Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Final Report

ALL APPENDICES

Report prepared by:

P. Tipping (Atkins) Team Leader
R. Antonelli (Atkins)
P. Boonekamp (ECN)
M. Donkelaar (ECN)
P. Kroon (ECN)
T. Longstaff (Atkins)
K. McLeod (Atkins)
G. Srinivasan (Atkins)
C. Tigchelaar (ECN)

ATKINS

ECN
Energy research Centre of the Netherlands

Contents

Appendices

Document Note

This document contains A3 pages necessary to display large tables. These pages should print automatically on printers with an A3 paper feed.

Document Control

Job Number: **5044526**			***Document reference:*** **EEAP_IA_5044526_021 Final Report**		
5	Final version incl. overlap & screening options info.	P. Tipping	ECN	PJTipping	13/07/2006
4	Supporting sheets added	P. Tipping	ECN	PJTipping	10/07/2006
3	Revised issue – typos corrected	P. Tipping	ECN	PJTipping	08/07/2006
2	Issue	P. Tipping	ECN	PJTipping	07/07/2006
1	Draft for comment to ECN	P. Tipping	K. McLeod	PJTipping	06/07/2006
Issue	**Purpose/Description**	**Originated**	**Reviewed**	**Authorised**	**Date**

Executive Summary

The Green Paper is clear that annual improvement in energy efficiency has declined from 1.4% per year in the 1990's to stabilise at around 0.5% per annum. This is despite the intensifying exposure of climate change and dependence on insecure energy supply. Improved energy efficiency constitutes part of the solution to both problems.

The Commission has stated that the question is 'not whether to take action on energy efficiency, but which actions are to be taken where and when'.

The impact of potential energy efficiency policy options were assessed in the categories of:

- Awareness
- Transformation
- Transport
- Financing Mechanisms
- Using the Full Potential of Existing Legislation.

Following an iterative process with the Commission, this Impact Assessment selected fifty-four policy options or "actions" for a screening assessment; i.e. whether the action has an impact, where and the extent of the saving in Million tonnes of oil equivalent (Mtoe).

Using a multi-criteria analysis (MCA) method, each action was scored against twenty-four criteria, with values given from +3 for a high positive impact, through 0 for definitive no, or no evidence for an effect, to -3 for a high negative. This assessment is presented in the report appendix. The MCA scores, without giving weights to different criteria, were used to select eighteen policy options for investigation in more detail.

The following table presents the results of the impact assessment of the eighteen options selected. Primary energy saving potentials are given as margins or as point-estimates; in the latter case these estimates are valid only for full implementation of the policy options at EU and national scale in year 2020. The aggregate energy saving potential is discounted for policy options overlap and an estimate given for energy savings achieved by year 2012.

In addition to the energy saving estimate, the options were scored in the MCA on two levels as follows:

- Major impacts - criteria (comprising security of supply, cost effectiveness, time for effect, administrative costs and climate change mitigation).

- All impact criteria used in the assessment including the Major impact criteria above.

The findings are presented in no order of priority.

Summary of Impact Assessment Findings for the Selected Policy Options

Option Reference	Option Description	Potential Energy Savings (Mtoe)	MCA Criteria Score (Major Criteria)	MCA Criteria Score (All Criteria)
1	EU to develop scheme recognising retailers providing information on energy efficiency by allowing public recognition through logo or certification scheme.	**6**	**5**	**20**
2	EU to encourage Member States to include energy efficiency training and information in national education curriculum for primary and secondary schools as part of sustainability awareness.	**10**	**9**	**21**
3	EU to include running costs in Energy Efficiency Product Listing / labelling or equivalent consumer information	**18**	**8**	**28**
4	EU/MS to extend EPBD to include smaller buildings (<1000m2), inspection requirements to smaller installations and higher minimum standards for public buildings	**80**	**5**	**18**
5	EU to adapt appliance label regulation as to regular updating of the label system, in order to stimulate the marketing of ever more efficient appliances, and extend the system to other devices.	**2**	**4**	**14**
4a	EU/MS to extend the concept of white certificate schemes, after evaluation of present national schemes, to all EU-countries and implement obligations on energy suppliers to provide energy efficiency	**60**	**3**	**19**
6	EU/MS to set up regulation and/or incentives to increase the average conversion efficiency per fuel type, by installing new plants with best available technology (BAT)	**20**	**5**	**15**
7	EU/MS to promote/require regulatory change towards facilitation of penetration of "off-grid" power generation – many obstacles to be removed through different measures	**16**	**7**	**31**
8	EU/MS to promote/require regulatory change towards facilitation of penetration of "grid-connected" CHP, via different measures	**14**	**8**	**33**
9	EU to introduce new CEN STANDARD to regulate district heating systems	**2**	**6**	**28**
10	EU to incentivise the use of intermediaries for small energy efficiency loans etc, for example by extending access to ECB or (through Energy Services Directive obligation) MS capital as a revolving fund for "soft loans"	**13**	**8**	**27**

Option Reference	Option Description	Potential Energy Savings (Mtoe)	MCA Criteria Score (Major Criteria)	MCA Criteria Score (All Criteria)
11	EU/MS to increase policy support for ESCOs through (1) dissemination of their activities, (2) the development of EU wide quality standards for ESCO projects, (3) standardised project monitoring and verification schemes, (4) model contracts and (5) improve access to (private) financial sources (e.g. cooperation with private banks). These measures could be combined with providing low-interest loans to ESCO projects.	**<6**	**4**	**13**
12	EU to incentivise production of energy efficient products through favourable taxation rate in Member States.	**15**	**4**	**12**
13	EU/MS to make driving costs more km depending. For instance the car or road tax can be made variable. Finally area and congestion charges used for traffic management also have a km reduction effect.	**3 to 15**	**8**	**13**
13a	EU to: 1) Set maximum CO2 emission standards for different type of cars (absolute, related to specific performance properties, or related to the mean value of all cars sold by one company). 2) Make more stringent agreement with car and truck producers after 2008-2009.	**28**	**4**	**12**
13b	EU/MS to restrict unnecessary power of car engines by technical devices like maximum speed limiters and/or limitation of maximum acceleration. Or limit the maximum power related to the vehicle weight (or maximum load) for new cars and trucks.	**11**	**2**	**5**
13c	EU/MS to decrease fuel use by making fuel more expensive. By making the differences between countries less, the incentive of buying cheap fuel across the boarder will decrease. Secondly a lower car tax can be introduced when an efficient car is bought or a financial penalty, which make the buying of a less efficient (second hand) car much more expensive. Thirdly a bigger difference in road tax related to the fuel consumption of a car can be introduced. Even a km charge can be fuel economy dependent.	**22**	**10**	**17**
14	An EU broad policy for labelling fuel efficient tyres, tyre pressure indicators (dashboard tyre pressure sensors mandatory on cars and freight vehicles, valve pressure indicators compulsory on existing vehicles tyres from 2010) and free facilities at service stations.	**15**	**6**	**11**
Aggregate primary energy savings potential for fully implemented policy options in year 2020 – single actions		**341 to 353**		

Taken altogether the eighteen policy options identify up to 353 Mtoe of potential primary energy savings over and above the current 'business as usual' (BAU) projection without taking into account antagonistic or synergetic interactions (overlap) between the different policy options.

Taking into account the separate policy options overlap the gross estimated aggregate energy savings potential estimate reduces by 26% to 262 Mtoe in year 2020.

This is approximately a 14% potential energy saving on the year 2020 projected primary energy consumption of 1885 Mtoe.

The assessment took into account the likely time for effect after implementation by recognising an interim position at year 2012. The projected gross energy saving potential in year 2012 is estimated as 117 Mtoe with the net energy saving potential being 87 Mtoe after adjustment for policy overlap.

Using a carbon dioxide emission factor of 2.1 Mton CO2/Mtoe (derived from PRIMES energy balances), the projected carbon emission savings from the eighteen policy option net energy savings are 183 and 550 Mton CO2 in years 2012 and 2020 respectively.

The MCA assessment scores for five major criteria and also the 24 original criteria are presented for the selected 18 policy options without further conclusions. Supporting evidence for the scores is provided in the appendix.

Consultations were carried out with a selection of authoritative organisations within the European Union; the results of these consultations were used in the impact assessment where referenced and the complete meeting notes are included in the Appendix to this report.

The 20% energy savings claim versus the "No Policy Change Scenario" was considered in a discussion paper (see Appendix). The No-Action Scenario foresees increasing energy prices (PRIMES-BAU assumes decreasing oil prices for 2005-2020, but increasing gas prices) and increasing effectiveness of the existing legislative and programme regimes.

1. Procedural Issues and Consultation of Interested Parties

Introduction

The Commission intends to produce an EU Action Plan on Energy Efficiency, outlining actions to be taken at EU and/or national level from 2007-2013.

Atkins Ltd and ECN acting within the framework contract lead by ECORYS BV were selected to develop and apply an impact assessment methodology underpinning the Energy Efficiency Action Plan. The following describes the broader aspects of the assessment relating to the Terms of Reference[1].

The services provided are intended to support the Directorate General for Energy and Transport (DG TREN) in assessing the impacts on the economy, environment and society of some of the policy options and actions potentially included in the Action Plan.

From initial consultation the Commission had identified three main issues which will address the current barriers to increasing energy efficiency:-

- Raising awareness
- Better financing mechanisms for energy efficiency
- Better implementation of Community legislation to improve impact

In addition the Commission asked for the end use sectors transport and energy transformation to be covered in the assessment.

A multi criteria analysis has been carried out, which acknowledges that different actions have different impacts on different sectors, and even within sectors. The impacts on the economy, on society and on the environment are assessed and quantified to the extent possible. Because of the limited assessment time, the impact assessment relies on existing published analysis and results from models runs (where available).

The assessment team liaised closely with DG TREN throughout the project commencing with an interactive workshop, followed by several progress meetings.

The assessment commenced on 2 May 2006 and finished on 11 July 2006.

In the first period of the assessment the consultant focus was defining potential policy options and a set of relevant criteria through an iterative process with DGTREN together with elaborating the Multi Criteria Analysis (MCA) matrix structure. In the second phase a screening assessment was carried out on fifty-four policy options, followed by a more definitive study of the eighteen options selected by the Commission including a weighting of major criteria. In addition consultations were held with authoritative organisation in the UK, Netherlands and with those representing groups on an EU wide basis.

[1] Action Plan on Energy Efficiency (CLWP:2006/TREN/032) – Impact assessment DG TREN Task Specifications for the Assignment

2. Problem Definition

The European Commission aims to promote energy efficiency. This is in line with broader Community objectives to:

- Improve Europe's competitiveness
- Improve Europe's security of supply
- Mitigate climate change (primarily by reducing carbon emissions)

The Commission intends to produce an EU Action Plan on Energy Efficiency, outlining actions to be taken at EU and/or national level from 2007-2013.

Public consultation on the Commission's Green Paper on Energy Efficiency (published June 2005) ended on 31st March 2006. The Green Paper proposed that up to 20% of Europe's energy use can be saved in a cost-effective manner by 2020. In addition the Green Paper on Energy 'A European Strategy for Sustainable, Competitive and Secure Energy' underlines the key role that energy efficiency must play in meeting EU objectives.

The Commission seeks to develop actions to harness this potential saving in the most cost-effective way – outlining which actions to take, in which area and at the best time. These actions must be realistic and provide useful guidance to Member States drawing up their own national Action Plans for Energy Efficiency.

The Green Paper on Energy Efficiency seeks a 20% reduction on the projected primary energy consumption of 1885 Mtoe by 2020 (NTUA-scenarios 2005-2030; published spring 2006).

Clearly increasing energy prices will be a significant incentive for consumers to conserve energy, thus contributing also to achieving the 20% reduction.

However, the rate of energy efficiency savings has decreased recently underpinning the EU's drive to put energy and how to save it, at the top of the agenda. Achieving the right policy framework is a pre-requisite to this. In creating measures for realising energy savings, policy-makers have to identify the conditions for implementation that have to be met, potential interactions with other policy measures and whether there are optimal combinations, the complementary role of EU-policy as to national policy in Member States.

However, much of this analysis is beyond the limited scope of this assessment which is restricted to a broad screening approach.

Overview

It is generally accepted that energy efficiency offers the "easiest hit" and most cost effective means of reducing emissions. Regrettably, this option receives the least attention in comparison with the other options, such as renewable energy production and clean fossil fuels (arguably because it is less glamorous). There is a fine balance that needs to be drawn between persuasion and coercion; (i.e. "carrot or stick" approach). In the UK it is recognised that more "stick" may be needed; i.e. as has been successfully applied in the Scandinavian countries.

Policy measures create the stimulus for the public to seek information, and information creates public support for policy measures. The Irish government attempts at reducing plastic bag use deliberately included both 'hard' and 'soft' measures – a punitive tax of 0.15 Euros on a bag, accompanied by an influencing campaign which explains the reasons for the charge. Results have been startlingly successful, with strong support for the tax and a 90% reduction in consumption of plastic bags. By comparison, in Australia, concerted efforts at influencing and providing information about the environmental impacts of plastic bags have not been successful in changing behaviour, with the result that an Irish-style levy is now being considered[2].

A high level analysis of the current situation illustrates where the right policy action may be successful in contributing to the 20% saving.

Awareness

The EU and the Member States are currently benefiting from some two decades of energy efficiency awareness actions originally initiated by the oil crises of 1970s.

The EU has provided policy actions, (e.g. directives on labelling and building certificates) and supporting programmes (i.e. Intelligent Energy for Europe) to inform and recognise energy saving measures. Energy labels are an obvious success, but other supporting resources have evolved separately over time and tend to be available only to those who know where to look e.g. Energy Star, Green Light. Historically much of the energy awareness effort has been channelled through national energy agencies, NGOs or equivalent organisations.

Awareness raising is essential to underpin all actions. Awareness of issues promotes greener behaviour, but information alone tends to motivate only those who are already motivated.

People are most responsive to issues which directly affect them, financially or otherwise in their local environment. Global environmental issues represent a collective good and well known barriers to action are the 'I can't make a difference on my own' attitude combined with 'why should I act when no one else is?'. Eurobarometer results show that Europeans "favour an active attitude but, at the same time, want their action to be part of a wider solidarity2[3]".

[2] Carrots, sticks and sermons: influencing public behaviour for environmental goals, Demos/Green Alliance report produced for Defra, UK

[3] Eurobarometer (2002) The attitude of Europeans towards the environment

Influencing consumers via awareness raising will not stimulate the wider audience unless used in conjunction with other government policies and legislation. For this reason it is difficult to quantify the direct impacts of future awareness campaigns, and convincing arguments can be made that in their own right they have limited value (e.g. promoting the benefits of recycling will have no effect without the provision of local recycling facilities).

In many of the Member States citizens in the workplace, travelling and at home are aware of the means of saving energy, but they don't understand why it applies to them, or if they do understand why, are not motivated enough to take action. Providing sufficient information to promote and then support efficiency actions is necessary, but in itself cannot be relied on to initiate action in those other than enthusiasts.

Historically energy efficiency programmes are characterised by identifying practical, often low-cost or no-cost measures saving energy and money, only to find that the implementation rate has been disappointingly low. However, when provided with energy efficient technology (e.g. energy efficient homes) consumers can use energy responsibly; for example a UK householder survey found that most respondents (86%) from energy efficient homes achieved the desired results from operating their heating systems either in a way that corresponds to policy expectations, or in a beneficial way that suited them and their lifestyle[4].

We must not lose sight of the many successes of energy efficiency programmes which usually including promotional elements and that demand-side energy efficiency programmes have been shown to be significantly cheaper than purchasing the equivalent energy. The question is how to make these existing programmes more effective in themselves to build on the increasing climate change media exposure.

Transformation

According to the Green Paper transformation losses are the single largest component of the estimated gross energy consumption in 2005 (25%). Combined heat and power (CHP) provides significant benefits in terms of energy efficiency because heat that would otherwise be wasted from power generation into the atmosphere can be used either in processes or for space heating or cooling. Other associated benefits include reduced grid losses from local generation. CHP power generation has been encouraged recently by an EU directive; around 13% of power generation is through combined technology (Green Paper).

CHP schemes are advantageous because their high efficiency reduces primary energy consumption, but to be successful they must be in close proximity to their heat or cooling load either in an industrial process or urban environment. This tends to favour many smaller CHP installations rather than large centralised installations. Supplying surplus electricity to the grid is often a key element of CHP schemes requiring the grid operator's cooperation in making grid connections which may not be in a major generator's interests.

[4] Pett J., and Guertler P., 2004 User behaviour in energy efficient homes Phase 2 report by the Association for the Conservation of Energy acknowledge published by the Energy Saving Trust IGP reference number: G01-14284

Replacing inefficient old, mainly coal fired generation remains a major challenge as security of supply issues concerning gas is prejudicing selection of high efficiency conversion technologies such as Combined Cycle Gas Turbine technology. New high efficiency coal fired generation technologies are yet to achieve market acceptability.

Using CHP fuelled by other sources such as biomass or waste is an attractive option although there may be additional environmental penalties associated with transport of fuels with lower calorific value.

Transport

The Green Paper identified 20% of the estimated gross energy consumption in 2005 as being transport, of which around half of this is private vehicles.

Positively influencing consumer choice towards more efficient vehicles, modes of transport or behaviour in transport has proved to be difficult versus the other competing messages from retailers, unwelcome lifestyle compromises, political concerns and similar.

UK studies have shown that the British public is aware of the health and environmental effects of traffic exhaust fumes. In a Public Attitudes survey (1993), 77 percent of respondents agreed with the statement that "the amount of traffic on the roads is one of the most serious problems for Britain," and a similar percentage believed it fairly likely that "within the next ten years . . . there will be a large increase in ill-health in Britain's cities as a result of air pollution caused by cars." The 1996 Annual Lex Report on Motoring found that 71 percent of drivers (and 75 percent of non-drivers) considered air pollution a major environmental concern, and that 39 percent of drivers (49 percent non-drivers) agreed that global warming from car fumes and car production was a major problem. More recently, the 1998 Lex survey reported that 68 percent of drivers continued to consider air pollution a "major problem" in Britain today, and 34 percent regard air pollution as an issue that has "now reached a crisis point where something must be done [to remedy the situation] immediately"[5].

This supports the case that awareness campaigns to date have been successful in raising general awareness of environmental issues. However, research shows that despite this level of awareness consumers still purchase cars based largely on non environmental factors like colour preference[6].

Clearly the EU must seek to rebalance the need to travel and the need to improve quality of life. Initiatives that can reduce congestion, improve local environments and encourage healthier and safer lifestyles are as important to many as the need to save energy. Access to transport and mobility are emotive issues for many and public resistance to financial incentives, like fuel tax and congestion charges, are strong - and are effective only as long as the measure is in place.

[5] 'Public understanding of the environmental impact of road transport' report available at www.ecolane.co.uk

[6] Choosing Cleaner Cars - Final report on Vehicle Rating Scheme, Transport Research Institute, Napier University and Environmental Change Institute, UK

The best savings in the transport sector vary enormously by region, industry, country as they are dependent on the end user's access to public transport, mobility needs, financial situation etc. Key aspects are determining where savings are and publicising to inform consumer choice.

There is a plethora of potential policy actions; for example mandatory performance standards in vehicles (tyres, engine fuel efficiency) are an obvious measure which affects all users EU wide, awareness building on existing vehicle labelling, behaviour change through speed limitations, policies for encouraging working at home, car sharing, changes to different (public) transport modes.

Financing Mechanisms

The Green Paper states that the EU could promote tax measures that either encourage or discourage certain forms of behaviour probably as a part of tax harmonisation. The message is that the 'polluter should pay'. Careful consideration is required to prevent taxation changes affecting those in fuel poverty or market forces within the Union.

Other measures that have a high profile at this time are the inclusion of energy efficiency in Cohesion funds, increasing Energy Supply Company (ESCO) capacity to deliver energy services rather than units of energy is another debating area at this time.

Little has been done to provide tax incentives to those potentially supplying the domestic consumer product market.

Using full potential of existing legislation

The EU has enacted many Directives concerning the energy market, energy transformation, transport, minimum performance specifications and similar. Perceived problems are that the legislation is not implemented as intended by Member States (or in some cases at all) or with much delay. In some cases undesired effects have happened contrary to the desired out-turn and policy gaps covered by other means need stiffening by legislation.

Within the EU the current regulatory position is the product of existing polices, implemented legislation, yet to be implemented legislation, support programmes and other measures. Not adding to the existing reasons for action comprises the 'No Action scenario' which is the baseline comparison for this assessment.

3. Objectives

Our methodology seeks to ensure a transparent visualisation of the key elements of the assessment and to ensure that all aspects of the evaluation are considered.

The objective 'tree' (Figure 3.1) describes the overall assessment structure, which seeks to elaborate the multi-criteria analysis options using a top-down approach.

The Mission Statement describes and defines the overall aspects of the assessment and the Assessment Objective describes elements common to all policy actions considered. The Objective Tree illustrates the categories of policy actions to be considered with the assessment criteria beneath (common to all actions).

Mission Statement

The following 'mission statement' sets the global objective and definitions for the assessment as:

To provide the Commission[1] with a substantiated[2] impact assessment[3] as part of a new Energy Efficiency[4] Action Plan[5] as described by the Green Paper on Energy Efficiency[6] concerning the current 25 Member States.

Statement Definitions:

1 Commission comprising DG Transport & Energy (DG TREN) procuring this assessment.

2 Substantiated comprising referenced traceable evidence or comment.

3 Impact Assessment according to the IA guidelines (ref SEC(2005) 791); the assessment is to include scoring on a level playing field without weighting individual criteria with respect to one another.

4 Energy Efficiency means reducing energy consumption without reducing the use of energy-consuming plant and equipment. The aim is to make better use of energy. Energy efficiency means promoting behaviour, working methods and manufacturing techniques which are less energy intensive[7].

5 Action Plan to at EU-level, to be formulated in 2006, as a result of the Green Paper consultation.

6 Green Paper 'Doing More with Less' (COM/2005 265 of June 2005)

[7] Energy efficiency : Action Plan (COM (2000) 247)

Assessment Objective

The following statement sets this impact assessment objective and definitions as:

The impact assessment[3] shall compare agreed[7] existing[8] or potential[9] energy efficiency[4] policy options[10] within vertical pillars of Awareness[11], Financing Mechanisms[12] and Legislation on Implementation[13,] together with actions within the horizontal platforms of transport[14] and energy transformation[15], in respect of the agreed impact assessment criteria[16].

Statement Definitions

7	Agreed means as selected by the Commission in the assessment process.
8	Existing means legislation in force on 1/06/2006.
9	Potential means actions that the Commission may consider in respect of energy efficiency.
10	Policy options means actions or measures that the EU may take to be effective at Community, national or regional level to achieve the stated energy efficiency objective within the framework of achieving a 20% energy saving through the Action Plan.
11	Awareness means ensuring existing and future energy consumers are conscious of information and support available on why to conserve energy, how to conserve energy, where to find the supporting information or data to make discerning decisions effecting energy consumption, and how to make access easy to all.
12	Financing Mechanisms means actions that the EU may take concerning taxation (polluter pays), incentives, loans and similar actions.
13	Legislation on Implementation means action at Community level to reinforce or amend existing legal instruments, or introduce new instruments.
14	Transport means land, water, (not maritime) and air; includes vehicles, rail, aviation and inland waterways for the purposes of moving persons or freight within the Community.
15	Transformation means supply of heat or power to consumers derived from primary energy fossil fuels. Includes grid distribution of non-fossil fuel sourced power.
16	Agreed Impact Assessment Criteria means those criteria sourced from the IA guidelines (SEC(2005) 791) agreed to be relevant and pertinent to this assessment.

The options under consideration by this impact assessment have been developed in parallel to the Action Plan itself, and may or may not be included in this by the Commission following further development.

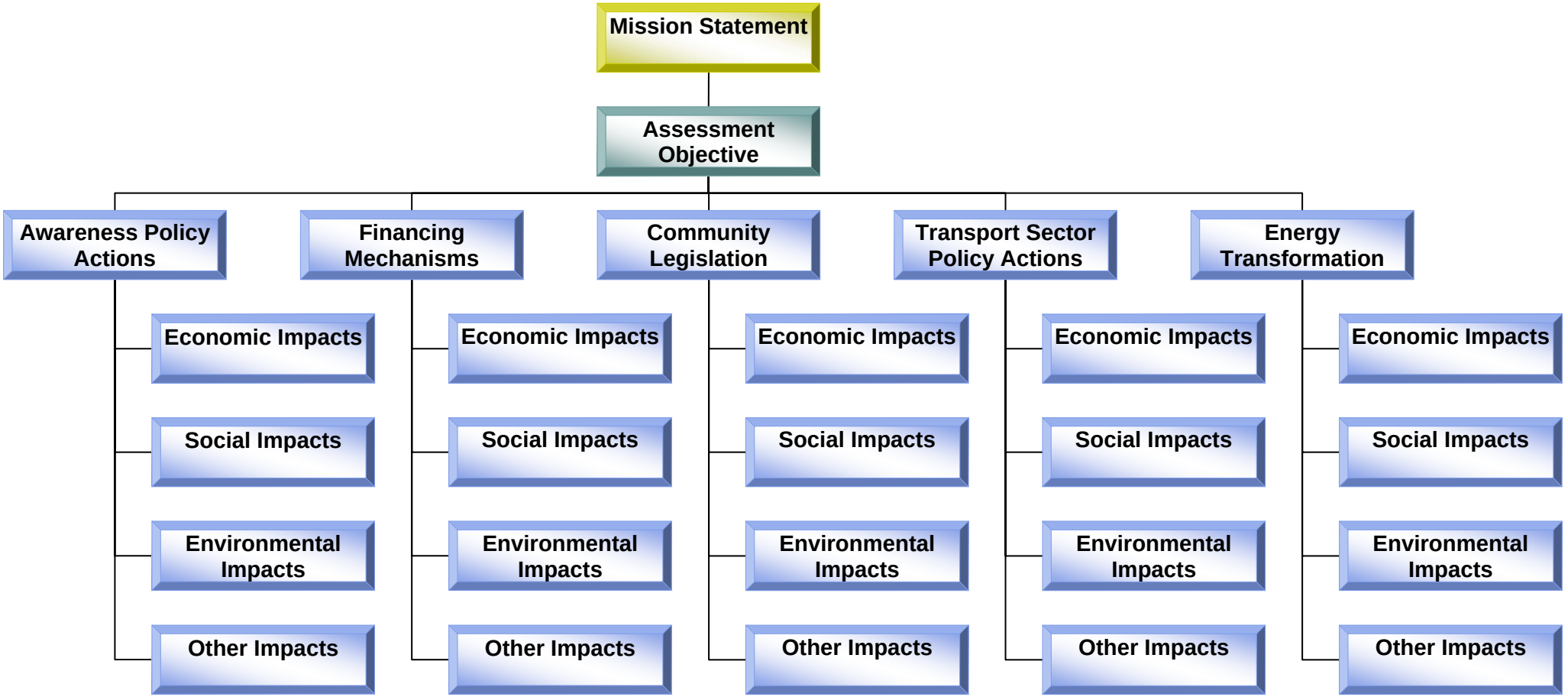
Table 3.3 summaries the general objectives for all the different policy options.

Table 3.3 Objective Elaboration

Policy Action Category	General Objective
Awareness	To provide underpinning awareness resources at Community level to enable energy consumers in Member States to want to, and be able to make purchase and behavioural change measures taking into account energy efficiency.
Using full potential of existing legislation	To provide enhanced implementation of existing EU legislation together with identifying gaps where further legislation would provide significant benefit.
Transformation	To encourage more implementation of CHP and other high efficiency transformation technologies with the liberalised energy market.
Financing Mechanisms	To provide appropriate financial instruments and mechanisms to underpin the more effective use of energy efficient solutions.
Transport	To promote the uptake of more efficient vehicles or modes of transport through influencing consumer behaviour.

Specific and operational objectives vary from action to action.

Figure 3.1 Impact Assessment Objective Tree



4. Policy Options/Actions

Based on positions in the Green Paper and comments from numerous parties, a potential policy options list was developed in parallel to the Action Plan elaboration. Following a selection exercise with DG TREN fifty four policy options or actions were agreed for the initial screening assessment. Eighteen of the most promising actions were analysed further. Table 4.1 shows the number of policy actions considered in each category together with the option labelling prefix used in the initial screening. The eighteen selected options were renumbered sequentially for the final assessment.

Table 4.1 – Categories Overview

Policy Action Category	Number of Actions Considered in Assessment		Option Prefix (initial screen)
	Screening Assessment	Detailed Assessment	
Awareness	9	3	A
Building on legislation	14	4	L
Transformation	7	3	G
Financing Mechanisms	12	3	F
Transport	12	5	T
No Policy Change	1	-	-

Table 4.2 provides the final list of eighteen policy actions for impact assessment together with a summary of the current situation and the approach taken for the action.

The "No Policy Change Scenario" is discussed in the 20% savings paper (see Appendix 4). The No-Action scenario foresees overall stable energy prices (gas up, oil down and coal small increase) and increasing effectiveness of the existing legislative and programme regimes.

The Green Paper predicts that overall, if no actions are taken, primary energy consumption would rise to 1885 millions of tonnes of oil equivalent (Mtoe) in 2020 within the EU-25.

In many cases the options are related by a common need for legislation, awareness and maybe financing mechanisms.

Table 4.2 Policy Option Descriptions and Objectives

Assessment Reference	Policy Action	General Objective	Assessment Category
1	EU to develop scheme recognising retailers providing information on energy efficiency by allowing public recognition through logo or certification scheme.	Ensure that informed advice is available to purchasers at the point of sale (either retail outlet or on-line sales) from sales staff. EU to ensure availability of information packs for sales persons and on-line suppliers describing labelling scheme and key aspects of energy efficiency characteristics	Awareness
2	EU to encourage Member States to include energy efficiency training and information in national education curriculum for primary and secondary schools as part of sustainability awareness.	Educate future generations on sustainable living particularly energy conservation	Awareness
3	EU to include running costs in Energy Efficiency Product Listing / labelling or equivalent consumer information	Increase visibility of operational costs of energy consuming devices to aid consumer choice	Awareness
4	EU/MS to extend EPBD to include smaller buildings (<1000m2), inspection requirements to smaller installations and higher minimum standards for public buildings	Increase the energy savings effect of EPBD-directive	Legislation
5	EU to adapt appliance label regulation as to regular updating of the label system, in order to stimulate the marketing of ever more efficient appliances, and extend the system to other devices.	Continuously decrease energy consumption of new appliances	Legislation
4a	EU/MS to extend the concept of white certificate schemes, after evaluation of present national schemes, to all EU-countries and implement obligations on energy suppliers to provide energy efficiency	Increase energy savings by creating a market for energy efficiency measures and energy services	Legislation
6	EU/MS to set up regulation and/or incentives to increase the average conversion efficiency per fuel type, by installing new plants with best available technology (BAT)	Decrease energy consumption of central electricity production with given fuel mix	Legislation
7	EU/MS to promote/require regulatory change towards facilitation of penetration of "off-grid" power generation – many obstacles to be removed through different measures	Wider implementation of micro-scale CHP	Transformation
8	EU/MS to promote/require regulatory change towards facilitation of penetration of "grid-connected" CHP, via different measures	Wider implementation of CHP installation at industrial level	Transformation
9	EU to introduce new CEN STANDARD to regulate district heating systems	Reduction of energy losses and GHG emissions	Transformation

Assessment Reference	Policy Action	General Objective	Assessment Category
10	EU to incentivise the use of intermediaries for small energy efficiency loans etc, for example by extending access to ECB or (through Energy Services Directive obligation) MS capital as a revolving fund for "soft loans"	Make energy efficiency funds more available in small amounts through intermediaries	Financing
11	EU/MS to increase policy support for ESCOs through (1) dissemination of their activities, (2) the development of EU wide quality standards for ESCO projects, (3) standardised project monitoring and verification schemes, (4) model contracts and (5) improve access to (private) financial sources (e.g. cooperation with private banks). These measures could be combined with providing low-interest loans to ESCO projects.	Increase the utilisation of shared savings financing to increase investments in energy efficiency Making investments in EE projects more attractive through lower interest rates	Financing
12	EU to incentivise production of energy efficient products through favourable taxation rate in Member States.	Provide complete range of efficiency incentives across full supply chain	Financing
13	EU/MS to make driving costs more km depending. For instance the car or road tax can be made variable. Finally area and congestion charges used for traffic management also have a km reduction effect.	Reduction of km driven	Transport
13a	EU to: 1) Set maximum CO2 emission standards for different type of cars (absolute, related to specific performance properties, or related to the mean value of all cars sold by one company). 2) Make more stringent agreement with car and truck producers after 2008-2009.	New cars having a lower CO2 emission per km	Transport
13b	EU/MS to restrict unnecessary power of car engines by technical devices like maximum speed limiters and/or limitation of maximum acceleration. Or limit the maximum power related to the vehicle weight (or maximum load) for new cars and trucks.	Reduction of non necessary car mass resulting in more efficient cars	Transport
13c	EU/MS to decrease fuel use by making fuel more expensive. By making the differences between countries less, the incentive of buying cheap fuel across the boarder will decrease. Secondly a lower car tax can be introduced when an efficient car is bought or a financial penalty, which make the buying of a less efficient (second hand) car much more expensive. Thirdly a bigger difference in road tax related to the fuel consumption of a car can be introduced. Even a km charge can be fuel economy dependent.	Decrease fuel use & Influence consumers with financial incentives to buy more efficient cars	Transport
14	An EU broad policy for labelling fuel efficient tyres, tyre pressure indicators (dashboard tyre pressure sensors mandatory on cars and freight vehicles, valve pressure indicators compulsory on existing vehicles tyres from 2010) and free facilities at service stations.	Reduction of fuel use by less rolling resistance	Transport

5. Analysis of Impacts

All policy options were assessed using two aspects;

- Estimated primary energy saving potential.
- Multi-criteria impact analysis

The Multi-Criteria Analytical Technique accorded with the SEC (2005)791 Impact assessment Guidelines.

Expected Energy Savings Estimation

For each action the energy savings to be realized are estimated in the following way.

Energy savings are expressed in Mtoe of primary energy consumption. For savings on electricity an average conversion efficiency of 40% (multiplication factor of 2.5) has been applied.

The energy savings due to the proposed actions are the extra savings with respect to the recent BAU-scenario (NTUA-scenarios 2005-2030, published spring 2006). This scenario, for the period 2005-2030, has been composed with the PRIMES-model on request of the EC.

The main inputs of the scenario are GDP growth of 2.0% per year and oil prices that decrease from 54 $Euro_{2000}$/bbl in 2005 to 48 $Euro_{2000}$/bbl in 2020, stable coal prices and 20% higher gas prices.

Total primary energy consumption increases from 1740 Mtoe to 1885 Mtoe in 2020 and total electricity consumption increases from about 3180 TWh in 2005 to 4000 TWh in 2020.

The estimation of energy savings per action start with the technical potential, i.e. the ultimate savings if all existing energy systems (or energetic behaviour) of energy users were replaced at once by a more energy efficient version (see full description in appendix). In reality it is not possible to fully realize this potential in 2020, due to physical and societal restrictions (see Figure 5.1). Stock-erosion regards disappearance of energy systems or energy use, e.g. demolition of buildings. The replacement rate, e.g. renovation of buildings every 30 years, defines how much of the technical potential is available in 2020.

The policy savings to be realized are dependent on a number of other factors. Cost-effectiveness can be defined as the pay-back time that is usually applied by users. However, it is also possible to apply a lifecycle cost approach where energy (cost) savings during the life time are compared with the initial investment in more efficient systems. Here a compromise between the two has been used to estimate the energy savings (and the rating of the cost-effectiveness of the action).

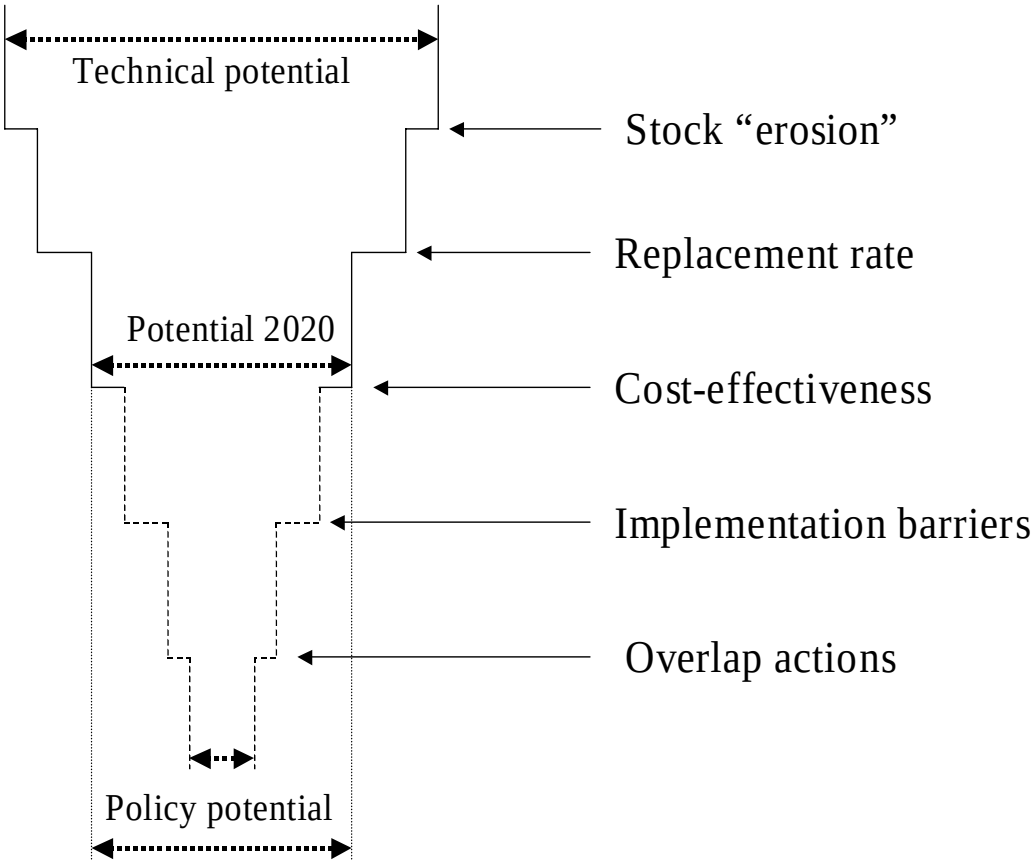


Figure 5.1: From technical savings potential to policy savings per action

Implementation barriers regard lack of knowledge on saving options, lack of incentive to choose the more efficient system, etc. Only in case of standards or other obligations full implementation can be assumed. Other restrictions regard the split-incentive issue for landlords and tenant, lack of space, lack of financing, etc. Due to these restrictions part of the saving potential will not be realized.

Overlap between various actions regards interaction between the saving effects of actions and overlap in the energy applications to be influenced by the actions. An example of the first mentioned issue is where electricity savings will save less primary fuels when the conversion efficiency of power plants increases. An example of the second issue is the (extension of the) Energy Performance of Buildings Directive (EPBD) on standards and certificates for buildings that will overlap with the effect of a white certificate scheme focusing on buildings too.

These "other factors" can be influenced by EU-policy or national policy measures. E.g. financial support can increase the cost-effectiveness for the energy users. Labels can overcome the information deficit for consumers wanting to buy efficient appliances. However, it is not clear at this moment how national savings policy will look like, as national action plans have still to be formulated.

Due to these uncertainties it is not possible to provide a point estimate of savings to be realised with each action. It is only possible to give a margin or a maximum that implicitly assumes full implementation of EU-policy measures in combination with all needed supporting policy measures of the Member States (M)S.

The derivation of the gross energy saving potential is given in the assessment supporting information for each option (see Appendix) either as narrative or a spreadsheet output.

By year 2012 implemented policy options will have different impacts. The MCA criterion 'short time for effect' took this into account for individual options. The analysis for each option was used to estimate the likely aggregate gross energy savings in year 2012 which was then discounted for overlap effects.

Multi-Criteria Analysis (MCA)

Multi-criteria analysis establishes preferences between options by reference to an explicit set of objectives identified by the decision making body. For each objective criteria are established to assess the extent to which the objectives have been achieved.

Our assessment may be **objective**, with respect to some commonly shared and understood scale of measurement, like weight or distance. Optionally, it can be **judgmental,** reflecting the subjective assessment of the analyst. A strength of MCA is the ability to accommodate and use simultaneously both forms of assessment of options.

Table 5.1 gives the twenty-four criteria agreed for this assessment; ten economic, two environmental, seven social and five assessment specific criteria defined as 'others'. The first five criteria in the table are those selected as major criteria for weighting purposes.

Table 5.1 Impact Assessment Criteria

Impact Criterion	Criterion Detail
Security of Supply	Does the action have an impact on the security of energy supply in the EU?; Does the action increase the divergence of energy sources to suppliers?; Does the action impact on the risk of supply disruption?; Does the action increase the diversity of generation technology options?
Cost Effectiveness	Is action cost effective for the target sector in economic terms?
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity?; Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?
Short time for effect	Does the action have a significant immediate or quick impact following implementation?

Impact Criterion	Criterion Detail
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals?; Does it provoke cross-border investment flows (including relocation of economic activity)?
Innovation and research	Does the option stimulate or hinder research and development?; Does it facilitate the introduction and dissemination of new production methods, technologies and products?; Does it promote greater resource efficiency?
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs?; Does it affect the demand for labour?
Market Barriers	Does the action impact on known market barriers to implementation?; Will the measure impose additional market barriers for selected sectors?
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment?; Does it contribute to improving the conditions for investment and for the proper functioning of markets?
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)?; Does it affect access to finance? Does it impact on the investment cycle?; Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited?; Will it directly lead to the closing down of businesses?
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?
Government budget	Does the action require substantial financial support at the cost of the government budget?
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach?; Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities?; Does the option make the public better informed about a particular issue? Does it affect the public's access to information?
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets; Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?
Specific Regions or Sectors	Does the option have significant effects on certain sectors?; Will it have a specific impact on certain regions, for instance in terms of jobs created or lost?; Does it have specific consequences for SMEs?

Impact Criterion	Criterion Detail
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?
Persistence	Does the action achieve a persistent affect?; Does the action irreversibly transform the market?
Monitoring & Verification	Can action be monitored and verified?
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?
Change in behaviour of end user	Does action promote change in end user behaviour?; Is action likely to significantly impact on end-user behaviour.

General guidelines followed by the analysts regarding scoring specific criteria were:

- Where an action has an already established pathway or programme track record, then this is a low positive effect.
- The absence of an impact is not scored as a positive; e.g. if all action costs are carried by public authorities, then this is not a benefit for SMEs.
- Business operational costs refer to the financial burden carried by product manufacturers or service suppliers.
- Administrative costs on businesses refer to end-users in the non-domestic sectors. Where administrative costs comprise the burden on a manufacturer or supplier then this is scored under business operational costs.

Note on determining scores on administrative costs
In the assessment administrative costs regard extra costs (not related to the actual implementation of the saving measure, e.g. investments) for energy users that are coupled to the realization of the savings potential of an action. These administrative costs do not regard the organizational costs of the parties that are committed to execute the action and can, in one way or the other, recover the expenses. E.g. when applying ESCO's, the burden of administrative costs for making plans, applying for subsidies and reporting on realized savings shifts from the end-user to the ESCO. These shifted costs are recovered by means of a levy on energy prices or government support, influencing the scores on other criteria such as "government budget" or "cost-effectiveness".

In the assessment it is only possible to give a qualitative rating of the administrative costs for the following reasons. This assessment regards the first phase of policy development where the specification of actions is too global to quantify administrative costs in Euros. For instance, administrative costs of a white certificate system with depend strongly on the choice of measures (insulation, appliances, cars) and the approach (tailor made/end-user or generic/appliance manufacturer). Moreover, these costs will differ per country due to the way an EU-action is combined with national policy measures and the synergy with existing or new implementation mechanisms and monitoring systems.

- Better public information, mentioned in both the social inclusion and governance criteria, is only relevant if it potentially leads to energy savings. If this should be the case, it is scored in the criterion "change in behaviour of end users".
- Where there is no reported information concerning an action, but logically there is a likely effect, then the analyst score as a low positive or negative instead of zero.
- In generic criteria, such as climate change, the magnitude of the impact is scored as proportional to the likely energy saving. However, a correction is made for differences as to fuel type (s) saved; e.g. in the case of coal for security of supply.
- If contradictory scores are identified within sub-elements of a criterion, then an on-balance score is given as described in the narrative.
- Where potential 'double-counts' occur, this is determined in the scoring narrative.
- Divergence of energy sources to suppliers' means the choice of different energy sources/technologies available to generate power or supply energy to end users.
- If scores are coupled to total savings: +1 for small (< 4 Mtoe), +2 for medium (4 to 20 Mtoe), +3 for large (>20 Mtoe)
- *Security of Supply* - Coupled to total savings, more for gas and oil, less for coal and electricity.
- *Competitiveness* - Dependent on energy-costs/total production costs ratio and world wide market, thus only relevant for the energy-intensive industry producing for world markets.
- *Innovation* - Only relevant for advanced technical saving options (mostly with a lower cost-effectiveness).
- *Cost-effectiveness* - For the energy-users (sometimes the investor). Normally the ratio between costs (mainly extra investments) and benefits (saved energy times price) should meet certain thresholds. For industry this could mean the same (very short) pay-back period as used for productive investments. It could be based as well on minimum lifecycle costs, leading to a pay-back time (almost) equal to the technical lifetime of the device. Here a compromise is applied, e.g. for companies 5-7 years as valid in license procedures. The resulting "economic" potential depends on energy prices and autonomous cost decreases as well. By definition not negative.
- *Employment* - Indirect effect coupled to total savings, direct effect dependent on skills demanded: high (scarce) or low (many unemployed but probably not fit)
- *Market barriers* - Lack of knowledge, capital or incentives to implement saving option, split incentives, etc.
- *Macro-economic* - +1 for large total savings (sometimes for medium savings)
- *Government budget* - Not for normal policy formulation, only for substantial organisational efforts or financial support in order of >0.1% of total budget.
- *Air-quality* - Mainly acidifying emissions, coupled to total savings, but larger for savings in transport, smaller for savings in buildings or on electricity
- *Climate* - Generally only CO_2, coupled to total savings, larger for coal, smaller for electricity
- *Short time effect* - Effect until 2012: 0% of ultimate effect = -3;<5% of ultimate effect = -2;<10% of ultimate effect = -1; 33% of ultimate effect = 0; 50% of ultimate effect = +1; 75% of ultimate effect = +2: 100% of ultimate effect = +3.
- *Tangible added value* – Other effects not covered by impact assessment criteria.

The aggregated MCA output should guide the Commission beyond the stage of 'any energy efficiency action should by definition reduce primary energy consumption'; i.e.

- What should be the objectives potentially pursued by the Union?
- What are the main policy options for achieving these objectives?
- What are the likely economic, social and environmental impacts of these options?
- What are the relative advantages and disadvantages of these options?

A standard feature of multi-criteria analysis is the *performance matrix*, or consequence table, in which each row describes an option and each column describes the performance of the options against each criterion. Summary information is presented in this matrix format in the Appendix.

All options were assessed in terms of a literature search and evidence from authoritative organisation consultations. All criteria were scored using the following protocol according to the scoring narrative developed by the analyst.

Scoring Protocol

Within the Terms of Reference for this assessment there was not sufficient time or resources for a detailed impact assessment supported by scenario modelling, widespread consultation and other analytical tools.

Therefore a simple seven point scoring scheme was adopted for this assessment as shown by Table 5.1. The low definition of this scoring protocol reflects the 'broad-brush' approach of the assessment and readers should not assume that a score of +3 is three times more beneficial than a score of +1.

The analyst elaborates an overall score for each criterion in the scoring narrative taking account of the criterion detail which may comprise several sub-aspects.

Table 5.1 – Assessment Criteria Scoring Scheme

Score	Impact or Affect Magnitude	Comments
+3	High positive	
+2	Medium positive	
+1	Low positive	
0	None	No direct link between action and effect; or no evidence found
-1	Low negative	
-2	Medium negative	
-3	High negative	

All options were assessed against all the agreed criteria. A criterion was scored as 0 where there was no known relationship between the action and the criterion, or no effect was expected.

Generic Impacts

Generic impacts are difficult to assess as one can assume that all energy efficiency measures presented will conserve energy thereby reduce air pollution and climate change. Likewise for some social impacts, such as job creation where the supporting evidence is not disaggregated. Our approach is to define a link between conserved energy and those policy option impacts; the score is proportional to the estimated energy saving ranked within the context of this assessment. However in some cases, account has to be taken of other factors, such as the fuel mix of electricity production to score electricity savings for the criterion security of supply. Further detail is provided in Section 6.

Each option assessment is supported by a reference sheet comprising the detail of the policy action, the estimated energy savings and then the criterion assessment for each action and the scoring narrative leading to a score. Supporting references are given on these sheets.

All assessment supporting information sheets for the eighteen selected options and the remaining thirty-six options screened are provided separately in the Appendices 1 and 6 respectively.

Consultations

A key aspect of Impact Assessments is to interview authoritative organisation within the assessment boundary to elucidate other expert opinion and supporting evidence.

Within this impact assessment the following consultations were made:

Organisation	Country	Area of Influence	Consultation Date	Comments
The Carbon Trust	UK	Promoting energy efficiency in the business and organisations arena as part of a wider portfolio	30/06/06	Meeting minutes agreed
Energy Saving Trust	UK	Promoting energy efficiency in the domestic and Local Authority arena	13/06/06	Meeting minutes agreed
Inland Revenue	UK	UK Taxation authority	-	No response to invitation
ESTA (Energy Systems Trade Association)	UK	Energy equipment suppliers federation in UK	09/06/06	Meeting minutes agreed
Ofgem	UK	Energy supply regulator	13/06/06	Meeting minutes agreed
EURELECTRIC	EU	Electricity generators Federation across the EU	220/6/06	Meeting minutes agreed
COGEN EUROPE	EU	Cogeneration Organisation across the EU	22/06/06	Meeting minutes agreed
ECOFYS	NL	Research Institute	27/06/06	Meeting minutes agreed
European Tyre & Rubber Manufactures Association (ETRMA)	EU	Tyre Manufacturer Association	29/06/06	Meeting minutes agreed
NOVEM	NL	National Energy Institution	26/06/06	Meeting minutes agreed
European Automobile Manufacturers Association (ACEA)	EU	Car Manufacturer Association	29/06/06	Meeting minutes agreed
ECEEE	EU	Represents NGOs and experts promoting energy efficiency.	21/06/06	Meeting minutes agreed
CEETB	EU	Represents the construction industry	22/06/06	Meeting minutes agreed

Organisation contact details are given in the record of each consultation (Appendix 5).

6. Comparing the Options

Generic Energy Savings Comparison
As discussed the following generic assessment criteria can only be scored on a relative basis within this assessment (from +3 for the highest to +1 with no clear relationship).

Climate Change
Primary energy savings from any source will reduce greenhouse gases (principally carbon dioxide) to an extent depending on the fuel type and on the fuel mix for electricity production.

This assessment assumes that any energy efficiency measure will have a positive effect on emission reduction. The magnitude of improvement is expected to be proportional to the energy saved and the type of energy carrier.

Air Pollution
Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides and similar from fossil fuel combustion. The extent of the pollution reduction will be related to the energy application, pollution abatement and type of energy carrier.

Job Creation:
A wealth of references, including the Green Paper report the positive job creation effects of energy efficiency programmes particularly in Europe and the United States. An early American publication[8] summarised the situation as "The positive employment and income results are due primarily to the relatively low labour intensity of the energy sectors (coal, oil and gas extraction, fuel refining and electric and gas utilities) compared to the economy as a whole. Conserving energy reduces the energy bills paid by consumers and businesses, thereby enabling greater purchase of non-energy goods, equipment, and services. The result is a shift of economic activity away from energy supply industries and towards sectors of the economy which employ more workers per dollar received. Regarding the different effects, less than 10% of the net jobs created are associated with direct investment in efficiency measures while more than 90% are associated with energy bill savings and respending of those savings.

Most sectors of the economy gain jobs and generate additional income while a few sectors lose jobs and generate less income in response to widespread energy efficiency improvements. Our analysis shows the largest absolute increase in jobs is in the construction, retail trade and services industries. These sectors install energy efficiency measures and gain new business orders from the respending of energy bill savings."

The macro-labour effect is very dependent on the state of the economy. With full employment a new activity, like energy saving, competes with existing or other new activities. Then energy savings do not deliver extra labour demand. Presently full employment is not at all the case in most European countries. But due to an aging work force and higher growth rates (as the EU assumes in their policies and PRIMES-scenarios) this can be the case in the coming years.

[8] Geller H., DeCicco J., Laitner, S. 1992 Energy Efficiency and Job Creation ACEEE report ED922

This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation will be proportional to the energy saved, or the investment amount.

For details on the scoring elaboration see supporting evidence in the Appendix.

7. Energy Saving Potential

According to the methodology and constraints described previously, the estimated gross primary energy savings potential for each fully implemented policy option is given in Table 7.1 (in no order of priority). For detail on derivation of the individual policy option saving potentials see Appendix.

Table 7.1 Estimated Energy Savings Potential for each Option (Gross) Year 2020

Option Reference	Option Description	Potential Energy Savings (Mtoe)
1	EU to develop scheme recognising retailers providing information on energy efficiency by allowing public recognition through logo or certification scheme.	**6**
2	EU to encourage Member States to include energy efficiency training and information in national education curriculum for primary and secondary schools as part of sustainability awareness.	**10**
3	EU to include running costs in Energy Efficiency Product Listing / labelling or equivalent consumer information	**18**
4	EU/MS to extend EPBD to include smaller buildings (<1000m2), inspection requirements to smaller installations and higher minimum standards for public buildings	**80**
5	EU to adapt appliance label regulation as to regular updating of the label system, in order to stimulate the marketing of ever more efficient appliances, and extend the system to other devices.	**2**
4a	EU/MS to extend the concept of white certificate schemes, after evaluation of present national schemes, to all EU-countries and implement obligations on energy suppliers to provide energy efficiency	**60**
6	EU/MS to set up regulation and/or incentives to increase the average conversion efficiency per fuel type, by installing new plants with best available technology (BAT)	**20**
7	EU/MS to promote/require regulatory change towards facilitation of penetration of "off-grid" power generation – many obstacles to be removed through different measures	**16**
8	EU/MS to promote/require regulatory change towards facilitation of penetration of "grid-connected" CHP, via different measures	**14**
9	EU to introduce new CEN STANDARD to regulate district heating systems	**2**

Option Reference	Option Description	Potential Energy Savings (Mtoe)
10	EU to incentivise the use of intermediaries for small energy efficiency loans etc, for example by extending access to ECB or (through Energy Services Directive obligation) MS capital as a revolving fund for "soft loans"	**13**
11	EU/MS to increase policy support for ESCOs through (1) dissemination of their activities, (2) the development of EU wide quality standards for ESCO projects, (3) standardised project monitoring and verification schemes, (4) model contracts and (5) improve access to (private) financial sources (e.g. cooperation with private banks). These measures could be combined with providing low-interest loans to ESCO projects.	**< 6**
12	EU to incentivise production of energy efficient products through favourable taxation rate in Member States.	**15**
13	EU/MS to make driving costs more km depending. For instance the car or road tax can be made variable. Finally area and congestion charges used for traffic management also have a km reduction effect.	**3 to 15**
13a	EU to: 1) Set maximum CO2 emission standards for different type of cars (absolute, related to specific performance properties, or related to the mean value of all cars sold by one company). 2) Make more stringent agreement with car and truck producers after 2008-2009.	**28**
13b	EU/MS to restrict unnecessary power of car engines by technical devices like maximum speed limiters and/or limitation of maximum acceleration. Or limit the maximum power related to the vehicle weight (or maximum load) for new cars and trucks.	**11**
13c	EU/MS to decrease fuel use by making fuel more expensive. By making the differences between countries less, the incentive of buying cheap fuel across the boarder will decrease. Secondly a lower car tax can be introduced when an efficient car is bought or a financial penalty, which make the buying of a less efficient (second hand) car much more expensive. Thirdly a bigger difference in road tax related to the fuel consumption of a car can be introduced. Even a km charge can be fuel economy dependent.	**22**
14	An EU broad policy for labelling fuel efficient tyres, tyre pressure indicators (dashboard tyre pressure sensors mandatory on cars and freight vehicles, valve pressure indicators compulsory on existing vehicles tyres from 2010) and free facilities at service stations.	**15**

Interaction between the Options

For each action on the priority-list the savings potential has been estimated. This saving figure is valid for situations where the chosen option is applied in isolation of other actions.

However, in the Action Plan a large part, or even all, of these actions may be present. This will probably cause interaction, meaning that the sum of the savings potentials of two separate actions is not the same as the combined savings effect. Often this implies an overlap, where the combination provides less savings than the two actions apart. However, in some cases two actions reinforce each other's effect (e.g. a combination of labels/information and subsidy/incentive to implement efficient appliances)[9].

In case of interacting actions in the Action Plan care must be taken in calculating the total savings of all actions. The overall savings effect will be (much) lower than the sum over all actions. A preliminary analysis (see appendix 2) shows the following major interacting couples of actions:

- EU-wide white certificates (Option 4a) and extension of the EPBD (Option 4)
- Stimulating ESCO's (Option 11) and EU-wide white certificates (Option 4a)
- Provision of soft loans (Option 10) and stimulating ESCO's (Option 11)
- Km-dependent costs (Option 13) and more expensive fuel (Option 13c).
- CO2-standards cars (Option 13a) and restricted engine power (Option 13b).

The following actions interact with many other actions:
- Stimulating ESCO's (Option 11)
- EU-wide white certificates (Option 4a)
- Strengthening and extending the label system (Option 5)
- Extension of the EPBD (Option 4)
- Soft loans (Option 10).

Relatively few interactions are present for:
- Highly efficient power plants (Option 6),
- Energy efficiency at schools (Option 2)
- CEN-standards for district heating (Option 9)
- Energy saving tyres (Option 14).

Running cost labels (Option 3) and energy saving tyres with labels provide for a reinforcing combination with a number of other actions.

Accounting for interaction by "discounting" the savings potential of each action in proportion to the amount of interaction results in an overall discount factor of 26% for the eighteen options.

[9] *Actual interaction effects between policy measures for energy efficiency - A qualitative matrix method and quantitative simulation results for households*, Energy-The International Journal, Available on line 28 February 2006.

Applying this factor to the sum of savings potential for all actions on the list leads to a net combined savings potential of 262 Mtoe; i.e. taken individually the eighteen policy options identify up to 353 Mtoe of primary energy savings over and above the current BAU projection in year 2020; discounting for overlap effects reduces the estimated energy saving by 26% to 262 Mtoe.

This is around a 14% potential saving on the 2020 projected EU primary energy consumption of 1885 Mtoe.

Projected Carbon Dioxide Emission Savings

The climate change element of the energy reductions from the eighteen policy options considered is extrapolated from the PRIMES model energy balances relating total primary energy use and total carbon dioxide emissions.

For 2005 the emission factor is 2.18 million tonnes (Mton) CO2/Mtoe and for 2020 it is 2.08. Conservatively this assessment uses a factor of 2.1 Mton CO2/Mtoe.

For the 262 Mtoe of net energy savings (including overlap) identified, this results in 550 Mton of CO2-reduction for the eighteen policy options in year 2020.

8. Multi-Criteria Analysis

According to the methodology described previously, the total assessment scores for the five major criteria and then for all criteria are given in Table 8.1. The option assessment category is sometimes ambiguous as some actions fall into more than one category; e.g. CO2-standards could be either transport or legislation options.

Table 8.2 provides the disaggregated scoring matrix results for the major criteria and Table 8.3 the disaggregated results for all criteria.

For supporting detail on scoring see the Appendix.

Table 8.1 – Aggregated Multi-Criteria Analysis Score for each Policy Option including Major and All Assessment Criteria

Option Reference	Option Description	MCA Criteria Score (Major Criteria)	MCA Criteria Score (All Criteria)	Assessment Option Category
1	EU to develop scheme recognising retailers providing information on energy efficiency by allowing public recognition through logo or certification scheme.	**5**	**20**	Awareness
2	EU to encourage Member States to include energy efficiency training and information in national education curriculum for primary and secondary schools as part of sustainability awareness.	**9**	**21**	Awareness
3	EU to include running costs in Energy Efficiency Product Listing / labelling or equivalent consumer information	**8**	**28**	Awareness
4	EU/MS to extend EPBD to include smaller buildings (<1000m2), inspection requirements to smaller installations and higher minimum standards for public buildings	**5**	**18**	Legislation
5	EU to adapt appliance label regulation as to regular updating of the label system, in order to stimulate the marketing of ever more efficient appliances, and extend the system to other devices.	**4**	**14**	Legislation
4a	EU/MS to extend the concept of white certificate schemes, after evaluation of present national schemes, to all EU-countries and implement obligations on energy suppliers to provide energy efficiency	**3**	**19**	Legislation
6	EU/MS to set up regulation and/or incentives to increase the average conversion efficiency per fuel type, by installing new plants with best available technology (BAT)	**5**	**15**	Legislation

Option Reference	Option Description	MCA Criteria Score (Major Criteria)	MCA Criteria Score (All Criteria)	Assessment Option Category
7	EU/MS to promote/require regulatory change towards facilitation of penetration of "off-grid" power generation – many obstacles to be removed through different measures	**7**	**31**	Transformation
8	EU/MS to promote/require regulatory change towards facilitation of penetration of "grid-connected" CHP, via different measures	**8**	**33**	Transformation
9	EU to introduce new CEN STANDARD to regulate district heating systems	**6**	**28**	Transformation
10	EU to incentivise the use of intermediaries for small energy efficiency loans etc, for example by extending access to ECB or (through Energy Services Directive obligation) MS capital as a revolving fund for "soft loans"	**8**	**27**	Financing
11	EU/MS to increase policy support for ESCOs through (1) dissemination of their activities, (2) the development of EU wide quality standards for ESCO projects, (3) standardised project monitoring and verification schemes, (4) model contracts and (5) improve access to (private) financial sources (e.g. cooperation with private banks). These measures could be combined with providing low-interest loans to ESCO projects.	**4**	**13**	Financing
12	EU to incentivise production of energy efficient products through favourable taxation rate in Member States.	**4**	**12**	Financing
13	EU/MS to make driving costs more km depending. For instance the car or road tax can be made variable. Finally area and congestion charges used for traffic management also have a km reduction effect.	**8**	**13**	Transport
13a	EU to: 1) Set maximum CO2 emission standards for different type of cars (absolute, related to specific performance properties, or related to the mean value of all cars sold by one company). 2) Make more stringent agreement with car and truck producers after 2008-2009.	**4**	**12**	Transport
13b	EU/MS to restrict unnecessary power of car engines by technical devices like maximum speed limiters and/or limitation of maximum acceleration. Or limit the maximum power related to the vehicle weight (or maximum load) for new cars and trucks.	**2**	**5**	Transport

Option Reference	Option Description	MCA Criteria Score (Major Criteria)	MCA Criteria Score (All Criteria)	Assessment Option Category
13c	EU/MS to decrease fuel use by making fuel more expensive. By making the differences between countries less, the incentive of buying cheap fuel across the boarder will decrease. Secondly a lower car tax can be introduced when an efficient car is bought or a financial penalty, which make the buying of a less efficient (second hand) car much more expensive. Thirdly a bigger difference in road tax related to the fuel consumption of a car can be introduced. Even a km charge can be fuel economy dependent.	**10**	**17**	Transport
14	An EU broad policy for labelling fuel efficient tyres, tyre pressure indicators (dashboard tyre pressure sensors mandatory on cars and freight vehicles, valve pressure indicators compulsory on existing vehicles tyres from 2010) and free facilities at service stations.	**6**	**11**	Transport

Table 8.2 Disaggregated MCA scoring for Major Criteria

	Major Assessment Criteria					
Option Reference	**Security of Supply**	**Cost Effectiveness**	**The Climate**	**Administrative costs on businesses**	**Short time for effect**	**TOTAL Major Criteria**
1	**2**	**1**	**2**	**-1**	**1**	**5**
2	**2**	**3**	**2**	**0**	**2**	**9**
3	**2**	**3**	**2**	**0**	**1**	**8**
4	**3**	**1**	**3**	**-1**	**-1**	**5**
5	**1**	**2**	**1**	**0**	**0**	**4**
4a	**3**	**1**	**3**	**-3**	**-1**	**3**
6	**2**	**1**	**3**	**0**	**-1**	**5**
7	**2**	**2**	**2**	**0**	**1**	**7**
8	**2**	**2**	**2**	**0**	**2**	**8**
9	**1**	**2**	**2**	**0**	**1**	**6**
10	**2**	**1**	**2**	**2**	**1**	**8**
11	**1**	**0**	**1**	**1**	**1**	**4**
12	**2**	**1**	**2**	**-1**	**0**	**4**
13	**2**	**2**	**2**	**0**	**2**	**8**
13a	**3**	**0**	**3**	**-1**	**-1**	**4**
13b	**2**	**1**	**2**	**0**	**-3**	**2**
13c	**3**	**1**	**3**	**0**	**3**	**10**
14	**2**	**1**	**2**	**0**	**1**	**6**

Table 8.3 Disaggregated MCA Scoring for All Criteria (inclusive of Major Criteria)

Option Reference	Option Description	Security of Supply	Competitiveness, trade and investment flows	Competitiveness, trade and investment flows	Cost Effectiveness	Employment & labour markets	Market Barriers	Macroeconomic Environment	Operating costs and conduct of business	Competition in the internal market	Government budget	Air Quality	The Climate	Social inclusion & protection of particular	Governance participation, good administration,	Administrative costs on businesses	Consumers & Households	Specific Regions or Sectors	Mobility and the use of energy	Public Authorities	Short time for effect	Persistence	Monitoring & Verification	Tangible Added value of measure	Change in behaviour of end user	TOTAL
1	EU to develop scheme recognising retailers providing information on energy efficiency by allowing public recognition through logo or certification scheme.	**2**	**1**	**0**	**1**	**1**	**2**	**0**	**0**	**0**	**-1**	**2**	**2**	**1**	**1**	**-1**	**2**	**-1**	**0**	**0**	**1**	**1**	**2**	**2**	**2**	**20**
2	EU to encourage Member States to include energy efficiency training and information in national education curriculum for primary and secondary schools as part of sustainability awareness.	**2**	**0**	**1**	**3**	**1**	**0**	**0**	**0**	**0**	**-3**	**2**	**2**	**1**	**1**	**0**	**2**	**-1**	**1**	**2**	**2**	**2**	**1**	**0**	**2**	**21**
3	EU to include running costs in Energy Efficiency Product Listing / labelling or equivalent consumer information	**2**	**0**	**1**	**3**	**1**	**3**	**0**	**0**	**0**	**0**	**2**	**2**	**1**	**1**	**0**	**3**	**0**	**0**	**0**	**1**	**3**	**3**	**0**	**2**	**28**
4	EU/MS to extend EPBD to include smaller buildings (<1000m2), inspection requirements to smaller installations and higher minimum standards for public buildings	**3**	**0**	**1**	**1**	**2**	**0**	**1**	**0**	**0**	**-1**	**2**	**3**	**1**	**-1**	**-1**	**1**	**1**	**0**	**-1**	**-1**	**3**	**2**	**1**	**1**	**18**
5	EU to adapt appliance label regulation as to regular updating of the label system, in order to stimulate the marketing of ever more efficient appliances, and extend the system to other devices.	**1**	**0**	**1**	**2**	**1**	**1**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**2**	**2**	**1**	**0**	**14**
4a	EU/MS to extend the concept of white certificate schemes, after evaluation of present national schemes, to all EU-countries and implement obligations on energy suppliers to provide energy efficiency	**3**	**0**	**2**	**1**	**2**	**3**	**1**	**0**	**1**	**-2**	**2**	**3**	**1**	**-1**	**-3**	**1**	**1**	**0**	**-1**	**-1**	**2**	**3**	**0**	**1**	**19**
6	EU/MS to set up regulation and/or incentives to increase the average conversion efficiency per fuel type, by installing new plants with best available technology (BAT)	**2**	**2**	**3**	**1**	**1**	**1**	**1**	**-2**	**0**	**-1**	**1**	**3**	**0**	**-1**	**0**	**0**	**0**	**0**	**0**	**-1**	**3**	**2**	**0**	**0**	**15**
7	EU/MS to promote/require regulatory change towards facilitation of penetration of "off-grid" power generation – many obstacles to be removed through different measures	**2**	**1**	**3**	**2**	**2**	**2**	**2**	**1**	**0**	**-1**	**2**	**2**	**2**	**1**	**0**	**2**	**0**	**0**	**0**	**1**	**1**	**2**	**2**	**2**	**31**
8	EU/MS to promote/require regulatory change towards facilitation of penetration of "grid-connected" CHP, via different measures	**2**	**2**	**3**	**2**	**1**	**2**	**2**	**1**	**2**	**-1**	**2**	**2**	**1**	**1**	**0**	**2**	**0**	**0**	**0**	**2**	**2**	**2**	**2**	**1**	**33**
9	EU to introduce new CEN STANDARD to regulate district heating systems	**1**	**1**	**2**	**2**	**1**	**1**	**2**	**1**	**2**	**0**	**2**	**2**	**1**	**0**	**0**	**1**	**2**	**0**	**1**	**1**	**2**	**2**	**1**	**0**	**28**
10	EU to incentivise the use of intermediaries for small energy efficiency loans etc, for example by extending access to ECB or (through Energy Services Directive obligation) MS capital as a revolving fund for "soft loans"	**2**	**2**	**1**	**1**	**1**	**3**	**1**	**2**	**1**	**-1**	**2**	**2**	**1**	**0**	**2**	**1**	**1**	**1**	**0**	**1**	**1**	**2**	**0**	**0**	**27**

Option Reference	Option Description	Security of Supply	Competitiveness, trade and investment flows	Competitiveness, trade and investment flows	Cost Effectiveness	Employment & labour markets	Market Barriers	Macroeconomic Environment	Operating costs and conduct of business	Competition in the internal market	Government budget	Air Quality	The Climate	Social inclusion & protection of particular	Governance participation, good administration,	Administrative costs on businesses	Consumers & Households	Specific Regions or Sectors	Mobility and the use of energy	Public Authorities	Short time for effect	Persistence	Monitoring & Verification	Tangible Added value of measure	Change in behaviour of end user	TOTAL
11	EU/MS to increase policy support for ESCOs through (1) dissemination of their activities, (2) the development of EU wide quality standards for ESCO projects, (3) standardised project monitoring and verification schemes, (4) model contracts and (5) improve access to (private) financial sources (e.g. cooperation with private banks). These measures could be combined with providing low-interest loans to ESCO projects.	**1**	**1**	**0**	**0**	**1**	**2**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**1**	**2**	**0**	**0**	**13**
12	EU to incentivise production of energy efficient products through favourable taxation rate in Member States.	**2**	**2**	**2**	**1**	**1**	**0**	**1**	**0**	**-1**	**-2**	**2**	**2**	**0**	**-1**	**-1**	**2**	**0**	**0**	**-1**	**0**	**1**	**1**	**0**	**1**	**12**
13	EU/MS to make driving costs more km depending. For instance the car or road tax can be made variable. Finally area and congestion charges used for traffic management also have a km reduction effect.	**2**	**0**	**0**	**2**	**1**	**0**	**2**	**0**	**0**	**0**	**3**	**2**	**0**	**0**	**0**	**-1**	**0**	**3**	**-2**	**2**	**0**	**-2**	**1**	**0**	**13**
13a	EU to: 1) Set maximum CO2 emission standards for different type of cars (absolute, related to specific performance properties, or related to the mean value of all cars sold by one company). 2) Make more stringent agreement with car and truck producers after 2008-2009.	**3**	**2**	**2**	**0**	**2**	**0**	**2**	**-2**	**0**	**0**	**2**	**3**	**0**	**0**	**-1**	**-2**	**-1**	**-1**	**-1**	**-1**	**2**	**3**	**0**	**0**	**12**
13b	EU/MS to restrict unnecessary power of car engines by technical devices like maximum speed limiters and/or limitation of maximum acceleration. Or limit the maximum power related to the vehicle weight (or maximum load) for new cars and trucks.	**2**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**-1**	**0**	**-3**	**0**	**3**	**0**	**-1**	**5**
13c	EU/MS to decrease fuel use by making fuel more expensive. By making the differences between countries less, the incentive of buying cheap fuel across the boarder will decrease. Secondly a lower car tax can be introduced when an efficient car is bought or a financial penalty, which make the buying of a less efficient (second hand) car much more expensive. Thirdly a bigger difference in road tax related to the fuel consumption of a car can be introduced. Even a km charge can be fuel economy dependent.	**3**	**2**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**-1**	**3**	**3**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**2**	**0**	**-1**	**17**
14	An EU broad policy for labelling fuel efficient tyres, tyre pressure indicators (dashboard tyre pressure sensors mandatory on cars and freight vehicles, valve pressure indicators compulsory on existing vehicles tyres from 2010) and free facilities at service stations.	**2**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**11**

9. Conclusions

This impact assessment has identified eighteen policy options with a gross potential of up to 353 Mtoe primary energy savings over and above the current Green Paper scenarios in year 2020 (assuming full implementation).

Applying a discount for overlapping effects between different policy options reduces the effective potential energy saving estimated to 262 Mtoe in year 2020.

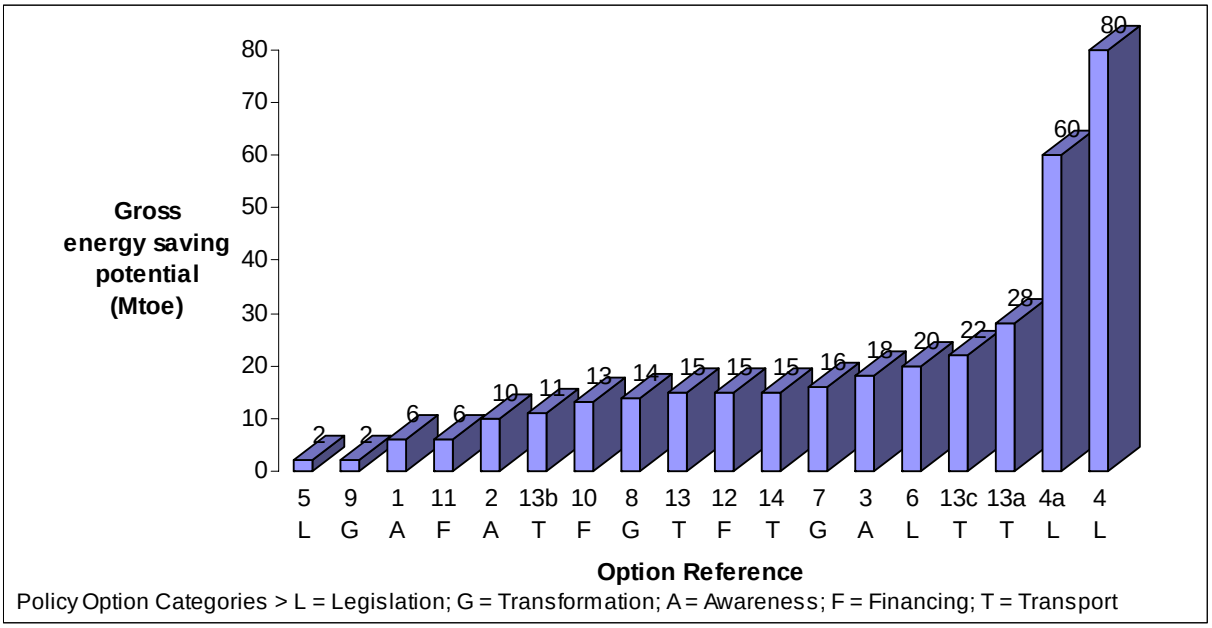
This represents a potential saving of around 14% on the 2020 primary energy consumption estimate of 1885 Mtoe.

87 Mtoe of this saving is projected to be realised by year 2012.

Energy Saving Potential

Figure 9.1 shows the gross energy saving potential estimated for each of the policy options (in ascending order). The net energy savings potential after overlap discounting reduces from an aggregate of 353 to 262 Mtoe for the eighteen options.

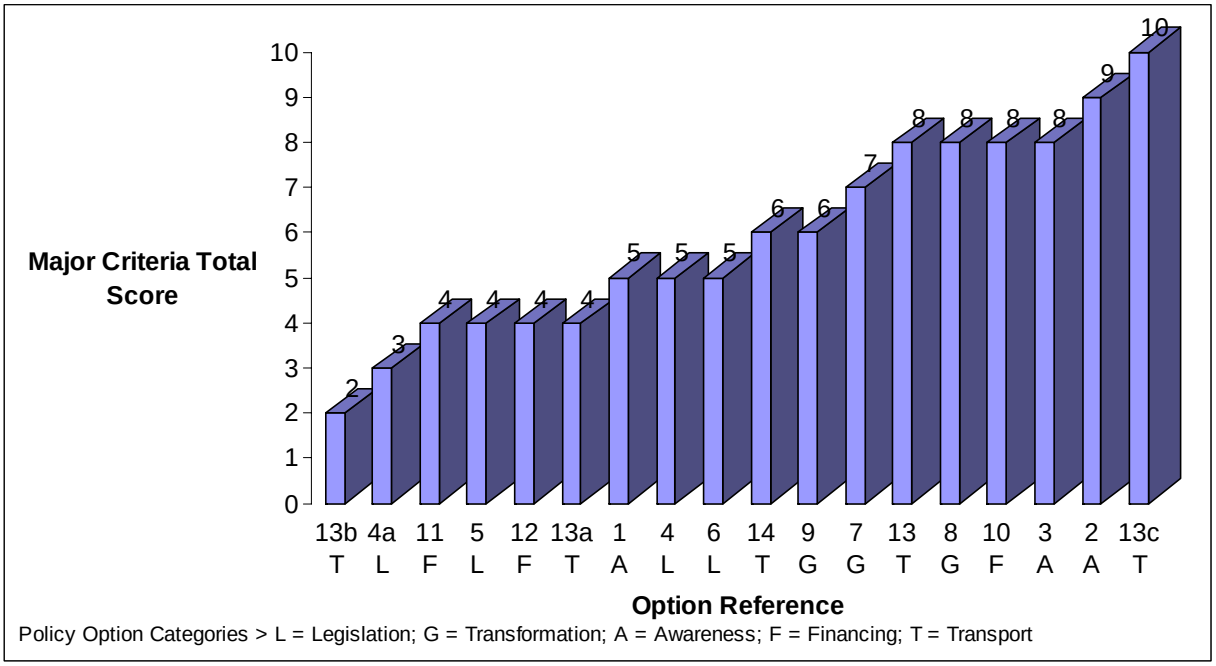
Figure 9.1 Gross Primary Energy Saving Potential for Each Option in 2020



Notes - for data ranges the mid value has been assumed.
- No overlap discount applied to these values

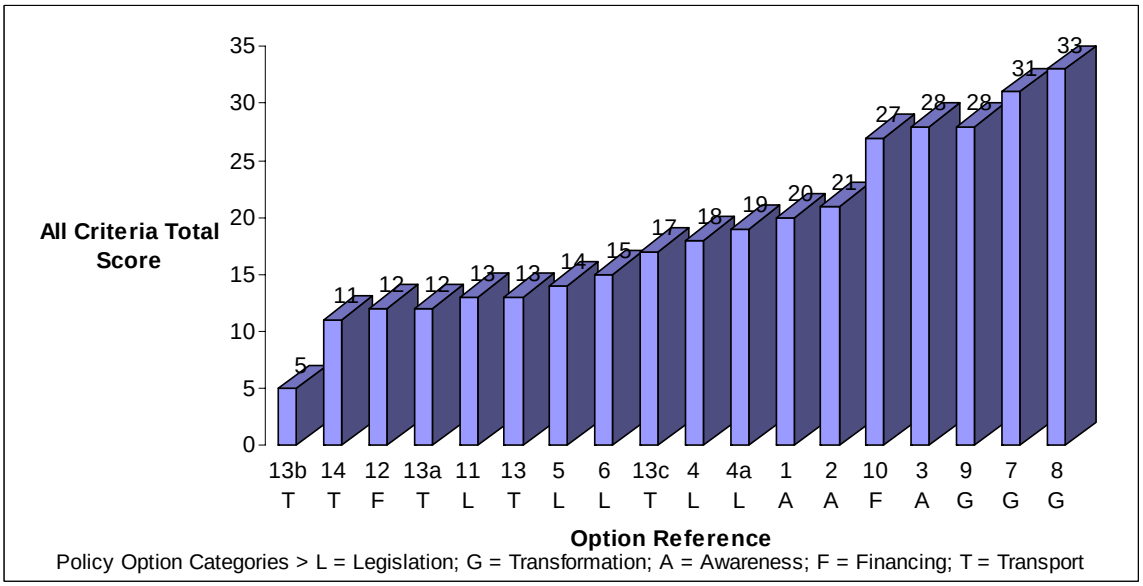
The policy options with the highest potential single primary energy savings were extending the EPBD to smaller buildings and extending the white certificate concept (note there is an expected overlap between these two options). Setting maximum CO2 emission standards for cars was the next highest scoring option at less than half the value of the previous two options.

Figure 9.2 Major Impact assessment Criteria Total Score for each Option



Increasing fuel cost or car tax scored highest on the major assessment criteria, with high scores for encouraging energy education in schools, including running costs in appliance labelling. Incentivising the use of intermediates for small-scale energy efficiency loans, promoting grid connected CHP and making driving costs more kilometre dependent all scored highly.

Figure 9.3 All Impact assessment Criteria Total Score for each Option



CHP related policy options scored highest in the overall impact assessment for all criteria with regulating district heating, including running costs in labelling information. Incentivising the use of intermediaries for small scale energy efficiency loans also scored highly.

Appendices

Appendix 1 – Assessment Supporting Sheets for Each Policy Option (18 selected options)

Appendix 2 – Visualisation of Interaction between Policy Option Savings

Appendix 3 – Preliminary Energy Saving Estimate (54 Policy Options)

Appendix 4 – Energy Savings Target Discussion Paper

Appendix 5 – Consultee Meeting Reports

Appendix 6 – Assessment Supporting Sheets for Screened Policy Option (36 options)

Appendix 7 – Energy Saving Estimate Methodology (18 selected Options)

Appendix 8 – Energy Saving Estimate Methodology for Screened Policy Options

Appendix 1 – Assessment Supporting Sheets for Each Policy Option

Appendix 1 presents the data, scoring narrative, information references and energy saving estimation used in preparing the multi-criteria analysis for each policy option.

The following table gives page number for each policy option sheet in appendix 1.

Option Reference	Option Description	Appendix Page Number
11	Increase policy support for ESCOs through (1) dissemination of their activities, (2) the development of EU wide quality standards for ESCO projects, (3) standardised project monitoring and verification schemes, (4) model contracts and (5) improve access to (private) financial sources (e.g. cooperation with private banks). These measures could be combined with providing low-interest loans to ESCO projects	**77**
12	EU to incentivise production of energy efficient products through favourable taxation rate in Member States	**83**
13	Make driving costs more km depending. For instance the car or road tax can be made variable. Finally area and congestion charges used for traffic management also have a km reduction effect.	**92**
13a	1) Set maximum CO2 emission standards for different type of cars (absolute, related to specific performance properties, or related to the mean value of all cars sold by one company). 2) More stringent agreement with car and truck producers after 2008-2009.	**99**
13b	Restricting unnecessary power of car engines by technical devices like maximum speed limiters and/or limitation of maximum acceleration. Or limit the maximum power related to the vehicle weight (or maximum load) for new cars and trucks.	**106**
13c	Decrease fuel use by making fuel more expensive. By making the differences between countries less, the incentive of buying cheap fuel across the boarder will decrease. Secondly a lower car tax can be introduced when an efficient car is bought or a financial penalty, which make the buying of a less efficient (second hand) car much more expensive. Thirdly a bigger difference in road tax related to the fuel consumption of a car can be introduced. Even a km charge can be fuel economy dependent.	**111**
14	An EU broad policy for fuel efficient tyres, tyre pressure indicators (dashboard tyre pressure sensors mandatory on cars and freight vehicles, valve pressure indicators compulsory on existing vehicles tyres from 2010) and free facilities at service stations.	**117**

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **AWARENESS**

Characterization of actions

Option Number	**1**
Code/action:	Sales Force Training
Previous MCA Reference:	A2
Directives:	-
Subcategory:	Voluntary Agreements with suppliers particularly appliance/vehicle retailers
Objective	Ensure that informed advice is available to purchasers at the point of sale (either retail outlet or on-line sales) from sales staff. EU to ensure availability of information packs for sales persons and on-line suppliers describing labelling scheme and key aspects of energy efficiency characteristics.
Action:	EU to develop scheme recognising retailers providing information on energy efficiency by allowing public recognition through logo or certification scheme.
Current status	Some information available to consumers regarding labels, but little else to direct purchasers to look at information available from EU or other national organisations. In many cases sales force do not understand energy efficiency aspects from purchasers
Approach taken	Requires underlying information to be readily available and understandable for non-professional sales staff. Then public recognition credits to claim 'green' credentials for those retailing organisations who participate in the suitable scheme. Compliments existing labelling schemes. Action applies to all those who are selling energy labelled goods including EU EnergyStar rated goods. Could be linked with award schemes which incentivise retailers/distributors/organisations with trophys, publicity efforts touting winning services, funding to replicate good practices eg training, publications. Examples of international awards are the US Environmental

Respect Awards and the Asia-Pacific Forum for Environment and Development's Award for Good Practices (References 11 & 12).

Estimated Energy Savings	Training of sales staff is expected to have a direct and positive impact on consumer behaviour, however recognition schemes to date have had little impact - eg the Green Claims Code, a voluntary code of practice for retailers and manufacturers is seen to lack a strong sanction, a serious barrier to its effectiveness. The code covers any claim about the environmental nature of a product which is offered to the consumer at point of sale and thus should incentivise retailers and consumers with brand recognition. Savings can be taken to be a small percentage only given limited influence over consumer decisions. Potential energy saving 5.9 Mtoe

Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation	Energy savings arising from developing energy efficiency schemes increase the security of supply by virtue that less primary energy is required, but will not impact directly on generation capacity divergence in terms of fuel type or technology. No effect on the risk of energy supply disruption. No identifiable negative effects. On balance a score of 2.	**2**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Having a more motivated knowledgeable work force will positively enhance EU commerce competitiveness. Skillsmart Retail is the licensed SectorSkills Council (SSC) for the retail industry in the UK. The long term aim of the SSC is that by 2009, retail employers of all sizes across the UK will be operating at skill levels and qualification agenda which will contribute directly to improved productivity growth. (Reference 1). This leads to a small positive. No significant effect on cross border investment flows. No identifiable negative effects. Energy costs per unit are important to EU firms (eg for energy intensive industry, when facing competitors with lower energy and transport costs outside EU). Energy efficiency savings from informed procurement decisions will have a positive impact, low scoring reflects understatement for awareness action which complements other actions with more directly attributable benefit.	**1**

Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	No effects expected	**0**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	There is little information to suggest any positive or negative effects in economic terms and ultimately will be determined by market forces. Reasonable to expect costs of adding additional energy efficiency training to existing staff training will be minimal compared with potential increase in sales. Low positive on balance. Energy Labelling Denmark (linked with the Danish Energy Authority), publishes a magazine about energy labelling entitled "Mærk & Spar" ("Mark and Save") for distributors/retail shops of major household appliances and publishes various informational pamphlets (Reference 8) - an example of a low cost measure. (Reference 10) - For retailers, our results imply that they can increase sales and profit by offering a range of products that includes a significant share of A-labelled products. To realize these benefits, however, careful training of their sales staff is key in order to successfully communicate the added value of an energy efficient product to the consumer at the point of sale	**1**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	The development of recognised energy efficiency training schemes through employers or external agencies involves those already employed although a barrier has been identified suggesting better qualified staff are required. Consequently there may be a minor positive benefit on job creation or labour markets and no identifiable negative effect. Overall balance score of 1.	**1**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Staff delivering information at point of sale maximises impact of available information and informs consumer choice, minimising information gap. Therefore medium positive.	**2**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No effects expected	**0**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of	Will have a direct affect on the labour availability of a business. The development of a retailer scheme, where trained personnel or energy efficiency is recognised through a certification scheme is not expected to impact in this area. However there will be an additional training burden on businesses and will affect cost of labour. See also 'Administrative Costs on Businesses' where this is taking account of. No other significant effects.	**0**

	certain products from the mark		
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No effects expected	**0**
Government budget	Do the actions require substantial financial support at the cost of the government budget?	Provision of supporting information packs would require financing at direct national level or through retail organisations. Additional finance will be required, possibly from government but minimal effect expected. Low negative.	**-1**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. The development of a national certification scheme will increase the awareness of the consequences of energy consumption amongst retailers and consumers. On balance a medium positive.	**2**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. The development of a national certification scheme will increase the awareness of the consequences of energy consumption amongst retailers and consumers. Households are responsible for carbon emissions of 40MtC per annum, with around 25% of this contribution from lights and appliances. (Reference 1). On balance a medium positive, hence 2.	**2**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Introducing a national sales training scheme is unlikely to lead to greater inequality. Providing advice on energy at the point of sale has an immediate benefit to consumers. The public is better informed and thus can make an informed choice, knowing that they can have an immediate impact on the amount of energy consumed. Score low positive.	**1**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a	No effect on governance some increased involvement for administering recognition element eg the certification system. Better informed public, better access to information gives the consumer increased visibility of available energy reduction options. Slight positive	**1**

	particular issue? Does it affect the public's access to information?		
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	If there are additional requirements for a business to conform or be part of an certification system then this will have an additional overhead costs and place greater pressure on functions in the sector that are already struggling to cope. It is probable SMEs will find it difficult to release people for training. (Reference 1). Many staff employed in the retail sector are part time based covering peak purchase periods incl. weekends. Hence a score of -1 as part time staff have high turnover and ongoing training burden.	**-1**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Using energy efficiency point of sales material and certification schemes is expected to be a successful strategy in positively changing buying behaviour with resulting reductions in energy bills (Energy Matters programme in UK). However, the instantaneous target audience is restricted to those purchasing or contemplating a purchase. In the medium to long term a certification scheme will deliver benefits. The market has been transformed with average energy consumption of new appliances decreasing for 30 years, noticeably in the UK where replacement appliances used 20% less energy than the item being replaced (Reference 3). Score medium positive.	**2**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	It is expected that a recognition scheme will not have an impact on certain sectors, or regions across the EU. A small number of additional jobs may be created in order to support the training and monitoring requirements for any training scheme. It is perceived that a certification/recognition scheme this will be an additional burden for SMEs involved in retail of EU label products/services. In the absence of more information the assumption is that the overall effect is a slight negative.	**-1**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Provision of information for the consumer at the point of sale will lead to more informed choice for the consumer. There is no evidence to suggest that this has an impact on transport, so scored as no effect.	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No significant effects expected.	**0**

Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The use of a sales force training scheme may not have a significant impact on consumer behaviour for a number of years. There will be lead in time for the design and production of Information Packs and Training Requirements so is unlikely to become fully effective for between 2 to 3 years. However trained staff will have an immediate impact on consumer behaviour. In a survey for the Dept for Transport (Reference 7) car showroom sales staffs were generally either positive or neutral in reaction to the concept of vehicle energy labelling. The labels were commonly seen as providing useful additional information in a relatively simple layout. Moreover, the labels were recognised as being more 'official' than some of the current manufacturers' labels that are used. For some dealers, such as Ford, the pilot labels are easier to use than the current ones, which are specific to individual cars. Score low positive. During consultation with Energy Savings Trust point made that education of sales personnel is definit	**1**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	In the short term positive benefits are expected although there are no studies found to support persistence. Any energy efficient white goods purchased tend to have extended expected lifetime of 10 years. Also overall there should be a beneficial positive in competitive advantage to retailers providing this information. 11 major UK retailers attending a meeting with DEFRA (June 06) to discuss voluntary partnership for retailers to commit, from 2007, to sell energy efficient consumer electronic products (included Argos Retail Group (Argos and Homebase); Amazon, Asda, Comet, Dixons Group (Currys); John Lewis, Kingfisher (B&Q); Morrisons, Morphy Richards, Sainsbury's and Tesco). Such initiatives would be a sound basis for encouraging a persistent effect.	**1**
Monitoring & Verification	Can action be monitored and verified?	Any certification scheme can be monitored and verified by virtue of organisations applying for recognition. Energy Labelling Denmark selects shops from their database of retailers of household appliances in Denmark. The database contains household appliance shops, electricians, kitchen centres, department stores, DIY centres and timber merchants that display and sell household appliances. Retailers are held responsible for all aspects of energy labelling (Reference 13). Score medium positive.	**2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Encourages and increases engagement of retail organisations and good behaviour in energy conservation. Score medium positive.	**2**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour?	There is potential for a consumer to make a more informed choice in the purchase of goods. Labelling schemes have proved effective in influencing consumer choice (Reference 5), logical to assume that more informed trained sales force will reinforce this. The impact of sales staff in influencing consumer choice is hard to quantify, and consumers tend to under estimate their influence. Study by ECI/TRI (Reference 6) surveying consumers shows that sales staffs were ranked more useful than all other sources of information eg	**2**

		brochures, websites when it came to purchasing cars. Score medium positive +2.	
		Major Criteria Score Total	**5**
		All Criteria Score Total	**20**

Notes	

Monitoring	
Verification	

References:

1 A Review of Skills and Training for Domestic Energy efficiency, DG Associates March 2005
2 Energy Efficiency Innovation Review Summary Report
3 World Energy Council, Energy Efficiency Policies and Indicators Report October 2001
4 Centre for Sustainable Energy - Energy Education Hitting Home 2004 - A summary of the evaluation report into the impact of the energy matters programme
5 http://www.energystar.gov/ia/partners/manuf_res/ENERGYSTAR_Value General.doc
6 Choosing Cleaner Cars - Final report on Vehicle Rating Scheme. Boardman, B., Banks, N., Kirby, H., Keay-Bright, S., Hutting, B., Stradling, S. 2000. Transport Research Institute, Napier University and Environmental Change Institute, University of Oxford, UK. http://www.eci.ox.ac.uk/lowercf/transport.html
7 Comparative colour-coded labels for passenger cars, survey conducted by MORI (Market & Opinion Research International Ltd) on behalf of the Department for Transport, UK
8 http://www.ens.dk/sw12327.asp
9 The Green Claims Code: Is it working?
Part I: Results of the monitoring surveys in the code's first year
A report by the National Consumer Council
10 The Influence of Eco-Labelling on Consumer Behaviour – Results of a Discrete Choice Analysis for Washing Machines
Katharina Sammer and Rolf Wüstenhagen*
Institute for Economy and the Environment (IWOe-HSG), University of St. Gallen, Switzerland
http://www.iwoe.unisg.ch/org/iwo/web.nsf/SysWebRessources/Sammer_Wuestenhagen_2006a/$FILE/BSE_Labelling_Sammer_Wuestenhagen_Oct26_2005.pdf
11 Environmental Respect Awards
http://www.environmentalrespect.com/index.html
12 Asia-Pacific Forum for Environment and Development
http://www.iges.or.jp/en/apfed/award/
13 http://www.ens.dk/graphics/Energibesparelser/alle_initiativer/el_apparater/energimaerkning_af_husholdningsapparater/pdf-filer/annual04.pdf

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **AWARENESS**

Characterization of actions

Option Number	**2**
Code/action:	School Children Education
Previous MCA Reference:	A3
Directives:	-
Subcategory:	Voluntary Agreements with Examination Boards
Objective	Educate future generations on sustainable living particularly energy conservation
Action:	EU to encourage Member States to include energy efficiency training and information in national education curriculum for primary and secondary schools as part of sustainability awareness.
Current status	No known community obligations to include energy efficiency awareness for primary and secondary schools (although many schools do undertake such training on a voluntary basis or ask external organisations to provide). The importance of education particularly in schools has long been recognised by the EU; however setting of national education curricula is carried out by Member States. The EU strategy has been to demonstrate successful engagement of local agencies particularly energy agencies etc through supporting demonstration projects; specifically FEEDU under the Save Programme (Kids4energy) until 2004 and now the ManageEnergy element of Intelligent Energy (1). The situation is well described and there is a high availability of information from resources within the Member States and the United States to promote education in schools. In some cases sustainable energy and efficiency is included in the National School Curriculum e.g. UK (2). ManagEnergy (1) identified the largest barrier to activities in schools as lack of funding & resources, however lack of knowledge/cooperation from Educational Authorities, lack of interest from teachers and school boards were significant barriers which could be addressed at a national level under policy obligation from the EU e.g. need to report on progress of providing sustainable energy education using established channels.

	Approach taken	Energy efficiency teaching is now a mandatory action in some Member States. Encouraging energy efficiency content in all national education curricular is a priority action for all Member States. Would require teachers to be trained in sustainable living including energy efficiency. Educational content should be suitable for different age groups eg transport issues for older children. Education curricula content, resource allocation and timing are national decisions made at national and/or regional level (3). Consequently a route for the Commission may be voluntary agreements with Member States on reporting progress on energy education implementation annually using established statistical routes. This would monitor the situation and identify areas of concern.
	Estimated Energy Savings	A 2004 UK report (4) stated that benefits from Energy Matters programme were lower fuel bills (40% of respondents) and that 76% of parents changed their behaviour to save energy and 54% installed energy saving light bulbs. 10 Mtoe – potential energy saving estimation

Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Energy savings arising from education increase the security of supply by virtue that less primary energy is required, but will not impact directly on generation capacity divergence in terms of fuel type or technology. No effect on the risk of energy supply disruption. No identifiable negative effects. On balance no direct link to security of supply but saving of >5 Mtoe so score of 2	**2**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Having more a motivated knowledgeable work force will positively enhance EU commerce competitiveness, however no direct link to enhanced energy education. No significant affect on cross border investment flows. No identifiable negative effects. On balance a score of 0	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Educating our next generation will provide greater efficiency immediately (reference 4) and is likely to provide a positive stimulus to students in taking up higher education pathways towards sustainable energy use/technology development. No direct evidence for this; however likely effect. No significant negative effects. Score 1	**1**

Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Quantified references to energy savings being directly attributed to costed educational programmes are rare; the EU (3) quoted savings attributed to education in Brasil of 0.01 US$/kWh compared to training at 0.02 US$/kWh and other programmes of over 13 US$/kWh. Other reports suggested cost effectiveness of 0.034 and 0.038 $/kWh for appliance standards and utility DSM in year 2000 (5) in the US and the 2005 IEA paper (6) cited several studies reporting a cost effectiveness of around 0.03$/kWh for DSM programmes. An analysis of funding and savings for energy efficiency programmes 2000 to 2004 in California found an average cost of 0.0295 $/kWh for DSM programmes. Taking the available evidence as energy efficiency programmes are cheaper than energy supplied and that energy savings from education are cheaper than DSM programmes; then educational programmes score a positive high of +3. Energy Matters (UK) programme analysis suggests that influence of children in the home is as effective as professional energy advice (Reference 4). An energy monitoring-initiative in Stjørdal (Norway) was incorporated into nature studies and related classes in the elementary school. A cost/benefit analysis showed significant savings. More than 200 schools participated in the project, with an annual budget of NOK 3 millions (EUR 366.000). 51 schools were investigated annually, and reported collective savings of 1,2 GWh in 1992, 2,9 GWh in 1993 and finally 1,3 GWh in 1994. The schools saved 13 kWh per EUR the first year, 31 kWh per EUR the second year and 36 kWh per EUR the third year. With an Internet application, the design would probably be even more cost effective (Reference 1).	**3**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	The local delivery of energy education through teachers or external agencies involves those already employed although a barrier has been identified suggesting better qualified staff are required to integrate with the national curriculum requirements. Consequently there may be a minor positive benefit on job creation or labour markets and no identifiable negative effect. Overall balance score of 1.	**1**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	No effects expected	**0**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No effects expected	**0**

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Energy education is not expected to impact in this area	**0**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No effects expected	**0**
Government budget	Do the actions require substantial financial support at the cost of the government budget?	A major obstacle to activities in schools and education has been identified as a lack of funding and resources (1). Therefore improved implementation will require additional resources which will require additional funding. This is a medium negative as EU support under the Socrates Programme and similar, focuses on supporting actions only. In many countries Energy Agencies are funded by other means to deliver educational services although they may lack the specific knowledge to integrate with national curriculum requirements on a longer term basis. Nevertheless a significant barrier; score high negative -3.	**-3**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. Education will increase the awareness of the consequences of energy consumption. On balance a medium positive.	**2**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. Education will increase the awareness of the consequences of energy consumption and contribute to carbon reductions. On balance a medium positive.	**2**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Including sustainable energy use and energy efficiency in national curricula for schools throughout the EU promotes greater equality. Providing energy education provides immediate benefit to students and schools with significant positive benefit reported from parent households reported although this will only be the child rearing generation. Score low positive +1	**1**

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Education provision is a Member State responsibility delivered locally through national, regional authorities and local schools. Imposition of additional obligations regarding monitoring and reporting of energy education as part of national curricula will be another requirement although this is happening in many cases through the school inspection regime. This will require additional resources and therefore is a low negative in terms of additional responsibilities although there is much support available to offset resourcing requirements from external organisations eg NGO's. A major obstacle to activities in schools and education as lack of funding and resources (1). Utilising education to inform students and also parents is a benefit provided that parents are not well informed already and therefore this is a medium positive for maximising the opportunity. Better educated students encourage schools to be more energy efficient. Education will affect the public's access to information in a positive manner due to greater awareness of information resources in some cases being a low positive. On balance a score of +1.	**1**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	No effect on businesses or SMEs	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Using energy educated school children and students as vectors of change in households has been reported as a successful strategy (4) in positively changing behaviour (e.g. heating control, purchasing CFLs etc) with resulting reductions in energy bills (Energy Matters programme in UK). However, the instantaneous target audience is restricted to those with children or students although a sustained programme will deliver the long term benefits. Score medium positive +2.	**2**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	No information was found on the extent that energy education has been incorporated into national curricula across member states for children and teacher training. In some Member States energy education is part of the national curriculum (e.g. UK - reference 2), but no data found on other Member States. Consequently any EU action regarding positively influencing Member States will impact more heavily on those yet to implement (although increased reporting would be an equivalent burden for all). In the absence of more information the assumption is that this is a low negative. Score -1	**-1**

Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Educating our next generation ideally will lead to more informed choices regarding transport and mobility. However, no direct evidence so scored as low positive.	**1**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Energy education is being provided through existing national and regional public authorities and therefore is utilising existing pathways. Score medium positive as no significant public authority restructuring will be required.	**2**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Using energy educated school children and students as vectors of change in households has been reported as a successful strategy (4) in positively changing behaviour (e.g. heating control, purchasing CFLs etc) with resulting reductions in energy bills (Energy Matters programme in UK). Evaluation of programme after 4 years found evidence of behavioural change in 76% of the sample evaluated. Score medium positive +2.	**2**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Short term positive benefits are reported from educational programmes although there was no data found to support persistence. Some evidence to suggest that longer term engagement of energy agencies with schools is harder to achieve than 'one- off' presentations. However logically influencing behaviours at an early stage with future reinforcement is a powerful strategy and therefore is scored as a medium positive +2. Educational programmes to date have been sporadic and for set periods using external resources. Continuity is essential to produce a persistent effect. Teachers are expected to have more influence than external agencies and a longer interaction with children/parents. At our consultation meeting the Energy Savings Trust also argued that this action had limited effectiveness. Highlighted that Energy Efficiency briefing documents would represent “information overload” for teachers and therefore have a negative impact. The educational material needs to be embedded into the curriculum and presented as part of the mainstream syllabus and not as an additional activity.	**2**
Monitoring & Verification	Can action be monitored and verified?	Education information is already collected from Member States under the Eurydice programme (Socrates Action 6 Observation & Innovation). Would require development of indicators and measures. Score low positive as an undeveloped programme is in place for education information, but this is not yet sufficiently developed to address energy education implementation.	**1**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	No additional benefits identified	**0**

Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour?	Using energy educated school children and students as vectors of change in households has been reported as a successful strategy (4) in positively changing behaviour (e.g. heating control, purchasing CFLs etc) with resulting reductions in energy bills (Energy Matters programme in UK). Significant short term positive effect reported with no detriment in environment when households have probably been targeted by DSM programmes already. Score medium positive +2.	**2**
		Major Criteria Score Total	**9**
		All Criteria Score Total	**21**

Notes	

Monitoring	SOCRATES programme including EURYDICE initiative
Verification	SOCRATES programme including EURYDICE initiative

References:

ManagEnergy - Reflection Document on a EU-wide Co-operation of Local Actors on Sustainable Energy Education 2004

1 http://www.teachernet.gov.uk/wholeschool/sd/focuson/energy/curriculum/

2 European commission DGTREN Education on Energy - teaching tomorrow's energy consumers 2006 ISBN 92-79-00772-6

3 Centre for Sustainable Energy - Energy Education Hitting Home 2004 - A summary of the evaluation report into the impact of the energy matters programme

4 Kenneth Gillingham, Richard Newell, and Karen Palmer 2004 Retrospective Examination of Demand-Side Energy Efficiency Policies June 2004, revised Sept. 2004 • Discussion Paper 04-19 rev Paper prepared by Resources for the Future http://www.energycommission.org/files/finalReport/III.2.a%20-%20Retrospective%20of%20Demand.pdf

5 Geller H, Attali S; The Experience with Energy Efficiency Policies and Programmes in IEA Countries 2005 IEA Information Paper

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **AWARENESS**

Characterization of actions

Option Number	**3**
Code/action:	Increased information on appliance running costs
Previous MCA Reference:	A6
Directives:	Ecodesign Directive 2005/32/EC. The framework directive defines the principles, conditions and criteria for setting environmental requirements for energy-using appliances. It therefore makes no direct provision for mandatory requirements for specific products; this will be done at a later stage for given products via implementing measures which will apply following consultations with interested parties and an impact assessment. (Reference 12)
Subcategory:	Voluntary agreement with manufacturers
Objective	Increase visibility of operational costs of energy consuming devices to aid consumer choice
Action:	EU to includes running costs in Energy Efficiency Product Listing / labelling or equivalent consumer information
Current status	Insufficient awareness of concentrated operational costs for consumer decisions. There is a wealth of information available on the web provided by energy suppliers, local authorities, environmental agencies etc (small sample shown in References 1-4). Mostly this focuses on the % split of use by type of appliance, or guidance on how to calculate the running costs of different appliances yourself. Many manufacturers (eg References 6&7) publish running and standby power consumption in Watts in technical spec sheets, but this varies by manufacturer and product type. The Australian Energy Label sets a precedent for including both a star rating and annual consumption data. Overall lack of easily available consumer information on other aspects of appliance operation.

Approach taken	Would require development of new test criteria for equipment suppliers to rate products Information would then be added to Product Listing or equivalent Could be included on Energy Labelling as well as existing information sources. "In order to improve the labelling scheme greater clarity is needed in the test procedures and lower tolerances should be adopted. In addition, the Commission could require public deposition of test data by manufacturers. Further, there is a need for vigorous enforcement, particularly where a manufacturer's declared energy consumption is shown to be incorrect. Greater co-ordination of enforcement across member states would be beneficial." (Reference 13).
Estimated Energy Savings	From the NAEEE there is evidence to demonstrate decreases in energy consumption of 1 - 6% and increases in energy efficiency of 1.4 - 3.6% across the use of 5 main appliances during the period 1993-2001 (Reference 8). It has been estimated if labelling had not been introduced, the annual electricity consumption of all new appliances (of the types labelled) in 1992 would have been about 11% higher than it was, and the total household electricity consumption in Australia would have been about 1.6% higher (Reference 15). Projections from the Swiss E2000 energy label (which were granted only to appliances which met targets of power consumption in different modes of operation, linked to running costs) also estimated savings of approximately 1% of Switzerland's overall electricity consumption (Reference 16). Estimated energy saving 18 Mtoe

Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Any action that assists in the uptake of energy efficient behaviour will reduce energy demand. This in turn reduces dependence on external suppliers to some degree. No effect on energy sources, supply disruption or generation technologies. Overall score of 2 as saving over 5 Mtoe	**2**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Increased consumer /workforce awareness will positively enhance EU competitiveness, however no direct link to increased trade. No significant affect on cross border investment flows. No identifiable negative effects. On balance a score of 0. Some countries may be concerned that publicly funded/administered eco-labelling information such as running costs may create de facto barriers to competitive market access because they display	**0**

		national and common EU environmental preferences, however harmonization mitigates this. Consumer organisations are likely to support action as competition will bring reduced running costs, improved quality and increased choice to consumers. If all EU manufacturers and retailers will have to comply, there will be no effect on intra-European Union trade. There is expected to be no effect on trade with non-EU countries.	
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Suppliers may be stimulated to research more efficient technology on all aspects of resource consumption. Low positive effect.	**1**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Using only energy savings as a benefit (that is allocating no monetary value to the environmental benefits), the NAEEEP is projected to deliver almost $4.2 billion dollars to the community (after the projected $2.6 billion costs are deducted from the $6.8 billion energy savings NPV at 10 % discount rate by 2018 (Reference 9). This experience of the Australian NAEEEP (National Appliance and Equipment Energy Efficiency Programme) suggests that such schemes to increase awareness of running costs/energy efficiency are cost effective. (Reference 14) Savings can be achieved at a negative cost to society. The extra costs of more efficient appliances are offset by savings in running costs over the life of the appliance. In the US, each tonne of CO2 avoided in this way in 2020 will save consumers $65; while in Europe, each tonne of CO2 avoided will save consumers €169 (reflecting higher electricity costs and currently lower efficiency standards in Europe). Significant savings are possible despite widely diverging situations in each IEA country. Manufacturers already routinely test their products. The information required is derived from basic design information and the technical measurements which manufacturers carry out as part of routine product development and quality control. Most manufacturers already publish similar information in their brochures or technical literature. If incorporated into existing energy labelling, manufacturers should face little additional cost per label	**3**

		(cost approx £0.20 per label in UK). Retailers will have no significant additional costs, their role being to check and fix labels to appliances on display. Nor should there be significant extra costs arising from the need to add information to mail order catalogues, websites etc.	
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	The provision of appliance running costs involves the administration and monitoring of the action but primarily those already employed by manufacturers, the burden imposed will vary depending on the degree of information the manufacturer already provides. Consequently there may be a minor positive benefit on job creation or labour markets and no identifiable negative effect. Overall balance score of 1.	**1**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Lack of information is recognised as one of the main barriers to the implementation of energy efficiency. Increasing visibility of running costs would have a positive impact on this barrier. No additional barriers affected.	**3**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No effect expected.	**0**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	No effect expected on availability or cost of inputs, access to finance or investment cycle. Action will promote the most efficient technologies available over inefficient technologies. Increased requirement for manufacturer to provide information which should be readily available. Not expected to lead to closing of businesses. Overall neutral effect.	**0**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No effects expected	**0**
Government budget	Do the actions require substantial financial support at the cost of the government budget?	No effects expected	**0**

Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. Action will increase the awareness of the consequences of energy consumption. On balance a medium positive.	**2**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. Action will increase the awareness of the consequences of energy consumption and contribute to carbon reductions. On balance a medium positive.	**2**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Better information provided by manufacturers about appliances if made easily available would clearly make the public better informed about running costs. No equality issues. Low positive.	**1**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Voluntary agreements to provide running cost information would largely involve manufacturers and EU level organisation. More visible information will logically have a positive impact on public understanding/awareness of running costs and energy efficiency. Overall low positive effect.	**1**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	No consumer costs expected. Neutral score.	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Increased quantity, quality and availability of running cost information would enable better informed consumer choice. There is abundant evidence from existing labelling schemes to demonstrate increased sales of energy efficiency products following the introduction of performance indicators. It is logical to assume that providing running cost information would create a more positive impact.	**3**

Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	An EU action to improve information provided by manufacturers would be available to all; no impact expected in particular regions. There may be some job creation in the appliance manufacturing industry/energy advisors but this is difficult to quantify. No specific consequences for SME's. Overall neutral effect.	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No effect expected.	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No effect expected.	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Availability of information at the point of sale will not have a marked impact on consumer behaviour for a number of years. There will be lead in time for the development of the information format and then subsequent growth effect as consumers renew appliances. There will be some immediate impact once the information is accessible, but unlikely to be significant for a number of years. Score low positive +1.	**1**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Product information (eg through labelling) is designed to effect market transformation through consumer choice. The most significant energy-using household appliances are now sold with a mandatory A-G rating, and the Energy Saving Trust's "Energy Efficiency Recommended" label identifies the top performing models within each appliance market. When coupled with financial incentives on the best, and regulation to remove the worst, these schemes have proved very successful at shifting consumer purchases towards the top end of the scale. From the NAEEE (Reference 8) there is evidence to demonstrate decreases in energy consumption of 1 - 6% and increases in energy efficiency of 1.4 - 3.6% across the use of 5 main appliances during the period 1993-2001. Average ratings of appliances on the market also improved after the introduction of better consumer running cost information while sale numbers remained steady. Purchase decisions of energy efficient appliances tend to be effective for extended period of product lifetime. Product labelling is known to have a limited effect unless linked to other initiatives, as consumer decisions are based on more than written information. Cost and convenience are	**3**

		the most commonly cited reasons 'not to do anything' and it is logical to conclude that financial benefits (from running cost savings) if easy to 'see' will be a continued driver for action.	
Monitoring & Verification	Can action be monitored and verified?	Market trends and energy efficient behaviour resulting from the action can be monitored and verified (evidence of the impact of Australia's energy labelling scheme (which incorporates consumption information) has been monitored since 1993 Reference 8). The number of appliances, manufacturers which receive a label or provide information can also be monitored.	**3**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Increased water consumption efficiency in wet appliances, already an identified benefit from existing labelling.	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour?	The more efficient use of energy is influenced by the choices people make about appliance purchases and the way the equipment is used. A survey from 1994 by the University of Oxford's Environmental Change Institute states that "After energy labels were introduced, the DECADE survey found that only 37% reported seeing the label. Of these, two-thirds would have liked more information, either on the label, through the sales staff, or on a poster in the shop. The biggest demand was for information on running cost implications. People whose work or educational background is focused on scientific and technical types of activity were more receptive to the energy label. When consumers notice the label and can obtain information, one third are influenced 'a great deal' or 'quite a lot' in the purchase they subsequently make. There are correlations between background factors (socio-economic group and age), contextual influences (local community attachment and early learning), levels of knowledge on environmental	**2**
		Major Criteria Score Total	**8**
		All Criteria Score Total	**28**

Notes	
Monitoring	
Verification	

References:

1 http://www.aceee.org/consumerguide/mostenef.htm
2 http://www.horizonpower.com.au/environment/smart_ways/in_your_home/running_costs.html
3 http://www.newcastle.gov.uk/core.nsf/a/energyrunningcosts
4 http://www.countryenergy.com.au/internet/cewebpub.nsf/Content/h_eff_buying+appliances
5 http://www.energyrating.gov.au/
6 http://www.sony-europe.com/
7 http://h41111.www4.hp.com/globalcitizenship/uk/en/environment/productdesign/energyefficiency.html
8 "Greening Whitegoods" a third report into the energy efficiency trends of major household appliances in Australia from 1993 to 2001 *
9 NATIONAL APPLIANCE AND EQUIPMENT ENERGY EFFICIENCY PROGRAM: WHEN YOU CAN MEASURE IT, YOU KNOW SOMETHING ABOUT IT PROJECTED IMPACTS 2000-2020
10 http://www.eci.ox.ac.uk/lowercf/decade.html
11 http://www.energystar.gov/index.cfm?c=news.nr_news
12 http://europa.eu/scadplus/leg/en/lvb/l32037.htm
13 Cool Labels - The first three years of the European Energy Label, 'Winward, J, Schiellerup, P and Boardman, B (1998) Cool Labels, Energy and Environment Programme, Environmental Change Unit, Oxford University, UK. (For executive summary see http://www.eci.ox.ac.uk/lowercf/coolabels.html)
14 http://www.gealabel.org/download/Docs/COOL-PRE.PDF
15 http://www.energyrating.gov.au/library/pubs/engybld4.pdf
16 http://www.psychologie.uni-kiel.de/nordlicht/sme/b14.htm

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **LEGISLATION**

Characterization of actions

Option Number	**4**
Code/action:	Extending EPBD to smaller buildings
Previous MCA Reference:	L5
Directives:	2002/91/EC
Subcategory:	adapted EU-legislation
Objective	Increase the energy savings effect of EPBD-directive
Action:	EU to extend EPBD to include smaller buildings (<1000 m2), inspection requirements to smaller installations and higher minimum standards for public buildings
Current status	EPBD obliges Member States to set energy efficiency standards for new buildings and renovated buildings with a floor space > 1000 m2, and demands labels (certificates) for all buildings.
Approach taken	The minimum floor space in the present EPBD-directive is adapted in such a way that 90% of all existing floor space in buildings has to meet the EPBD-demands. In this way some building types, which are difficult to integrate into the EPBD-scheme, can be left aside, thus limiting the policy burden, while realizing almost the maximum saving effect.

	Estimated Energy Savings	According to the MURE-Database the technical savings potential of the existing EPBD was 3465 PJ (83 Mtoe) in 2010, assuming a start in 2002. Given a later start in 2009, but 2020 as end year, provides 1.5 times energy savings or 125 Mtoe. This could be doubled if smaller buildings are included. Thus, the extended EPBD action leads to an extra technical savings potential of 125 Mtoe. However, only 90% is part of the extended EPBD. Also, renovation of (privately owned) dwellings is often done part by part, circumventing the ">20%" obligation in the EPBD-directive (see interview with ECEEE). Without proper incentives from national policy measures this part of the savings potential will not be realised. Therefore the policy savings are estimated at 80 Mtoe only. Further on, there is much overlap with EU-wide implementation of white certificate schemes (L12).
Assessment criteria		Alternative calculation based on Ecofys study: extended EPBD provides 36 Mton/a CO2 technical potential in 2010 in the EU-15 and 44 Mton/a in new member states, total is 80 Mton/a CO2 in 2010. With a couple factor between Mton CO2 and Mtoe of 0.54 this results in 43 Mtoe/a extra energy savings in 2010. Given these savings for the period 2006-2010, the extended EPBD for the period 2009-2020 will results in 3 x 43 Mtoe/a or 129 Mtoe/a energy savings. This is quite near the value obtained from the MURE-database.

	Details	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The EPBD and the action to extend it to smaller buildings will mainly affect the energy use for space heating and water heating (about 85% of residential energy consumption in EU-15 (Ademe 2005)). Natural gas and oil are the main energy sources for these purposes. Savings on these fuels have a positive impact on security of supply. Therefore the large savings potential (ca. 80 Mtoe) when extending the EPBD to small (mainly residential) buildings has a substantial effect on security of supply.	**3**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	The saving activities regard households, where competitiveness is not relevant, and small business where energy costs are rather low compared to total production costs. The action stimulates production in the European construction and refurbishment sector, where there is hardly competition of non-EU rivals. Overall competitiveness is not an issue at all.	**0**

Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	The action will lead to an increasing demand for cheaper, simpler and better versions of energy-saving products/ systems developed for small residential buildings. However, research and development will profit little due to the use of existing techniques.	**1**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Investments on energy saving measures on the one hand, and benefits for avoided energy expenditure on the other hand, determine to a large extent the cost effectiveness of this action. If the investor and the beneficiary are the same (f.i. homeowners), energy saving are cost effective or even beneficiary (assuming that administration costs are not included). If this is not the case, profits will not automatically return toward the initial investor.	**1**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	For the indirect effect of (substantial) realised energy savings see general text on employment effects. The direct impact on job creation is difficult to predict, because of the diversity of saving measures and local construction methods. Estimates differ from 10.000 to 100.000 jobs created within the construction, renovation and consultancy sector.	**2**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	The split incentive (landlord/municipalities/social housing cooperatives versus households) is not solved by this action. The same is true within central and eastern Europe where there is a lack of funds to make the necessary investments. But it solves the lack of knowledge on possible improvements in energy efficiency.	**0**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Investments in energy saving will lead to more economic activity, especially within the construction sector. Added investments are estimated at 15-25 billion euros a year, which is 1-3% of annual construction expenditure in Europe. These investments will be financed partly at the expense of other economic activities and partly with savings on fuel import costs. In the longer run these investments will result in annual cost-reduction. Overall there will be a limited positive effect on GDP, mainly because expenditures will shift from energy consumption towards energy	**1**

		saving investment on new products and refurbishment.	
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	The action will enlarge construction expenditure with 1-3% which is a significant incentive for this sector. Extra economic activity can lead to scarcity of resources such as materials or labour.	**0**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Since the EPBD is an European directive aiming at all MS, and renovation/energy savings is often a "local" activity, the internal EU market will not be distorted.	**0**
Government budget	Do the actions require substantial financial support at the cost of the government budget?	Although financial support is probably needed to realise the saving potential, it is assumed here that support does not have to be provided by government alone. Measures can be financed by other parties as well (suppliers in white certificate schemes, ESCO's in favourable market conditions). The same holds for the necessary audits that will often need subsidies.	**-1**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Lower energy demand will in principle decrease acidifying emissions. But it could lead to an increase in the use of building materials. Some of these can be harmful for the indoor environment.	**2**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	See general text on energy savings and CO2-emissions. Most savings regard fuels. Given the substantial savings potential large emission reductions result. Therefore the highest rating is valid.	**3**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Energy cost has a greater influence on the budget of low-income people in comparison with high-income people. Energy savings thus can have a positive effect on inequality. But only, if low income people aren't forced to make large investment costs.	**1**

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Although many tasks can be carried out by market parties, the government needs to control en enforce the framework of the EPBD. For the extended EPBD the amount of effort is relatively larger due to the smaller scale and diversity of the buildings and dwellings.	**-1**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Calculating energy-use, labelling and proposing improvements are executed by external specialist. However, cooperation of the owners and occupants is needed to some extent. Moreover, they have to decide on necessary investments in energy savings at renovation. Within the existing EPBD directive, administration was limited to large buildings. If EPBD is extended to small buildings, administration will form a higher burden on these energy users.	**-1**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	The action will lead to better quality housing and a decrease in energy costs. Especially households should benefit from this.	**1**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	The action will affect landlords and housing cooperatives, but consultants and refurbishers will benefit. Eastern European countries will benefit the most, if proposed EPBD-saving measures are applied.	**1**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Not relevant	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Due to the much larger scale of activities the establishment of new public authorities seems necessary to check refurbishing plans on their energy performance.	**-1**

Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Due to the coupling to renovation this action leads to small effects before 2012 only	**-1**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Improvement of buildings will have a long lasting effect on energy saving in the future.	**3**
Monitoring & Verification	Can action be monitored and verified?	Calculation method is already developed for the EPBD. Although calculations can differ from actual savings, it offers good insight in the actions results.	**2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	The labelling of houses gives potential buyers/ tenants information about the quality, expected living costs and comfort of dwellings.	**1**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour?	End-users are confronted more often with energy-use and saving possibilities of dwellings and buildings, which will probably increase their awareness in general.	**1**
		Major Criteria Score Total	**5**
		All Criteria Score Total	**18**

Notes	

Monitoring	
Verification	

References:

Eurima, Pres Release 8 June 2006: Buildings waste 270 mld Euro (gross savings excl. investments) across Europe or 3.3 mln bbl/day out of 6. Other effects: 83 Mton CO2 in 2010 and 140 in 2015 and <460 in 2030, 530.000 extra jobs until 2030. About 90% of the potential for energy, CO2 and cost savings are in buildings below 1000 m2.

INOFIN, EU-IEE-project, incl. ECN: Financing refurbishment of social housing

Ecofys, march 2004, Mitigation of CO2 beyond EPBD: potential 80 (current) to 400 Mton (full scale) for EU-15 when applying new-standards on existing buildings. Given time delays reduction is in 2010 34 (current) to 70 Mton (full scale). Current EPBD covers only 28% of existing stock, not single-family dwellings (45%). National standards after EPBD estimated from expert's opinion. Contribution of new buildings compared to baseline very small because standards are already used in baseline. BAU > retrofit with 20% saving measures. BAU+EPBD-effect without certificate > retrofit with 100% saving measures plus 20% for other buildings. BAU+EPBD+Certificate-effect > 100% for EPBD-part and 40% for other buildings.

MURE (2006), Energy performance of Buildings (directive 2002/91/EC), MURE database, http://www.isis-it.com/mure

Petersdorff, c. et al.(2005), Cost effective Climate protection in the EU building stock, Ecofys, cologne, p.3
Petersdorff, c. et al.(2005), Cost effective Climate protection in the EU building stock of the new member states, Ecofys, Cologne
ECEEE-interview, June 2006: dwellings are often renovated part-by-part, avoiding the obligations coupled to the threshold of 20% in costs. Therefore also strengthened insulation and boiler standards should be applied.

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **LEGISLATION**

Characterization of actions

Option Number	**4a**
Code/action:	EU-wide implementation of white certificate schemes
Previous MCA Reference:	L12
Directives:	2006/32/EC
Subcategory:	adapted legislation
Objective	Increase energy savings by creating a market for energy efficiency measures and energy services
Action:	EU/MS to extend the concept of white certificate schemes, after evaluation of present national schemes, to all EU-countries and implement obligations on energy suppliers to provide energy efficiency
Current status	White Certificate schemes have recently been introduced in several MS. In the Netherlands and UK comparable schemes without tradable certificates have been/are active. The Energy Service directive favours the creation of markets for energy services and saving options.
Approach taken	In the longer run it is desirable that trading in white certificates is possible all over Europe. This is also needed as to create a level playing field for the energy supplier that has the obligation to run the schemes. Therefore white certificate schemes have to be introduced in all or most MS. The set up of the harmonized scheme will depend on the experience gained in running schemes. The directive will be amended as to introduce the scheme in all MS before 2010.

	Estimated Energy Savings	White certificates could cover half of natural gas (165 Mtoe) and 70% of electricity use in EU-15 (136 Mtoe) or 505 Mtoe in primary energy. Introduction of white certificates can potentially increase energy-efficiency with 15% (Farinellli et al, 2005), saving 76 Mtoe in 2020 (based on free of costs for society). If this saving will actually be accomplished depends to a high extend on energy saving obligations set by the national governments. These obligations define the price of certificates and, indirectly, the incentive and efforts to save energy. It is assumed that EU-wide white certificate schemes are used as the main policy instrument to realise the savings mentioned in the ESD. Assuming that the ESD-average of 1% of base year energy use is realised for 2009-2020, this leads to about 12% savings on 2020 energy consumption under white certificates schemes or 60 Mtoe. However, due to the non-obligatory ESD-savings total policy savings can be lower than 60 Mtoe. A great part of this savings potential overlaps with that of the (extended) EPBD (action L5), because both action focus on buildings. But, given white certificates as main see instrument to reach ESD-savings, this action will overlap with many other actions.	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Given the potential to increase energy-efficiency, consisting mostly of natural gas, the action greatly contributes to secure energy supply.	**3**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	It aims at internal energy saving and doesn't have an impact on competitiveness. Since energy suppliers act mostly within Europe there is no impact on the competitive position of EU firms.	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	This action has a small positive effect on research for energy saving measures. Energy suppliers will invest in innovative energy saving solutions. It will also stimulate innovation on service products. Service companies and energy suppliers will find innovative ways to save energy.	**2**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Although the system helps to achieve saving in the most cost effective way it also brings additional costs with it, e.g. administration costs which are transferred to the end-users of grid supplied energy. It is expected that the costs will not exceed the benefits. Energy suppliers can sell energy efficiency. The profit which is taken	**1**

		from this compensates the decrease in sold energy.	
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	For the indirect effect of realised energy savings see general text on employment effects. New jobs are created within the field of certification, administration and consultancy. It also stimulates extra jobs at the production of energy saving products and renovation of buildings.	**2**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	It gives energy suppliers an incentive to actively support energy saving, while at the moment they benefit from inefficient use of energy. In this way major barriers, such as lack of knowledge on options, split incentive, financing, etc. can be taken away	**3**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	White Certificate schemes can lead to a more efficient system of realising cost-effective energy savings, thus leading to lower costs of energy services, lower budgets for government support and lower costs of importing energy. On the other hand, the action will confront energy companies with major administrative costs. Overall a small positive effect on economic development.	**1**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	For suppliers the action forces them to do new tasks. On the other hand, for end-users this action can provide better access to finance. Energy savings become a new "product" that can be sold with profit because of the white certificate system. Overall a neutral score results.	**0**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	If saving targets are equalised for all European countries this will benefit countries that are lagging on eco-efficiency. They can easily save energy with relatively low costs. The white certificates they will retrieve from this, can be sold with profit to more progressive countries. It 's possible that customers in countries with a high eco-efficiency because of successful policies of the past, have to pay again to increase eco-efficiency in other countries	**1**
Government budget	Do the actions require substantial financial support at the cost of the government budget?	Money is needed to investigate energy saving and to set up a monitoring and certification system. Much of these actions can be financed by the market itself, but governments have to contribute as well. Extra saving	**-2**

		measures due to this action will lead to a higher demand on existing government support schemes.	
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Lower energy demand decreases acidifying emissions. But it could lead to an increase in the use of building materials that can be harmful for the indoor environment.	**2**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	The action can lead to a CO2 emission reduction of 190 Mtonnes (based on zero-costs)	**3**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Energy cost has a greater influence on the budget of low-income households in comparison with high-income households. Energy savings thus can have a positive effect on inequality, especially if white certificate schemes focus on supporting low income households, like in the UK.	**1**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	This action gives the energy market freedom to choose between energy saving possibilities and creates a good source of information for consumers. However, it demands a lot of control by government and public institutions.	**-1**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Administration costs are high, because of the necessary monitoring and certification. A study for the UK estimates administration costs which exceed 20% of the projects cost but are below 2% of total expenditure of energy suppliers	**-3**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	This action will make it easier for consumers to 'buy' energy savings and will improve their financial situation due to cost-effective savings.	**1**

Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	The energy suppliers are affected due to extra costs of the scheme and the lower energy demand. Manufacturers of efficient products, installers and building companies will profit. It also offers market chances for ESCO's. Eastern-Europe region can profit from trade in white certificates due to their ample saving possibilities but lack of resources.	**1**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Not relevant	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Public authority has to provide a framework in which the white certificate system can function. Much of the organisational efforts can be outsourced.	**-1**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The proposed action will be implemented after evaluation of existing national schemes. Therefore it will not contribute much to savings before 2012.	**-1**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	The duration of energy savings will be part of the value of white certificates for each saving measure. Long lasting, persistent energy saving measures will be more attractive.	**2**
Monitoring & Verification	Can action be monitored and verified?	Monitoring and verification is a major element of this action, therefore no extra effort is needed.	**3**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Unknown	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour?	This action will stimulate all kind of parties to approach end users and thus helps to create awareness on the energy issue. Possibly the action leads to activities to directly influence end user behaviour.	**1**
		Major Criteria Score Total	**3**
		All Criteria Score Total	**19**

Notes

Monitoring	
Verification	

References

Bertoldi, JRC, 2005: Green and White Certificates
Green T-forum, New York, 4 May 2006, Jones-Sterling Power: energy efficiency certificates or White Tags per state

Hargreaves, OFGEM, Energy services Working group, November 2003: EEC > special reward for energy services: assessment, advice, cost sharing.
EED, 29 may 2006 > France law on WC-system providing 54 TWh of savings or 3.6% of national consumption
EED, 2 June 2006: EU parliament > tradable white certificates must wait until ETS has been optimized
STROMEN, Storm/ENECO: alternatief voor WC via certificaat+puntensysteem >gecanceld juni !!
Farinelli et al, White and Green: comparison of market based instruments to promote market-based instruments to promote energy efficiency, Journal of Cleaner production, 13 (2005), p.1015-1026: MARKAL-calculations for EU-15+ > up to 15% extra savings in household and service sector without higher societal costs in 2020 (base year 2000?). With 2%/year small societal costs, not taking into account externalities.
CEETB-interview, June 2006: when introducing a white certificate system, the market for energy services should be open for all parties, not only energy suppliers.
Eurelectric-interview, June 2006: obligations in a white certificate system should not be put on the suppliers solely.

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **LEGISLATION**

Characterization of actions

Option Number	**5**
Code/action:	Regular revision and extension of the label system
Previous MCA Reference:	L11
Directives:	92/75/EC
Subcategory:	adapted legislation
Objective	Progressively decrease energy consumption of new appliances
Action:	EU to adapt appliance label regulation as to regular updating of the label system, in order to stimulate the marketing of ever more efficient appliances, and extent the system to other devices.
Current status	Due to the directive on labelling of appliances A- to G-labels have been defined for different appliances. However, new appliances are often more efficient than A-label appliances but this cannot be made clear to customers. Thus there is less incentive for manufacturers to further improve appliances. New devices, such as flat screens and mobile air cooling units, penetrate in the market without a timely labelling of more efficient versions.
Approach taken	The labelling system is updated regularly in such a way that the most efficient market ready appliances are labelled accordingly, thus enabling a better promotion of these type of appliances and enable financial support for the most efficient appliances only. The labelling system is extended to all devices, sold in large quantities, where non-experienced users have to decide on buying a more or less energy efficient version.

	Estimated Energy Savings	According to (CECED, 2006) 34 TWh or 7 Mtoe primary energy savings for appliances have been achieved since 1995. It is assumed that more than half or 4 Mtoe is due to labelling, the remaining part is due to structural technical improvements. The effect of the present labelling system will increase further in time, even without strengthening the system. For some appliances further savings ask for totally new concepts (e.g. ultrasonic washing machines); for other appliances further savings ask for more costly techniques and stand-by losses are already treated in many cases. Therefore it is assumed that extra savings due to updated labels are equal to 30% of already realised energy savings, or more than 1 Mtoe. However, the label system can be extended to other fields, such as office equipment, ventilation, etc.). This can increase the savings potential to about 2 Mtoe.

Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The total savings potential is rather small. Next to that, appliances are powered by electricity, which is generated only for less than half on basis of oil and gas. Therefore the impact on supply security is very limited.	**1**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	EU-appliance label regulation regards the products of both EU and Non-EU companies. The more efficient appliances can meet appliance regulation in other parts of the world. So there is no real impact on competitiveness of EU-companies.	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	In principle this action will greatly stimulate innovation within the appliance industry. However, if not enough incentives are provided for a fast market transformation, manufacturers cannot recover their R&D-investments timely to invest in still more efficient devices (CECED, 2006).	**1**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	In the past more efficient appliances have been extremely cost-effective. However, due to exhaustion of the "easy" saving potential for some appliances and higher R&D-costs the cost-effectiveness will decrease, but remain quite positive.	**2**

Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	The production and selling of more efficient appliances does not create extra jobs compared to conventional versions. The extra personnel needed for innovation is marginal on total employment. For indirect effect of realised energy savings see general text on employment effects.	**1**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	The limited range of energy labelling doesn't offer a market incentive for producers to fabricate appliances which are more energy efficient than label A. This action gives them a opportunity to distinguish themselves from other companies.	**1**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No traceable impact on total GDP	**0**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	The action changes the efficiency of appliances but not the market for (new) appliances itself. Therefore no impact.	**0**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Due to the EU-wide application it has no impact on competition in the internal market.	**0**
Government budget	Do the actions require substantial financial support at the cost of the government budget?	The management of the label-system requires some personnel and budget, but can be neglected as to the total budget. However, national governments sometimes stimulate with subsidies for A-labels, but this cannot be assumed in advance.	**0**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	See general text on effect of energy savings on missions. However, it regards electricity, which is produced for a great part with hydro or nuclear, without acidifying emissions.	**1**

The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	See general text on savings and CO2-emissions. However, the saved electricity is produced for a great part with hydro or nuclear, that do not cause CO2-emissions. Therefore the already small effect is still lower.	**1**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	On the one hand more efficient appliances are more expensive and therefore more difficult to buy by low-income households. On the other hand the label system provides appliances that reduce their energy costs. Overall no impact.	**0**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	No impact	**0**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Since there is already a regulation on appliances labelling, expanding the labels will not change administrative costs.	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	This action offers consumers more information on energy use of appliances. This gives them the opportunity to choose energy saving appliances.	**1**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	No impact	**0**

Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Not relevant	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No impact	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	It takes time to formulate new more stringent labels or labels for new devices, and for producers to develop new appliances, so short time effect s will be limited.	**0**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	This action will have a persistent effect, because it is not conceivable that appliances will be less efficient in the future.	**2**
Monitoring & Verification	Can action be monitored and verified?	This action can be monitored quite well if a system is developed to count the sales figures per energy label category.	**2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Energy saving appliances could prevent overheating of dwellings in the summer.	**1**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour?	The action lead to more awareness on energy use, which could help consumers to change their behaviour. On the lower costs of use could stimulate a less saving behaviour.	**0**
		Major Criteria Score Total	**4**
		All Criteria Score Total	**14**

Notes	

Monitoring	
Verification	

References:

High level stake holder advisory group: report
EED 28/02/06: dynamically improving efficiency standards,
CECED (European committee of Domestic Equipment manufacturers), January 2006, Comment on the Green Paper (presentation): Only if diffusion is quick, returns on previous investments are positive and industry can continue to invest in further innovation.
ECEEE-interview, June 2006: labels for the 20% most efficient appliances only.
Eurelectric-interview, June 2006: in favour of labels with cost-information

Wuppertal Institute, Energy efficiency as a key element of EU's post-Kyoto strategy - Results of integrated scenario analysis, 2005 (in ECEEE-2005 proceedings): a 3-year revision scheme for labels assumed

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **LEGISLATION**

Characterization of actions

Option Number	**6**
Code/action:	Highly efficient new generation capacity (excluding RES)
Previous MCA Reference:	L13
Directives:	96/61/EC, 2001/80/EC, 2003/54/EC
Subcategory:	adapted legislation
Objective	Decrease energy consumption of central electricity production with given fuel mix
Action:	EU/MS to set up of regulation and/or incentives to increase the average conversion efficiency per fuel type, by installing new plants with best available technology (BAT)
Current status	The directive on Emission Trading system for industry and electricity supply (2003/54/EC) amends the IPCC-directive (96/61/EC, amend M2) and the large combustion plant directive (2001/80/EC), as to mandatory emission standards for CO2. However, it allows mandatory efficiency standards in national legislation on environmental performance of power plants. Present average conversion efficiencies (Ecofys, 2004) are much lower than present best practices (CE, 2006). Due to continued uncertainty about fuel prices and the height of long term caps on total emissions (influencing the price of CO2-emission rights in the ETS), in combination with risk-minimalisation in a liberalised market, it cannot be expected that the highest (cost-effective) conversion efficiency will be realised. The liberalisation of electricity supply has stimulated lifetime extension instead of building new plants, thus limiting the possibilities for building modern highly efficient power plants (see L9).

Approach taken	Average efficiency of electricity supply can be increased by changing the fuel mix from coal and nuclear to gas. However, this can conflict with the policy to increase security of supply. Therefore the action aims at increasing conversion efficiency per fuel type, e.g. all gas based electricity production. EU-legislation (i.e. IPPC-directive) is adapted in such a way that the minimum demands on conversion efficiency in national license procedures for new power stations are harmonised. The minimum demands are based on a regularly executed benchmarks on power plants of the same fuel type worldwide. The minimum demands take account of other legislation, e.g. SO2 and NOx, in order not to harm other objectives. The actions also entails a Demonstration-program to support implementation of highly efficient power plants.
Estimated Energy Savings	Input for total electricity generation in the EU-25 in 2020 is 850 Mtoe (PRIMES-baseline), of which 56% fossil fuel or 470 Mtoe. With 50% replacement/extension of total capacity for 2007-2020 an input of 235 Mtoe is at stake. New coal- and gas-fired plants, with on average 4%-point higher efficiency in 2020 than BAU, lead to 9% lower input or 20 Mtoe technical savings potential. Given future fuel prices lying between that of PRIMES-BAU and present higher levels, investments in higher conversion efficiency are cost-effective. Therefore improved legislation can deliver total policy savings of 20 Mtoe.

Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The action does not influence the chosen type of power plant but the efficiency; for the same total electricity production it decreases all inputs and thus favours security of supply. This reasoning defers from changes in relative costs that can influence the choice of plant types. To prevent later building of new plants, extension of life times of old plants must be avoided by action L34 at the same time! Savings 2% of GIC, thus substantial, therefore rating =2.	**2**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	With world energy prices at present high levels the extra investments in new power plants with higher efficiency are cost-effective, therefore they decrease electricity costs for end-users (given proper market functioning) and thus increase competitiveness of EU-companies. Moreover, it will strengthen the position of power plant suppliers in the world market (see innovation).	**2**

Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Higher conversion efficiencies stimulate innovation to a great extent, thus enabling further future efficiency increases and lower costs.	**3**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	With world energy prices at present high levels the extra investments in new power plants with higher efficiency are cost-effective. With lower primary energy prices the cost-effectiveness will depend on the price of CO2-emission rights. Given future caps in the NAP's in line with policy targets for 2030 that actually address the greenhouse problem these prices will rise and cost-effectiveness will be guaranteed.	**1**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	For indirect effect of realised energy savings see general text on employment effect. Research, design and erection of more efficient power plants will ask for more high skilled technical workers. Worldwide export of technology will also create jobs. The new plant uses the same amount of labour. Overall a small direct employment effect is expected.	**1**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	The main market barrier is the focus on short term costs, in a competitive market with many uncertainties on future energy prices, emission rights and technological progress. This prevents extra investments into higher than standard efficiency of new plants. Because the action enforces all market players to choose efficient plants (for a specific fuel type) it helps to remove the risks for individual companies.	**1**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	With high energy prices the more efficient power plants contribute to lower energy costs and a strong position in generation technology, with a traceable effect on GDP	**1**

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	The action influences the investment decisions of the producers, possibly at the cost of their return on investments and shareholder value.	**-2**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	The extra investment costs of highly efficient power plant can change the relative production costs per fuel type and thus influence the market. However, the functioning of the market as such is not at risk.	**0**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	No effect on budget because it regards legislation, however extra R&D-support possibly leads to higher R&D-expenses in general.	**-1**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	In principle lower emissions due to reduced total fuel use, assuming that SO2- and NOx-emissions per kWh are kept at the same level with higher efficiency. It is not assumed that the agreed cap on total acidifying emissions is not "filled" by lifting emission standards. Given the future contribution of power plants to total acidifying emissions this results in a small overall emission reduction.	**1**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Given the same fuel-mix higher conversion efficiencies will lead to substantially lower CO2-emissions in line with the amount of energy savings.	**3**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Not relevant	**0**

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	The action requires a more active role of license providers, as to check whether producers install the most efficient plant.	**-1**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	The procedures are the same for conventional and high efficiency power plants. Therefore no extra red tape expected.	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Given a cost-effective choice for highly efficient power plants no important changes in electricity cost will occur, thus no effect.	**0**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Assuming no effect on the location of new power plants there is no effect on regions. Highly efficient plants will demand more high skilled work, which will favour some "other metal" sub sectors.	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Not relevant.	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Existing public authorities can handle the implementation of highly efficient power plants.	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Given the time to implement the action and time to build these power plants the greater part of the total effect will emerge after 2012, thus not really short term.	**-1**

Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Highly efficient power plants will last for 25 years., even with lower energy prices because they are always more attractive than conventional plants once the investment is done (sunk costs)	**3**
Monitoring & Verification	Can action be monitored and verified?	Saving and reduction effects are easy to monitor due to good data; however the effect can be influenced by market changes that change the running time of these plants.	**2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Not known	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour?	Not relevant	**0**
		Major Criteria Score Total	**5**
		All Criteria Score Total	**15**

Notes	See also G5 (fiscal incentives to stimulate high-efficiency power generation) which applies R&D tax credits

Monitoring	
Verification	

References:

Ecofys, Comparison of power efficiency on grid level, ECS 04028, august 2004: study for CRIEPI on fossil fired power generation efficiency for 1990-2000 and China, Japan, USA, UK, France, Germany and Scandinavian countries. Average 37-38% for coal, 36-40% for gas and 36-37% for oil.

CE, mei 2006, Nieuwe energiecentrale debat-De CE-bijdrage: coal-reference plant is Nordjylland 3 in Aalborg with 47% (40% with CO2-sequestration), Gas-CC 58% (with sequestration 50%), CHP (electric+thermalefficiency) Gasengine 43+49%, District heating 38+52% and CHP-industry 43+35%. Present coal burning does not fit NEC for SO2 and reduces NOx less than needed.

ECN, 2005?, Quick-scan energy saving policy OECD, appendix interviews: from BM-covenant in NL no substantial improvements to be expected. Minimum standards for new power plants based on actual production circumstances; they should be formulated at EU-level due to market competition.

IPPC-directive (96/91/EC), M2: the permit shall not include emission limit values for direct GHG unless significant local pollution is caused. MS may choose not to impose requirements relating to energy efficiency in respect of combustion units.

KEMA, October 2005, Vienna: Energy efficiency in power plants: efficiency new coal plants 43-47% and new gas-CC 54-58%. Advanced coal plants can even reach 50%.

Eurelectric-interview, June 2006: Best available technique depends on the issue: climate (CO2), acidification (SO2/NOx) or conversion efficiency.
ECCP, June 2001, EC: Improving efficiency one of the emission reduction options in energy supply, with a potential of 100 Mton for 2000-2010 (chapter 3.2)
Wuppertal Institute, Energy efficiency as a key element of EU's post-Kyoto strategy - Results of integrated scenario analysis, 2005 (in ECEEE-2005 proceedings): efficiency of thermal power plants increases from 37% in 2000 to 49% in 2020 by fuel switch and general preference of best available technology. The IPPC-directive can be used to create higher pressure for the implementation of highly efficient technology.

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **TRANSFORMATION**

Characterization of actions

Option Number	**7**
Code/action:	"Off-grid" CHP
Previous MCA Reference:	
Directives:	EU Directive 2004/8/ EG
Subcategory:	adapted EU-legislation
Objective	Wider implementation of micro-scale CHP
Action:	EU/MS to promote/require regulatory change towards facilitation of penetration of "off-grid" power generation – many obstacles to be removed through different measures
Current status	OPET CHP/DHC project: is a systematic effort for the further use and market uptake of different CHP/DHC technologies in favour of EU policies. Most countries support cogeneration with obligating the net operator to purchase co-generated electricity and some kind of remuneration model. Directive on promotion of cogeneration based on a useful heat demand in the internal energy market.
Approach taken	Directive sets a number of criteria for an obligatory analysis of the national potential for high efficiency CHP (including small scale) in each Member State. Support of schemes based on useful heat demand and primary energy savings to be continued or established in the Member States. Issue of guidelines for the implementation of Annex 2 of the Directive regarding the calculation of CHP electricity, including harmonised reference values for separate production. Finally each Member State must report to the EU regularly about the progress in achieving the potential and the actions taken to promote CHP.
Estimated Energy Savings (Mtoe)	16 Mtoe

Assessment criteria	Details	Scoring Narrative	MCA Score
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation	CHP is a generic technology that offers many benefits over separate production of heat and electricity and it can be used with almost any fuel source. There are already security of supply concerns with natural gas so the ability to use CHP with other fuel sources such as landfill gas, sewage gas, biomass (e.g. wood wastes, or peat), or municipal solid waste clearly gives environmental and security of supply benefits. Also off-grid operation gives local security of supply through not being affected by disruptions to central systems. Also, with CHP, there are avoided transmission losses. On-site power eliminates service disruptions caused by grid damage or adjustments to overloads, and provides the power quality needed in many industrial applications. Most "off-grid" CHP plants will be small scale units (for small communities, offices) and can be extended to include micro-generation for domestic users. "Off-grid" CHP also includes "island" systems operating independently on large industrial or commercial sites.	**2**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Small CHP plants, e.g. using by-products such as bark and sawdust as fuel, have made small factories almost self-sufficient in energy and improved their overall competitiveness.	**1**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	The successful implementation of a programme to promote all scale CHP should be underpinned by an active Innovation and Research programme to support the demonstration and use of innovative ideas. This type of research requires more than laboratory research; it requires a significant commitment by industry to demonstrate and use the technologies on a commercial scale and use the operational experience to identify the scope for further	**3**

		improvements. Micro-generation has been at the development stage for many years but, despite Suppliers' claims to the contrary, domestic micro-generation has not yet established commercially.	
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	The cost effectiveness of CHP is reasonably good but each case has to be considered on its merits. Capital costs have been falling and there has been a steady increase in efficiency of energy conversion so local co-generation offers benefits over distant and often less efficient power generation. The promotion and/or regulation of CHP would require some financial support by national and/or local government to ensure that help is properly directed. - this would mainly be in the form of administrative support for regulatory, information dissemination, training and awareness activities. The cost of this would be relatively small compared in the context of the gains resulting from an increased uptake of CHP. Obviously there will be a need for increased funding if this action extends to the provision of fiscal benefits.	**2**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	If in the future micro-generation becomes "must-have" technology (as condensing boilers are today and no longer the expensive alternative to conventional boilers) for domestic energy supply there will be a need to develop an extensive supply chain to support demand.	**2**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Significant barriers remain to be overcome before the micro-generation market takes off; as discussed the technology is not yet commercially proven and the general public is unaware that micro-generation is a potential energy supply option for the home. The proposed promotion of CHP, which should include awareness actions, should help significantly to overcome these barriers. The barriers affecting the uptake of larger scale CHP are less severe.	**2**

Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Studies (7) into the impact of high-efficiency power generation schemes on markets demonstrate that schemes as CHP have the potential to generate employment opportunities. CHP is more labour intensive than conventional energy production, in delivering the same amount of energy output. A higher CHP implementation can therefore benefit not only the national economy but also SMEs at the local or regional level, where it can stimulate local investment and employment.	**2**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the mark	Energy savings and stability are a major motivation in the installation of many distributed off-grid generation systems. Supporting their implementation by promoting new regulations will impact positively on the investment cycle.	**1**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	The competitiveness of the international market will be generally unaffected by this action except for a slight negative discrimination against other energy saving technologies. In the UK there is an obligation for the suppliers to generate a certain percentage of power from 'green' sources; this means that CHP does not necessarily receive favourable treatment by the Regulator.	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Yes, this action would require some financial support by national and/or local government to ensure that the promotional and regulatory activities are properly directed. - this would mainly be in the form of administrative support for regulatory, information dissemination, training and awareness activities. Obviously there will be a need for increased funding if this action extends to the provision of fiscal benefits.	**-1**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission	**2**

		source. Typically CHP will reduce combustion emissions by 30 to 50% compared to separate heat and power generation; therefore medium positive score.	
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source. Carbon emission savings from CHP are estimated as 800 tonnes of carbon emission per MWe of CHP per year (4) compared to fossil fuel consumption. Score medium positive. According to the U.S. Department of Energy, CHP systems could reduce annual greenhouse gas emissions by at least 25 million tons of carbon.	**2**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	The promotion of micro-generation will inevitably engage the general public because this action, inter alia, should be directed at them if there is to be increased awareness of how micro-generation can be used in the homes	**2**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities?	Any positive change to existent regulatory framework will be seen as good governance.	**1**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Provided that the promotional activities taken under this action include a positive attempt to remove barriers (as discussed above) and administrative burdens then this item has a neutral score.	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets) Does it have significant consequences for the financial situation of individuals / households?	Nearly all CHP applications to date have been developed for either the industrial or commercial sectors. Development of CHP systems for the household market – micro-CHP systems as they are commonly called – has been largely neglected because of high unit costs. Recent technological developments with gas-fired engines have, arguably, made household systems economically viable. They can be	**2**

		operated to provide all home-heating needs (for hydronic heating systems); electricity is produced as a by-product.	
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	This action does not have any regional or sector specific effect.	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	There might be some local fuel supply impacts if natural gas is not the preferred fuel	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	This action has no effect on the organisational structure of public authorities.	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	CHP plants can and should exist without support in the medium to long term. The competitiveness of new CHP plants in the short term depends on the specific market situation. However there is not yet an established market for micro-generation and there is unlikely to be significant near term penetration, hence lower score than of "grid-connected" CHP.	**1**
Persistence	Does the action achieve a persistent effect? Does the action irreversibly transform the market?	Once CHP plant is installed then the benefits are long lasting, i.e. for the 20-30 years life time of the plant. The effects of regulatory changes will achieve a persistent positive result.	**1**
Monitoring & Verification	Can action be monitored and verified?	It is easy for the suppliers to 'self-report' on the number and size of CHP plants installed in response to this action. However, it must be recognised that the suppliers would not necessarily admit that some CHP plants would have been installed anyway.	**2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	A positive benefit of this action is the contribution to the energy efficiency.	**2**

Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Changing the energy supply arrangements will not it itself necessarily change consumer behaviour in the absence of supporting measures such as advanced metering and consumer education. However such measures are available through energy suppliers, therefore a low positive score. Even "thinking-about" micro-generation for the home could be regarded as a change in End User behaviour.	**2**
		Major Criteria Score Total	**7**
		All Criteria Score Total	**31**

Notes	

Monitoring	Through existing pathways
Verification	Through existing pathways

References:

1 http://www.energyinst.org.uk/energyreview/display.cfm?q=1
2 http://www.euroace.org/reports/R_Caleb2.pdf
3 http://www.nemw.org/IECEC98.htm
4 Digest of United Kingdom Energy Statistics 2005 ISBN 011 515513 9

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **TRANSFORMATION**

Characterization of actions

Option Number	**8**
Code/action:	"grid-connected" CHP
Previous MCA Reference:	
Directives:	EU Directive 2004/8/ EG
Subcategory:	adapted EU-legislation
Objective	Wider implementation of CHP installation at industrial level
Action:	EU/MS to promote/require regulatory change towards facilitation of penetration of "grid-connected" CHP, via different measures *Note: "grid-connected" CHP includes micro-generation and so this action could impact on households - see commentary below:*
Current status	OPET CHP/DHC project: is a systematic effort for the further use and market uptake of different CHP/DHC technologies in favour of EU policies. Most countries support cogeneration with obligating the net operator to purchase co-generated electricity and some kind of remuneration model. Directive on promotion of cogeneration based on a useful heat demand in the internal energy market
Approach taken	The CHP Directive came into effect on February 21, 2004. In support of the Directive, Euroheat & Power has launched a "CEN/CENELEC Workshop" on detailed rules for calculation of CHP products (CHP electricity, CHP heat, CHP fuel), gathering together the main industry stakeholders.
Estimated Energy Savings (Mtoe)	14 Mtoe

Assessment criteria	Details	Scoring Narrative	MCA Score
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation	CHP is a generic technology that offers many benefits over separate production of heat and electricity and it can be used with almost any fuel source. In reality, because combined cycle gas turbines offer significant efficiency gains over other plant, natural gas has been the fuel of choice. However, there are already security of supply concerns with natural gas. Where CHP can be coupled with other fuel sources such as landfill gas, sewage gas or biomass, it is clearly of benefit to environmental and security of supply aims. CHP plants can also be operated on wood wastes, coal, peat, municipal waste or other secure fuels. While grid connected CHP plants can be centrally dispatched, they can also be operated independently in the event of a disruption to central systems. Also with CHP there are avoided transmission losses. On-site power eliminates service disruptions caused by grid damage or adjustments to overloads, and provides the power quality needed in many industrial applications.	**2**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Grid-connected CHP plant is a proven technology which produces around 10% of Europe's electricity and heat requirements and has a significant growth potential. This will lead to an improved environment and greater economic competitiveness.	**2**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	The successful implementation of a programme to promote all scale CHP should be underpinned by an active Innovation and Research programme to support the demonstration and use of innovative ideas. Regulation, in addition to soft awareness initiatives, may be needed to encourage commitment by industry to implement new and developing technologies on a commercial scale. There is a greater range of proprietary equipment available on the market than previously as new technologies become proven and as a result costs have declined sharply in recent years. The equipment suppliers have a	**3**

		vested interest in supporting research activities because the investment costs, as well as the fuel/electricity cost differential, are significant drivers in developing a cost effective CHP market.	
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	The cost-effectiveness of CHP facilities are more site specific than for other Distributed Generation projects because of the need to find customers with a need for heat. On-site production avoids transmission and distribution costs, which otherwise amount to about 30% of the cost of delivered electricity. Estimated cost of the action: Low	2
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	Supporting "grid-connected" CHP by facilitating access to the market though improved regulation might involve job growth potential in high-tech manufacturing, installation and servicing.	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Giving CHP a high profile will help overcome the barriers, either real or perceived, imposed by the power companies and regulators, e.g. it is often forbidden to route private power lines across property lines. Another issue is that there should be fair and legal access to the electricity grid using standard interconnection procedures and at a fair price that allows for the economic benefits of local generation and superior environmental performance.	2
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Studies (3) into the impact of high-efficiency power generation schemes on markets demonstrate that schemes as CHP have the potential to generate employment opportunities. CHP is more labour intensive than conventional energy production, in delivering the same amount of energy output. A higher CHP implementation can therefore benefit not only the national economy but also SMEs at the local or regional level, where it can stimulate local investment and employment.	2

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the mark	From an investment point of view it is generally easier to find sites for RES and other DG than for a large central power plant and such units can be brought online much more quickly. Capital exposure and risk is reduced and unnecessary capital expenditure avoided by matching capacity increase with local demand growth. Therefore measure should reduce burdens on investors and developers	1
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	DG can also stimulate competition in supply adjusting price via market forces. A DG operator can respond to price incentives reflecting fuel and electricity prices. In a free market environment DG operator can buy or sell power to the electricity grid - exporting only at peak demand and purchasing power at off-peak prices. DG can act as a physical 'hedge' against volatile electricity prices.	2
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Yes, this action would require some financial support by national and/or local government to ensure that the promotional and regulatory activities are properly directed. - this would mainly be in the form of administrative support for regulatory, information dissemination, training and awareness activities. Obviously there will be a need for increased funding if this action extends to the provision of fiscal benefits.	-1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source. Typically CHP will reduce combustion emissions by 30 to 50% compared to separate heat and power generation; therefore medium positive score.	**2**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source. Carbon emission savings from CHP are estimated as 800 tonnes of carbon emission per MWe of CHP per year (2) compared to fossil fuel consumption. Score medium positive. According to the	**2**

		U.S. Department of Energy, CHP systems could reduce annual greenhouse gas emissions by at least 25 million tons of carbon.	
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No effect on equality. The public is becoming increasingly concerned about climate change issues and would welcome any measure which is introduced to facilitate potential mitigation measure such as CHP.	**1**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities?	Actions taken by the suppliers and the electricity companies in response to the Regulators' requirements will be seen as good governance but will not have a wide impact across industry and commerce in the member states.	1
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Provided that the promotional activities taken under this action include a positive attempt to remove barriers (as discussed above) and administrative burdens then this item has a neutral score.	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households	"Grid-connected" CHP includes micro-generation and so this action could impact on households. In the UK the boiler replacement rate is 1.5 million/year. (Ref 4). In the future it is confidently expected that micro-generation will be a viable and attractive option for domestic users - with or without grid connection This impact should be seen as a positive benefit.	2
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	This action does not have any regional or sector specific effect.	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	**No** net effects expected; overall there may be some local fuel supply impacts if gas is not the preferred fuel.	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	This action has no effect on the organisational structure of public authorities.	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	CHP plants can and should exist without support in the medium to long term. The competitiveness of new CHP plants in	**2**

		the short term depends on the specific market situation.	
Persistence	Does the action achieve a persistent effect? Does the action irreversibly transform the market?	Once CHP plant is installed then the benefits are long lasting, i.e. for the 20 years life time of the plant. However, there might be times where the plant is taken out of service because gas and electricity prices become unfavourable.	**2**
Monitoring & Verification	Can action be monitored and verified?	It is easy for the suppliers to 'self-report' on the number and size of CHP plants installed in response to this action. However, it must be recognised that the suppliers would not necessarily admit that some CHP plants would have been installed anyway.	**2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	A positive benefit of this action is the contribution to the energy efficiency.	2
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Generating energy in a more efficient way does not affect directly the end-user behaviour, so low positive score.	1
		Major Criteria Score Total	**8**
		All Criteria Score Total	**33**

Notes	

Monitoring	Through existing pathways
Verification	Through existing pathways

References:

1 http://www.euroace.org/reports/R_Caleb2.pdf

2 Digest of United Kingdom Energy Statistics 2005 ISBN 011 515513 9

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **TRANSFORMATION**

Characterization of actions

Option Number	**9**
Code/action:	new CEN STANDARD to regulate (district) heating systems
Previous MCA Reference:	G7
Directives:	-
Subcategory:	adapted EU-legislation
Objective	Reduction of energy losses and GHG emissions
Action:	EU to introduce new CEN STANDARD to regulate district heating systems
Current status	OPET CHP/DHC project: is a systematic effort for the further use and market uptake of different CHP/DHC technologies in favour of EU policies. European standards for calculating energy performance of buildings produced by CEN Energy Demand Management Committee (EDMC) (Article 14 Committee) SEI and DEHLG represented on EDMC EDMC Sub-Group Monitoring CEN Standards development EPBD Concerted Action Project (23 Member States)
Additional Comments	There *is no single CEN standard applicable to Di Heating (DH) systems and, arguably, it is not approp or indeed possible, to develop such a single DH stan This is because DH systems consist of many component boilers and burners, pumps, network infrastructure (i.e pipes of which there are many types and des substations, local pipework and internal building syste deliver heat to End Users. The operation of all these must be supported with accurate metering and co systems.* *There are separate standards for all these items but Act recognises the need for DH to be considered holistical for example, consolidation into a single "best pra performance standard.* *Also, Action 9 is only one of many actions that cou taken to promote DH. (DGTREN are planning a separa on DH)*

	Approach taken	Increasing the market penetration of DHC through new and expanding existing DHC systems; Develop promotional information on the benefits and potential of DHC/CHP relative to reducing pollution and GHG Establish CHP implementation targets; Ensure access, under transparent and non-discriminatory terms, to the power grid; Encourage energy and CO2 tax schemes that at the very least do not discriminate against DHC and CHP, and preferably would provide positive incentives. Focusing upon the whole supply chain, and the related technologies, connected with the use of biomass resources for combined heat and power and district heating purposes
	Estimated Energy Savings	2 Mtoe

Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	A new "best practice performance standard" to improve operating efficiency of DH systems will indirectly improve the security of supply as result of reduction demand of primary energy.	**1**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	The major components of a DH system (boiler plant, distribution network - pre-insulated pipes, sub-stations, flow and temperature controls, heat meters, etc) are generally sourced from within the EU. The regulation will require increased metering and controls, the components of which could be supplied by non-EU rivals. However, much of the rehabilitation work necessary after the collapse of the command economy has now been completed.	**1**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	A new DH "performance standard" will promote better control of systems which, in turn, will promote innovation and research into both supply and ed use efficiency and control, including building standards.	**2**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	The industry will take measures to ensure that their actions are cost effective.	**2**

Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	This action impacts over a very wide range of equipment from that in the boiler houses, the distribution networks, the heat sub-stations and the heat meters and temperature controls in the individual apartments, Rehabilitation activity will cause increased economic activity in the sector, particularly as district cooling becomes more widely adopted.	**1**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	This action could help break down market barriers, i.e. lead to investment which might not otherwise have gone ahead. **Disconnections** are the main threat for DH - i.e. customers switching to gas so that the same DH overheads have to be met by fewer and poorer End Users so jeopardising the future commercial viability of the DH plant. This occurs when gas is priced at an artificially low level; e.g. when the DH company pays the same price for gas as domestic users. Other "barriers" limit new build DH; (Ref 2). *Also see note below:*	**1**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	In those member states where this widespread use of DHC there could be significant impact at the macro-economic level, e.g. there has been significant inward investment in previously ailing companies, e.g. Dalkia in Tallinn, Bratislava and Ostrava who have taken them over, refurbished them and, in some cases, converted them to CHP. The attraction is a secure and long term customer base.	**2**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Plant and equipment which is designed and specified to good engineering standards is more likely to attract finance.	**1**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	The action could impact positively on the internal market as industry reacts to the need for improved standards.	**2**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Government finance to support this particular action would be insignificant - however, wider support may be needed to ensure that DH remains commercially viable and socially acceptable in the future.	**0**

Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source. Typically CHP in this situation will reduce combustion emissions by 30 to 50% compared to separate heat and power generation; therefore medium positive score.	**2**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source. Carbon emission savings from CHP are estimated as 800 tonnes of carbon emission per MWe of CHP per year (1) compared to fossil fuel consumption. Score medium positive.	**2**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	As householders gain more control of their heating bills, the public will become better informed on how they can make a difference to both their personal situations and to climate change mitigation. Existing DH users must be "dissuaded" from switching to an alternative energy supply option.	**1**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities?egard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	This option will require action by local authorities to ensure compliance with standards. As discussed above, the public will become better informed on how to improve the effectiveness of DH systems. Action at the national or municipal level may be needed to discourage disconnections and so prevent possible closure of DH plants and loss of valuable infrastructure assets. This can be done by zoning of cities according to heat supply (as done in DK) or through persuasion (as done in Debrecen in HU).	**0**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Discussed above; SME's are not affected.	**0**

Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Improved DH standards will potentially reduce heating bills depending on consumer use. Additional support required to ensure consumers use energy efficiently.	**1**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	This action applied to those member states where there is widespread use of district heating; SME's are not affected.	**2**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	The demand for transport could be reduced for solid fuel fired plants if gas used, conversely if biomass is used transport use would increase.	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Some regulation will be needed to ensure compliance with a new standard.	**1**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	There will be some short term improvements as low cost measures are implemented followed by longer term gains on plants where extensive rehabilitating is needed to meet new performance standards.	**1**
Persistence	Does the action achieve a persistent effect? Does the action irreversibly transform the market?	Improved DH standards will have a permanent long term effect over the 20 year life time of the plant and beyond. The maintenance needs for upgraded plant will be much less than for old plant in a bad state of repair. This is already being seen in those DH systems serving towns in central and Eastern Europe which have been modernised in recent years. There will be an increased market for smart meters and sophisticated control systems.	**2**
Monitoring & Verification	Can action be monitored and verified?	Adherence to a standard will be subject to regulation and enforcement. 'Before' and 'after' performance monitoring will form the basis of key performance indicators (KPI's) set for the heat supply companies.	**2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Substantial refurbishment of DH systems is expected in new accession countries; this proposed action would impact significantly on DH plant upgrades.	**1**

Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	If 'wasted' heat has to be paid for by individuals then their behaviour will change to ensure that their bills are acceptable. However, they need meter readings and controls to enable them to take conservation action. Consumer will need education to use energy efficiently; this activity would be complimentary to this action.. Also, as discussed above, disconnections have to be discouraged.	**0**
		Major Criteria Score Total	**6**
		All Criteria Score Total	**28**

Notes	The UK Community Heating programme has met with limited success and the £10m earmarked for future projects is now longer being committed.

Monitoring	
Verification	

References:

1 Digest of United Kingdom Energy Statistics 2005 ISBN 011 515513 9

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **FINANCING**

Characterization of actions

Option Number	**10**
Code/action:	rearrange existing financing mechanisms, including focused organization of clearinghouse-type (new MS), including role of energy companies, pricing, etc.
Previous MCA Reference:	F4
Directives:	-
Subcategory:	Access to financing
Objective	Make energy efficiency funds more available in small amounts through intermediaries
Action:	EU to incentivise the use of intermediaries for small energy efficiency loans etc, for example by extending access to ECB or (through Energy Services Directive obligation) MS capital as a revolving fund for "soft loans"
Current status	Available in some countries (eg Carbon Trust Zero Interest loans to SMEs in UK), but not in most
Approach taken	
Estimated Energy Savings	13 Mtoe

Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The effect of such a measure will be "second order" but positive, as reduced energy demand inherently eases supply security. It will not encourage supply variety in fuels or generating technologies, or reduce the likelihood of supply "glitches"	**2**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	This action will improve the market for otherwise marginal energy efficient products. It would thus stimulate a "home market" which would ultimately benefit EU players when exporting, particularly as energy prices are forecast to continue to rise. State Aid issues are a major consideration in UK. The present UK (Carbon Trust) model is allowable only for SMEs, when all companies could benefit. Larger Loans could be extended with bigger savings, but these would fall foul of competitiveness measures. Additionally the scheme has been of disproportionate benefit to the manufacturers of green hardware, who have been encouraged to use it as part of their marketing. This has effectively made green manufacturers (be they from the EU our elsewhere) more competitive than others.	**2**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Innovation would be a logical outcome of this action, whether in terms of new products or of innovative financing mechanisms. As ever, the challenge will be identifying the cut-off between qualifying and non-qualifying technologies, and observing that energy efficiency is always a second consideration in equipment designed to achieve a different function	**1**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Making cash available at a low interest rate for qualifying technologies is unlikely to be particularly expensive. Arguably administration of the scheme could be a major cost consideration, unless clear and unambiguous guidelines can be readily achieved. Experience in the UK (CT zero interest loans) shows that this is not insurmountable, particularly if Suppliers' or ESCOs' own marketing expenditure can be leveraged. CT Loans are £10-100k zero interest loans with a three to five year payback, based on energy saving. A typical loan of 60k paying back in 4 years thus saves £15k/yr worth of energy. The cost to CT of this is the equivalent interest payable on the outstanding debt over the period i.e.	**1**

		approximately £12k (plus the cost of administration). CT believes this to be cost effective. Default rates have been very low, but it is important to remember that these are unsecured loans, so are unlikely to be recovered in the event of business failure. For this reason CT undertake stringent credit checks before issue	
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation is expected to be proportional to the energy saved, or the investment amount. Consequently a low positive score	**1**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	This action directly addresses known market barriers. Ready access to capital, particularly for SMEs, is a major concern. Investment horizons for Energy Efficiency CapEx often exceed companies' investment guidelines, so lease alternatives may be very attractive.	**3**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	The beneficial macroeconomic effects of improved energy efficiency would assist the EU at a micro-economic level, and this measure would help overcome the observed market failures, inherent in human nature, of Energy Efficiency being "obviously the right thing to do" but "not top of the corporate priority list"	**1**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	This measure improves the availability of equipment, as it offers an alternative financing stream. This option value is of benefit to businesses. Suitable intermediaries may not be in existence in some Member States, and this service will be a new offering for others. If ESCOs are selected as intermediaries then a new market can potentially be reached	**2**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Funding of this kind already exists in several member states, leading to competitive advantage for recipients. Universal accessibility would benefit the internal market. The present UK CT scheme gives participant SMEs an advantage over non-SMEs in the UK (presumably an intended result of state aid rules)	**1**

Government budget	Does the actions require substantial financial support at the cost of the government budget?	Making capital available for a programme of this kind is necessarily at the expense of alternative investments. It should be noted that this is lease money - not grants - but inevitably some defaults occur, and such a scheme costs for administration. Increasing cash in circulation will have an inflationary effect from a monetary perspective	**-1**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved.	**2**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	**2**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	If universally applicable, this measure is inclusive. It has little communication value	**1**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	This action has little effect on public governance	**0**

Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	This action provides business with options, and thus must be welcome. The benefit is received disproportionately by SMEs, which is a particularly attractive side effect. Recipient businesses in the CT scheme need to subject themselves to credit checks similar to those undertaken for an equivalent loan by a commercial bank. This has not generally been deemed onerous, and complaint rates have been very low, usually only arising when applicants are turned down on the basis of credit checking. Unlike commercial banks (who could increase the lending rate for apparently risky loans) the CT scheme is "digital" (yes or no) - the 20% or so of companies that get turned down on the basis of credit risk having put in effort are often indignant.	**2**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Lease schemes applicable at the Domestic scale tend to be less cost effective due to the specific energy intensity of the hardware involved. However, there is again the potential to provide options, which are welcome.	**1**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Industry sectors where equipment is readily available but a little bit too expensive tend to benefit disproportionately from lease schemes of this kind. An example of this from the UK would be paint dryers used in automotive repair, where many SME customers have been happy to pay a little more for existing energy efficient models when granted access to capital. Some "big ticket" sectors (eg petrochem) will be less well suited to this approach/ It is important to observe that the strength of these sectors will differ by geography, and that networks, trade associations etc have a role to play in education. Otherwise this action will be independent of geography. In the case of the CT scheme, there has been a deliberate attempt to spread loans across multiple sectors. As well as meeting political "Universal Service" objectives, this has the added benefit of shielding CT from default in the event of sectoral downturn. For example the portfolio risk is lower than if all the loans went to Hotels (given that occurrences like the UK's Foot and Mouth outbreak bankrupted a lot of hotels)	**1**

Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Only if extended to transport products - i.e. letting taxi firms lease hybrid cars. Not presently within the scope of the CT scheme, because Transport is the responsibility of a different agency. This highlights the importance of intermediaries having a suitably wide jurisdiction.	**1**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No change needed, except where the Intermediaries selected are working in Public sector, for example in Regional Energy Agencies. The CT experience is that local authorities treat this very differently. Some market the Loans for CT, others ignore it, others are hostile and present alternative offers	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	In practice the adoption of these kinds of schemes takes time. A "soft" lease is merely an alternative to existing purchase schemes, and customers must be comfortable with the cost benefit. Evidence is that the adoption of such schemes grows only gradually. Once the equipment is procured, however, it has an immediate beneficial effect (unlike some slower behavioural measures). CT's loan scheme targets SMEs, which are a notoriously difficult market to address. SMEs are distrustful of "government" and have stretched management resources. Typically businesses will only adopt a new idea if they have seen one of their peers benefit from it. Correspondingly it has taken the CT scheme three years to reach its present £1m/month level, but it has been growing at about 50%/yr.	**1**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Improved Equipment, once purchased, has a long term effect.	**1**
Monitoring & Verification	Can action be monitored and verified?	Most existing schemes validate the availability of leases on the basis of purchase orders etc. in the same way as a commercial bank. This is readily achieved. It can never be guaranteed that, once fitted, the equipment will be optimally operated, but this is in the interests of the owner, and as such ought to be reliable. The CT scheme seeks invoices and commissioning certification.	**2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	none	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	This action concerns hardware, not behaviour	**0**

Major Criteria Score Total	**8**
All Criteria Score Total	**27**

Notes	

Monitoring	
Verification	

References:

1. Klinckenberg, Investing in Building Energy Efficiency in Europe, EuroAce, 2005
2. CSE / Energy Saving Trust, Thinking out of the Box, April 2004
3. Financing Energy Efficiency, IBRD ESMAP May 2006
4. "Action not Talk", Energy Efficient Europe initiative
5. Ecofys, Cost-Effective Climate Protection in the EU Building Stock, EURIMA, 2005

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **FINANCING**

Characterization of actions

Option Number	**11**
Code/action:	Increasing the utilisation of energy service contracting / ESCO financing types
Previous MCA Reference:	F5
Directives:	Energy Service Directive
Subcategory:	Alternative financing measures / access to financing
Objective	Increase the utilisation of shared savings financing to increase investments in energy efficiency Making investments in EE projects more attractive through lower interest rates
Action:	EU/MS to increase policy support for ESCOs through (1) dissemination of their activities, (2) the development of EU wide quality standards for ESCO projects, (3) standardised project monitoring and verification schemes, (4) model contracts and (5) improve access to (private) financial sources (e.g. cooperation with private banks) These measures could be combined with providing *low-interest loans to ESCO projects*
Current status	ESCOs are well developed in a limited number of EU MS, but a large potential for energy efficiency projects through ESCOs remains unexploited EU-wide. Part of these unexploited energy efficiency projects will possibly not be realised otherways due to lack of funds or long pay-back times
Approach taken	Promote the establishment and development of ESCOs in all EU MS through the measures listed above. Focus will be on the private sector. In addition, providing easily accessible loans to end-users through ESCO's, that may promote the ESCO business

	Estimated Energy Savings	It is estimated that promoting ESCO type projects can lead to around 1% additional energy savings in the private sector. Total energy use in BAU by 2020 for private sectors (Final Energy Demand) is: industry (382 Mtoe) + services (181 Mtoe) = 563 Mtoe. With ESCO's contributing approx. 1% extra savings, the savings potential is **< 6 Mtoe.** This equals to **0,3%** of total primary energy consumption (1885 Mtoe) according to BAU scenario --> small savings

Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Reduced energy demand inherently eases supply security, but part of the savings regards electricity that is generated by "secure" nuclear, coal or hydro. It will not encourage supply variety in fuels or generating technologies, or reduce the likelihood of supply "glitches"	**1**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Additional energy efficiency projects lead to lower energy costs. However, ESCO's will not focus on the large energy intensive companies that serve the world market, where energy efficiency is important for competitiveness. Therefore the effect on competitiveness of energy users is small. Higher investments in energy efficiency projects will be beneficial for manufacturers of EE equipment, but not necessarily of EU-based firms only	**1**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Limited, as ESCOs usually invest in conventional technologies with lower pay-back times	**0**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	The start up costs of ESCO type projects may be high before any result is achieved. E.g. high transaction costs for contractual arrangements, the need to carry out detailed energy audits. These costs are made by the ESCOs and should somehow be covered. The ESCO's clients will in the end pay these costs. For some (mainly smaller) projects, these costs will not compensate for the energy cost reduction and conventional financing (own capital or loans) may be more cost-effective. Therefore neutral score	**0**

		(0)	
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	For the indirect employment effects of energy savings see general remarks. Given the small total savings the indirect effect is rather small. The magnitude of direct job creation through establishment of new ESCO's is also expected to be proportional to the energy saved, or the investment amount. Consequently a low positive score.	**1**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	The action has a major influence on access to finance, not available for private companies (especially SMEs) in traditional project financing for energy efficiency. Standardisation of the ESCO financing approach may make banks more willing to provide credit, meaning less perceived risks for banks. Other main barrier to be addressed is lack of knowledge of ESCO type projects among potential target groups.	**2**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Growth of the ESCO business in the EU and indirect economic effects of energy savings will have no traceable macroeconomic impacts.	**0**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	This option will directly affect the cost of energy inputs. ESCO projects have relatively large transaction costs (especially as this is not the firms core business), but could be reduced by e.g. standardised contracts. However, ESCO projects may be an easier way of getting access to finance	**1**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Common standards for ESCO projects improve equal competition within the EU among companies claiming to offer ESCO services. No negative impact on competition within the EU in general	**0**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	The actions presented above require some actions from government agencies and some government budget (e.g. costs of setting up national ESCO programme, institutional setup). Low-interest loans can be provided by "green" financing schemes with a relatively	**0**

		few burden on the government budget.	
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	See general remark on the relation between total energy savings and (non-CO2) emissions. Here savings regard for a great part gas (with fewer emissions) and electricity, partly from "clean" nuclear and hydro. Therefore the reduction of emissions is relatively limited The magnitude of improvement is low due to the amount of energy saved.	**1**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	See general remark on CO2-emision reduction and total savings. Here savings regard for a great part gas (with fewer emissions) and electricity, partly from "clean" nuclear and hydro. Therefore the reduction of emissions is relatively limited The magnitude of improvement is low due to the amount of energy saved.	**1**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No impact expected	**0**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Government stimulation of ESCO's part of normal policy activities. No impact expected	**0**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Accreditation / introduction of standardised monitoring and verification procedures present a burden on the ESCO's. However, energy users save much time and effort by working with ESCO's instead of getting information, (more costly) financing, etc. themselves --> administrative burden decreased	**1**

Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	No impact expected	**0**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Specific regions or sectors are not likely to be influenced. The action will lead to the establishment of new ESCOs, some of them linked to energy suppliers, some of them independent SMEs. In general, the impact is neutral (0)	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Not relevant	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Possible role of government agency in accreditation of ESCOs, taking care of dissemination etc. This should be part of normal policy execution.	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The adoption of the ESCO concept by firms takes time, they have to get familiar with the approach and first projects requires some preparation. When started, the number of projects by ESCOs can increase quite fast, especially with good project examples. Overall a good contribution before 2012.	**1**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Once firms are aware of the possibility, they will see the ESCO concept as a good possibility of reducing energy consumption. Projects once realised have a long-term effect. However, not sure whether ESCO business will decrease after attractive and less complicated projects have been realised. Uncertainty about long-term potential of ESCO projects	**1**
Monitoring & Verification	Can action be monitored and verified?	ESCO's need to monitor in detail the energy savings of their projects. Therefore it is possible to only monitor the no. of projects and total energy savings.	**2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	None	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Implemented ESCO projects do not necessarily lead to change in end-user behaviour	**0**
		Major Criteria Score Total	**4**

All Criteria Score Total	13

Notes	

Monitoring	
Verification	

References:

Steve Sorrel, *The Contribution of energy service contracting to a low carbon economy*,
Tyndall Centre Technical Report No. 37, November 2005
Paolo Bertoldi & Silvia Rezessy, *Energy Service Companies in Europe: Status Report 2005*,
European Commission, DG Joint Research Centre, Institute for Environment and Sustainability, Renewable Energies unit, Brussels, 2005

Energy saving potential based on BAU scenario NTUA et al. (EU25) and expert estimate

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **FINANCING**

Characterization of actions

Option Number	**12**
Code/action:	Producer pays less tax for producing energy efficient goods (US model)
Previous MCA Reference:	F6
Directives:	-
Subcategory:	Access to financing
Objective	Provide complete range of efficiency incentives across full supply chain
Action:	EU to incentivise production of energy efficient products through favourable taxation rate in Member States
Current status	Incentives for producing energy efficient products are market driven
Approach taken	provide a full supply chain model from producer to purchaser/vendor to end-purchaser/installer provide a suite of integrated products by linking measure with, for example, enhanced capital allowance scheme (F13). Would apply to products listed on Energy Efficiency Product Listing or equivalent
Estimated Energy Savings	15 MToe

Assessment criteria	Details	Scoring Narrative	MCA Score
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	No impact on security of supply; No divergence issues; No risk of supply disruption; Potential for increase in diversity of generation technology, Overall score of 2 as 10 Mtoe.	**2**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	A change in incentivisation for producing energy efficient products increases competition within the EU, providing that it uniformly applied, will give the EU states a competitive advantage over non EU countries. No evidence that it provokes cross border investment flows. A medium positive, +2 Implementation of such a supplier taxation regime is not straightforward in a market in which multinationals are major players. It is anticipated that the most equitable means of levying the taxation is against the national Limited Company in the country of manufacture. Thus Nissan UK Ltd would receive this beneficial fiscal incentive in the same way as a 'true' EU domiciled company like Peugeot. Any alternative interpretation could be deemed anti-competitive. This interspection would make the EU an attractive manufacturing base, while not necessarily advantaging EU players. Care would need to be taken in implementation to avoid 'Transfer pricing' issues, for example when defining local content vs. assembly operations	**2**

Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	The UK government has already used grants to stimulate the market for new technologies, e.g. 50% grants for photovoltaic installations. Such policies help speed products to reach a self sustaining price more quickly. (Reference 1). Such policies help speed products through the initial high cost, low volume period of their production, hence can reach self sustaining price more quickly. There is a potential for new technologies and production methods. No overall effect on resource efficiency. A medium positive, +2. Evidence to directly link fiscal positions and R&D is notoriously difficult to establish, even where the sole intent of a fiscal tool is increasing R&D (for example the newly installed corporation tax regime in the UK). It seems likely that integration between such R&D incentives and the proposed action would be potentially powerful, and encourage, as a minimum, reallocation of R&D and manufacturing effort to EU states. Empirically it is attractive to observe that fiscal attempts at stimulating the demand site have been more successful than supply side for example the Danish wind industry or Japanese solar are more competitive and lower taxed UK players.	**2**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Research studies by the Building Research Establishment show that the time when people are more likely to invest in energy efficiency is when purchasing and moving into a new home (Reference 2). The stamp duty paid for the majority of house transactions provides an opportunity for rebates, or a fund for grants to encourage owners to put energy efficiency at the top of their priorities in initial alterations and renovation of their homes. A low positive, +1. Clearly some tax cuts can encourage both the supply and demand side (as with the stamp	**1**

		duty example). Direct supply side fiscal tools for example corporation tax breaks, or VAT exemptions are relatively cost effective in that they do not cost a lot to implement. It is easier to directly tax a small number of manufacturers at source than a large number of consumers. It is this logic that is driving the UK government to focus its energy efficiency effort on power suppliers instead of consumers in the (yet to be unlevied) energy white paper. Of paramount importance here, however, is the question of materiality. If the fiscal incentive is insufficient it will not affect behaviour, but merely be treated as increased margin. An example of the failure of a fiscal incentive in the UK is the Enhanced Capital Allowance Scheme, the impact of which has been muted by its high complexity vs. its modest materiality.	
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	An incentivisation of production of energy efficient products will maintain current job levels within the industry and may in the longer term increase the number of specialist jobs in the EU. This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation is expected to be proportional to the energy saved, or the investment amount. Consequently a low positive score.	**1**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	There will need to a uniform adoption of incentivisation across the EU member states and may take some time to agree and implement: neutral. For the most part, manufacturers can be relied upon to recognise and invest for attractive markets. The availability of suppliers is rarely a market barrier for take up if demand exists. It is possible that companies reluctant to invest is tooling, R&D etc., for new product may push old product and entail a market barrier, but this is not a major effect.	**0**

Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Certain parts of the energy efficiency industry have already seen demand exceeding the level of trained staff, notably those in fitting gas heating systems. It is suggested that there should be tax allowances for companies training installers, grants payable to trainees, and tax incentives for investors in energy efficiency companies similar to the Enterprise Investment Scheme. Unless some these or similar policies are adopted there will be a skills shortage and / or lack of investment in the energy efficiency market., a low positive.	**1**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	The industry is already seeing a shortage in the key skills required for energy efficiency (See also Macroeconomic Environment), no effect on finance, there is a potential to impact on the investment cycle, No other effects, overall neutral, 0.	**0**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	There will need to be a universal adoption of incentives across the EU and this will be by negotiation with member states and may take a period of consultation, low negative, -1.	**-1**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	It is anticipated that significant financial support from government will be required in order to publicise and fund any energy efficiency incentives, medium negative, -2	**-2**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	**2**

The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	**2**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	The measure is not expected to lead to greater in/equality. The public will be better informed of particular issues. Arguably the highly skilled, and already privileged, group may become more privileged, but, this is not a major effect.	**0**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	The incentivisation of energy efficient products will have to be agreed within the EU. Protocols will need to be established to the address the issue of identifying net efficiency impacts of energy efficiency improvements that qualify for allowances. (Reference 4). There is no change in responsibilities for institutions and administrations. Any savings or gains for the end user will have to publicised by the government. There is no detriment in the access to public information. However these measure will take a period of time, possibly 3+ years to implement if agreement is required across the EU, hence negative score, -1	**-1**

Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	There are ongoing burdens on businesses where incentives for energy efficiency measures for different materials and products already exists. Changes will impose burdens particularly on SMEs, There may be a need to change literature to highlight to consumers the advantages of purchasing goods that have effectively been subsidised, hence a low negative, -1. The means of implementation will determine the true administrative cost to industry. Examples exist of schemes that we perceived as disproportionately onerous to apply (for example, Enhanced Capital Allowances in the UK), and alternatively cheap to apply models (e.g. Company car taxation in the UK). Most models fall somewhere in-between (e.g. UK Climate Change Levy Agreements) and the perceived costs to businesses for administration are weighed against the materiality of benefits. Ultimately the very fact that taxation on companies is attractive to government because it is easier to tax companies than consumers proves that there must be some administrative burden faced by businesses.	**-1**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Incentivising the production of energy efficient products, will bring about price reductions for consumers. For example energy efficient white goods could boost the sale of greener fridges by around 90,000 each year which is a significant step towards reducing energy consumption by households. The CO2 and financial savings to be gained are significant if everyone in the UK installed loft insulation up to 270mm thickness. The amount of money saved would pay for the energy bills of over 800,000 families in a year. A medium positive, +2. (Reference 3)	**2**

Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	The measure is not expected to impact on certain sectors or regions or SMEs. In the broadest sense this approach is likely to benefit manufacturing sectors in the energy efficiency space, but we will treat this as neutral.	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No effect on demand for transport, unless applied to transport vehicles.	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	There may be a requirement to either restructure or setup a new authority in order to administer and monitor the incentivisation production of energy efficient products; a low negative. The main demand here will be for monitoring and applying the fiscal systems transparently. It is likely that this role could be adapted by e.g. auditors if public authorities do not want to take it up.	**-1**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	There will be an immediate and perceivable reduction in cost of energy efficient products which in turn would drive a consumer towards those products. The downside is that in order to achieve to uniform incentives across the EU will take a period of time to implement. Overall a neutral effect.	**0**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	There will be a persistence level providing incentives are maintained for energy efficient products. A lo positive, +1.	**1**
Monitoring & Verification	Can action be monitored and verified?	The action can be monitored and verified. For products that have received incentives at the production stages, will need to be clearly labelled and identified with benefits to the consumer or end user otherwise any advantages are lost, score low positive, +1. Verification is easier for supply side than demand side.	**1**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	No other known effects.	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	There is potential for a consumer to make a more informed choice in the purchase of goods. Score low positive +1.	**1**

Major Criteria Score Total	**4**
All Criteria Score Total	**12**

Notes	

Monitoring	
Verification	

References:

1 web www.ukace.org/pubs/consult/treas1002.pdf Treasury Consultation on Economic Instruments to Improve Household Energy Efficiency

2 Evaluation the Effectiveness of Home Energy Report, Rosie Parnell, Sheffield University, September 2001 (BRE have reached similar conclusions)

3 B&Q commissioned report (April 2006) conducted by Centre for Economics & Business Research (CEBR)

4 web www.aceee.org/energy/multipulate.htm American Council for an Energy Efficient Economy

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **Transport**

Characterization of actions

Option Number	**13**
Code/action:	Road pricing
Previous MCA Reference:	T1
Directives:	-
Subcategory:	Tax measures
Objective	Reduction of km driven
Action:	EU/MS to make driving costs more km depending. For instance the car or road tax can be made variable. Also area and congestion charges used for traffic management have a km reduction effect.
Current status	Area pricing is is implemented in several European cities like London and Stockholm. Road pricing for freight vehicles is implemented in Germany and Austria (and Switzerland).
Approach taken	Austria uses a pre paid system with a transponder and manual enforcement (i.e. pulling people over); Germany uses several systems including an on-board unit with GPS. In Stockholm the licence plate is read and a monthly bill is send to the car owner.
Estimated Energy Savings	Saving < 1% (only freight) to 4% (all vehicles) of road transport consumption, saving 3-15 Mtoe in 2020. Up to 10% is mentioned in literature. Local savings due to an area tax can be 10-20%.

Further information: The effect is related to the level of additional costs. For the USA a study says that a complete flexible insurance premium would mean a mean level of 6 ¢/mile (about 10 eurocent/km). This could result in a travel reduction effect of 10% (based on 1991 figures) (VTPI, 2005). In the EU the level of fuel costs is due to the taxation already higher; so the relative increase will be lower. It should be mentioned that the minimum tax level in the EU for gasoline is 0.359 euro/l and for diesel is 0.302 euro/l (about 1.5 - 3 eurocent/km). This is about half of total governmental income from cars (incl. VAT) (ACEA, 2006). A Dutch study on making the road tax and part of registrations tax flexible by 2008 estimates the CO2 reduction effect in 2020 on 6%. But this is with a frequently km-use bills and mobi meters. Dutch publications mention that not only the level is important, but also how often users have to pay specific km-related bills (how stronger the relation is between trip and bill, how stronger the reduction effect).

Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	See general remark on relation with total savings. Given that total savings consist of oil products only, the action has a substantial impact on security of supply.	**2**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Competitiveness of transporters in EU is not influenced as road transport does not compete world wide.	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Production of on-board units combined with GPS might stimulate industry. The use of the Galileo satellite navigation system can be interesting in this field. Increase in transport costs can lead to efficiency improvements in logistics.	**0**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Because it regards a shift between taxes for vehicle owners overall costs for the sector do not change (but there is a shift in cost to vehicles driving more km). If the tax level is calculated once a year, the km measurement cost are low € 5 - € 10/y. If the tax level is calculated frequently by using electronic in car equipment (mobi meters), at investment cost	**2**

		of € 100 - € 150/car (excl. mounting), costs are higher. Mobility reduction is normally very cost effective; but additional public transport has also costs. The London area tax has overall a positive financial effect (Dix, 2006).	
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	Extra jobs in the car industry, in manual enforcement, and in expansion of public transport.	**1**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	No impact known	**0**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	The action leads to less car driving and less fuel consumption. Less congestion due to the action saves time and costs in the transportation sector, and indirectly lowering production costs.	**2**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	No effect expected	**0**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No effect expected	**0**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Substantial investments in reading equipment but lower costs for new roads and road maintenance. Road pricing might be budget neutral by lowering other taxes.	**0**

Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	See general remark on relation with total energy savings. Energy use in transportation has a relatively large effect on air quality. Therefore the savings lead to substantial reduction of emissions.	**3**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	See general remark on relation between total savings and CO2-emissions. The savings constitute only oil products and will lead to a substantial reduction in CO2 emissions.	**2**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No effect expected	**0**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	No effect expected	**0**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	No effect expected	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	They have to pay more (odometer audits or mobi meters) but they gain if their car-mobility is reduced. Small effect in more use of public transport and less passenger car km (negative).	**-1**

Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	No effect expected	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Mobility will be reduced	**3**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	If they have to register the car km (for instance by paying the infrastructure for automatic reading or the mobi meters), this will lead to additional costs.	**-2**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The shift in taxes can be implemented before 2012 with immediate effects on savings. More complex systems might need extra time. Overall a medium score.	**2**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	The shift between taxes or area pricing can be redirected again, although not to be expected. Overall a neutral score.	**0**
Monitoring & Verification	Can action be monitored and verified?	Pay-As-You-Drive pricing requires verified mileage data. Vehicle owners can report odometer readings, by email or mail, with random verification spot checks. Automated data collection is also possible; and done with current technology (mobi meters). Thirdly odometer audits can be done at costs € 5 - €10 with normal vehicle service (VTPI, 2005).	**-2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Accidents will decrease in proportion to less vehicles on road	**1**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	More use of public transport	**0**
		Major Criteria Score Total	**8**
		All Criteria Score Total	**13**

13

Notes	

Monitoring	
Verification	

References

Directive 1999/62/EC of the European Parliament and the Council of 17 June 1999 on the charging of heavy goods vehicles for the use of certain infrastructures. Official Journal of the European Communities, L 187/42, 20 July 1999. http://europa.eu.int/eur-lex/pri/en/oj/dat/1999/l_187/l_18719990720en00420050.pdf

Directive 2006/38/EC of the European Parliament and the Council of 17 May 2006 amending Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures. Official Journal of the European Communities, L 157/8, 9 June 2006. http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_157/l_15720060609en00080023.pdf

ACEA (2006) *ACEA's annual Tax Guide 2006.* http://www.acea.be/ASB20/axidownloads20s.nsf/Category0ACEA/CED7D957932102C5C125714D002D4DF4/$File/2006ACEATaxGuide~Introduction.pdf, ACEA, Brussels, 2006

Brink, R.M.M. van, et.al. (2004) *Optiedocument verkeersemissies; Effecten van maatregelen op verzuring en klimaatverandering. (Assessment of options for reduction of acidifying and climate changing emissions in the transport sector; in Dutch).* RIVM report 773002026/2004, http://www.mnp.nl/nl/publicaties/2004/Optiedocument_Verkeersemissies__effecten_van_maatregelen_op_verzuring_en_klimaatverandering.html, RIVM/MNP, Bilthoven. August 2004.

VTPI (2005): *Pay-As-You-Drive Vehicle Insurance; Converting Vehicle Insurance Premiums Into Use-Based Charges.* http://www.vtpi.org/tdm/tdm79.htm. TDM Encyclopaedia, Victoria Transport Policy Institute, Victoria, Canada, Updated December 14, 2005

VTPI (2006a): *Road Pricing; Congestion Pricing, Value Pricing, Toll Roads and HOT Lanes es.* http://www.vtpi.org/tdm/tdm35.htm. TDM Encyclopaedia, Victoria Transport Policy Institute, Victoria, Canada, Updated April 4, 2006

Harmsen, R., et. al. (2003): *International CO2 Policy Benchmark for the Road Transport Sector; Results of a Pilot Study,* ECN-C-03-001, http://www.ecn.nl/library/reports/2003/c03001.html, ECN and COWI, Petten, February 2003.

Parry, I,W.H. (2005) *Is Pay-As-You-Drive Insurance a Better Way to Reduce Gasoline than Gasoline Taxes?* Discussion Paper, RFF DP 05-15, http://www.rff.org/rff/Documents/RFF-DP-05-15.pdf, Resources for the Future, Washington, April 2005.

Perkins, S. (2002): *Recent Developments in Road Pricing Policies in Western Europe.* Internet: www1.oecd.org/cem/topics/road/roaddocs.htm. ALP

Euractiv (2005) *Road Charging (Eurovignette).* Internet: http://www.euractiv.com/en/transport/road-charging-eurovignette/article-117451
Dix, M. (2006): *How much does the scheme cost: the London experience.* http://www.cemt.org/topics/taxes/Paris06/dix.pdf. Conference on Road Charging Systems: Technology Choice and Cost Effectiveness, Paris, 1 June 2006
Söderholm, G. (2006) *The Stockholm Trial:Congestion charging and improved public transport aimed at reducing traffic jams and creating a better environment.* http://www.cemt.org/topics/taxes/Paris06/Soderholm.pdf. Conference on Road Charging Systems: Technology Choice and Cost Effectiveness, Paris, 1 June 2006
Schulz, G. (2006): *HGV tolls in Germany HGV tolls in Germany based on satellite and mobile communications based on satellite and mobile communications technology:technology:innovative, environmentally friendly and fair*. http://www.cemt.org/topics/taxes/Paris06/Schulz.pdf. Conference on Road Charging Systems: Technology Choice and Cost Effectiveness, Paris, 1 June 2006

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **Transport**

Characterization of actions

Option Number	**13a**
Code/action:	CO2 emission standard
Previous MCA Reference:	T5
Directives:	-
Subcategory:	New EU-legislation
Objective	New cars having a lower CO2 emission per km
Action:	EU to 1) Set maximum CO2 emission standards for different type of cars (absolute, related to specific performance properties, or related to the mean value of all cars sold by one company). 2) Negotiate More stringent agreement with car and truck producers after 2008-2009.
Current status	Voluntary agreement with motor suppliers; Target is CO2 emissions of new ACEA/JAMA/KAMA passenger cars to be reduced to 140 g CO2/km in 2008/2009. The 5th report is published as COM(2005)69. Status in 2003: 164 g/km compared to 186 g/km in 1995. ASEA published in January 2006 an integrated approach on further CO2 reduction (ACEA, 2006)
Approach taken	New directive, with extensions to other vehicles than passenger cars. Some comparable directives already in place on minimum energy efficiency requirements during use. Implementation in Eco design directive (2005/32/EC) is not possible because in the directive cars are excluded.
Estimated Energy Savings	If the level would be 120 g CO2/km, the effect might be 14% additional saving to the voluntary agreements. If for other vehicles an effect of 5% could be reached, the energy saving will be 28 Mtoe in 2020 (and 33 Mtoe in 2025).

Further information: The CO2 emission standard will lead to a substantial reduction in energy use of the transportation sector; depending of the chosen level of 10-30% in 2020. A commission of the European Parliament considers that it is necessary to reduce CO2 emissions in the medium term more drastically than proposed in the Green Paper (for example, to attain a maximum threshold between 100 and 80 g/km CO2 by 2020); furthermore in 1996 it was already considered, that 2010 was the deadline for achieving a maximum average emission limit of 120 g/km CO2 (Vidal-Quadras Roca,2006).

Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	See general remark on relation with total savings. Given that total savings consist of oil products only, the action has a substantial impact on security of supply.	**3**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Improved efficiency will increase commercial viability. In 2003 the European automobile industry (ACEA) was with 163 g/km already more efficient than JAMA 172 g/km and KAMA 179 g/km.	**2**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Strong impulse for new technology development and use of better materials.	**2**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	In COM(2005)269 the producers ACEA and JAMA claim in 2003 that - although the technological potential to achieve 120 g CO2/km by 2012 is available, the associated costs would be prohibitive. Market distortions and negative effects on the European economy would also be substantial. They believe that equivalent reductions could be achieved in a more cost-efficient manner by using an integrated approach involving the automotive industry and other actors. ACEA nevertheless gave a first indication that a further reduction of 5 % between 2008 and 2012 (equal to a target of about 133 g CO2/km) could be feasible by improvements in vehicle technologies. According to (Bates, 2001, page 57) most options are cost effective if the fuel taxes are taken into account. But	**0**

		without fuel taxes most options are not cost effective. According to (Delbeke 2005) mean extra production cost for 120 g/km are 3000 euro/car. So the cost effectiveness depends on the chosen level.	
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	Probably more complex cars will be needed, which gives a positive impact on employment (no external source).	**2**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	No	**0**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Positive: lower oil imports and a better export position for European car producers.	**2**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	The cars on the market will change. Car producers will have to make substantial investments.	**-2**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Market competition can be influenced. This can be caused by the substantial differences between car producers (some make mainly small vehicles other mainly large vehicles). It is not clear what these effects will be and which company will be most influenced. See (SAM, 2005) for the unknown effect of the ACEA agreement. Car producers are companies with a large employment, so market shifts will influence employment in member states.	**0**

Government budget	Does the actions require substantial financial support at the cost of the government budget?	**0**	
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	This depends on the chosen technology. For lighter cars or hybrid cars an improvement can be expected (and probably also the emission limits in g/km can be lowered). But a higher share of diesel cars and some improvements of gasoline car engines can increase the emissions of PM10 (ECN).	**2**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	The CO2 emission standard will lead to a substantial reduction in energy use of the transportation sector.	**3**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No effect expected	**0**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	No effect expected	**0**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Car producers will have to match with the standard. This will result in additional administrative costs.	**-1**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Cars will be more expensive to buy.	**-2**

Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Market competition can be influenced. This can be caused by the substantial differences between car producers (some make mainly small vehicles other mainly large vehicles). It is not clear what these effects will be and which company will be most influenced. See (SAM, 2005) for the unknown effect of the ACEA agreement. Car producers are companies with large employment, so market shifts will influence employment in member states.	**-1**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Due to the lower fuel costs per km some additional mobility can be expected.	**-1**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Tax on new cars will increase but income from fuel tax, and sometimes also the road tax will decrease.	**-1**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The impact is related to new cars entering the park, furthermore new technology has to be implemented in the development process of new cars, so the full effect will take at least 15 years.	**-1**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Positive. Cars will be efficient for there whole lifetime (passenger cars about 15 years; trucks about 10 -12 years). Know how in efficiency will be used for new cars.	**2**
Monitoring & Verification	Can action be monitored and verified?	Decision No 1753/2000/EC already describes the monitoring for passenger cars.	**3**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	-	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	-	**0**

Major Criteria Score Total	**4**
All Criteria Score Total	**12**

Notes

Monitoring	Decision 1753/2000/EC of the European Parliament and of the Council establishing a scheme to monitor the average specific emissions of CO2 from new passenger cars.
Verification	

References

EC (2000): *Decision No 1753/2000/EC of the European Parliament and of the Council of 22 June 2000, establishing a scheme to monitor the average specific emissions of carbon dioxide from new passenger cars.* Official Journal L 202, 10/08/2000 P. 0001 – 0013, http://europa.eu.int/scadplus/leg/en/lvb/l28055.htm

COM(2004)78 final: *Communication from the Commission to the Council and the European Parliament Implementing the Community Strategy to Reduce CO2 Emissions from Cars: Fourth annual report on the effectiveness of the strategy (Reporting year 2002),* [SEC(2004)140], 11.02.2004.

COM(2005)269: *Communication from the Commission to the Council and the European Parliament of 22 June 2005 on implementing the Community strategy to reduce CO2 emissions from cars: Fifth annual Communication on the effectiveness of the strategy* [COM(2005) 269 - Official Journal C 172 of 12.07.2005]. http://europa.eu.int/comm/environment/co2/report/com_05_269.pdf

ACEA (2006) *An Integrated Approach to reducing passenger car-related CO2 emission.* European Automobile Manufacturers Association, Brussels, January 2006.

COM(2006) 314 *Communication from the Commission to the Council and the European Parliament Keep Europe moving - Sustainable mobility for our continent Mid-term review of the European Commission's 2001 Transport White Paper.* http://ec.europa.eu/transport/transport_policy_review/index_en.htm, Brussels, 22.06.2006.

Delbeke, J. (2005): *Transport sector perspectives after the entry into force of the Kyoto protocol.* Transport & climate change - A special strategy for a special sector? http://www.transportenvironment.org/Article102.html, T&E Seminar, Brussels, 1 April 2005.

Bates, J. et.al. (2001): *Economic Evaluation of Sectoral Emission Reduction Objectives for Climate Change; Economic Evaluation of Emissions Reductions in the Transport Sector of the EU; Bottom-up Analysis Final Report (updated version).* AEA Technology Environment, Abingdon, United Kingdom, March 2001 http://europa.eu.int/comm/environment/enveco/climate_change/transport_update.pdf

Harmsen, R., et. al. (2003): *International CO2 Policy Benchmark for the Road Transport Sector; Results of a Pilot Study,* ECN-C-03-001, http://www.ecn.nl/library/reports/2003/c03001.html, ECN and COWI, Petten, February 2003.

SAM (2005): *Transparency issues with the ACEA Agreement: are Investors Driving Blindly?* http://www.sam-group.com/downloads/studies/ACEA_Driving_Blindly.pdf, SAM Group and World Resources Institute, Zurich, Switzerland, March 2005
Vidal-Quadras Roca, A. (2006) Report on Energy efficiency or doing more with less - Green Paper . (2005/2210(INI)), A6-0160/2006, European Parliament, Committee on Industry, Research and Energy, Rapporteur: Alejo Vidal-Quadras Roca, 3 May 2006

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **Transport**

Characterization of actions

Option Number	**13b**
Code/action:	Vehicle Limitations (engine downsizing)
Previous MCA Reference:	T6
Directives:	98/14/EC of 6 February 1998 adapting to technical progress Council Directive 70/156/EEC on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers
Subcategory:	New directive or voluntary agreement
Objective	Reduction of non necessary car mass (or motor power) resulting in more efficient cars
Action:	EU/MS to restrict unnecessary power of car engines by technical devices like maximum speed limiters and/or limitation of maximum acceleration. Or limit the maximum power related to the vehicle weight (or maximum load) for new cars and trucks.
Current status	Car speed, car power and car weight still is increasing. Most new cars have a maximum speed of 180-200 km/h, 40% higher than allowed is most EU countries. This results in an inefficient gearbox too. Heavy vehicles have a speed limiter
Approach taken	Start high level group with the target of how (and not if) to restrict unnecessary engine power at the detriment of energy efficiency.
Estimated Energy Savings	According to (SRU, 2005) engine downsizing combined with a better gearbox can reduce energy use with 10%. The saving potential in 2020 is at least 11 Mtoe (increasing to 17 Mtoe in 2025)

Assessment criteria	Details	Scoring Narrative	MCA Score
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Gasoline and diesel engine attain the best degree of efficiency within a certain performance range. Downsizing and improved transmission aim to ensure that this range is exceeded as rarely as possible. In downsizing, engine capacity reduction forces the engine to work harder. Downsizing is supplemented by forced induction (turbo charging or electronically supported induction) (SRU,2005). It can be followed by reduced vehicle weight and rolling resistance.	2
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Improved efficiency will increase commercial viability.	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Strong impulse for new technology development and use of better materials.	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Yes, engine will be more complex but other part of the car can be made lighter.	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	-	0
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	-	0

Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	-	0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	A small positive effect can be expected.	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	-	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	No	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	It is not clear what the substantial changes in the engine will have for effect on unregulated emissions like PM10 for gasoline vehicles.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	The CO2 emission standard will lead to a substantial reduction in energy use of the transportation sector.	2
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No	0

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	-	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	No	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Yes, driving a car might become cheaper (positive). But there might be a noticeable cap because some unused and un-useful characteristics of the old car will differ from the new one (negative)	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	No	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Due to the lower fuel cost a small increase in mobility can be expected.	-1
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No	0

Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The design of cars should be changed. This takes time. And when introduced, it takes at least 15 years before complete market penetration is reached.	-3
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	-	0
Monitoring & Verification	Can action be monitored and verified?	Yes	3
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	There has been discussion about safety related to the lighter cars resulting from the first USA CAFE measures. It is questionable whether the "arms race" in heavier vehicles to be safer at accidents should not be bending to other forms of safety measures.	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Yes, mainly when he decision about a new car is made.	-1
		Major Criteria Score Total	**2**
		All Criteria Score Total	**5**

Notes	

Monitoring	
Verification	

References:

SRU (2005) *Reducing CO2 Emissions from Cars Section from the Special Report Environment and Road Transport.* http://www.lowcvp.org.uk/uploaded/documents/Reducing_CO2_Emissions%20Aug%2005.pdf, German Advisory Council on the Environment, Berlin, August 2005

98/14/EC of 6 February 1998 adapting to technical progress Council Directive 70/156/EEC on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **Transport**

Characterization of actions

Option Number	**13c**
Code/action:	Increased fuel tax & Financial Incentives for buying efficient vehicles
Previous MCA Reference:	T9
Directives:	2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity
Subcategory:	Tax measures
Objective	Decrease fuel use and influence consumers with financial incentives to buy more efficient cars
Action:	EU/MS to decrease fuel use by making fuel more expensive. By making the differences between countries less, the incentive of buying cheap fuel across the boarder will decrease. Secondly a lower car tax can be introduced when an efficient car is bought or a financial penalty, which make the buying of a less efficient (second hand) car much more expensive. Thirdly a bigger difference in road tax related to the fuel consumption of a car can be introduced. Even a km charge can be fuel economy dependent.
Current status	A minimum fuel tax for the EU is already in place. In some countries the fuel tax is much higher. Tax incentives for purchase of efficient cars are in place in some EU countries.
Approach taken	Increase tax levels in all EU-countries to close the gap between countries (possibly compensated by lowering other car taxes). It could also be stimulated by a new directive: of the EU on stimulating the buying of efficient cars. Each country may choose their own way in this as long as targets for shifts are realised.
Estimated Energy Savings	The short term effect of a substantial (!) change can be 12 Mtoe. If also truck diesel is increased this might rise to 15 Mtoe. A car park effect of 4% might increase the effect to 22 Mtoe.

Further information: In a document with transport options for the Netherlands the effect is given for a combination of several tax options, including a substantial higher fuel tax (Brink, 2003). The package is budget neutral for passenger cars. The higher tax is not transferred to trucks because the package contains the introduction of a specific truck-diesel (without a higher tax). The short-term reduction is 7% for passenger cars (mainly related to less passenger car km). A shift in car tax, more CO2 based, can reduce CO2 emissions for new cars with 2-6% (page 138).

Assessment criteria	Details	Scoring Narrative	MCA Score
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	See general remark on relation with total savings. Given that total savings consist of oil products only, the action has a substantial impact on security of supply.	3
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Improved efficiency will increase commercial viability.	2
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Impulse for new fuel-efficient technology development.	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Yes, finally the sector will gain from the energy saving.	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	No	0

Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	No	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	-	0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	-	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Yes. The source of the budget is substantially changed. Because the effect of the changes are influenced by the reaction of the citizens, this can result in less tax income.	-1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Less mobility is less emissions.	3

The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	The mobility reduction will lead to a substantial reduction in CO2 emissions.	3
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No. Because cars will become cheaper (and using them more expensive) inequality will be less.	1
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	-	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	-	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	-	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	-	0

Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Normally a tax change, which results in more cars, can have a mobility effect, but in this case driving becomes more expensive (so more cars, but less km per car).	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	-	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Yes	3
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	No, as long as the measure is taken.	0
Monitoring & Verification	Can action be monitored and verified?	Yes	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	There might be a small increase in the demand for parking places. Also the demand for public transport can increase.	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	The measure will have a substantial effect on people at the petrol stations. Because the high prices will reduce their mobility. Furthermore there are smaller effects in more use of public transport and less passenger car km.	-1
		Major Criteria Score Total	**10**
		All Criteria Score Total	**17**

Notes	

Monitoring	
Verification	

References:

Directive 2003/96/EC *of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity.* L 283/51, 31 October 2003 http://europa.eu/eur-lex/pri/en/oj/dat/2003/l_283/l_28320031031en00510070.pdf

Brink, R.M.M. van, et.al. (2004) *Optiedocument verkeersemissies; Effecten van maatregelen op verzuring en klimaatverandering. (Assessment of options for reduction of acidifying and climate changing emissions in the transport sector; in Dutch).* RIVM report 773002026/2004, http://www.mnp.nl/nl/publicaties/2004/Optiedocument_Verkeersemissies__effecten_van_maatregelen_op_verzuring_en_klimaatverandering.html, RIVM/MNP, Bilthoven. August 2004.

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **Transport**

Characterization of actions

Option Number	**14**
Code/action:	Tyres more energy efficient
Previous MCA Reference:	T10
Directives:	98/14/EC of 6 February 1998 adapting to technical progress Council Directive 70/156/EEC on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers.
Subcategory:	New directive or voluntary agreement
Objective	Reduction of fuel use by less rolling resistance.
Action:	An EU broad policy for labelling fuel efficient tyres, tyre pressure indicators (dashboard tyre pressure sensors mandatory on cars and freight vehicles, valve pressure indicators compulsory on existing vehicles tyres from 2010) and free facilities at service stations.
Current status	At this moment no information about the energy efficiency of tyres is available for the public. The subject is under discussion. About 40% of new passenger cars have tyres with a lower rolling resistance.
Approach taken	Awareness campaign to the public. Good information system on fuel efficiency of different tyres, maybe more stringent demands for tyres in directive 2001/43/EC
Estimated Energy Savings	The saving by fuel-efficient tyres at the right pressure is estimated for light duty vehicles at 5% (4-6.5%). For trucks it is somewhat lower (4%). If the same figure can be used for trucks the potential energy saving is 15 Mtoe.

Further information: The Tyre and Rubber manufactures (BLIC,2005) sees 5 energy saving options related to tyres of light-duty vehicles: Tyre sizing by the car producer, Tyre design (3-4%), Tyre inflation pressure maintenance (1-2,5% if always on the right pressure) by good tyre pressure facilities at tank stations and by well informed drivers and road pavement roughness (3-7% increase if road surface is not smooth).

Assessment criteria	Details	Scoring Narrative	MCA Score
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	See general remark on relation with total savings. Given that total savings consist of oil products only, the action has a substantial impact on security of supply.	**2**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	The main tyre producers are global companies, so know how, which is build up in Europe, is directly used in other countries. But some positive effects might occur.	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	In tyre production, but also in pressure indicators.	**1**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	The add ional costs and the gain of fuel saving are in the same range (so it depends on the situation). Measures taken by car producers might be cost effective. Finally positive because a better tyre pressure is positive for road safety.	**1**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	No	**0**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	No	**0**

Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Very small positive effect	**0**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	No effect known	**0**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No effect known	**0**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	No claim on budget.	**0**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	See general remark on relation with total energy savings. Energy use in transportation has a relatively large effect on air quality. Moreover, the emission of particulates form tyres can change also.	**2**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	See general remark on relation between total savings and CO2-emissions. The savings constitute only oil products. Therefore the savings will lead to a substantial reduction in CO2 emissions.	**2**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No effect known	**0**

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	no effect known	**0**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Only some administrative burden on tyre manufacturers, not on car owners.	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Yes, better informed on the important relation between tyres and tyre pressure and fuel consumption.	**1**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	No effect known	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Due to regular replacement of tyres the impact can be large before 2012 for passenger cars. For truck full implementation might take time until 2020.	**1**

Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Energy saving tyres can be replaced again by less efficient tyres. However, sustained policy can prevent this. Effect of retreading (about 50% of truck and bus tyres get a new tread and are used again) unknown.	**0**
Monitoring & Verification	Can action be monitored and verified?	From the sales numbers for energy saving tyres total savings can be monitored quite easily. But only after there is good information between the different tyres and there rolling resistance,	**1**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Not known	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	The user of the car has to look at the pressure of the tyres.	**0**
		Major Criteria Score Total	**6**
		All Criteria Score Total	**11**

Notes	

Monitoring	
Verification	

References:

Blick (2006): *ECCP II. Potential contribution of measures concerning tyre fitment that could be included in the integrated approach to reduce CO2 emissions from light-duty vehicles. European Tyre Industry Proposal.* European Tyre and Rubber Manufactures (BLIC/ETRTO), Brussels, January 19 2006

ETRMA (2006a): *Tyre & GRG Facts and Figures;* Updated May 2006), ETRMA, Brussels, Belgium, 2006

ETRTO (2006) *Reference Method for Rolling Resistance Measurement - Passenger Car, Truck and Bus tyres.* European Tyre and Rim Technical Organisation _ Engineering Design information - 2006 section TM page TRR.1 - TRR.13 Page

ETRMA (2006b): *ECCPII - ETRMA response to TNO questionnaire,* Internet: http://forum.europa.eu.int/Public/irc/env/eccp_2/library?l=/&vm=detailed&sb=Title (working group 5). 14 June 2006

Tyre Industry (2005): *CARS21 Tyre EU-25 CO2 emission reduction through tyre related solutions.* Tyre Industry Input, September 2005, page 22 and 24

ETRTO (2005) *Rolling Resistance Reference Measurement Method for PC and CV tyres.* IEA workshop: Energy Efficient Tyres: Improving the On-Road Performance of Motor Vehicles, International Energy Agency, Paris, 15-16 November, 2005

Directive 2001/43/EC *of the European Parliament and of the Council of 27 June 2001 amending Council Directive 92/23/EEC relating to tyres for motor vehicles and their trailers and to their fitting.* Official Journal L 211 , 04/08/2001 P. 0025 - 0046

Directive 98/14/EC of 6 February 1998 adapting to technical progress Council Directive 70/156/EEC on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers.
IEA workshop (2005); *Energy Efficient Tyres: Improving the On-Road Performance of Motor Vehicles*, http://195.200.115.136/Textbase/work/workshopdetail.asp?WS_ID=227, IEA, Paris, 14-16 November 2005.
IEA workshop (2005); *Energy Efficient Tyres: Improving the On-Road Performance of Motor Vehicles*, IEA, Paris, 14-16 November 2005

Appendix 2 – Visualisation of Interaction Between Policy Option Savings

For each action on the priority-list the savings potential has been estimated. This saving figure is valid for situations where the chosen option is applied in isolation of other actions.

However, in the Action Plan a large part, or even all, of these actions may be present. This will probably cause interaction, meaning that the sum of the savings potentials of two separate actions is not the same as the combined savings effect. Often this implies an overlap, where the combination provides less savings than the two actions apart. However, in some cases two actions reinforce each other's effect (e.g. a combination of labels/information and subsidy/incentive to implement efficient appliances)[10].

For example:

- Interaction between saving effects
  - E.g. savings on electricity and more efficient power plants
- Interaction between effects policy measures
  - Same energy applications
  - Same condition (knowledge, incentives)
  - E.g. subsidies + legislation/obligation

In case of interacting actions in the Action Plan care must be taken in calculating the total savings of all actions. The overall savings effect will be (much) lower than the sum over all actions.

A matrix analysis approach has been taken to determine interactions between the eighteen policy options; see Figure A. The aggregate discount factor determined is then applied to the gross energy saving potentials determined during the MCA.

The analysis shows the following major interacting couples of actions:

- EU-wide white certificates (4a) and extension of the EPBD (Option 4)
- Stimulating ESCO's (Option 11) and EU-wide white certificates (Option 4a)
- Provision of soft loans (Option 10) and stimulating ESCO's (Option 11)
- Km-dependent costs (Option 13) and more expensive fuel (Option 13c).
- CO2-standards cars (Option 13a) and restricted engine power (Option 13b).

The following actions interact with many other actions:

- Stimulating ESCO's (Option 11)
- EU-wide white certificates (Option 4a)
- strengthening and extending the label system (Option 5)
- extension of the EPBD (Option 4)
- soft loans (Option 10).

[10] *Actual interaction effects between policy measures for energy efficiency - A qualitative matrix method and quantitative simulation results for households*, Energy-The International Journal, Available on line 28 February 2006.

Relatively few interactions are present for:

- Highly efficient power plants (Option 6),
- Energy efficiency at schools (Option 2)
- CEN-standards for district heating (Option 9)

Running cost labels (Option 3) and energy saving tyres with labels provide for a reinforcing combination with a number of other actions.

Estimation Method

- for each action individual savings potential = x Mtoe;
- for each combination "overlapping" Mtoe = MIN(x, y);
- for each combination earlier interaction-scores (-1, 0, 1, 2 or 3) transferred into a fraction (x,y), e.g. a "3" means 40%;
- correction x and y = MIN(x,y) * fraction (x,y)
- total correction x = Mtoe – sum(corrections)
- to avoid negative net effect > fraction/scale factor
- Correction total potential = sum (total correction x)

Result: 26% reduction in gross energy savings potential

Figure A

Potential Policy Option Interaction Visualisation

Option Reference	Description	1 logo	2 schools	3 cost-label	4 EPBD	5 Labels	4a WhC	6 plants	7 CHP	8 CHP	9 CEN	10 soft loans	11 ESCO's	12 tax-prod.	13 km-costs	13a CO2-lim	13b max-power	13c price up	14 tyres
1	logo																		
2	schools	0																	
3	cost-label	2	-1																
4	EPBD	0	0	0															
5	Labels	2	-1	2	0														
4a	WhC	1	0	1	3	1													
6	plants	0	0	0	0	0	0												
7	CHP	0	0	0	2	0	*0*	1											
8	CHP	0	0	0	1	0	*0*	1	0										
9	CEN	0	0	0	0	0	*0*	1	0	0									
10	soft loans	0	0	0	1	0	2	0	1	1	0								
11	ESCO's	1	0	0	2	0	3	0	2	2	0	3							
12	tax-prod.	1	0	-1	1	2	2	0	1	0	0	1	1						
13	km-costs	0	0	-1	0	1	1	0	0	0	0	0	1	0					
13a	Set max CO2 limits	0	0	2	0	1	1	0	0	0	0	0	2	0	2				
13b	Restrict power of car engines	0	0	1	0	1	1	0	0	0	0	0	1	0	1	3			
13c	Car or fuel taxation	0	0	-1	0	1	1	0	0	0	0	0	1	0	3	2	2		
14	tyres	0	0	1	0	2	1	0	0	0	0	0	1	-1	-1	2	1	-1	

Scoring protocol
+1 = small overlap
+2 = medium overlap
+3 = strong overlap
-1 = small reinforcing
-2 = reinforcing

Appendix 3 – Preliminary Energy Saving Potential for Screened Options

Fifty-four policy options were screened prior to selecting eighteen policy options for detailed assessment in this report.

Table A1 presents the preliminary gross energy savings determined at the option screening stage for reference. These potential energy savings are for fully implemented policy options without correction for overlap. Further estimate refinement took place on those policy options selected for detailed assessment.

Table A1 – Potential Gross Primary Energy Savings for 54 Policy Options Screened

Option Reference	Description	Estimated Energy Saving (Mtoe)
A1	EU to increase means of recognition for organisations providing links etc to EU Energy Efficiency information sources.	**12**
A2	EU to encourage development of scheme recognising retailers providing trained sales personnel or information on energy efficiency by allowing public recognition through logo or certification scheme. MS to provide information packs or equivalent to be supplied providing information on labelling scheme, Energy Efficiency Products Listing or equivalent for product category.	**6**
A3	EU to encourage Member States to include energy efficiency training and information in national education curriculum for primary and secondary schools as part of sustainability awareness.	**10**
A4	EU/MS to oblige energy suppliers to include information on energy bill (power and heat) interpretation and how relates to energy efficiency and taking advantage of new metering technology.	**54**
A5	EU/MS to harmonise all product related energy efficiency information into one Energy Efficiency Product Listing portal	**-**
A6	EU to include operational costs in Energy Efficiency Product Listing or equivalent consumer information	**9**
A7	EU/MS to include Eco Labelling organisations and products on appliance/service performance listing source	**-**
A8	EU to extend existing/create new labelling schemes to make end users aware of consequences of energy use.	**8**
A9	EU/MS to stimulate the use of more energy efficient transport modes by providing information on the differences in energy use (and other effects) for different modes of transport.	**3**
L1	Harmonise energy audit scheme certification through adoption of EU wide standard	**>4**
L2	Obligation to for product suppliers to set optimum power management settings as default on pre-configured products and software default settings.	**3**
L3	Adapt existing EU and national legislation as to strengthen the economic attractiveness of high-quality cogeneration	**>4**
L4	Include mandatory Energy Efficiency training in Installer Certification & Supplier certification	**-**
L5	Extend EPBD to include smaller buildings (<1000 m2), inspection requirements to smaller installations and higher minimum standards for public buildings	**83**
L6	Lift restrictions on support for energy efficiency in the Guidelines on state aid, provided that efficiency targets are agreed on	**>5**
L7	Revise public procurement regulations to favour energy efficient appliances, vehicles and services	**8**
L8	Reduce energy use of public lighting by optimizing lighting systems.	**3.8 – 7.6**

Option Reference	Description	Estimated Energy Saving (Mtoe)
L9	Set up of regulation and/or incentives to increase the average conversion efficiency per fuel type by removing old inefficient power plants	**>4**
L10	The demands according to the EPBD-directive are strengthened in relation to technological progress and cost reductions.	**?**
L11	Adapt appliance label regulation as to regular updating of the label system in order to stimulate the marketing of ever more efficient appliances	**?**
L12	Extend the concept of white certificate schemes, after evaluation of present national schemes, to all EU-countries and implement obligations on energy suppliers to provide energy efficiency	**76**
L13	Set up of regulation and/or incentives to increase the average conversion efficiency per fuel type, by installing new plants with best available technology (BAT)	**>20**
L14	Adaptation of existing EU and national regulation as to the management and capacity planning of networks for electricity and gas in order to decrease energy losses	**5**
G1	EU to place Obligation on Member States for variable subsidy for gap between cost and production for CHP	**3**
G2	EU/MS to require national regulators to ensure energy suppliers incentivise all scale CHP	**3**
G3	EU/MS to enable fair access and fair rules for CHP in competitive markets in the EU	**6**
G4	EU/MS to addressing the administrative burdens placed on smaller generators e.g. for grid connection and incentivising the utilisation of distributed generation.	**6**
G5	EU/MS implementation of fiscal incentives across all EU to facilitate investment in high-efficiency power generation	**3**
G6	EU/MS to require Public Sector adoption of a 15% target to use CHP generated electricity	**3**
G7	EU to introduce new CEN STANDARD to regulate district heating systems	**2**
F1	Public banking institutions need to identify a way of marketing funds for energy efficiency measures International Financial Institutions (IFI), such as the EIB, EBRD, should establish partnerships with intermediaries like national, local banks or national energy agencies using National guarantee funds to cover investments in energy efficiency	**6**
F2	EU to consider ecological tax reform in line with energy tax harmonisation	**14**
F3	EU to increase adoption of existing energy efficiency legislation by linking implementation with structural fund provision to member States	**24.5**
F4	EU to incentivise the use of intermediaries for small energy efficiency loans etc, for example by extending access to ECB or (through Energy Services Directive obligation) MS capital as a revolving fund for "soft loans"	**11**
F5	Increase policy support for ESCOs through (1) dissemination of their activities, (2) the development of EU wide quality standards for ESCO projects, (3) standardised project monitoring and verification schemes, (4) model contracts and (5) improve access to (private) financial sources (e.g. cooperation with private banks). These measures could be combined with providing low-interest loans to ESCO projects	**<6**
F6	EU to incentivise production of energy efficient products through favourable taxation rate in Member States	**10**
F7	Stabilising energy prices at minimum level through varying tax rates. I.e. agree on minimum energy prices, when market prices decrease, increase the energy tax rates.	**90**
F8	Encourage energy performance contracting in public buildings. Example: Berliner Energieagentur scheme to upgrade public buildings in a situation where public financing was limited, and obtained via a shared savings scheme run by an ESCO	**2 to 3**
F9	Energy efficiency agreements in industry to provide an incentive for efficiency improvements	**<10**
F10	EU/MS to lower VAT (Value Added Tax) for energy saving products	**5**
F11	Provide for a tax incentive for capital equipment purchasers to choose the most energy efficient equipment	**5 to 6**

Option Reference	Description	Estimated Energy Saving (Mtoe)
F12	EU/MS to encourage off-balance sheet investments, like leasing in energy efficient technologies, for example by extending low cost earmarked capital to commercial lenders, or credit support to recipient	**5**
T1	Make driving costs more km depending. For instance the car of road tax, but also the insurance premium can be made variable. Finally area and congestion charges used for traffic management also have a km reduction effect.	**3 - 15**
T2	Directive on EU labelling becomes standard for all road vehicles. The label information is extended with the fuel cost at current fuel prices over the first 100 000 km driven.	**3.5**
T3	Separation of low speed and high speed traffic is good for traffic safety and can increase the use of low speed modes (walking, bicycling, mopeds). Specific bicycle lanes or tourist routes can also stimulate the use of bicycles instead of the car.	**2**
T4	For company cars the user tax is related to the specific fuel consumption of the car.	**3.3**
T5	1) Set maximum CO2 emission standards for different type of cars (absolute, related to specific performance properties, or related to the mean value of all cars sold by one company). 2) More stringent agreement with car and truck producers after 2008-2009.	**28 - 33**
T6	Restricting unnecessary power of car engines by technical devices like maximum speed limiters and/or limitation of maximum acceleration. Or limit the maximum power related to the vehicle weight (or maximum load) for new cars and trucks.	**11 - 17**
T7	To encourage car sharing (multi-passenger) schemes	**2**
T8	The use of more energy efficient transport modes can be stimulated by infrastructural measure, like more rail for goods transport, building of mode change locations (from truck on trains or ship and vice versa), or locating new business parks nearby rail or water.	**8**
T9	Decrease fuel use by making fuel more expensive. By making the differences between countries less, the incentive of buying cheap fuel across the boarder will decrease. A lower car tax can be introduced when an efficient car is bought, or a financial penalty which make the buying of a less efficient (second hand) car much more expensive. Or a bigger difference in road tax related to the fuel consumption of a car. Even a km charge can be fuel economy dependent.	**22**
T10	An EU broad policy for fuel efficient tyres, tyre pressure indicators (dashboard tyre pressure sensors mandatory on cars and freight vehicles, valve pressure indicators compulsory on existing vehicles tyres from 2010) and free facilities at service stations	**17**
T11	Procurement by government giving a good example by buying efficient technology with a longer pay back period or by joining technology test projects. Furthermore it is possible to use only energy efficient company cars (for instance only A and B labelled passenger cars)	**3**
T12	The use of more energy efficient transport modes (here public transport) can be stimulated by infrastructural measure, like more rail for trains, trams and metro and more busses. A more integrated approach can contain high quality vehicles, specific bus lanes, priority at traffic lights, parking places at stations, good information, social security, lower ticket prices and other financial measures. For new building quarters energy for transport can be part of the plan.	**1.5**
T13	In (Sec(2005) 467) are two actions described; A kerosene tax for intra-community and national flights by EU carriers (0.33 euro/l; equal to the gasoline tax) and a departure tax of 10 euro for intra community flights and 30 euro on international flights.	**7.5**
T14	Use the satellites as optimal as possible in the transport sector and for governmental purposes.	**No estimation**

Appendix 4 – Energy Savings Discussion Paper

Analysis of the meaning of 20% cost-effective energy savings in the EC Green Paper

Supplementary Note to DG-TREN, European Commission, June 2006 as part of Energy Efficiency Action Plan Impact Assessment Contract CLWP:2006/TREN/032.
Author Piet G.M. Boonekamp, ECN-Policy Studies, with contributions from Peter Tipping, Atkins.

In the "Green Paper on Energy Efficiency"[11] the European Commission (EC) states that "According to numerous studies the European Union (EU) could save at least 20% of its present energy consumption in a cost-effective manner."

In the following a first assessment is made of the robustness of this statement and the factors that play a role in actually reaching this goal. The questions to be answered are:

1. How is the 20% defined?
2. Do the studies mentioned underpin the 20% statement?
3. How is the 20% realised (which policies, which saving measures in which sectors)?
4. Is there track record elsewhere for 20% achievable savings?
5. What is the relationship with the savings target in the Energy Service directive?
6. What is the definition of the baseline for the Green Paper target?

Finally some observations are made and a conclusion is drawn.

1. The 20% definition

On page 4 of the Green Paper the EC states that the EU could save at least 20% of its present energy consumption in a cost effective manner. It suggests a total amount of saved energy equal to 20% of energy consumption at the beginning of the period, here presumed to be 2005. However, according to Annex 1 of the Green Paper it regards "how the EU could achieve a reduction of the energy consumption of the EU by 20% compared to the baseline projections [Commission, 2004][12] in 2020.

Energy consumption is defined as total primary energy consumption of the 25 EU member states. The 20% energy savings encompasses energy savings in energy supply sectors as well, e.g. electricity production.

Cost effective can be interpreted in different ways. One of the studies[13] the EC is referring to uses the term "life cycle costs". This suggests that the pay-back time of the investment can be equal to the technical lifetime of the saving measure. This is an extended definition of cost effectiveness compared to the 3, 5 or 8 year pay-back time that is currently used in the Netherlands[14].

[11] Green Paper on Energy Efficiency or Doing More with Less, European Commission, COM(2005)265 final, juni 2005
[12] Commission, 2004: European Energy and Transport, scenario on key drivers.
[13] World energy Assessment
[14] Menkveld et al, 2005: Not used profitable potential for energy savings (in Dutch), ECN, Petten, 2005, ECN-C-05-062.
.

2. Underpinning in background documents

The background documents mentioned in the Green Paper are:

1. *The mid-term potential for demand side energy-efficiency in the EU S. Lechtenböhmer en S. Thomas, Wuppertal Institue for Climate, Environment, Energy.*
2. *Public Sector Leadership: Transforming the Market for Efficient Products and Services, Harris et al.*
3. *Improving energy efficiency by 5% and more per year?, K. Blok, Copernicus Institute/Ecofy, Journal of Industrial Ecology, 2005.*
4. *Cost-effective climate protection in the building stock of the EU15 and new Eastern European Member States, Ecofys Gmbh, 2005.*
5. *World Energy Assesment 2000, Chapter 6 Energy end-use efficiency.*
6. *"White and Green": Comparison of market-based instruments to promote energy efficiency, Journal of Cleaner Production, 13 (2005) 1015-1026, 2005.*
7. *Cross-country comparisons of energy efficiency trends and performance in CEEC, Synthesis report, ADEME, Danish Energy Authority, SAVE, 2004.*
8. *Cost-Effective Climate Protection in the Building Stock of the New EU-MS, Beyond the EU Energy Performance of Buildings Directive Report established by ECOFYS for EURIMA.*

Only the study of the Wuppertal Institute (ref. 1) presents a scenario analysis for the EU where 20% extra savings are realized with what are clearly new policies. The results of a "policy and measures" scenario (P&M) are compared with that of a "business-as-usual" (BAU) scenario. The related publication of the Wuppertal Institute[15] provides a good overview of the main policies and measures in different sectors. Some doubts regard the time scale to reach the additional savings. In 2010 the P&M scenario predicts already 10% less energy use from new policies implemented in 2006 at earliest. For some instruments (Emission Trading System, ETS) member states are bound to existing agreements. Not clear is whether account is taken of fixed replacement rates for appliances, installations and buildings.

K. Blok (ref. 3) shows the substantial technical possibilities but does not describe how these measures are implemented with policy measures. The WEA (ref. 5) presents economic saving potentials for different sectors in 2020 and describes possible policy measures. However, the saving potentials are expressed against energy consumption in a base-year and not against a BAU-scenario.

The article on the White and Green project (ref. 6) claims that a white certificate system can lower energy use in buildings in the EU-15 with 15% in 2020 compared to a BAU scenario, without costs. Studies of Ecofys on (possible strengthening of) the Energy Performance of Buildings directive (EPBD, ref. 4 and 8) regard the built environment only and focus on reduction of CO_2-emissions. Due to differences in fuel mix these results are transferable into energy efficiency increases only if assumptions are made regarding future fuel mix. EPBD and white certificates both regard energy consumption in buildings and dwellings; this prevents adding the two potentials because an overlap in claimed effects seems probable. The study under reference 2 regards the public sector that constitutes only a small part of the built environment.

The study under reference 7 states that CEEC economies (Hungary, Czech Republic, Slovak Republic, Slovenia, Poland, Latvia, Lithuania, Estonia, Bulgaria and Romania) are 50% more energy intensive than the EU-15. In principle, closing this gap with Western economies could contribute considerably to the overall 20% saving. However, it is suggested in this study that some closing of the gap is already part of BAU scenarios. In that case the fast CEEC efficiency improvement reduces somewhat the otherwise significant contribution that CEECs would make to reach the 20% savings.

[15] S. Lechtenböhmer et al, 2005: Energy Efficiency as a key element of the EU's Post-Kyoto Strategy-Results of an Integrated Scenario Analyses, Wuppertal Institute for Climate, Energy Environment, Germany, Paper for ECEEE Summer study What works and who delivers?

3. How is the 20% realised?

The scenario analysis of the Wuppertal Institute[15] specifies in a transparent manner how much the different final sectors contribute to the goal for extra energy savings in the EU. In absolute terms the biggest contribution comes from savings in transport and industry (see Table 1). Including energy supply about 60% of the total emission reduction is realised under the emission trading scheme (ETS), by renewables, fuel shifts and energy savings. This outcome from the analysis is due to an assumed decrease in allocated emission rights of 2,8% per year. However, in practice this development can only be achieved if sector- and technology-specific policies and measures are combined with this tightening of the national caps.

Table 1: Final energy demand by sector for BAU and P&M scenario in 2020

Mtoe	BAU	P&M	Reduction
Industry	365	292	20%
Tertiary	194	148	24%
Households	313	260	17%
Transport	418	323	23%
Total	1290	1023	21%

The following policies and measures have been supposed.

Households

- Standards for energy use of electric appliances (including stand-by use) in combination with regularly strengthened energy labelling for all appliances and financial support.
- Insulation of buildings and efficiency improvements of heating systems by extension of the EPBD standards to all new and renovated buildings, EU standards for building parts, subsidies on low energy and passive heated dwellings, better conversion efficiency in hot water production, obligatory installation of solar boilers in new and renovated dwellings.

Tertiary

- labelling and standardisation of electric office appliances and building installations (air conditioning, lighting)
- extension of EPBD to all smaller buildings and obligatory demolition of old buildings.

Industry

- further development of the ETS
- standardisation for electric motors
- execution of energy audits

Electricity production:

- more renewable energy generation (wind and biomass)
- increase of the share of combined heat and power (CHP), above the target in the directive
- higher conversion efficiencies due to a fuel shift to gas (new Gas Combined Cycle generation according to Best Available Technology or BAT)

Transport

- target in ACEA covenant to emission limit of 100 g CO_2/km
- improved energy efficiency of airplanes and lorries/trucks
- savings in freight transport by shifts in modal split, training of drivers, logistics, telematics (sea shipping not regarded as most of energy use is outside the scope of the study) .

4. Is there track record elsewhere for 20% achievable savings?

EU-15 Members

Historically it has been widely accepted that the potential savings from energy efficiency across all sectors are around 20% of current use and that achieving this was the major element in meeting carbon dioxide reductions. This should be seen as an overall target as the sectors, as well as the EU Member States, are at different stages of implementing efficiency measures.

Today, most national governments within the 25 EC member states are unwilling to commit to binding targets in any sector. Despite support for hard targets in principal, EU energy ministers have stated their preference for non-binding indicative national targets only[16].

In some countries authoritative organisations may publish indicative 'average' claims for energy efficiency savings according to their target audience. Assuming that such claims are justified on national practical evidence/experience, these would give a useful barometer of 'expected savings' in various sectors. However, a non-exhaustive websearch of English language national and authoritative organisations confirmed that few claims of achievable energy savings are being published to promote stakeholder interest. Notable exceptions were as follows.

In the UK DEFRA's Climate Change Programme document[17] proposes 20% saving from efficiency measures by 2020. The Carbon Trust[18] (UK) estimates that businesses and public sector organisations can achieve a 10% cut to heating, lighting and power bills without capital investment and 20% with a little investment. Some 'best practice' business examples have reported 50% savings. In the household sector the Energy Saving Trust[19] quotes that a 22% reduction target is possible. Ofgem[20] are consulting with Energy Supply companies for a further 20% reduction in household energy consumptions under the Energy Efficiency Commit obligation.

The Sustainable Energy Agency (Ireland) agrees that the business sector can see a 20% reduction and the Danish Energy Agency quotes typical savings of 15%.

Newer Member States (accession May 04)

The member states most recently granted accession have great potential for energy savings but also have their own sets of barriers – for example, Lithuania has minimal oil and gas reserves of its own. The Czech Republic Energy Efficiency Centre's annual report quotes 20% for various industrial schemes. According to the Polish Foundation for Energy Efficiency the economic potential for the industrial sector is 30-33% savings; the technical potential of the residential and commercial building sectors are estimated to be 35-45% savings, with an economic potential of 20-35%. The economic potential will increase if energy efficiency measures are combined with renovation of existing buildings. The potential savings from electric motors are estimated to be 10-12% of electricity consumption and the economic potential 6-8%.

[16] http://www.euractiv.com/en/energy/eu-states-reject-binding-energy-efficiency-targets/article-141683
[17] Climate Change The UK Programme 2006 CM6764 HMSO
[18] http://www.thecarbontrust.co.uk/energy
[19] http://www.est.org.uk
[20] Energy Efficiency Commitment 2005-2008 Innovative Action Decisions document November 2005 http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/12963_249_05.pdf?wtfrom=/ofgem/work/index.jsp&section=/areasofwork/energy efficiency

Organisations for the Promotion of Energy Technologies (OPETs) and Fellow Members of the Network of Organisations for the Promotion of Energy Technologies (FEMOPETS), created by the EC and funded under the Joule Thermie programme to cover the rational use of energy, generally do make indicative energy saving claims.

Many organisations, either at national or European level, make more specific savings claims for measures to reduce energy consumption in their sector, for example the International Union of Railways[21] (UIC) identifies possible reductions between 2 and 10% for rolling stock design and over 10% for adoption of double-deck rolling stock.

5. Relationship with Energy Service directive

The directive on energy end-use efficiency and energy services (ESD) was adopted in April 2006. It requires member states to draw up national action plans to achieve 9% final (end-use) energy savings during the years 2008-2016 on almost all energy consumption that is not part of the emission trading scheme (mainly households, tertiary sector and transport). It regards energy savings beyond the autonomous savings, to be realized with policy measures from 1995—and in some cases 1991-- on. The target is only indicative but the national action plans will need approval from the Commission and will be reviewed every three years. There is a clear obligation for Member States to aim to achieve the target by taking appropriate measures.

On the other hand the Green Paper aims at 20% total savings of primary energy in the period up to 2020. This means extra savings beyond autonomous trends as highlighted earlier. However, the scope is larger as it entails energy consumption for a longer period, and includes the emission trading sectors, such as industry and energy supply.

The table in the appendix presents a rough picture of ESD-savings fitting into the Green paper target. Total energy consumption in 2000 is set at 100 units. Final energy users are divided into ETS-energy use and ESD-energy use. Energy supply as a whole is supposed to be part of the ETS-scheme. For end-use sectors an energy demand growth of 2% (excluding energy savings) has been assumed, in line with the trends in the Wuppertal study. For electricity production a 1% higher demand growth has been supposed. In the baseline a 1% per year efficiency improvement has been assumed. This is somewhat higher than the realized 0.8% yearly efficiency improvement from 1990 on, as found in the Odyssee-project on energy indicators[22]. To realise extra savings of 20% in the period 2005-2020 an additional 1.5% efficiency improvement per year must be accounted for in the calculation scheme. With these extra savings total energy consumption actually decreases after 2000 (see line “Total” and “with extra savings”), in accordance with the results from the Wuppertal study.

From this simple analysis it follows that in the period 2005-2020 total yearly savings of 2.5% will result from the process of reaching the 20% goal of the Green Paper (GP). However, it must be remarked that the 2.5% total savings contain autonomous savings as well. Long term historic analysis for periods with hardly any policy on energy savings suggest autonomous savings of 0.5 to 1.0% per year. For the Netherlands it has been estimated that total energy savings of about 1% per year consisted of 0.7% autonomous savings and 0.3% policy induced savings[23]. Taking the 0,7% autonomous savings figure this means that yearly savings of 1.8% must be realised with existing and new policy measures, as to reach the goal of the Green Paper (see Table 2).

[21] http://www.railway-energy.org
[22] Energy efficieny - Monitoring in the EU-15, ADEME, Paris 2005.
[23] Memorandum to the Parliament on energy savings and saving options (Energiebesapring en optiedocument), 24 May 2006.

Table 2: Estimated efficiency improvement 2005-2020 related to Green Paper

	Yearly savings (%)	
Autonomous	0.7	
Existing policy	0.3	
Total Baseline	1.0	
New policy GP	1.5	
Total savings	2.5	
Total policy savings		1.8

The 20% efficiency improvement is equal to 25.4 units (total energy use in 2000 set at 100 units, see appendix). The savings due to the ESD equal only 5.4 units, or one fifth of the Green Paper savings. The relatively small contribution of the ESD is due to:
- the smaller scope as it regards only half of total energy consumption (no energy-intensive industry and no energy supply);
- the smaller base, as it regards 1% of fixed historic (non-growing) energy use;
- a shorter period (2008-2016 for ESD against 2005-2020 for the Green Paper).

If a correction is made for the different periods, the ESD-contribution is one-third of the Green Paper savings. When correcting also for the larger scope of ETS, the contribution of ESD is two-thirds (see "Non-ETS", last two columns in the table). This factor of two-thirds corresponds with the 1% extra ESD-savings and the 1.5% extra savings, calculated for the Green Paper.

In the preceding analysis it has been supposed that the Action Plans of the Green Paper lead to 1.5% extra savings in all end-use and energy supply sectors. If less than 1.5% efficiency improvement is realized in ESD-sectors, the relative contribution of the Energy Service directive will be higher than two-thirds. However, in that case the extra savings in emission trading sectors should be more than 1.5% in order to realize the overall goal of the Green Paper.

6. Definition of the baseline for the Green Paper efficiency improvements

According to the text in the appendix of the Green Paper 20% cost-effective savings be realized compared to projections for 2020. However, it is not specified which projections are meant. Normally, goals in official documents are based on projections and policies that were known at the time of publication of the document. Given publication of the Green Paper mid-2005 this means that the baseline should encompass all policy measures or actions up to the end of 2004. The same holds for assumptions with regard to future economic growth, energy price levels, etcetera. The recently provided PRIMES-scenarios for EU-countries offer such a baseline scenario, as these scenarios start from 2005, and contain existing policy up to the end of 2004. Economic growth is set at 2% per year and the oil price is assumed to decrease somewhat from the high 2005 level of 54 $/barrel.

With regard to existing policy some remarks have to be made:
- national policy measures up to the end of 2004 should be present in the PRIMES-scenarios. However, no information is available yet on concrete measures. Moreover, the effect of these measures in the baseline scenario is not given as part of presented output;
- all EU-directives until end-2004 should be present in the baseline as well. However, the actual effect of these directives is dependent on the implementation in all EU-countries. As this often takes several years, only a small number of directives can be taken as existing policy, e.g.: SAVE (1993),

IPPC (1996), labels and standards (1992-1998), LCP (2001), ETD-taxes (2003) and ETS (2003). The Energy Efficiency Action Plan of 2000 is also part of existing policy. Probably not (completely) effective are the directives on Electricity (2003), CHP (2004), Eco-design (2005) and EPBD (2006). The effect of these directives can be attributed to the extra 20% savings to be realized.
- recently, energy prices have increased further compared to applied levels in the PRIMES-base year. The Green Paper goal probably was based on price levels and expectations for 2004/2005, without knowledge on this further increase (which can reverse again in time). Therefore, these higher prices should not directly lead to a correction of the 20% savings goal. In effect, the extra savings due to higher prices could be taken for granted when trying to realize this goal.

Observations and tentative conclusion

Observations:

- The 20% savings in the Green Paper does not regard total energy savings but only the extra savings beyond a BAU (Business As Usual) trend. Therefore the effects of all policy measures implemented before 2005 are not part of the 20%. The definition of cost-effectiveness goes beyond pay-back periods that many energy users accept. Both factors make it somewhat harder to reach the 20%.
- The most extensive and consistent underpinning of 20% savings is given by the Wuppertal study. However, this study supposes a number of stringent additional policy measures.
- The results of the studies on the effects of several of the measures cannot be summed up due to probable overlap. The closing of the efficiency gap between western and eastern European countries is already partially accounted for in the BAU-trends and thus contributes somewhat less than assumed earlier to the 20% savings. Rebound effects are also likely as living standards are raised in the new Member States. Both these observations point to a possible overstating of the results of policies.
- To reach the goal of 20% savings above BAU, yearly total savings of 2.5% will be necessary. Given 0.7% autonomous savings, existing and extra Green Paper policy should contribute 0.3% and 1.5% respectively, totalling 1.8% policy induced savings per year. This indicates that the effects of existing measures need to be increased somewhat more than was foreseen in the Green Paper. There the effect was expected to be roughly evenly divided between existing and new measures.
- The rate of autonomous energy savings will increase (possibly from 0.7% to 0.8-0.9%) if present high world market prices persist until 2020. In that case smaller policy induced savings suffice to realise the Green Paper target of 20%.
- In ESD-sectors (e.g. households, tertiary and transport) the goal of the Green Paper requires about 1.5 times more efficiency improvements than the target of the Energy Service directive (taking into account the shorter period and smaller scope of the ESD).
- The new PRIMES baseline scenario, containing existing policy measures up to end-2004, can be used as the baseline for the Green Paper goal of 20% energy savings.
- Given slow actual transferring of earlier EU-directives into national policy, only part of all present directives should be regarded as existing policy measures in the baseline.

Conclusion:

A considerable strengthening of energy efficiency policy, at EU and/or country level, is needed in the shortest run possible to make the (extra) 20% savings statement in the Green Paper come true. However, to accomplish this task a substantial part of EU-energy efficiency policy can be relied on, as many (new) directives have yet to deliver their full potential contributions. Moreover, enduring high energy price levels can help to realise the target to some extent.

Appendix: Simplified overview of energy consumption and savings related to the goals of Green Paper and ESD (total energy use 2000 = 100)

Analysis of 20% savings for Green Paper and Savings Energy Service directive															
	Change			(energy consumption 2000 = 100)							Change	Savings in Green Paper			Savings
	per year	2000		2005		2010		2015		2020	2000-2020	2000-2020	2005-2020	2008-2016	ESD
Non-ETS															
without savings	**2,0%**	60	2%	66,2	2%	73,1	2%	80,8	2%	89,2					
baseline (+savings)	**-1,0%**	60		63,0		66,1		69,5		72,9	12,9				
with extra savings	-1,5%	60		58,4		56,9		55,4		53,9	-6,1	26%	20%		
idem (PJ)												-19,0	-14,4	-8,7	-5,4
total savings (%)												40%	31%		-9%
ETS-end use															
without savings	**2,0%**	**20**	2%	22,1	2%	24,4	2%	26,9	2%	29,7					
baseline (+savings)	**-1,0%**	20		21,0		22,0		23,2		24,3	4,3				
with extra savings	-1,5%	20		19,5		19,0		18,5		18,0	-2,0	26%	20%		
idem (PJ)												-6,3	-4,8	-2,9	**0**
total savings (%)												40%	31%		
Total end-use															
without savings		80		88,3		97,5		107,7		118,9					
baseline (+savings)		80		84,0		88,2		92,6		97,2	17,2				
with extra savings		80		77,9		75,8		73,8		71,9	-8,1	26%	20%		
idem (PJ)												-25,4	-19,2	-11,5	-5,4
total savings (%)												40%	31%		
ETS-supply	**1,0%**	< extra growh electricity													
without savings	3,0%	**20**	3%	23,2	3%	26,9	3%	31,2	3%	36,1					
baseline (+savings)	**-1,0%**	20		22,0		24,3		26,8		29,5	9,5				
with extra savings	-1,5%	20		20,4		20,9		21,4		21,8	1,8	26%	21%		
idem (PJ)												-7,7	-6,1	-3,7	**0**
total savings (%)												40%	32%		
Total															
without savings		**100**		111,5		124,4		138,8		155,0					
baseline (+savings)		100,0		106,0		112,5		119,4		126,8	26,8				
with extra savings		100,0		98,3		96,7		95,2		93,7	-6,3	26%	20%		
idem (PJ)												-33,1	-25,4	-15,2	-5,4
total savings (%)												40%	31%		

Appendix 5 – Consultee Meeting Reports

Organisation	Country	Area of Influence	Consultation Date	Comments
The Carbon Trust	UK	Promoting energy efficiency in the business and organisations arena as part of a wider portfolio	30/06/06	Meeting minutes agreed
Energy Saving Trust	UK	Promoting energy efficiency in the domestic and Local Authority arena	13/06/06	Meeting minutes agreed
Inland Revenue	UK	UK Taxation authority	-	No response to invitation
ESTA (Energy Systems Trade Association)	UK	Energy equipment suppliers federation in UK	09/06/06	Meeting minutes agreed
Ofgem	UK	Energy supply regulator	13/06/06	Meeting minutes agreed
EURELECTRIC	EU	Electricity generators Federation across the EU	220/6/06	Meeting minutes agreed
COGEN EUROPE	EU	Cogeneration Organisation across the EU	22/06/06	Meeting minutes agreed
ECOFYS	NL	Research Institute	27/06/06	Meeting minutes agreed
European Tyre & Rubber Manufactures Association (ETRMA)	EU	Tyre Manufacturer Association	29/06/06	Meeting minutes agreed
NOVEM	NL	National Energy Institution	26/06/06	Meeting minutes agreed
European Automobile Manufacturers Association (ACEA)	EU	Car Manufacturer Association	29/06/06	Meeting minutes agreed
ECEEE	EU	Represents NGOs and experts promoting energy efficiency.	21/06/06	Meeting minutes agreed
CEETB	EU	Represents the construction industry	22/06/06	Meeting minutes agreed

Interviews were held with the organisations shown by the assessment team. Minutes were taken during the meeting and agreed with the interviewee prior to inclusion in this report.

Interview 1 – The Carbon Trust (UK)

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Interview Record

Organisation	**The Carbon Trust**
Person/s interviwed	**Dr. G. Felgate**
Contact Details	**Director** **8th Floor** **3 Clement's Inn** **London WC2A 2AZ** **Tel: +44 (0)20 7170 7000**
Interviewer	**T. Longstaff**
Date of Interview	**30 June 2006**
Location	**London, CT office**
Date record agreed	**05 July 2006**

Document Control

Job Number: **5044526**			***Document reference:*** **-**		
3	Agreed version for use	T Longstaff	G Felgate	*P Tipping*	06-07-06
2	Draft consultation record	T Longstaff	G Felgate		
1	Action list issued to consultee				21-6-2006
Issue	**Purpose/Description**	**Originated**	**Reviewed**	**Authorised**	**Date**

1. Confirmation of Protocol

Confirm that the consultee understands the framework that the interview is being conducted within, that the interview record may be quotable in the impact assessment, and that the interview record will be agreed before inclusion in the assessment record.

2. Interview Record

Option Reference	Option Description	Comments
4	Extend EPBD to include smaller buildings (<1000 m2), inspection requirements to smaller installations and higher minimum standards for public buildings	Getting existing Directives and Regulations to be adhered to is a much bigger effect than extending the scope of Directives: If you drive too fast you expect to get caught, if you cheat the building regs you expect to escape
10	EU to incentivise the use of intermediaries for small energy efficiency loans etc, for example by extending access to private capital (through Energy Services Directive obligation) public capital as a revolving fund for "soft loans"	(Note: The CT is such an intermediary,with a 3 year old revolving zero interest loan fund presently loaning £1m / month over the period of the projects' energy payback.) This is working well for the Carbon Trust, growing fast, and has huge scope for expansion. At present State Aids limits this to SMEs, but there is no good reason for this. CT Loans are zero interest, but preferential rates are probably sufficient. It would be even more powerful if investments could be taken off balance sheet. At present, when energy efficiency investments are seen as competitive ("either / or") with normal capex so far as shareholders are concerned, there is a natural tendency to invest in core business, even though businesses would like to make the energy efficient investment instead. A (non attributable) retailer example was given who wanted to upgrade energy efficiency of lighting on an acceptable payback, but had to pick between that and a shop refit. CT believes that there are lots of sensible energy efficiency schemes identified which are simply not going ahead because of competition for funds. The EU could help in this by encouraging the provision of cash through central banks at favourable terms, and by doing what it can to influence accounting standards such that energy efficiency loans are not deemed to damage business solvency / gearing.
12	Incentivise manufacturers to produce energy efficient products through favourable taxation rates and other incentives	In Garry's limited experience it is much more effective to focus the fiscal support on consumers. The UK has high owner occupancy of houses, not because housebuilders were given tax breaks, but because mortgages were. It is better to put zero VAT on insulation products than low corporation tax on insulation manufacturers. In turn it is better to offer low council tax on insulated properties than zero VAT on insulation. The effort should go into material intervention on the consumer / demand side

Option Reference	Option Description	Comments
14	An EU broad policy for fuel efficient tyres, tyre pressure indicators (dashboard tyre pressure sensors mandatory on cars and freight vehicles, valve pressure indicators compulsory on existing vehicles tyres from 2010) and free facilities at service stations, labelling of tyres	Garry was interested that the EU should consider action at this "micro" level, citing the example recently put forward by the Governor of New hampshire that there are 1.2bn chargers in the US, and legislation to force them to take 6W, not 8W would make a material difference

3. Additional Comments:

The Carbon Trust is a not for profit company tasked with ensuring that the UK's Industrial / Commercial sector meet its Kyoto Protocol obligations. From his experience Garry Felgate would urge the EU to:

1. Change State Aid policy to support energy efficiency rather than frustrating it. In particular legislation should allow agents to identify proprietary energy saving hardware (rather than generic technologies), and should allow for the focus of resources on willing recipients (rather than Universal Service). This was supported by Analogy.

- Domestic Heating Analogy: A heating engineer visits a house, recommends a technology, identifies a product, then offers to come and install it the next day. The Carbon Trust is only allowed to recommend a technology, so implementation falls short of desired levels.

- Customer acquisition analogy: A service company finds a willing buyer, does a good job for them, then does repeat business with them making a real difference. The Carbon Trust starts to achieve something then has to stop because of state aid ceilings. The effect is that CT spends a lot of money on customer acquisition of less willing customers and leaves willing customers partially satisfied.

- Working with consumers who want to achieve energy savings and creating leaders (who will ultimately be emulated) is a better allocation of funds in a rationed market than forcing support on reluctant consumers.

2. Focus support on winning industries: Not all countries need champions in all sectors. Focus Energy Efficiency support on winning industries to create champions that can be used as a model elsewhere. The implication is that German funding should be focused on, for example, Car Manufacturers (who can then be shown as a model for British car manufacturers), Italian on Clothes, UK on Retail etc.

- Don't "pick winners" at a macro / technology level: Work with the market. Corporations are smarter than governments – the cash that governments can provide will not create markets. Why provide £1000 grants for buying hybrid cars if there's already a six month waiting list? Instead, focus on identifying blockages in the market and make a material intervention, ideally on the customer side.

- Be open to allowing Incubators to "pick winners" on a micro / business level: Successful innovation needs the right technology and the right management. A Macro approach ignores the management, and so is doomed to failure. Europe has phenomenal research capabilities and more patents per head than the US or Japan, but doesn't bring innovations to market. Government can help young companies bring energy efficient technologies to market through providing services and finance. (The Carbon Trust's VC Incubator has significant experience of this)

3. Take a Pragmatic approach to Industry: Dispel all concepts of Macroeconomics – focus on the pragmatic, not the conceptual. Industry wants to be told what to do, and how to make it happen – they then want Follow Up to enable action, possible with cash support in the form of loans.

4. Treat Technical Reports as only a building block: Engaging the consumer is more valuable than offering generic advice: a strong technical report is a prerequisite, but will achieve nothing until put into context by people. Technologies do not differ hugely across the EU25: the EU could helpfully make sure that all members have access to the strong library that currently exists locally.

5. Grants vs Loans: Loans work for industry, Grants work for Domestic.

6. Carbon Trading: Logically Energy Efficiency will have to save Carbon cheaper than Trading, otherwise businesses will logically just trade. Thus if the market rate for Carbon is 20 Euros / tonne, Energy Efficiency measures will only be adopted if they cost <19 Euros / tonne. The volatility of the Trading regime does not help here: an example given was a major industrial player (named by Garry but not for the record) that missed its target by 1800 tonnes, considered buying this at 30 Euros per tonne last year, but didn't because it believed (as a result of CT work) that it could save the equivalent at a cost of 10 Euros / tonne. It tightened its future target by 1800 plus 1800, and prepared to save 3600 tonnes by taking action. In the meantime the Carbon price collapsed to 6 Euros per tonne, so they just bought the allocation in the market.

7. Understand Materiality: It was stressed that any fiscal measures need to be material. The example used was Road Tax for SUVs. In the UK the Road Tax rate is a little higher - £280/yr vs £190/yr for a family car. People paying £25000 on an SUV are unlikely to be detered from buying it for this sort of differential. The Mayor of London proposes to charge £20/day for driving SUVs – this is a much more tangible deterent. Single Issue Marketing and education has a place here also:"SUVs are evil" campaigns make sense.

8. Technology: There is a danger that the view that "we will be saved by technology" is gaining political ground not just in the US. The problem is that we can already be saved by today's technology, which can readily save 30% if adopted. Why would we expect any improved adoption of future technologies?

9. Encourage good Regulation: Regulation is frowned upon, particularly in the UK. Regulation is not bad per se, but it does need to be fair, consistent and long term. Unleaded petrol was cited as a good example. It was asserted that lead additives would be banned in ten years. When ultimately banned in 2001 the legislation was irrelevant, because the market had already acted

10. Ignore Lobbyists: The EU and national governments should stop listening to lobbyists and start listening to companies; the latter are more important.

Interview 2 - Energy Saving Trust (UK)

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Interview Record

Organisation	**Energy Savings Trust (EST)**
Person/s interviwed	**Brian Samuel** - (Policy and Strategy)
Contact Details	**21 Dartmouth Street** **London SW1H 9BP** **+44 (0)20 7222 0101**
Interviewer	**G Srinivasan**
Date of Interview	**13th June 2006**
Location	**EST Offices**
Date record agreed	**22nd June 2006**

Document Control

Job Number: **5044526**			***Document reference:*** **-**		
3	Agreed version for use	G Srinivasan	B. Samuel	*P Tipping*	6 July 2006
2	Draft consultation record	G Srinivasan	B. Samuel		
1	Action list issued to consultee				21-6-2006
Issue	**Purpose/Description**	**Originated**	**Reviewed**	**Authorised**	**Date**

1. Confirmation of Protocol

Confirm that the consultee understands the framework that the interview is being conducted within, that the interview record may be quotable in the impact assessment, and that the interview record will be agreed before inclusion in the assessment record.

2. Interview Record

Option Reference	Option Description	Comments
A4	Increase means of recognition for organisations providing links etc to EU Energy Efficiency information sources.	Irrelevant: need local solutions. The EU is too distant. Need to share best practice with like-minded organisations. EST have targeted 10 customer types. There must be a clarity and consistency of message. Use local champions and invest in good networking organisations.
A7	Develop scheme recognising retailers providing trained sales personnel or information on energy efficiency by allowing public recognition through logo or certification scheme. Information packs or equivalent to be supplied providing information on labelling scheme, Energy Efficiency Products Listing or equivalent for product category	Yes: Education of sales personnel is definitely needed. John Lewis educate their sales staff; however the time when potential sales of electrical goods are highest (i.e. evenings and weekend) is when temporary staff are on duty. Energy savings information is **not** included on web site. The labelling is confined to "A = good" and "D = bad" but there is no reference to energy efficiency

Option Reference	Option Description	Comments
A8	Oblige Member States to include energy efficiency training and information in national education curriculum for primary and secondary schools as part of sustainability awareness.	Although a good idea in theory there is limited evidence available on whether this is effective or has any lasting effect. A research project is under way to determine this and the results will be published shortly. Would parents be influenced and how long would the message last? EST's schools programme did not include funding to monitor benefits, but there is an unsubstantiated view that it was OK. Energy Efficiency briefing documents would represent "information overload" for teachers and therefore have a negative impact. The educational material needs to be embedded into the curriculum and presented as part of the mainstream syllabus and not as an additional activity. There is no useful benefit if a school programme runs for a limited period of, say, just one year.
A9	Oblige energy suppliers to include information on energy bill interpretation and how relates to energy efficiency	It helps but only those who are really interested; there is a ‹1% hit rate. However it is a cheap measure and relatively cost effective. However, there is a need follow up on a "one to one" basis. Any persons showing an interest should have a course of action that they can follow, e.g. by 'phoning a Help Line
A11	Harmonise all product related energy efficiency information into one Energy Efficiency Product Listing portal	One stop shop needed for consumers where advice can be obtained on transport, micro generation, photovoltaics, etc. Ofgem offer 'top 10 tips' but do not provide any follow up. The advice must go beyond that on energy efficiency. EST attempt this: The energy supplier are obvious organisations to provide this service. However there is no incentive for petrol service stations to encourage the efficient use of transport energy.
A18	Include operational costs in Energy Efficiency Product Listing or equivalent consumer information	Do not overload end users with too much information. The A to G rating is sufficient even though the actual energy usage between different appliance models cannot be easily compared. However the rating system has the advantage of being simple and standardised.
A24	Mandatory labelling of 'energy unit' consumption consequences at point of sale	Mandatory labelling needs to be extended; however the re-labelling process is slow whereas the white goods industry moves very fast. Labelling needs to be fit for purpose; 80% of new fridges are now classified as "A" thus devaluing the standard.

Option Reference	Option Description	Comments
		Bad appliances need to be banned as is the practice for bad toys.
L5	Extend EPBD to include smaller buildings (<1000 m2), inspection requirements to smaller installations and higher minimum standards for public buildings	This action will have a very positive impact if enforced at local level.
L27	Adapt appliance label regulation as to regular updating of the label system in order to stimulate the marketing of ever more efficient appliances	The above actions need widening (possibly) to include the removal of the "standby mode" when equipment is switched off.
L43	Revise public procurement regulations to favour energy efficient appliances, vehicles and services	Currently the requirement for "energy efficient" equipment is too low procurement criteria. The situation could be improved through good local leadership.
L45	Include mandatory Energy Efficiency training in Installer Certification & Supplier certification	EST have done this for considering boilers – same principle for retailers.
F1 & 2	Public banking institutions need to identify a way of marketing funds for energy efficiency measures. International Financial Institutions (IFI), such as the EIB, EBRD, should establish partnerships with intermediaries like national, local banks or national energy agencies using National guarantee funds to cover investments in energy efficiency	These actions needs to happen. Economies of scale would result from an "umbrella approach". However a funding programme may not necessarily deliver savings or be cost effective. A balance of support is needed. Council tax rebates for investment in energy efficiency measures, coupled with a further discount from the supplier may be better than the actions F1 and F2. However, LAs are considered more trustworthy than suppliers.
F4	Incentivise the use of intermediaries for small energy efficiency loans, etc	Who would be the intermediaries? Also, who would use them? Not relevant for housing sector. Action could help to alleviate fuel poverty. ESCO's do **not** need policy support. Reward needed for 'saving' units, not 'selling' units. Need resource, not policy support. All of the following need to be engaged. Manufacturers / supply chain / house builders / authorities responsible for enforcing planning and building regulations / Local Church Association. There should be local centres of excellence support by national network with emphasis on the measures that are most cost effectives. Recycling **has** to be done

Option Reference	Option Description	Comments
F5 / 11	Increase policy support for ESCOs in the form of help for the dissemination of their activities, quality standards, and access to finance Encourage investments in energy efficiency projects through low interest or interest free energy efficiency loans	Not discussed

3. Additional Comments:

Since action is better at the local level it is important to ensure that the appropriate (possibly additional) resources is available within the Local Authority.

Interview 3 – Inland Revenue (UK)

Inland Revenue did not respond to interview invitation

Interview 4 – ESTA (Energy Systems Trade Association) (UK)

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Interview Record

Organisation	**ESTA (Energy Systems Trade Association)**
Person/s interviewed	**Professor Martin Fry - Chairman** Also Vice President Energy Institute
Contact Details	ESTA PO Box 77 BENFLEET Essex SS7 5EX martin_r_fry@compuserve.com 01628 829 959
Interviewer	**G Srinivasan**
Date of Interview	**9th June 2006**
Location	**London, - City University**
Date record agreed	**16th June 2006**

Document Control

Job Number: **5044526**			***Document reference:*** **-**		
3	Agreed version for use	G Srinivasan	M. Fry	*P Tipping*	6/7/06
2	Draft consultation record	G Srinivasan	M. Fry		30 - 06 -06
1	Action list issued to consultee	21-6-2006			
Issue	**Purpose/Description**	**Originated**	**Reviewed**	**Authorised**	**Date**

1. Confirmation of Protocol

Confirm that the consultee understands the framework that the interview is being conducted within, that the interview record may be quotable in the impact assessment, and that the interview record will be agreed before inclusion in the assessment record.

2. Interview Record

Option Reference	Option Description	Comments
L3	Adapt existing EU and national legislation as to strengthen the economic attractiveness of high-quality cogeneration	The existing legislation is very weak but the stated action will have a positive impact on the security of supply. New projects should incorporate requirement for CHP
L18	Adaptation of existing EU and national regulation as to the management and capacity planning of networks for electricity and gas in order to decrease energy losses	Electricity networks require massive investment. Update is now due; this is now being driven by embedded generation. This action L18, whether through legislation or otherwise, has to be done! If this requires Government support then this will not be forthcoming; however there needs to be on-going debate on this topic needed; at present this issue remains unresolved. Micro generation – could affect individuals. The way in which planning consents are granted need to be considered and simplified. Cogeneration will transform the market particularly if it forms part of new build. Cogeneration will increase awareness.
L21	Set up of regulation and/or incentives to increase the average conversion efficiency per fuel type, by installing new plants with best available technology (BAT)	Any increase in conversion efficiency is best left to market forces rather than through improved legislation. The manufacturers and power producers are already reacting positively. (Note: ESTA has a specialist Contract Energy Management Group which embraces CHP)
L34	Set up of regulation and/or incentives to increase the average conversion efficiency per fuel type by removing old inefficient power plants	Market forces will cause generation companies to close down inefficient plants although admittedly some legislation may help this process.

Option Reference	Option Description	Comments
G1	Obligation on Member States for variable subsidy for gap between cost and production for CHP	Industrial and commercial organisations do not need grants to support investment in CHP – providing them with grants would not work. Such action could not be justified – who would be eligible? Grant support is arguably more justified in the domestic sector, but not just for micro-generation. The interveiwee, MR Fry, has direct experience of PV generation; he has an installation on the roof of his house. This cost him ~£4k and he received a 50% It is sometimes claimed that the best use of Government grant funding is to support cavity call insulation.. However, the intervieweee considers that public money should be available across a range of technologies.
G3	Fair access and fair rules for CHP in competitive markets in the EU	This action is connected to L18 There is a grid connection problem when there is export. Fair access / fair rules – this is not a problem so why is action needed? Network voltage problem for grid connected fuel cell/PV systems.
G5	Fiscal incentives to facilitate investment in high-efficiency power generation	Ths action presumably covers exemption from VAT and /or Council tax for energy efficient features Present system mitigates against those who are non VAT registered. Enhanced Capital Allowance – the amount of benefit is too small. There is a possibility that heat pump installations could be VAT exempt? Regulator could facilitate further progress – things are already happening. Long term relations between supplier/customer relationship.
G7	new CEN STANDARD to regulate district heating systems	Not qualified to comment
G18	Public Sector adoption of 15% target to use CHP generated	This is a good idea
G11	Energy suppliers required to incentivise all scale CHP by regulators	Not discussed
G14	Addressing the administrative burdens placed on smaller generators and incentivising the utilisation of distributed generation.	Not discussed

Option Reference	Option Description	Comments
F5 / 11	Increase policy support for ESCOs in the form of help for the dissemination of their activities, quality standards, and access to finance Encourage investments in energy efficiency projects through low interest or interest free energy efficiency loans	Already exist for SMEs - could be extended
F7	Investigate degree of volatility of energy prices across the Community	Already being done, why is UK gas price so high? Linked to weather forecast - is market fair or being rigged? Are spikes the true situation? Time available to agree a fuel supply contract (often only a few hours) is too short.
F18	Encourage off-balance sheet investments, like leasing in energy efficient technologies	Off-balance arrangements can be made through Contract Energy Management / ESTA / ESCO. Tyhis should be encouraged. The future challenge is in the domestic sector). Energy end use efficiency and energy services directive (2008) – the UK government is considering a target of 1% p.a. reduction from 2009-2017 across all sectors

3. Additional Comments:

Interview 5 – Ofgem (UK)

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Interview Record

Organisation	**Ofgem**
Person/s interviewed	**Charles Hargreaves** (responsible for Energy Efficiency commitment)
Contact Details	**9 Millbank** **London, SW1P 3GE** **+44 (0)20 7901 7000**
Interviewer	**G Srinivasan**
Date of Interview	**13th June 2006**
Location	**Ofgem Offices**
Date record agreed	**7th July 2006**

Document Control

Job Number: **5044526**			***Document reference:*** **-**		
3	Agreed version for use	G Srinivasan	C. Hargreaves	*P Tipping*	6/7/06
2	Draft consultation record	G Srinivasan	C. Hargreaves		
1	Action list issued to consultee	21-6-2006			
Issue	**Purpose/Description**	**Originated**	**Reviewed**	**Authorised**	**Date**

1. Confirmation of Protocol

Confirm that the consultee understands the framework that the interview is being conducted within, that the interview record may be quotable in the impact assessment, and that the interview record will be agreed before inclusion in the assessment record.

2. Interview Record

Option Reference	Option Description	Comments
L3	Adapt existing EU and national legislation as to strengthen the economic attractiveness of high-quality cogeneration	There is possibly a case for strengthening the legislation for small scale cogen; however, legislation for large scale should be relaxed so that market forces will determine whether or not CHP plant projects are implemented. However, the action should not be limited to CHP; the focus should be on ensuring the implementation of the most appropriate energy saving technology. Should not have too many different laws, but having a framework is OK. Defra's Energy Efficiency commitment covers small scale and all mitigation technologies including micro-generation. It is sometimes overlooked that improved energy efficiency has associated carbon reduction targets; these need to be openly declared. CHP is not zero C technology
L18	Adaptation of existing EU and national regulation as to the management and capacity planning of networks for electricity and gas in order to decrease energy losses	Although the distributors are subject to price controls Ofgem prefer to support these with complimentary 'carrot' measures. Ofgem believe that the distributors have the incentive to improve efficiency because this gives better returns on investment but they do not yet have sufficient evidence regarding how the effectiveness of the market forces. However at a recent Energy Institute Meeting (22nd May 2006 - London and Home Counties Branch) to discuss the UK's Electricity Grid Infrastructure John Sinclair from the Energy Networks Association indicated that efficiency improvements because they are recognised as cost effective investments.
L21	Set up of regulation and/or incentives to increase the average conversion efficiency per fuel type, by installing new plants with best available technology (BAT)	This "command and control measure" is not in favour; too much dictation comes at a cost, i.e. subsidies or increased fuel costs.

Option Reference	Option Description	Comments
L34	Set up of regulation and/or incentives to increase the average conversion efficiency per fuel type by removing old inefficient power plants	As for L21 - let the market decide.
L40	Implement obligations on energy suppliers to provide energy efficiency (with a trading option through white certificate scheme)	Defra's Energy Efficiency Commitment promotes Energy Efficiency to domestic consumers i.e. retrofitting of improvements into homes, e.g. cavity wall insulation. This is where the action is really needed. In summary there are the following three forms of intervention that can be used to manipulate the market: a) regulation b) incentives c) fiscal The UK Government prefers (b) Eliminating the energy used while TVs and other electrical appliances are on "standby" will lead to importnat energy savings. Fiscal benefits incentives are much more effective than straight grants, e.g. reduction of council tax is better than straight grant of £100.
G1	Obligation on Member States for variable subsidy for gap between cost and production for CHP	It is inappropriate to support one particular technology – each energy efficiency measure must be allowed in equal chance. Micro-CHP could save energy. This has been talked about for many years but commercial scale units are not yet available on market.
G3	Fair access and fair rules for CHP in competitive markets in the EU	Although there certainly is a need fair play it would be better to channel resource into improving insulation standards.
G11	Energy suppliers required to incentivise all scale CHP by regulators	Already discussed.
G14	Addressing the administrative burdens placed on smaller generators and incentivising the utilisation of distributed generation.	This can be coupled with the question relating to access to markets The administrative cost for ROCs for small companies is high; there is a balance to be made between providing incentives and grants.
G18	Public Sector adoption of a 15% target to use CHP generated electricity	There are ways of reducing carbon emissions other than CHP. Promoting these along with CHP encourages healthy inter-technology competition. Imposing costs on End Users through "pushing" them to use CHP may be inappropriate. Diversifying range of options improves security of supply.

Interview 6 – Eurelectric (EU)

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Interview Record

Organisation	**Eurelectric**
Person/s interviwed	**Mr. Scowcroft**
Contact Details	**Head of unit Environment & Sustainable Development**
Interviewer	**P. Boonekamp**
Date of Interview	**22 June 2006**
Location	**Brussels, Eurelectric Office**
Date record agreed	

Document Control

Job Number: **5044526**			***Document reference:*** -		
3	Agreed version for use	P. Boonekamo	Mr Scowcroft	*P Tipping*	6 July 2006
2	Draft consultation record	P. Boonekamo	Mr Scowcroft		
1	Action list issued to consultee				
Issue	**Purpose/Description**	**Originated**	**Reviewed**	**Authorised**	**Date**

1. Confirmation of Protocol

Confirm that the consultee understands the framework that the interview is being conducted within (i.e. introductory letter), that the interview record may be quotable in the impact assessment, and that the interview record will be agreed before inclusion in the assessment record.

2. Interview Record

Impact Assessment Action Reference	Description	Comments	References
G..	CHP-various	The most important thing is to command the existing CHP-directive and not introduce new legislation. CHP has an important role to play when there is a constant heat load. It's more a matter of effective CHP than CHP at all costs. Present differences between fractions of CHP per country are mainly due to historic choices by public electricity production, e.g. low in UK but high in Eastern Europe. Liberalization is 10 years old and it takes 20-30 years to turn things round. The fraction of CHP to be realised is for the market to decide. CHP is not an emerging, but a mature technology and therefore does not necessarily should get subsidies.	
L21/L34	Increase conversion efficiency of central power production	A large proportion of power plants will be replaced in the next 20-30 years. It is important to maintain a balanced supply; there is always a trade-off between flexibility (peak load production) and high efficiency (base load). Competitive pressures in the market are such that people get as much efficiency out of their plant as possible. The Best Available Technology (BAT, connected to IPPC en BREF) depends on the issue: SO2/NOx, CO2 or conversion efficiency. One of the drivers is the price of carbon in the ETS. If this leads to building a coal plant with carbon sequestration, it will not be the most efficient	

Impact Assessment Action Reference	Description	Comments	References
		plant. Not all targets for climate, security of supply and energy efficiency can be met at the same time. Advanced coal plant could reach 55% efficiency, with sequestration almost 50%. Uncertainty preventing investment in high efficiency plants? Assumptions at the start of ETS (gas as cost-effective alternative to comply with ETS-goals) became no longer true due to very high gas prices. Policy cannot provide long term certainty as to investment factors. Consistent policy and functioning market needed. Lack of price signals from ETS? No emission reduction investments to be expected after first three years without banking. But rising carbon costs are pretty much built in all boardroom decisions. The value of the Action Plan is on the demand side; it will take some time before the ETS will have an impact on demand; it can be envisaged that producers stimulate energy efficiency with their customers to remain below their emission-cap. However, lowering electricity use can be contradictory to lower CO_2-emissions (see additional comments)	
L24	EU-wide White Certificates	It is good that countries look at this system, but there is a piling up of all sorts of certificates. It is not clear how white certificates actually contribute to CO_2-reduction. At some stage companies can shift from selling a commodity (electricity) to an energy service. One of the problems is that regulators pose limits on the length of the contract. But ESCO's, investing in delivering services, need a long contract period. There is always a trade-off between optimal/flexible market structure and an integrated/longer term structure needed for energy services and savings. Energy efficiency commitments should not be put solely on the suppliers. Some Eurelectric members are not in favour of targets	

Impact Assessment Action Reference	Description	Comments	References
		anyhow. With too much different targets (CO_2, Renewables, energy savings) the system falls apart.	
L18	Decrease network losses	Network companies are seen as monopolies. There is tremendous pressure on grid operators from producers and customers to cut down network losses. The 10% savings figure seems a bit high. The new MS systems may not be as efficient as in the EU-15. Historic figures on network losses may be influenced by inadequate registration of consumption.	High level group (massive losses in the system). Eurelectric figures on possible improvement?
L27	Labels updating	Eurelectric in favor of labels with cost information. Long lasting equipment is a problem if the efficiency of new appliances increases fast.	
L40	Optimized public lighting	This is a public procurement issue. Savings are also favourable for the load pattern.	
L47	Harmonised audit schemes	There is a huge energy audit scheme in EMAS, while Eurelectric is in favour of "do-it-yourself" audit scheme for SME.	

3. Additional Comments:

Awareness is important, in sofar governments should rather inform energy users about the possibilities for energy efficiency than ask suppliers to do this. In principle customer-driven policies are more effective, especially in a market situation where customers possibly prefer low prices instead of energy saving services. With controlled market with obligations is not what Eurelectric has in mind as a market.

Electric technologies increase electricity use but can decrease primary energy use because they are much more efficient in end use. Heat pumps are often neglected in policy (see brochure "Electricity for more efficiency", July 2004, Eurelectric/UIE).

Electricity savings should be transferred to primary energy savings (using about 40% efficiency) to present the real effects.

Interview 7 – COGEN Europe (EU)

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Interview Record

Organisation	**COGEN Europe**
Person/s interviwed	**Dr. S. Minett**
Contact Details	**Director**
Interviewer	**P. Boonekamp**
Date of Interview	**22 June 2006**
Location	**Brussels, COGEN office**
Date record agreed	

Document Control

Job Number: **5044526**			***Document reference:*** **-**		
3	Agreed version for use	P. Boonekamp	S. Minett	*P Tipping*	6 July 2006
2	Draft consultation record	P. Boonekamp	S. Minett		
1	Action list issued to consultee				
Issue	**Purpose/Description**	**Originated**	**Reviewed**	**Authorised**	**Date**

1. Confirmation of Protocol

Confirm that the consultee understands the framework that the interview is being conducted within (i.e. introductory letter), that the interview record may be quotable in the impact assessment, and that the interview record will be agreed before inclusion in the assessment record.

2. Interview Record

Impact Assessment Action		Comments	References
Reference	**Description**		
G1.. G7	Various CHP-actions	Without CHP the electricity producers probably cannot deliver their CO_2-emission reductions as demanded under the second and third round of the NAP. CHP is cost-effective if you look at the total costs including transmission and distribution costs, not only the power plant costs. The Greenpeace-UK study shows that a decentralized system is cheaper than a centralized one. The CHP-directive will have a quite important impact as to translating this macro-view to the micro-project level. CHP-production at the site of an user connected to the low-voltage grid avoids 14% grid losses. Average losses in the Netherlands are low due to much CHP. CHP reduces also the need for spare capacity. All-in-all MW-costs for CHP are higher but costs per delivered MW are lower. The CHP-directive allows MS to give support to CHP representing the avoided system costs. Penalising conventional production for their long tem cost effects on the system can be a solution too. If these costs cannot be integrated in a market system, an obligation can provide the optimal result without large	Decentralized energy, Greenpeace, UK

Impact Assessment Action Reference	Description	Comments	References
		financial flows. In Flanders the price paid for CHP-electricity is increased with a fixed quantity. In the UK the penalty on not realising CHP is too low to incentivised producers.	
L21	Highest efficiency for new conventional plants	Conventional coal plants could have 50% efficiency. With 60% for gas few CHP are high efficiency, but the real efficiency is much lower, maybe 52%. In the CHP-directive 52,5% will be used as reference value.	
F7	Stabilizing energy tax	Stable prices are good for CHP, but the spark spread between fuel price and electricity price is more important.	

3. Additional Comments:

Presentation "Why is there not more Cogeneration?" to the High Level Group on Competitiveness, Energy and the Environment, Dr. Simon Minett, Managing Director, COGEN Europe, 27 March, Brussels.

Labelling of electricity to source should also regard CHP-electricity.

CHP should not be seen as opposed to central production options, but as a (more efficient) variant on nearly all production options: gas-CC, coal, biomass and even a future coal plant with carbon sequestration.

Interview 8 – ECOFYS Germany

Minutes of telephonic interview with Ecofys Germany

Interview held Tuesday 27 June 10:00 hr

Participants:
Carsten Petersdorff – Ecofys Germany
Piet Boonekamp – ECN the Netherlands
Casper Tigchelaar – ECN the Netherlands

Approved: 6 July 2006

Questions and answers

1. *Can you estimate the energy saved when EPBD standards are regularly strengthened according to technical and financial improvements?*

In its studies Ecofys did not focus on a extra strengthening of existing EPBD standards apart from the strengthening which is already expected after implementing the existing EPBD. Minimal standards are not the same throughout Europe because of differences in climate and construction techniques.
Perhaps strengthening EPBD standard could increase energy efficiency in newly build houses with 20 to 30 %. But, since the large share of the energy saving potential lies in the existing building stock and only a small part of the existing buildings are in the scope of the EPBD, these potential should be tapped. I do not expect a major impact of the improvement of EPBD standards without taking into account smaller existing buildings.

2. *Can you estimate the energy saved when EPBD is expand to smaller buildings?*

The Ecofys reports (Ecofys 2004, Mitigation of CO2-emissions from the Buidling Stock – beyond the EU Directive on Energy performance of Buildings"; Ecofys 2005 Cost-Effective Climate Protection in the EU Building Stock; Ecofys 2005, Cost-Effective Climate Protection in the Building Stock of the New EU Member States") shows the technical potential that could be realised in 2015. When calculating these energy savings, Ecofys did use the assumption that the EPBD would be fully implemented in January 2006. Since the full implementation is now expected in January 2008, the energy savings will be delayed with around two years, so the potential savings within the report could be achieved in 2017. (ECN concludes that to calculate the potential for 2020, a multiplication with a factor 12/9 or 1,33 has to be applied).
Ecofys assumes, that the yearly retrofit rate within the EU-10 have to be increased to 3 % of the housing stock due to the urgent need for refurbishment, towards 2 % within the EU-25. In our calculations, we assume that all retrofit will suffice EPBD standards. We do not take into account that retrofitting activities can be executed part by part, avoiding the obligation to apply the EPBD standards. However, standards for different saving measures will apply.

3. *Did you make assumptions or calculations on the administrative costs that will come with the expansion of the EPBD to smaller buildings?*

Ecofys did not make assumptions or calculations on this subject.

4. *Can you give your comments on the matrix in which we made an assessment on actions concerning the EPBD? (see attachment*)

With respect to security of supply it is important to know which fuels have been saved. However, Ecofys presents results on CO_2 emission only. Much savings will regard natural gas, oil or district heat (the latter with a country specific emission factor) and less on electricity.

5. *What in general is your opinion on the EC's green paper on energy efficiency, "Doing More with Less"?*

Petersdorff refers to Prof. Kornelius Blok or Monique Voogt, Ecofys-Netherlands.

6. *In what way do you think the EPBD and White certificates will interact with each other?*

For this question Petersdorff refers to Prof. Kornelis Blok or Monique Voogt of Ecofys-Netherlands.

7. *Cost savings from energy savings in residential building will not necessarily benefit the investing actor (landlord or housing cooperative). What's your opinion on this split incentives when energy measures are implied within the existing building stock?*

In our study we did not take into account the negative aspects of split incentives. (When asked, Petersdorff indicates that the problem of split incentives is solvable with for instance allowing to increase the rents to finance energy saving measures.)

8. *What definition of cost effectiveness did you use in the studies?*

To calculate the cost effectiveness, Ecofys used costs and benefits on a national level for the period 2006 to 2015. Investment costs are transferred to yearly capital costs using societal interest rates, benefits are calculated on the basis of annual cost savings due to reduced energy demands.

9. *Did Ecofys take into account the effect of global warming which leads to warmer winters and hotter summers?*

No, Ecofys thinks that the effect of lower HDD (heating degree days) on calculated effects will not be very large until the year 2015.

Document Control

Job Number: **5044526**			***Document reference:*** **-**		
3	Agreed version for use	P. Boonekamp	C Petersdorff	*P Tipping*	7 July 2006
2	Draft consultation record	P. Boonekamp	C Petersdorff		
1	Action list issued to consultee				
Issue	**Purpose/Description**	**Originated**	**Reviewed**	**Authorised**	**Date**

Interview 9 - European Tyre & Rubber Manufactures Association (ETRMA) (EU)

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Interview Record

Organisation	**European Tyre & Rubber Manufactures Association (ETRMA)**
Person/s interviewed	**Mrs. Fazilet Cinaralp and Christophe Penant**
Contact Details	**ETRMA** **Avenue des arts 2 box 12** **B-1210 Brussels; Belgium** **Tel.+32 2 218 49 40** **Fax. +32 2 218 61 62** **info@etrma.org** **www.etrma.org**
Interviewer	**Pieter Kroon**
Date of Interview	**29 June 2006**
Location	**ETRMA office**
Date record agreed	**7 July 2006**

Document Control

***Job Number:* 5044526**			***Document reference:***		
3	Agreed version for use	P. Kroon	F Cinaralp C Penant	*P. Tipping*	7 July
2	Draft consultation record	P. Kroon	F Cinaralp C Penant		4 July
1	Issued as agenda to consultee				27 June
Issue	**Purpose/Description**	**Originated**	**Reviewed**	**Authorised**	**Date**

1. Confirmation of Protocol

Confirm that the consultee understands the framework that the interview is being conducted within (i.e. introductory letter), that the interview record may be quotable in the impact assessment, and that the interview record will be agreed before inclusion in the assessment record.

2. Interview Record

Impact Assessment Action Reference	Description	Comments	References
T10	An EU broad policy for fuel efficient tyres, tyre pressure indicators (dashboard tyre pressure sensors mandatory on cars and freight vehicles, valve pressure indicators compulsory on existing vehicles tyres from 2010) and free facilities at service	The energy efficiency of tyres has the attention of three different DG's: DG Enterprise and Industry (CARS 21 project in 2005 input was given by the industry), DG environment (ECCP II) and now DG TREN. Furthermore it is under discussion at ISO (for test method definition) ETRMA stresses that integrated tyre policies should contain 5 subjects. You cannot take tyre design alone. All these condition have to be addressed, looking at long-term solutions. a) Tyre specifications by vehicle producers b) Tyre RR evaluation system c) Tyre inflation pressure maintenance d) Improved and accurate inflation stations e) Road pavement roughness. Ad a) This is the responsibility of the car producers (see also BLIC, 2006).	Blic (2006): *ECCP II. Potential contribution of measures concerning tyre fitment that could be included in the integrated approach to reduce CO2 emissions from light-duty vehicles. European Tyre Industry Proposal.* European Tyre and Rubber Manufactures (BLIC/ETRTO), Brussels, January 19 2006 ETRMA (2006a): *Tyre &*

Impact Action Reference	Assessment Description	Comments	References
	stations.	Ad b) The energy saving potential of low resistance tyres: In 2008 about 50% of the light duty vehicles will be fitted with LRR tyres (low rolling resistance tyres). Under the right conditions an almost complete penetration can be reached in 2020. The energy saving potential is 3-4% for light-duty vehicles and 3% for heavy-duty vehicles. The current market penetration for the commercial vehicles is much lower, i.e. 2 to 5%. It will take until 2020 before almost complete penetration can be reached under the right conditions (Tyre Industry, 2005). Because of their significant energy consumption, the N1 vehicles are added to the passenger cars in the ECCP II process. A main policy option for ETRMA is the introduction of a **Rolling Resistance Evaluation System for Tyres.** This system can help people to evaluate the fuel consumption difference between different tyres, thus enabling them to make a well-informed choice. The system still needs to be defined. It can be placed on the internet and/or at the place where the tyres are sold for the consumer. The sector doesn't think that a simple energy efficiency label or a (good or bad) label like the German Blue Angel is a solution. Such a label isn't precise enough. The evaluation system demands a reliable test method. The tyre industry is a global industry so an **ISO standard is needed**. The sector had finished their work on such a proposal (ETRTO 2006), presented it at the IEA workshop in 2005 (ETRO, 2005), and submitted it to ISO in January 2006. Normally it takes three years to develop an ISO standard, and then some time will be needed for international implementation.	*GRG Facts and Figures*; Updated May 2006), ETRMA, Brussels, Belgium, 2006 ETRTO (2006) *Reference Method for Rolling Resistance Measurement - Passenger Car, Truck and Bus tyres*. European Tyre and Rim Technical Organisation _ Engineering Desigc information - 2006 section TM page TRR.1 - TRR.13 Page ETRMA (2006b): *ECCPII - ETRMA response to TNO questionnaire*, Internet: http://forum.europa.eu.int/Public/irc/env/eccp_2/library?l=/&vm=detailed&sb=Title (working group 5). 14 June 2006 Tyre Industry (2005): *CARS21 Tyre EU-25 CO2 emission reduction through*

Impact Action Reference	Assessment Description	Comments	References
		Ad c) It is not optimal to fix or sell fuel-efficient tyres if the consumer doesn't know how to use them. Therefore, a long-term information or awareness campaign is indispensable. You will need to work on the drivers too! Consumers should be aware that all tyres are not the same. Furthermore, consumers should know that the fuel consumption of their car depends on the type of tyre and on the (right) pressure. If the tyre pressure would always be at the right level, energy consumption of passenger cars would be 1 tot 2.5% lower. For commercial vehicles this is 1% lower, because people driving commercial vehicles are professionals and have a different attitude towards their tyre pressure. Tyre pressure indicators (TPMS) have still a very low implementation share. They can mainly be found in luxury cars and are installed for safety reasons. A recommendation can be to introduce **reliable/precise tyre monitoring devices** in all new cars in a certain year. This is a short-term action, which results in better road safety and less waste of energy. Those tyre pressure indicators do not replace regular pressure measurements but it would certainly help to promote their implementation. Ad d) In many places where you can buy fuel, there are no devices for measurement of the pressure in the tyres and for inflation if needed, for instance at supermarkets in France. Furthermore, the quality of the equipment is sometime not good enough (e.g. defect manometers). Thus, if you are well-informed and you want to maintain a good pressure in your tyres, it is hard to find good facilities. **Therefore, the realization of a good quality tyre pressure service at (all) tank stations would be a good policy option.**	*tyre related solutions*. Tyre Industry Input, September 2005, page 22 and 24 ETRTO (2005) *Rolling Resistance Reference Measurement Method for PC and CV tyres.* IEA workshop: Energy Efficient Tyres: Improving the On-Road Performance of Motor Vehicles, International Energy Agency, Paris, 15-16 November, 2005 Directive 2001/43/EC *of the European Parliament and of the Council of 27 June 2001 amending Council Directive 92/23/EEC relating to tyres for motor vehicles and their trailers and to their fitting.* Official Journal L 211 , 04/08/2001 P. 0025 - 0046

Impact Action Reference	Assessment Description	Comments	References
		Ad e) Road pavement has a significant effect on energy consumption and must also be taken into account. Rough roads can increase rolling resistance with 20-40% and fuel consumption with 3 to 7%. The main road network generally has a smooth surface. The secondary network generally has a macrorough surface and very macrorough can be found on small roads. A smooth surface induces a lower rolling resistance (Tyre Industry, 2005), BLIC (2006). **Other comments** The sector has some comments on the current text of the concept action description. The comment will be taken into account by ECN in the final version. The sector thinks that, if the commision would decide to introduce tyre efficiency regulations (or elements), directive 2001/43 (an extension of EC 1992/23) would be a proper place. But before such an action can be taken a proper impact assessment has to be made to establish what the best instuments are. It is now too early to take action. Tyres are compromises between antagonistic performances, necessary tasks like safety, lifetime etc. and rolling resistance. **Specific questions** *Effect of outdoor temperature?* A higher outdoor temperature will result in a higher inner temperature of the tyre and generally a lower rolling resistance. It is not (yet) possible to say whether winter and summer tyres are better than all season tyres from an energy point of view. The rubber mixes are not the same. The use of different tyres is related to other factors (safety etc.). But if the commission is interested, the sector can look into this subject (but it will take some time).	

Impact Action Reference	Assessment Description	Comments	References
		Retreading? Retreading, applying a new tread to used tyre casings, is a main recycling option for tyres from trucks and busses (one of two tyres in this market is a retreaded one). Because tyres are designed for this purpose, retreaded tyres are as good as new ones according to the retreading companies (when retreading is done according to UN/Regulation 109). Energy effects are not known. On the contrary, thee market share for retreaded passenger tyres is fairly low (1%). *Cost effectiveness?* For a passenger car driving over 200000 km in its technical lifetime and using 22 tyres, the additional production costs for LRR are € 300. With a cost pass-through ratio of 2 the consumer costs are € 600. With this figures and a mean gain of 3,5% of fuel consumption the cost effectiveness- depending on the specific fuel consumption- can be calculated (ETRMA, 2006). *The tyre sector* EU import and export tyres: 70% of the market is supplied by local production and about 30% by import (EU is the most open world market). In the EU there are 77 production plants and 200000 employees working in this sector. In Europe, there are five major producers and several local producers. The major producers are international companies (also US or Japan-based), but all have an EU head office and a technical center in the EU. But it is a global market: nobody can make tyres just for one market; tyres can go everywhere (ETRMA, 2006a).	

3. Additional Comments:

Interview 10 – NOVEM (NL)

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Interview Record

Organisation	**SenterNovem**
Person/s interviewed	**Mr. Loren Motamedi**
Contact Details	**Staf Member Long-Term Agreements**
Interviewer	**M. ten Donkelaar**
Date of Interview	**26 June 2006**
Location	**Utrecht**
Date record agreed	**6 July 2006**

Document Control

Job Number: **5044526**			***Document reference:*** **-**		
3	Agreed version for use	M. Doonkelaar	L Motamedi	*P Tipping*	7 July 2006
2	Draft consultation record	M. Doonkelaar	L Motamedi		
1	Action list issued to consultee	6			21-6-2006
Issue	**Purpose/Description**	**Originated**	**Reviewed**	**Authorised**	**Date**

1. Confirmation of Protocol

Confirm that the consultee understands the framework that the interview is being conducted within (i.e. introductory letter), that the interview record may be quotable in the impact assessment, and that the interview record will be agreed before inclusion in the assessment record.

2. Interview Record

Introduction:
The first generation Long Term Agreements (**LTA-1**, 1989-2000) was agreed between the Ministry of Economic Affairs and 31 branches of industry and service sector in the early nineties. They included an energy efficiency target with each branch of 20% in 2000 compared to the base year 1989. On average, this target was met and even exceeded, 23% energy efficiency improvement was reached.

In the second generation **LTA-2** (2001-2012), no quantitative target has been agreed. Nevertheless, participating companies are obliged to draft an energy conservation plan and to implement activities with a payback period of less than 5 years (so-called certain measures). Furthermore, companies are obliged to undertake efforts towards the implementation of so-called expansion themes and cooperation in the product chain with other companies.

These **expansion themes** have to be part of the energy conservation plan and are related to the reduction of energy use during the product cycle:

- Sustainable products using less (raw) materials (dematerialization)
- Optimizing transport, logistics, and product chains
- Reduced energy consumption on industrial estates

The obligation to take these themes into account is a strong incentive for innovative approaches.

Next to SenterNovem, the competent authorities (responsible for environmental permitting) are involved in the LTA-2 and evaluate energy efficiency plans as well. Therefore, LTA-2 assigns an important role to provincial and municipal authorities, as the competent authorities of the execution of the Environmental Management Act.

Examples from the application of Voluntary Agreements in Finland and Sweden also show the inclusion of product cycle management. These innovative approaches are therefore becoming more common.

Impact Assessment Action Reference	Description	Comments	References
F9	Energy efficiency agreements in combination with grant schemes	Features: • In the Netherlands, the 2nd generation long-term energy efficiency agreements (LTA) are not combined with grant scheme but linked to the Environmental Management Act. In addition, companies cooperating in the LTA receive an energy tax exemption for the LTA-2 period (2001 -2012)[24]. • Obligation to develop an Energy Conservation Plan (every 4 years), to present it to competent authorities and to implement all measures (e.g. good housekeeping) with pay-back time of less than 5 years (unless properly motivated). • LTA promote innovation as they include so-called expansion themes (beyond company site), e.g. companies should take steps towards decreasing transport, energy supply and less use of materials. • Sanctions for companies not meeting the obligations regard stricter application of the Environmental Management Act. • *Persistence* of the scheme: the opinion is that the effect will diminish once the LTA will disappear. It is therefore important for the government to continue with the LTA's and to sharpen the requirements by adding new elements to the agreements. Positive impacts of LTA's: • Overcoming organizational barriers - coming in contact with companies providing technology, establishing cooperation with other companies on a specific site in the field of transport or energy supply (e.g. use of waste heat) • Information /awareness barriers - about possibilities for energy	Long-term Agreements on Energy Efficiency in the Netherlands - Results for 2004

[24] This tax exemption does only apply, however, to energy tax above 10 mln. KWh consumption (highest tax category).

Impact Assessment Action Reference	Description	Comments	References
		efficiency, its costs and financing possibilities. The impact of the first generation LTA is next to the achieved energy efficiency target, mainly important from the awareness point of view. This increased awareness gave the possibility to develop the LTA-2 after the year 2000 with adding the additional expansion themes.	
F11	Tax incentives for energy efficiency equipment	• Tax incentive in the NL (EIA regulation) is open to all companies from large to small to invest in energy efficiency. • Open for technologies from the "energy list", which have a substantial energy saving effect compared to conventional technologies ("innovative"). The energy list is frequently updated, more conventional technologies are taken out and innovative ones taken in.	Energy Investment Deduction - Annual Report 2004

3. Additional Comments:

Interaction between energy efficiency policies and measures:

- Companies involved in the LTA are usually more in contact with energy agencies, authorities and there is more chance that they will make use of subsidies or tax incentives earlier than other companies. As their knowledge of energy efficiency investments is larger too, Dutch companies involved in the LTA will usually make more use of regulations like the EIA.
- The EIA tax deduction scheme is (partly) paid out of the revenues of the energy tax charged on electricity and natural gas.
- Introduction of Long-Term Agreements may be a motivation for external consultants to offer energy efficiency services to LTA companies. These could be leasing constructions and ESCO type projects.

Interview 11 – European Automobile Manufacturers Association (ACEA)

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Interview Record

Organisation	**European Automobile Manufacturers Association (ACEA)**
Person/s interviewed	**Mr. Carlo Cucchi**
Contact Details	**ACEA** **Avenue des Nerviens 85,** **B-1040 BRUSSELS** **Phone +32 2 732 55 50,** **Fax +32 2 738 73 10** **info@acea.be** **www.acea.be**
Interviewer	**Pieter Kroon**
Date of Interview	**29 June 2006**
Location	**ACEA office (new location)**
Date record agreed	

Document Control

Job Number: **5044526**			***Document reference:***		
3	Agreed version for use	P. Kroon	C Cucchi	*P Tipping*	10 July 2006
2	Draft consultation record	P. Kroon	C Cucchi		4 July 2006
1	Issued as agenda to consultee	20 June		Boonekamp	27 June
Issue	**Purpose/Description**	**Originated**	**Reviewed**	**Authorised**	**Date**

1. Confirmation of Protocol

Confirm that the consultee understands the framework that the interview is being conducted within (i.e. introductory letter), that the interview record may be quotable in the impact assessment, and that the interview record will be agreed before inclusion in the assessment record.

2. Interview Record

Impact Assessment Action Reference	Description	Comments	References
T1	Make driving costs, for instance car or road taxes, more km-dependent. Finally area and congestion charges used for traffic management also have a km reduction effect.	Part of the Integrated Approach of ACEA; see text at 3 Additional Comments (ACEA, 2006) Taxation might help, but it has to be designed thoroughly. It is a policy which can influence the low price segment of the car market.	ACEA (2006) *An Integrated Approach to reducing passenger car-related CO_2 emission*. European Automobile Manufacturers Association, Brussels, January 2006.
T2	The directive on EU labelling becomes standard for all road vehicles. The label information is expanded with the fuel cost, for instance at current fuel prices and over the first 100 000 km driven	Labels persuade changing the decision for a new car. There is a choice because there are differences in efficiency between car types. However, the most efficient car types are not always the most popular ones.	
T3	Separation of low speed and high speed-traffic is good for traffic safety and		

Impact Assessment Action Reference	Description	Comments	References
	can increase the use of low speed modes (walking, bicycling, mopeds). Specific bicycle lanes or tourist routes can also stimulate the use of bicycles instead of the car.		
T4	For company cars the user tax is related to the specific fuel consumption of the car.	The use of market-oriented measures is interesting.	
T5	1) Set maximum CO_2 emission standards for different type of cars (absolute, related to specific performance properties, or related to the mean value of all cars sold by one company). 2) More stringent agreement with car and truck producers after 2008-2009.	Part of the Integrated Approach of ACEA; see text at 3 Additional Comments (ACEA, 2006) ACEA, DG TREN and DG Enterprise are discussing the ACEA agreement. The 2008 target is 140 g CO_2/km calculated as sale-weighted average for new cars. If you want to reduce CO_2 emissions from traffic you have to look at a global point of view. Do not solely concentrate on new vehicles, but also on the types of vehicles used, how they are used and what kind of fuels are used. In "Keep Europe moving" (COM (2006)314) the figure of 120 g/km is mentioned, which came up years ago. 120 g/km is technically possible but unfeasible because it is too expensive. Main problem is that you can't sell the required expensive technology in the low price segment of the park. Consumers at the top range of the market (BMW, Mercedes, etc.) are interested in new developments and are able to afford costly technology. The costs of 120 g/km are € 4000 euro/vehicle (Delbeke, 2005). This figure represents additional production costs. There is no general figure	ACEA (2006) *An Integrated Approach to reducing passenger car-related CO_2 emission*. European Automobile Manufacturers Association, Brussels, January 2006. COM(2006) 314 *Communication from the Commission to the Council and the European Parliament Keep Europe moving - Sustainable mobility for our continent Mid-term review of the European Commission's 2001 Transport White Paper*. http://ec.europa.eu/transport/transport_policy_review/index_

Impact Assessment Action Reference	Description	Comments	References
		for the additional costs in consumer price, because other aspects play an important role as well (what price can I get on the market? What market segment am I interested in?). Which other options can facilitate energy saving? In the car segment major energy saving can be realised with the power train. The used technology, construction, design and details of the vehicle also have an impact, but the highest savings are in the power train; the rest merely helps. In the power train the diesel approach is successful. Main question at this point is to reduce the exhaust emission of PM_{10} and NO_x. Gasoline is different. Basically gasoline engines nowadays are environmentally friendly with low NO_x and no PM. However, the fuel consumption has to be improved, for instance via direct injection or variable valve timing. Many different options are tested and introduced to the market. There is a small problem with DI gasoline engines and PM emissions (when running lean), which has to be solved. The gearbox is also a main factor. An electronically controlled gearbox can ensure optimal efficiency of engine use. However, this is very expensive. If you learn from the electronically controlled gearbox, you can introduce a (less costly) gear indicator, which provides the driver with information on when to switch gears. Then there is still the issue that the indicator will not reduce energy consumption in the test cycle (but only in real life use). A discussion point is also how many drivers will follow the instructions. Is it possible to introduce an agreement for vans and heavy-duty	en.htm, Brussels, 22.06.2006. Delbeke, J. (2005): *Transport sector perspectives after the entry into force of the Kyoto protocol*. Transport & climate change - A special strategy for a special sector? http://www.transportenvironment.org/Article102.html, T&E Seminar, Brussels, 1 April 2005.

Impact Assessment Action Reference	Description	Comments	References
		vehicles and trucks? This is questionable. The purchase of a commercial vehicle calls for different criteria than for purchasing a personal car. The reduction of the vehicle consumption of CVs is therefore market driven. Although there is no energy efficiency test cycle for vans (only for passenger cars), there is substantial information on fuel consumption available on the market. It should be mentioned that fuel consumption depends on transport load, the type of trip, and on which roads you drive. So the van with the lowest figure in a cycle is certainly not automatically the most efficient one for the specific purpose. Is the agreement favourable for car producers? An important note is that the US market is substantially different from the EU market. Fuel consumption is not a main selling factor on this market, even at the current high prices (see for instance the 50% market share of SUVs, vans and pick-up trucks). Reliability, for instance, is a better marketing tool in the US. Fuel consumption is an issue in Japan, Korea, India and perhaps China.	
T6	Restricting unnecessary power of car engines by technical devices like maximum speed limiters and/or limitation of maximum acceleration. Or limit the maximum power related to the vehicle weight (or maximum load) for new cars and trucks.	Engine downsizing and lowering maximum power. Each car has one engine size that is most suitable with regard to fuel efficiency. That is not necessary the smallest one. It might be possible to create a smaller version of this engine and turbo-charge it. One thing is clear - limiting the maximum power to maintain a maximum speed of 150 km/h instead of 200 km/h can improve energy efficiency. However, the maximum speed of cars is market-driven and a compromise between several qualities. Therefore there will also be a need for policy to reduce the engine power…	
T7	To encourage car sharing (multi-passenger) schemes.		

Impact Assessment Action Reference	Description	Comments	References
T8	The use of more energy efficient transport modes can be stimulated by infrastructural measures, like more rail for goods transport, building of mode change locations (from truck on trains or ship and vice versa), or locating of new business parks nearby rail or water.		
T9	Decrease fuel use by making fuel more expensive. By making the differences between countries less, the incentive of buying cheap fuel across the boarder will decrease. Secondly a lower car tax can be introduced when an efficient car is bought or a financial penalty, which make the buying of a less efficient (second hand) car much more expensive. Thirdly a larger difference in road tax related to the fuel consumption of a car can be introduced. Even a km charge can be fuel-economy dependent.	Part of the Integrated Approach of ACEA; see text at 3 Additional Comments (ACEA, 2006)	ACEA (2006) *An Integrated Approach to reducing passenger car-related CO_2 emission*. European Automobile Manufacturers Association, Brussels, January 2006.
T10	An EU broad policy for fuel efficient tyres, tyre pressure indicators	Part of the Integrated Approach of ACEA; see text at 3 Additional Comments (ACEA, 2006)	ACEA (2006) *An Integrated Approach to reducing*

Impact Assessment Action Reference	Description	Comments	References
	(dashboard tyre pressure sensors mandatory on cars and freight vehicles, valve pressure indicators compulsory on existing vehicles tyres from 2010) and free facilities at service stations.	A high penetration rate of tires with a lower rolling resistance in passenger cars in 2012 is possible. It is very difficult to demonstrate in driving tests that the tires are actually more efficient. You would have to demonstrate a small improvement of the same size as the reprocubility of the test. You could use simulations with figures from tire testings. No experience with decisions involved in the buying of new tires.	*passenger car-related CO_2 emission*. European Automobile Manufacturers Association, Brussels, January 2006.
T11	Procurement by government giving a good example by buying efficient technology with a longer pay-back period or by joining technology test projects. Furthermore it is possible to use only energy efficient company cars (for instance only A and B labelled passenger cars)	Yes, the government can give a good example, for instance if high-level politicians also use fuel-efficient cars. Fuel efficiency might be a good selection criterion for buses. Main problem is the small production volume of buses. CNG is a very clean fuel for buses, and is used in bus engines converted from diesel versions. This causes a temperature limitation problem in the engine and an underpowered engine. However, the market is too small to develop a fuel-efficient dedicated CNG engine.	

3. Additional Comments:

An integrated Approach

ACEA calls in a special position for an Integrated Approach to Lower CO_2 emissions after 2008. An approach in which also other stakeholders, such as the fuel industry and the policy makers must take part.

In an Integrated approach ACEA will maintain its current expenditures and development efforts (The European car industry spends more on research and development - € 20 billion annually or 5% of its turnover - than any other industry sector in Europe (representing 24% of total EU R&D)).

Car technologies after 2008, which could help to lower the CO_2 emissions:
Energy management e.g. hybrid technologies; Aerodynamics e.g. shape, airflow management; Engine improvement e.g. thermomanagement, reduced friction; Improved transmission e.g. reduced friction, longer gear ratios; Combustion efficiency e.g new combustion processes, DI technology, variable valve control, cylinder deactivation; Rolling resistance, e.g. low rolling resistance tires, brake drag reduction; Weight reduction, e.g. high strength steel, aluminium, magnesium, plastics, composite materials; Driver information devices e.g. gear shift indicators/ fuel economy indicators.
Furthermore the sector can contribute by providing its support and promotion to Alternative Fuels, Tire Technology, Traffic Management and Driver Education & Behaviour.

The fuel industry can help with further increased market penetration of alternative fuels; Development and maintenance of appropriate tire inflation infrastructure; Support common initiative to educate drivers on eco-driving.

The policy makers can contribute with: Investigating fuel taxation impact on CO_2 emissions; Shift basis of annual car taxation to CO_2; Invest to improve road and traffic management infrastructure; R&D support for new technologies and new fuels; Support initiatives on optimal tire pressure; Support common initiative to educate drivers on eco-driving; Ensure consistency of legislation (consider trade-offs with other political aims).

ACEA (2006) *An Integrated Approach to reducing passenger car-related CO_2 emission*. European Automobile Manufacturers Association, Brussels, January 2006.

Alternative fuels
In the green paper there are only a few pages on the transport sectors. No reference was made to alternative fuels. Main comment of ACEA is that alternative fuels like CNG and biofuels should have been mentioned. Those technologies are already state of the art. Hydrogen is long-term technology.
Of high significance are the specifications on biofuels. A certain amount (5%) can be mixed with gasoline and diesel fuel. However, higher percentages and pure vegetable oil were not considered when the engines where designed. These fuels might have a negative effect on air emissions. So if a car is technically changed to use those different fuels, this could have negative effects on their emissions. Therefore we advise not to focus on introducing biofuels too much. Keep the other emissions in mind as well!

Interview 12 – ECEEE (EU)

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Interview Record

Organisation	**ECEEE**
Person/s interviewed	**Mr. Peter Bach, DEA**
Contact Details	**Chairman Board ECEEE**
Interviewer	**P. Boonekamp**
Date of Interview	**21 June 2006**
Location	**Petten/Copenhagen, by telephone**
Date record agreed	

Document Control

Job Number: **5044526**			***Document reference:*** **-**		
3	Agreed version for use	P. Boonekamp	P. Bach	*P Tipping*	6 July 2006
2	Draft consultation record	P. Boonekamp	P. Bach		
1	Action list issued to consultee	15-6-2006			
Issue	**Purpose/Description**	**Originated**	**Reviewed**	**Authorised**	**Date**

1. Confirmation of Protocol

Confirm that the consultee understands the framework that the interview is being conducted within (i.e. introductory letter), that the interview record may be quotable in the impact assessment, and that the interview record will be agreed before inclusion in the assessment record.

2. Interview Record

Impact Assessment Action		Comments	References
Reference	**Description**		
F5	Policy support for ESCO's ….	Concept is good but in practice difficult. Support for ESCO's via savings commitments for energy suppliers. No other form of support for ESCOs (e.g. soft loans) should be considered, leave it to the market, as it is a market based way to improve energy efficiency.	
F10	Lower VAT-rate for energy efficient products	Not for end-use savings (at least not in Denmark). Other Member States showed interest to introduce variable VAT rates. More important to remove "wrong" taxes, such as a real estate tax in Sweden that goes up with more energy efficiency of houses.	
F19	LTA + grants	LTA's should always be complemented with incentives and penalties. Penalty in form of (higher) CO2-tax has worked as well in the Danish industry. The less strong the penalties and incentives, the less effective the LTA scheme.	
F30	Ecological tax reform	Emphasis on fiscal policies for structural change in energy consumption patterns.	

Impact Assessment Action Reference	Description	Comments	References
F7	Stabilising energy tax	Interesting proposal. Stable prices important, e.g. Denmark kept energy savings at same level when energy prices decreased in the eighties. At that time energy taxes were increased that may have influenced the speed of energy savings. Increasing energy taxes should be combined with lower income tax to prevent a to high tax burden on households. The tax revenue will not increase, therefore earmarking of energy tax revenue difficult. .	
L5	EPBD-smaller buildings	Dwellings are often renovated part-by-part, so the EPBD-threshold of 20% in costs is not met. In Denmark standards are valid for each of the EPBD-saving options, which give the same total result as a full EPBD-renovation. Renovation of older dwellings according to same standards as for newly build houses.	
L29	Strengthening EPBD	Strategy needed with long-term targets, communicated in advance; should ultimately result in passive houses.	
L27	Revise labels regularly	Labels for the 20% best and minimum standards based on life cycle costs. Focus on “best not-yet available” technology.	R. Kemna report
L18	Network losses	Higher network capacity, as result of measures to decrease losses, not needed if energy consumption is reduced. The potential of decreasing network losses is much smaller than increasing end-use efficiency.	
L47	EU-harmonised audits	.??	

3. Additional Comments:

In principle the lifecycle cost approach behind cost-effective savings in the Green Paper is good. In practice it is implicitly applied, e.g. when standards for new dwellings are applied for renovated dwellings (with long pay-back periods).

Pay-back time of investments: When related to investments in energy efficiency (e.g. housing renovation) → some renovation works have to be carried out anyway, it has only sense to speak about payback time when comparing price difference between conventional technology and energy efficient technology.

Saving policy: long (term), legal and loud!

Interview 13- CEETB (EU)

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Interview Record

Organisation	**CEETB**
Person/s interviwed	**Mr. Loebel**
Contact Details	**Secretary General**
Interviewer	**P. Boonekamp**
Date of Interview	**22 June 2006**
Location	**Brussels, CEETB office**
Date record agreed	

Document Control

Job Number: **5044526**			***Document reference:*** -		
3	Agreed version for use	P. Boonekamp	Mr Loebel	*P Tipping*	6 July 2006
2	Draft consultation record	P. Boonekamp	Mr Loebel		
1	Action list issued to consultee	21-6-2006			
Issue	**Purpose/Description**	**Originated**	**Reviewed**	**Authorised**	**Date**

1. Confirmation of Protocol

Confirm that the consultee understands the framework that the interview is being conducted within (i.e. introductory letter), that the interview record may be quotable in the impact assessment, and that the interview record will be agreed before inclusion in the assessment record.

2. Interview Record

Impact Assessment Action		Comments	References
Reference	**Description**		
F5	Policy support for ESCO's ….	ESCO's are a niche market, because of profitability demands and small scale. Third party financing needed (e.g. KFW in Germany). Not much savings in SME to be expected due to low energy bills and competition with other activities as to time and capital. Support for audits could be a first step. Not delivering the savings or lower than expected cost-effectiveness are other problems. Definition of cost-effectiveness leads in practice to much confusion. It is very dependent on the situation, e.g. already planned renovation. Then there is an important role for the installer. Despite more ESCO's the bulk of savings will be done by more traditional parties.	KfW-Befragung zu den hemmnissen und erfolgsfaktoren von energie effizienz in unternehmen. KfW, Frankfurt am Main, Dezember 2005 (study on reasons why SME's don't implement saving measures)
F10	Lower VAT-rate for energy efficient products	VAT-directive offers possibility but very difficult due to unamity demands. In some countries also for energy efficiency services, such as repair, boiler maintenance and retrofitting dwellings. Could be extended, but not before 2010. Lower VAT for a great part passed on to the client.	

Impact Assessment Action Reference	Description	Comments	References
F18	Leasing	Bringing together suppliers, banks, etc. should be stimulated but lot of barriers.	
F30	Ecological tax reform	Challenging but must be neutral	
F7	Stabilising energy tax	Idea is good, provides security on pay-back time of investments into energy savings.	
L24	White Certificates	Delivery of energy and energy(saving) services should not be combined. Applied long contract period limits competition; the market for energy services should be open for all parties. EU-wide application of white certificates huge effort, have to wait for evaluation of present systems.	
L44	Revise Guidelines on state aid	Not really a problem, change probably not needed and too late for present negotiations.	
L45	Training installers	The point is not subsidised training but a change in the habits of most installers to offer CHP, heat pumps, etc. Maybe a better approach is to educate young employees in school. This is already included in some general saving programmes. In Germany companies can get an official label; CEETB has proposed to DG-TREN a European logo, based on national qualifications. There is no information available about the extra savings of better equipped installers. Installers are only part of the chain in construction.	
L47	EU-harmonised audits	Audits are already done according to CEN-standards as to determining energy use of buildings as part of providing the certificate.	Information on CEN-results from J. Hogeling, ISSO, Rotterdam.

3. Additional Comments:

Energy efficiency obligation as part of a white certificate system should be applied such that all parties, that are able and prepared to realise energy savings in end use, are treated equal with respect to participating (level playing field).
The Ecofys-calculations on the saving potential under the EPBD can be checked later with the results of the Certificate calculations for each building.

Appendix 6 – Assessment Supporting Sheets for Screened Policy Options

This appendix provides the MCA supporting information sheets used to complete the screening process.

Note:
These assessments include the eighteen policy options adopted for detailed assessment.

Further refinement of these policy options took place in the final phase of the assessment.

1. Draft Report Executive Summary

The Green Paper is clear that annual improvement in energy efficiency has declined from 1.4% per year in the 1990's to stabilise at around 0.5% per annum. This is despite the intensifying exposure of climate change and dependence on insecure energy supply. Improved energy efficiency constitutes a solution to both problems.

The Commission have stated that the question is 'not whether to take action on energy efficiency, but which actions are to be taken where and when'.

Following an iterative process with the Commission, this Impact Assessment selected fifty-four policy options or "actions" for a screening assessment; i.e. whether the action has an impact and where. Each action was scored on 23 criteria, with values given from +3 for a high positive impact, through 0 for definitive no, or no evidence for an effect, to -3 for a high negative.

The total score, without giving weights to different criteria, was used to select the top ten actions for investigation in more detail.

Energy efficiency policy options were assessed in the categories of:

- Awareness
- Transformation
- Transport
- Financing Mechanisms
- Legislation Implementation

The three highest scoring policy options for each category (4 in the case of transport where two options were equal) were found to be (in descending order of score):

2. Introduction

The Commission intends to produce an EU Action Plan on Energy Efficiency, outlining actions to be taken at EU and/or national level from 2007-2013.

Atkins Ltd and ECN acting within the framework contract lead by ECORYS (Nederlands) BV were selected to develop and apply an impact assessment methodology underpinning the Energy Efficiency Action Plan. The following describes the broader aspects of the assessment relating to the Terms of Reference[25].

The services provided are intended to support the Directorate General for Energy and Transport in assessing the impacts on the economy, environment and society of some of the policy options and actions potentially included in the Action Plan.

From initial consultation the Commission had identified three main issues which will address the current barriers to increasing energy efficiency:-

- Raising awareness
- Better financing mechanisms for energy efficiency
- Better implementation of Community legislation to improve impact

In addition the Commission asked for the end use sector transport and energy transformation to be covered in the assessment.

A multi criteria analysis (MCA) has been carried out, which acknowledges that different actions have different impacts on different sectors, and even within sectors. The impacts on the economy, on society and on the environment are assessed and quantified to the extent possible. Because of the limited assessment time, the impact assessment relies on existing published analysis and results from models runs (where available).

This appendix provides the detail supporting the MCA.

Each action category has a summary sheet for the action rationale, a summary sheet for the scores and individual detail sheets for each action including the scoring narrative and supporting references.

[25] Action Plan on Energy Efficiency (CLWP:2006/TREN/032) – Impact assessment DG TREN Task Specifications for the Assignment

3. Transformation Actions

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Multi-Criteria Analysis
Matrix of Actions

Actions Category: TRANSFORMATION

MCA Performance Matrix Actions Rationale

MCA Reference	Actions	Objective	Current Situation	Approach taken
G1	EU to place Obligation on Member States for variable subsidy for gap between cost and production for CHP	Identify and reduce subsidies that have adverse impacts on the energy consumption, economy and the environment.	Budgetary subsidies, both direct expenditures and tax subsidies; Public provision of goods and services below cost; Capital cost subsidies; Policies that create transfers through the market mechanism.	Subsidies should be delinked from energy consumption or production. Policies need to be targeted more cost-effectively, for example, by directly supporting household incomes instead of supporting energy consumption, or by directly subsidising employment instead of production. The best hope for reducing energy subsidies in EU lies with a coordinated global reform of subsidy policy.
G2	EU/MS to require national regulators to ensure energy suppliers incentivise all scale CHP	Incentivise CHP implementation including large scale and microgeneration	UK - Ofgem Energy Efficiency Commitment Innovative Action (2005-2008) requirement for energy suppliers	Energy suppliers achive performance bonuses by incentivising energy efficient practices/technological solutions in customers; could include microCHP as well as large scale CHP
G3	EU/MS to enable fair access and fair rules for CHP in competitive markets in the EU	Decreasing distribution losses through incentivising more embedded CHP	Cogeneration Directive EC/2004/8 Need of a CHP system certification Lack of electrical interconnection standardisation	Removal of “Big Player” market dominance in the EU energy market A co-ordinated approach across the EU towards research, development and demonstration. Adoption of European Standards for the electrical interconnection of distributed generation plants. Development and implementation within the EU of standardised CHP system certification and authorisation protocols
G4	EU/MS to addressing the administrative burdens placed on smaller generators e.g. for grid connection and incentivising the utilisation of distributed generation.	Integration of distributed generation into EU energy market Promotion of small-generator energy	Review of institutional, economic and regulatory issues White Paper, Green Paper, The Directive on Electricity Production from Renewable Energy Sources (2001/77/EC) Kyoto protocol / Millennium development goals / Cap and trade for carbon emissions / Building Energy Efficiency Directive / Fiscal harmonization for transport fuel / Promotion of biofuels Economic incentives: Feed-in tariffs / Tax credit / rebates / investment subsidies / low interest loans / reduced VAT Other policies: Portfolio Standard (PS), Renewables Obligation (RO), green power marketing, Renewable Electricity funds, disclosure of fuels and emissions, net metering	Development of a European Commission Action Plan for the introduction of DG in all Member States. Directive 2002/91/EC to be stregthened to require novel DG solutions to be actively considered in future planning processes. Small generators connected to the transmission system should be exempt from the Connection and Use of System Code (CUSC). Promoting unbundling benefits payable to so-called ‘embedded’ generators, which input their power to the lower-voltage local distribution system rather than the national grid. Helping smaller generators to be able to directly access these benefits, which would significantly improve their commercial position. This move would also encourage independent consolidators into the market, and this would allow smaller generators to club together to spread risks and reduce costs. Reducing the administrative burden on smaller generators by providing funds for clear advice for smaller generators. Allow smaller generators to notify their predicted output closer to real time. Ena

G5	EU/MS implementation of fiscal incentives across all EU to facilitate investment in high-efficiency power generation	Wider implementation of high-efficiency technologies	Practical problems that have arisen with the implementation of tax credits are related to: - design (the social rate of return is generally unknown), - permanency (uncertainty over the level and future existence of the credit), - relabelling (imprecise definition of high-efficncy generation technology), - the definition of the base (company-specific moving-average definition of the base), - the interaction of the credit with other parts of the tax system (it relies on the company having a tax liability against which the credit can be offset).	- Support R&D tax credits in all Member States - Allow the tax credit to be deducted from the firm's payroll tax, to effectively avoid any danger of tax exhaustion - Implementation of a levy–grant system. The system could be organised at the industry level and could involve all members of the industry paying a levy which is redistributed proportionally to R&D. - Payments to account for system efficiency improvements - Credits for system perforamnce benefits - Credits for environmental performance benefits - Compensation payments for avoided network infrastructure costs - Development of a detailed (and freely-available) financial model of the European Union energy market
G6	EU/MS to require Public Sector adoption of a 15% target to use CHP generated electricity	Increased application of CHP projects for public estate	In some Member States Public Bodies are already obliged to consider using CHP generated energy (e.g. UK), however implementing CHP installation is falling short of target.	MS to set national targets with support mechanisms Development of mechanisms for the capitalisation of the benefits of CHP EU wide assessment of appropriate, fair and consistent incentive regimes for CHP across Member States
G7	EU to introduce new CEN STANDARD to regulate district heating systems	Reduction of energy losses and GHG emissions	OPET CHP/DHC project: is a systematic effort for the further use and market uptake of different CHP/DHC technologies in favour of EU policies. European standards for calculating energy performance of buildings produced by CEN Energy Demand Management Committee (EDMC) (Article 14 Committee) SEI and DEHLG represented on EDMC EDMC Sub-Group Monitoring CEN Standards development EPBD Concerted Action Project (23 Member States)	Increasing the market penetration of DHC through new and expanding existing DHC systems; Develop promotional information on the benefits and potential of DHC/CHP relative to reducing pollution and GHG Establish CHP implementation targets; Ensure access, under transparent and non-discriminatory terms, to the power grid; Encourage energy and CO2 tax schemes that at the very least do not discriminate against DHC and CHP, and preferably would provide positive incentives. Focusing upon the whole supply chain, and the related technologies, connected with the use of biomass resources for combined heat and power and district heating purposes

Multi-Criteria Analysis Matrix of Actions

Actions Category: TRANSFORMATION

MCA Performance Matrix **Impact Criteria**

Reference		Economic													Environmental		Social							Other	
	Actions	**Security of Supply**	**Competitiveness, trade and**	**Innovation and research**	**Cost Effectiveness**	**Employment & labour markets**	**Market Barriers**	**Macroeconomic Environment**	**Operating costs and conduct of business**	**Competition in the internal market**	**Government budget**	**Air Quality**	**The Climate**	**Social inclusion & protection of**	**Governance participation, good**	**Administrative costs on businesses**	**Consumers & Households**	**Specific Regions or Sectors**	**Mobility and the use of energy**	**Public Authorities**	**Short time for effect**	**Persistence**	**Monitoring & Verification**	**Tangible Added value of measure**	**Change in behaviour of end user**
G1	EU to place Obligation on Member States for variable subsidy for gap between cost and production for CHP	2	1	1	1	1	2	0	0	-1	-2	2	2	-1	-1	-2	1	1	-1	0	0	0	2	-1	0
G2	EU/MS to require national regulators to ensure energy suppliers incentivise all scale CHP	2	0	1	2	2	1	-1	-2	-1	0	2	2	0	1	0	1	0	0	0	2	2	2	2	1
G3	EU/MS to enable fair access and fair rules for CHP in competitive markets in the EU	3	2	1	3	1	3	2	1	2	2	2	2	0	1	2	0	1	0	0	0	1	0	1	0
G4	EU/MS to addressing the administrative burdens placed on smaller generators e.g. for grid connection and incentivising the utilisation of distributed generation.	3	2	1	1	2	0	2	1	2	0	2	2	1	0	2	0	1	0	0	2	2	1	0	0
G5	EU/MS implementation of fiscal incentives across all EU to facilitate investment in high-efficiency power generation	0	1	2	0	1	2	0	-1	0	-3	2	2	0	1	-1	0	-1	1	0	-1	3	2	0	0
G6	EU/MS to require Public Sector adoption of a 15% target to use CHP generated electricity	2	0	1	-1	1	-1	0	0	0	-2	2	2	1	-1	0	0	1	0	0	0	1	1	0	0
G7	EU to introduce new CEN STANDARD to regulate district heating systems	1	1	3	2	1	1	2	1	2	0	2	2	1	0	0	1	2	0	1	1	2	2	1	0

G1 – Supporting Evidence for Scoring

Category: **TRANSFORMATION**

Characterization of actions

Code/action:	Reduce subsidies
MCA Reference:	G1
Category:	Transformation
Directives:	-
Subcategory:	adapted EU-legislation
Objective	Identify and reduce subsidies that have adverse impacts on the energy consumption, economy and the environment.
Action:	EU to place Obligation on Member States for variable subsidy for gap between cost and production for CHP
Current status	Budgetary subsidies, both direct expenditures and tax subsidies; Public provision of goods and services below cost; Capital cost subsidies; Policies that create transfers through the market mechanism.
Approach taken	Subsidies should be delinked from energy consumption or production. Policies need to be targeted more cost-effectively, for example, by directly supporting household incomes instead of supporting energy consumption, or by directly subsidising employment instead of production. The best hope for reducing energy subsidies in EU lies with a coordinated global reform of subsidy policy.
Estimated Energy Savings	

Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Obligation on Member States for variable subsidy would support the implementation of CHP and therefore increase the differentiation of energy generation. Local generation can reduce the risk that consumers are left without supplies of electricity and/or heating. The risk of supply disruption could be reduced by an increased implementation of CHP plants. A variable subsidy could help to invest in CHP plants. The action could increase the diversity of generation technologies. Score medium positive	2
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	The action could render less heavy the financial burden for EU CHP firms and consequently help their competitiveness with non-EU firms. Variable subsidy could attract investors from outside EU. The action could correct undesirable market trends in EU markets. Score low positive	1
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Having a subsidy variable with the market trend could attract a larger number of technology developers to the CHP field as investing in CHP plant would become more commercially attractive	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Variable subsidies could remove economic distortions, thereby improving efficiency and growth. The action could reduce budgetary burdens and generate additional resources.	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	Supporting CHP implementation would involve two major types of employment - firstly in project administration which includes project development, marketing, advice and monitoring, and secondly in installation and maintenance.	1

Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	The barrier to CHP implementation represented by the lack of financial incentives could be reduced especially for small players in the power generation market. Score medium positive	2
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Variable subsidies could remove economic distortions, thereby improving efficiency and growth. The action could reduce budgetary burdens and generate additional resources. A greater use of Combined Heat and Power would offer substantial economic, environmental and social benefits to the EU.	0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Variable subsidies for CHP will not directly affect operating costs and the conduct of business, although the wider uptake of CHP will generally be beneficial..	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Variable subsidies will have an arguably adverse effect on the internal market through the favouring of CHP over other carbon reduction technologies.	-1
Government budget	Does the actions require substantial financial support at the cost of the government budget?	If the national governments of member states are required to provide subsidies, there would be a negative impact arising from the uncertainties implied in the proposed action.	-2

G2 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**TRANSFORMATION**	
	Characterization of actions		
	Code/action:	Opportunities to incentivise CHP	
	MCA Reference:	G2	
	Category:	Transformation	
	Directives:	-	
	Subcategory:	adapted EU-legislation	
	Objective	Incentivise CHP implementation including large scale and microgeneration	
	Action:	EU/MS to require national regulators to ensure energy suppliers incentivise all scale CHP	
	Current status	UK - Ofgem Energy Efficiency Commitment Innovative Action (2005-2008) requirement for energy suppliers	
	Approach taken	Energy suppliers achive performance bonuses by incentivising energy efficient practices/technological solutions in customers; could include microCHP as well as large scale CHP	
	Estimated Energy Savings		
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	CHP is a generic technology that can be employed with almost any fuel source. In reality, because combined cycle gas turbines offer significant efficiency gains over other plant, natural gas has been the fuel of choice. There are already security of supply concerns attached to natural gas, so although expanded use of CHP has environmental benefits, the security of supply benefits are not so clear. Where CHP can be coupled with other fuel sources such as landfill gas, sewage gas or biomass, it is clearly of benefit to environmental and security of supply aims. Most CHP systems utilize natural gas from secure sources, rather than imported petroleum, but they can also be operated on wood wastes, coal, or other secure fuels. They are independently fuelled and operated. While they can be centrally dispatched, they can also be operated independently in the event of a disruption to central systems	2
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	The incentivisation for CHP will potentially be of benefit to suppliers, but there is no reason why energy suppliers should gain any material benefits unless there are any particularly advantageous clauses within the Regulators' schemes.	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	CHP incentivisation action by regulators will.attract a larger number of technology developers to the CHP field as investing in CHP plant would become more commercially attractive. However this is a specialist field with high development costs	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	CHP offsets the cost inefficiencies and waste inherent in traditional central utility power generation. The large energy demand posed by certain manufacturing facilities makes it feasible to generate both electrical and thermal supplies on-site in one power plant. The thermal by-product of power generation in on-site power plants can be applied to steam and process heat activities that are prevalent in manufacturing.	2

		CHP technology raises the overall efficiency of electricity generation from 30 percent to 80 percent or better.	
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	CHP development would generate capital investment and jobs in construction and plant operations.	2
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	The proposed action will have no negative impact on market barriers, and could serve to increase the uptake of CHP. However, this will be at the expense of other carbon reduction technologies. For this reason the UK Regulator, Ofgem, does not favour specific guidance to the energy suppliers as implied by this action.	1
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	It would be argued that favouring CHP over other carbon reduction technologies means that there is discrimination against the latter, so that there is not proper functioning of the market.	-1
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	If energy suppliers are required to increase their CHP plant then this will impact directly on them unless the market moves to energy service basis. Score medium negative as substantail costs incurred.	-2
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	The competitiveness of the international market will be generally unaffected by this action except for a slight negative discrimination against other energy saving technologies. In the UK there is an obligation for the suppliers to generate a certain percentage of power from 'green' sources; this means that CHP does not necessarily receive favourable treatment by the Regulator.	-1
Government budget	Does the actions require substantial financial support at the cost of the government budget?	This action has no effect on government budgets.	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source. Typically CHP will reduce combustion emissions by 30 to 50% compared to separate heat and power generation; therefore medium positive score.	2
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source. Carbon emission savings from CHP are estimated as 800 tonnes of carbon emission per MWe of CHP per year (9) compared to fossil fuel consumption. Score medium positive. According to the U.S. Department of Energy, CHP systems could reduce annual greenhouse gas emissions by at least 25 million tons of carbon.	2
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No significant effects on equality although more effiicnet energy services to disadvantaged groups would be be a financial advanatge. No evidence to support this.	0
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Actions taken by the suppliers in response to the Regulators' requirements will be seen as good governance but will not have a wide impact across industry and commerce in the member states.	1
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	See above	0

Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Due to the current high costs of microgeneration, consumers are most likely to benefit from an energy services supply basis. However this would require significant change in Member States not accustomed to centralised heat supply. However moving towards managed energy services would is a stated goal of EU therefore a low positive score	1
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	This action does not have any regional or sector specific effect.	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No net effects expects; overall may be some local fuel supply impacts if gas is not the preferred fuel	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	This action has no effect on the organisational structure of public authorities.	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	If the Regulator demands CHP uptake from the suppliers, then the response could be quite rapid.	2
Persistence	Does the action achieve a persistent effect? Does the action irreversibly transform the market?	Once CHP plant is installed then the benefits are long lasting, i.e. for the 20 years life time of the plant, The targets set by the Regulator under this action, if the benefits are to be on-going, should be regularly increased, say annually.	2
Monitoring & Verification	Can action be monitored and verified?	It is easy for the suppliers to 'self-report' on the number and size of CHP plants installed in response to this action. However, it must be recognised that the suppliers would not necessarily admit that some CHP plants would have been installed anyway, without prompting from the Regulator.	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	The suppliers' direct (albeit 'forced') contribution to energy efficiency must be considered as a positive benefit of this action.	2
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Changing the energy supply arrangements will not it itself necessarily change consumer behaviour in the absence of supporting measures such as advanced metering and consumer education. However such measures are available through energy suppliers, therefore a low positive score	1
	Notes		
	Monitoring		
	Verification		
	References		
	1	http://www.raeng.co.uk/news/publications/list/submissions/Energy_Policy_Security_of_Supply.pdf	

G3 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**TRANSFORMATION**	
	Characterization of actions		
	Code/action:	Decreasing distribution losses through more embedded CHP	
	MCA Reference:	G3	
	Category:	Transformation	
	Directives:	EC/2004/8	
	Subcategory:	adapted EU-legislation	
	Objective	Decreasing distribution losses through incentivising more embedded CHP	
	Action:	EU/MS to enable fair access and fair rules for CHP in competitive markets in the EU	
	Current status	Cogeneration Directive EC/2004/8 Need of a CHP system certification Lack of electrical interconnection standardisation	
	Approach taken	Removal of "Big Player" market dominance in the EU energy market A co-ordinated approach across the EU towards research, development and demonstration. Adoption of European Standards for the electrical interconnection of distributed generation plants. Development and implementation within the EU of standardised CHP system certification and authorisation protocols	
	Estimated Energy Savings		
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Helping the access of CHP in the EU markets will impact positively on security of energy supply. Their locations at the point of need eliminate their vulnerability to a disruption of the transmission system, and indeed create the ability to provide emergency power downstream of such a disruption.	3
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	EU economy is driven by market competition, and works best where competition is most vigorous. The proliferation of CHP systems has the potential to bring new and vigorous competition into the electric power sector and thermal energy sectors alike.	2
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Although CHP technologies for large industrial applications are well established and tested, there remains a need for improvement in smaller industrial, commercial and residential systems. An easier access of CHP schemes into EU markets would stimulate research and attract investment especially in CHP development projects using alternative fuels.	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	The adoption of fair rules for CHP plants would be cost effective as CHP systems can help avoid needless and economically inefficient investment in new transmission capacity, as well the waste of the transmission line losses of power, because of their location at the site of the demand.	3

Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	A study conducted by The New Economics Foundation in 1995 (1) found that a growth in the CHP sector would support a substantial number of jobs. The widespread use of relatively small CHP units is inherently more labour-intensive than the supply of power through larger scale traditional electricity-only power stations.	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	A fair access of CHP plants in the EU market would involve reducing one of the main implementation barriers, i.e. grid interconnection issues. These generators require fair, legal access to the electricity grid using standard interconnection procedures and at a fair price that includes the economic benefits of local generation and superior environmental performance. The main cause for the current CHP market stagnation is uncertainty within the industry which has arisen through the implementation of the Electricity and Gas Directives introduced to liberalise the markets. In theory liberalisation should provide new opportunities for cogeneration through the elimination of many of the existing barriers. These included the monopolistic structure of the electricity market which resulted in low tariffs for the purchase of surplus electricity, no possibility of wheeling, high tariffs for stand-by and top-up supplies as well as predatory pricing against possible competition.	3
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Studies (2) into the impact of high-efficiency power generation schemes on markets demonstrate that schemes as CHP have the potential to generate employment opportunities. CHP is more labour intensive than conventional energy production, in delivering the same amount of energy output. A higher CHP implementation can therefore benefit not only the national economy but also SMEs at the local or regional level, where it can stimulate local investment and employment.	2
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	An easier access for CHP into EU markets and the consequently wider implementation of those systems would affect the cost of raw materials and energy. As cogeneration is able to use different types of fuels, the cost of raw materials will be determined by the relative demand of new and usual energy sources . A decentralised approach makes best use of resources by locating power stations where there is demand, so that energy is generated close to the point of use. This would affect the price and availability of energy.	1
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Cogeneration is an important vehicle for promoting competition and enhancing the competitiveness of the European power market.	2
Government budget	Does the actions require substantial financial support at the cost of the government budget?	CHP implementation should be the result of a very supportive government policy made up of a combination of energy planning, legislation and subsidies. The liberalisation of the electricity market obliges changes to be made within the legal framework and support measures. This would imply that cogeneration of a certain quality will be exempted from taxation or ensuring fair access to fuel supplies and electricity systems, to harmonise rules and regulations and to remove unnecessary institutional obstacles.	2
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. Typically CHP will reduce combustion emissions by 30 to 50% compared to separate heat and power generation; therefore medium positive score.	2
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source. Carbon emission savings from CHP are estimated as 800 tonnes of carbon emission per MWe of CHP per year (9) compared to fossil fuel consumption. Score medium positive.	2

		According to the U.S. Department of Energy, CHP systems could reduce annual greenhouse gas emissions by at least 25 million tons of carbon.	
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No inequality issues identified.	0
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	The public responsibility of municipalities (i.e. their governance obligations) in promoting carbon reduction technologies will be enhanced through having fair access and fair rules for cogeneration projects.	1
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	If transparent rules and fair access are applied, then by definition the administrative burdens would be reduced. Medium positive effect	2
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Having a wider implementation of CHP plants, especially small-scale installations, would offer an alternative choice in matter of energy and heating suppliers. Microgeneration is not yet, however, a proven technology available to domestic consumers (3). The action has no direct impact on households.	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Supporting the implementation of cogeneration plants would positively impact the economy and social life of the interested region in many ways. SMEs are more likely to benefit by having "fair play"; in the case of large-scale CHP free market forces would apply.	1
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No identifiable effects.	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No significant effect identified. Governance issues already discussed above.	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	No, the impementation time will be driven by market forces.	0
Persistence	Does the action achieve a persistent effect? Does the action irreversibly transform the market?	The persistent effect is potentially high because of the average long life of a CHP installation. However, there might be times where the plant is taken out of service because gas and electricity prices become unfavorable.	1
Monitoring & Verification	Can action be monitored and verified?	It would not be possible to assess whether or not the presence of "fair rules" directly influences the decision to implement a CHP plant.	0
Tangible Added value of measure	Whether action has material or other benefits not covered elsewhere that should be included?	Yes, the presence of fair rules makes potential investors more prepared to give serious consideration to project implementation.	1
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Changing the energy supply arrangements will not it itself necessarily change consumer behaviour in the absence of supporting measures such as advanced metering and consumer education which are handled through energy supplier not generator in most cases	0
	Notes		
	Monitoring		
	Verification		
	References:		
	1	New 25 Economics Foundation, 1995, Combined Heat and Power: The Impact on Employment, Combined Heat and Power Association, London.	
	2	ECOTEC Research and Consulting Ltd, 1995, The potential contribution of renewable energy schemes to employment opportunities, /PL/00109/REP, Report for ETSU Harwell.	
		http://www.hm-treasury.gov.uk/budget/budget_04/press_notices/bud_bud04_press03.cfm	

		http://ec.europa.eu/environment/enveco/industry_employment/ecotec_renewable_energy.pdf	
	3	Interview with Ofgem	
	4	http://uschpa.admgt.com/vision2020.pdf	

G4 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**TRANSFORMATION**	
	Characterization of actions		
	Code/action:	Addressing the administrative burdens placed on smaller generators and incentivising the utilisation of distributed generation.	
	MCA Reference:	G4	
	Category:	Transformation	
	Directives:	2001/77/EC	
	Subcategory:	adapted EU-legislation	
	Objective	Integration of distributed generation into EU energy market Promotion of small-generator energy	
	Action:	EU/MS to addressing the administrative burdens placed on smaller generators e.g. for grid connection and incentivising the utilisation of distributed generation.	
	Current status	Review of institutional, economic and regulatory issues White Paper, Green Paper, The Directive on Electricity Production from Renewable Energy Sources (2001/77/EC) Kyoto protocol / Millennium development goals / Cap and trade for carbon emissions / Building Energy Efficiency Directive / Fiscal harmonization for transport fuel / Promotion of biofuels Economic incentives: Feed-in tariffs / Tax credit / rebates / investment subsidies / low interest loans / reduced VAT Other policies: Portfolio Standard (PS), Renewables Obligation (RO), green power marketing, Renewable Electricity funds, disclosure of fuels and emissions, net metering	
	Approach taken	Development of a European Commission Action Plan for the introduction of DG in all Member States. Directive 2002/91/EC to be stregthened to require novel DG solutions to be actively considered in future planning processes. Small generators connected to the transmission system should be exempt from the Connection and Use of System Code (CUSC). Promoting unbundling benefits payable to so-called 'embedded' generators, which input their power to the lower-voltage local distribution system rather than the national grid. Helping smaller generators to be able to directly access these benefits, which would significantly improve their commercial position. This move would also encourage independent consolidators into the market, and this would allow smaller generators to club together to spread risks and reduce costs. Reducing the administrative burden on smaller generators by providing funds for clear advice for smaller generators. Allow smaller generators to notify their predicted output closer to real time. Ena	
	Estimated Energy Savings		
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	As the demand for more and better quality electric power increases, DG can provide alternatives for reliable, cost-effective, premium power for homes and business. DG can provide customers with continuity and reliability of supply, when a power outage occurs at home or in the neighborhood, restoring power in a short time. Distributed energy (including reciprocating engines, microturbines, fuel cells, wind power, and photovoltaic systems) would improve the efficiency, environmental performance and reliability of the EU's power generation while reducing vulnerability to terrorism and other disruptions associated with centralised electricity delivery.	3
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Incentivise distributed generation by reducing administrative burdens would increase competition - new DG installations add many competitive players to the power market, for whom power is a byproduct, so they do not "game" the market.	2
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Reducing administrative burdens will influence the uptake of DG which in turn will stimulate research and development in the use of alternative fuels (eg those derived from gasification processes) and advanced technologies.	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	DG covers a broad range of technologies, including many renewable technologies that provide small-scale power at sites close to users. Highly efficient combined heat and power (CHP) plants, back-up and peak load systems are providing increasing capacity. All these technologies offer new market opportunities and enhanced industrial competitiveness provided that fair grid access arrangements exist	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	Supporting distributed generation by reducing the administrative burdens would involve significant job growth potential in high-tech manufacturing, installation and servicing.	2
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	On site production distributed generation minimises the transmission and distribution losses as well as the transmission and distribution costs, a significant part (above 30%) of the total electricity cost.	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	The impact of distributed generation, such as renewable energy, on employment demonstrate that DG has the potential to generate employment opportunities. Distributed generation is more labour intensive than conventional energy production, in delivering the same amount of energy output. It also uses less imported goods and services, particularly during operation, since renewable energy sources are by their nature indigenous, local energy sources. A higher use of renewable energy can therefore benefit not only the national economy but has also a valuable impact at the local or regional level, where it can stimulate local investment and employment. The increased penetration of RES and other DG, together with higher energy efficiency will help security of supply by reducing energy imports and building a diverse energy portfolio. The new technologies developed and the experience of implementing new energy management models will provide invaluable expertise and knowledge with immense export potential.	2
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	From an investment point of view it is generally easier to find sites for RES and other DG than for a large central power plant and such units can be brought online much more quickly. Capital exposure and risk is reduced and unnecessary capital expenditure avoided by matching capacity increase with local demand growth. Therefore measure should reduce burdens on investors and developers	1
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	DG can also stimulate competition in supply adjusting price via market forces. A DG operator can respond to price incentives reflecting fuel and electricity prices. In a free market environment DG operator can buy or sell	2

		power to the electricity grid - exporting only at peak demand and purchasing power at off-peak prices. DG can act as a physical 'hedge' against volatile electricity prices.	
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Some organisational support from government would be needed to address the administrative issues. This should be small.	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source. Typically CHP will reduce combustion emissions by 30 to 50% compared to separate heat and power generation; therefore medium positive score.	2
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source. Carbon emission savings from CHP are estimated as 800 tonnes of carbon emission per MWe of CHP per year (9) compared to fossil fuel consumption. Score medium positive. According to the U.S. Department of Energy, CHP systems could reduce annual greenhouse gas emissions by at least 25 million tons of carbon.	2
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No effect on equality. The public is becoming increasingly concerned about climate change issues and would welcome any measure which is introduced to facilitate potential mitigation measure such as CHP. Conversely if the public percieves that there are unreasonable administrative barriers preventing the implementation of technically viable carbon reduction projects, there would become impatient and intolerant. On balance achieving more public understanding a low positive	1
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	See above	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	By definition this action must have a positive impact and this would apply particularly on SMEs. In the UK it is recognised that the administartion associated with ROCs are disproportionally high to the extent that it becomes a disincentive for SMEs (2).	2
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets) Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Not applicable	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	DG (i.e. DHC) should always be considered for new commercial development and in industrial sectors where there is a match power-heat balance. A wider diffusion of DG systems will have only a limited effect on the job market.	1
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Not applicable	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	The action does not require any substantial restructuring of existing public authorities.	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	If the market conditions are favourable the timescale for implentation will be short-term and the effect of the carbon reduction will be immediate.	2
Persistence	Does the action achieve a persistent effect? Does the action irreversibly transform the market?	The reduction carbon emission resulting from DG is a permanent benefit and the market could be such that DG would be routinely considered rather than a possible "nice to have" option.	2

Monitoring & Verification	Can action be monitored and verified?	The reduction in administrative procedures may allow positive investment decisions for marginal projects. Where "administration" has been an influencing factor, this can be assessed through end-user questionnaires.	1
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Not applicable	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Changing the energy supply arrangements will not it itself necessarily change consumer behaviour in the absence of supporting measures such as advanced metering and consumer education which are handled through energy supplier not generator in most cases	0
	Notes		
	Monitoring		
	Verification		
	References:		
	1	http://www.distributed-generation.gov.uk/documents/10_01_2005_dgcg00030.pdf	
	2	Interview with Ofgem	

G5 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**TRANSFORMATION**	
	Characterization of actions		
	Code/action:	Fiscal incentives to facilitate investment in high-efficiency generation	
	MCA Reference:	G5	
	Category:	Transformation	
	Directives:	-	
	Subcategory:	adapted EU-legislation	
	Objective	Wider implementation of high-efficiency technologies	
	Action:	EU/MS implementation of fiscal incentives across all EU to facilitate investment in high-efficiency power generation	
	Current status	Practical problems that have arisen with the implementation of tax credits are related to: - design (the social rate of return is generally unknown), - permanency (uncertainty over the level and future existence of the credit), - relabelling (imprecise definition of high-efficncy generation technology), - the definition of the base (company-specific moving-average definition of the base), - the interaction of the credit with other parts of the tax system (it relies on the company having a tax liability against which the credit can be offset).	
	Approach taken	- Support R&D tax credits in all Member States - Allow the tax credit to be deducted from the firm's payroll tax, to effectively avoid any danger of tax exhaustion - Implementation of a levy–grant system. The system could be organised at the industry level and could involve all members of the industry paying a levy which is redistributed proportionally to R&D. - Payments to account for system efficiency improvements - Credits for system perforamnce benefits - Credits for environmental performance benefits - Compensation payments for avoided network infrastructure costs - Development of a detailed (and freely-available) financial model of the European Union energy market	
	Estimated Energy Savings		
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Technologies with higher efficiencies have been demonstrated in several applications, but have not yet been widely adopted by industry. Improve efficiency will improve security supply, however, the efficiency improvements are more likely to be achieved by market forces rather than fiscal incentives. The capital cost of more efficient power generation plants (e.g. supercritical fluidised bed, co-firing, etc) would be very high and the percentage of fiscal support would be necessarily very small (because of state aid issues). Therefore, fiscal incentives will not directly affect security of supply.	0

Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Fiscal incentives could be usefully applied to favour EU suppliers and this will promote potential cross-border activities.	1
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Many opportunities exist for improving the efficiency of energy generation, including advanced combustion technologies, fuel cells, gasification technologies, and advanced steam cycles. If financially supported, the research in these areas would be positively affected. This is a better direction for fiscal support than the direct subsidy of industry.	2
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	There are better ways of targeting financial incentives. Because of the high capital costs involved, there will be very few benficials.	0
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	The implementation of high-efficiency generation projects will create additional employment opportunities during the construction phase, but not thereafter.	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	New technology appears expensive to implement, if assessed by today's prices. However, costs are not constant - for most new technologies, they will reduce faster than conventional technologies. So, new technology will get cheaper much faster than conventional fossil fuels (a mature technology) in 20-30 years time. The higher costs of new technology should therefore not necessarely be considered as a barrier to investment. Market forces woulddrive future investment programmes based on cost benefit analysis.	2
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Although expanding the use of high-efficiency energy generation is good for our energy self-sufficiency and the environment, this action would have limited impact on national employment. This is because of the specialist nature of the business and the few replacement plant that would be installed.	0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Compared to the average fossil fueled power plant, high efficiency power generation technologies use less fuel per kilowatt hour of electricity to trim operating costs, while reducing carbon dioxide emissions. Any O&M activities that are out-sourced will be reduced following the shutting down and replacement of inefficient plants.	-1
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	As high-efficiency technologies become more widely adopted, competition will increase and technologies which are currrently expensive will become more costly competitive.	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Yes, this action would involve a substantial financial support by national and/or local government with the accompaning administrattive support to ensure that funds are properly directed.	-3
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. High efficiency power generation will reduce combustion emissions by 20 to 30% compared to low efficincy fossil fuel power generation; therefore medium positive score.	2
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source. No specific data for reduced emissions, but should be at least 20% better than existing low efficincy generation. Score medium positive.	2
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Not applicable	0

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	All the new projects involving high capital expediture will have high engagement by the public.	1
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Unlikely to effect SMEs, but by nature fiscal benefits would involve increased administrative activity.	-1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets) Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Energy price increases could be attenuated in the long term.	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Power generation sector will be the only one effected and new high efficiency plants could lead to a loss of jobs in the long term.	-1
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	The reduction of used coal on upgraded power plants will reduce lorry and rail movements, but this reduction will be only significant at local level.	1
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Not applicable	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The upgrading of inefficient plants is a long-term activity.	-1
Persistence	Does the action achieve a persistent effect? Does the action irreversibly transform the market?	Fiscal benefit might have a transient effect, however the improved efficiency from the ugraded plants will have a high longevity.	3
Monitoring & Verification	Can action be monitored and verified?	Organisations proceding with upgrading projects can be interviewed to determine the extent to which the fiscal benefits affected their investment decision	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	See above	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Not applicable	0
	Notes		
	Monitoring		
	Verification		
	References:		

G6 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**TRANSFORMATION**	
	Characterization of actions		
	Code/action:	Local Government Leadership and Partnership adoption of a 15% target for Government Departments to use CHP generated electricity	
	MCA Reference:	G6	
	Category:	Transformation	
	Directives:	Energy Services directive	
	Subcategory:	adapted EU-legislation	
	Objective	Increased application of CHP projects for public estate	
	Action:	EU/MS to require Public Sector adoption of a 15% target to use CHP generated electricity	
	Current status	In some Member States Public Bodies are already obliged to consider using CHP generated energy (e.g. UK), however implementing CHP installation is falling short of target.	
	Approach taken	MS to set national targets with support mechanisms Development of mechanisms for the capitalisation of the benefits of CHP EU wide assessment of appropriate, fair and consistent incentive regimes for CHP across Member States	
	Estimated Energy Savings		
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Increasing local CHP capacity in the EU will impact positively on security of energy supply in terms of reduced transformation losses meaning less primary energy required within the EU. Local public generation capacity will reduce network losses, or if the CHP is supplying a private network (e.g. Woking) eliminating large scale grid losses. The possibilities for non-gas fired CHP are increasing e.g. biomass boilers, but such installations are at an early stage in most Member States. Their locations at the point of need eliminate their vulnerability to a disruption of the transmission system, and indeed create the ability to provide emergency power downstream of such a disruption. Overall medium positive.	2
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	EU economy is driven by market competition, and works best where competition is most vigorous. The proliferation of CHP systems has the potential to bring new and vigorous competition into the electric power sector and thermal energy sectors alike. No effect on competitiveness expect.	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	CHP is a mature technology although using biomass or similar boilers is a developing technology in many Member States. Increased market demand in an area that has largely stagnated would stimulate further development; therefore low positive	1

Cost Effectiveness	Is action cost effective for the target sector in economic terms?	The UK is unlikely to achieve its target of 10% of Government estate using CHP sourced power due to the recalcitrance of public authorities to install CHP in anything other than optimum technical and financial situations. On this basis forcing public authorities to adopt uneconomic solutions would not be cost effective. Current market conditions suggest that this is the case therefore low negative	-1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	Supporting CHP implementation would involve two major types of employment - firstly in project administration which includes project development, marketing, advice and monitoring, and secondly in installation and maintenance.	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Where Member States already have an obligation concerning the preferential use of CHP, this measure will have no effect. Where public authorities have a low implementation of CHP then imposing an obligation to use CHP generated energy would encourage CHP installation. However, making CHP installation a priority would disadvantage other energy technologies; e.g. solar, wind and therefore this would impose a skewed market situation. On balance a low negative in that imposing an obligation would influence the ability of the market to decide - score -1.	-1
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?		0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Where CHP installation provides good economic and environmental sense, then installations will provide good savings together with the associated benefits. Requiring public authorities to consider/install CHP in more marginal or disadvantageous situations would act against the interests of the population for the duration of what could be an extended investment. As under market barriers promoting one energy efficient technology over and above others is not letting the market decide. This could stifle innovative technology development and therefore companies operating in this arena. On balance a neutral score.	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?		0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Supporting CHP installations outside of optimum situations would impose a significant financing burden on local government budget; therefore medium negative score.	-2
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source. Typically CHP will reduce combustion emissions by 30 to 50% compared to separate heat and power generation; therefore medium positive score.	2
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source. Carbon emission savings from CHP are estimated as 800 tonnes of carbon emission per MWe of CHP per year (9) compared to fossil fuel consumption. Score medium positive. According to the U.S. Department of Energy, CHP systems could reduce annual greenhouse gas emissions by at least 25 million tons of carbon.	2
Social inclusion & protection of	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No effect on equality. The public is becoming increasingly concerned about climate change issues and would welcome any measure which is introduced to facilitate potential mitigation measure	1

particular groups		such as CHP. Conversely if the public percieves that there are unreasonable administrative barriers preventing the implementation of technically viable carbon reduction projects, there would become impatient and intolerant. On balance achieving more public understanding a low positive	
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	As covered in Government budget, imposing this CHP burden on public authorities will constrain local energy supply choices and may impose a medium term financial penalty on local tax payers in sub-optimum conditions. No effects on public awareness or information provision. On this basis a low negative	-1
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	No effects expected as measure applies to local authorities only	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	No direct effects on consumers	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	This focused target effects only the public sector who are likely to outsource CHP energy supply to ESCOs or equivalent. Therefore a likely stimulation of the ESCO market is a low positive. No effect expected on SMEs	1
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No effects expected in transport arena	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	This measure would be addressed by existing public authority procurement etc; therefore would not require significant changes to existing public authorities.	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Public procurement of energy services tends to take several years where there is not a strong case and local authority funding is constrained. Therefore neutral score.	0
Persistence	Does the action achieve a persistent effect? Does the action irreversibly transform the market?	Installing CHP plant in sub-optimum situations has resulted in the equipment being decommissioned after the service contract has expired in favour of more cost effective solutions. Therefore no persistent effect as energy supply can easily revert to other forms of energy supply when obligation fulfilled. However capital investment should be effective for an extended period. Score low positive	1
Monitoring & Verification	Can action be monitored and verified?	CHP installations are monitored in Member States and EU wide information is available. Therefore efficacy of action could be easily monitored by interest groups. Score low positive as established pathways	1
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	As under persistence, UK experience is that energy users compelled to install uneconomical equipment will use the first opportunity to revert to other forms of supply when the service period has expired. However installing CHP is a medium term decision which may bring compelling benefits ten years in future. Overall neutral score	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Changing the energy supply arrangements will not it itself necessarily change consumer behaviour in the absence of supporting measures such as advanced metering and consumer education which are handled through energy supplier not generator in most cases	0
	Notes		
	Monitoring	Through existing pathways	
	Verification	Through existing pathways	

	References:		

G7 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**TRANSFORMATION**	
	Characterization of actions		
	Code/action:	new CEN STANDARD to regulate (district) heating systems	
	MCA Reference:	G7	
	Category:	Transformation	
	Directives:	-	
	Subcategory:	adapted EU-legislation	
	Objective	Reduction of energy losses and GHG emissions	
	Action:	EU to introduce new CEN STANDARD to regulate district heating systems	
	Current status	OPET CHP/DHC project: is a systematic effort for the further use and market uptake of different CHP/DHC technologies in favour of EU policies. European standards for calculating energy performance of buildings produced by CEN Energy Demand Management Committee (EDMC) (Article 14 Committee) SEI and DEHLG represented on EDMC EDMC Sub-Group Monitoring CEN Standards development EPBD Concerted Action Project (23 Member States)	
	Approach taken	Increasing the market penetration of DHC through new and expanding existing DHC systems; Develop promotional information on the benefits and potential of DHC/CHP relative to reducing pollution and GHG Establish CHP implementation targets; Ensure access, under transparent and non-discriminatory terms, to the power grid; Encourage energy and CO2 tax schemes that at the very least do not discriminate against DHC and CHP, and preferably would provide positive incentives. Focusing upon the whole supply chain, and the related technologies, connected with the use of biomass resources for combined heat and power and district heating purposes	
	Estimated Energy Savings		
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	A new standard to improve operating efficiency of DH systems will indirectly improve the security of supply as result of reduction demand of primary energy.	1
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	The major component of a DH system (boiler plant, distribution network - pre-insulated pipes, etc.) are generally sourced from within the EU. The regulation will require increased metering and controls, the components of which could be supplied by non-EU rivals. However, much of the rehabilitation work necessary after the collapse of the command economy has now been completed (ECN to advice further)	1

Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	A new DH standard will promote better control of systems which, in turn, will promote innovation and research into both supply and ed use efficiency and control, including building standards.	3
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	The industry will take measures to ensure that their actions are cost effective.	2
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	This action impacts over a very wide range of equipment from that in the boiler houses, the distribution networks, the heat sub-stations and the heat meters and temperature controls in the individual apartments, Rehabilitation activity will cause increased economic activity in the sector, particularly as district cooling becomes more widely adopted.	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	This action could help break down market barriers, i.e. lead to investment which might not otherwise have gone ahead.	1
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	In those member states where this widespread use of district heating and cooling there will be significant impact at the macro-economic level.	2
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Plant and equipment which is designed and specified to good engineering standards is more likely to attract finance.	1
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	The action could impact positively on the internal market as industry reacts to the need for improved standards.	2
Government budget	Does the actions require substantial financial support at the cost of the government budget?	The government finance to support this action would be insignificant.	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source. Typically CHP in this situation will reduce combustion emissions by 30 to 50% compared to separate heat and power generation; therefore medium positive score.	2
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source. Carbon emission savings from CHP are estimated as 800 tonnes of carbon emission per MWe of CHP per year (9) compared to fossil fuel consumption. Score medium positive.	2
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	As householders gain more control of their heating bills, the public will become better informed on how they can make a difference to both their personal situations and to climate change mitigation.	1
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	This option will require action by local authorities to ensure compliance with standards. As discussed above, the public will become better informed on how to improve the effectiveness of district heating systems. On balance, neutral impact.	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Discussed above; SME's are not affected.	0

Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Improved DH standards will potentially reduce heating bills depending on consumer use. Additional support required to ensure consumers use energy efficiently.	1
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	This action applied to those member states where there is widespread use of district heating; SME's are not affected.	2
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	The demand for transport could be reduced for solid fuel fired plants if gas used, conversely if biomass is used transport use would increase.	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Some regulation will be needed to ensure compliance with a new standard.	1
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	There will be some short term improvements as low cost measures are implemented followed by longer term gains on plants where extensive rehabilitating is needed to meet new performance standards.	1
Persistence	Does the action achieve a persistent effect? Does the action irreversibly transform the market?	Improved DH standards will have a permanent long term effect over the 20 year life time of the plant and beyond. The maintenance needs for upgraded plant will be much less than for old plant in a bad state of repair. This is already being seen in those DH systems serving towns in central and Eastern Europe which have been modernised in recent years. There will be an increased market for smart meters and sophisticated control systems.	2
Monitoring & Verification	Can action be monitored and verified?	Adherence to a standard will be subject to regulation and enforcement. 'Before' and 'after' performance monitoring will form the basis of key performance indicators (KPI's) set for the heat supply companies.	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Substantial refurbishment of DH systems expected in new accession countries would maximise the impact of this measure	1
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	If 'wasted' heat has to be paid for by individuals then their behaviour will change to ensure that their bills are acceptable. However, they need meter readings and controls to enable them to take conservation action. Overall consumer will need education to use energy efficiently which is additional to action	0
	Notes		
	Monitoring		
	Verification		
	References:		

4. Financing Actions

Impact Assessment on the Future Action Plan for Energy Efficiency
(CLWP: 2006/TREN/032)

Multi-Criteria Analysis Matrix of Actions

Actions Category: FINANCING

MCA Performance Matrix — **Impact Criteria**

Reference		Economic										Environmental		Social							Other				
	Actions	**Security of Supply**	**Competitiveness, trade and investment flows**	**Innovation and research**	**Cost Effectiveness**	**Employment & labour markets**	**Market Barriers**	**Macroeconomic Environment**	**Operating costs and conduct of business**	**Competition in the internal market**	**Government budget**	**Air Quality**	**The Climate**	**Social inclusion & protection of particular groups**	**Governance participation, good administration, ……..**	**Administrative costs on businesses**	**Consumers & Households**	**Specific Regions or Sectors**	**Mobility and the use of energy**	**Public Authorities**	**Short time for effect**	**Persistence**	**Monitoring & Verification**	**Tangible Added value of measure**	**Change in behaviour of end user**
F1	Public banking institutions need to identify a way of marketing funds for energy efficiency measures International Financial Institutions (IFI), such as the EIB, EBRD, should establish partnerships with intermediaries like national, local banks or national energy agencies using National guarantee funds to cover investments in energy efficiency	1	1	0	-1	1	2	1	2	0	-1	1	1	1	0	1	0	0	0	-1	1	2	1	1	0
F2	EU to consider ecological tax reform in line with energy tax harmonisation	2	-1	3	3	1	1	1	-2	2	2	1	1	-2	0	-1	-1	-2	1	0	2	1	2	1	2
F3	EU to increase adoption of existing energy efficiency legislation by linking implementation with structural fund provision to member States	1	1	1	3	-1	2	-1	0	-1	1	1	1	0	3	0	0	-2	0	0	2	1	3	1	0
F4	EU to ncentivise the use of intermediaries for small energy efficiency loans etc, for example by extending access to ECB or (through Energy Services Directive obligation) MS capital as a revolving fund for "soft loans"	1	2	1	1	1	3	1	2	1	-1	1	1	1	0	2	1	1	1	0	1	1	2	0	0
F5	Increase policy support for ESCOs through (1) dissemination of their activities, (2) the development of EU wide quality standards for ESCO projects, (3) standardised project monitoring and verification schemes, (4) model contracts and (5) improve access to (private) financial sources (e.g. cooperation with private banks) These measures could be combined with providiong low-interest loans to ESCO projects	1	1	0	-1	1	1	0	1	0	-1	1	1	0	0	-1	0	0	0	-1	1	1	1	0	0
F6	EU to incentivise production of energy efficient products through favourable taxation rate in Member States	0	2	2	1	1	-1	1	0	-1	-2	1	1	0	-2	-1	2	0	0	-1	0	1	1	0	1
F7	Stabilising energy prices at minimum level through varying tax rates. I.e. agree on minimum energy prices, when market prices decrease, increase the energy tax rates.	1	-3	1	2	1	1	1	1	-3	-1	1	1	-1	0	0	0	-1	0	0	2	3	0	0	3
F8	Encourage energy performance contracting in public buildings. Example: Berliner Energieagentur scheme to upgrade public buildings in a situation where public financing was limited, and obtained via a shared savings scheme run by an ESCO	1	0	0	-1	1	2	0	0	0	-1	1	1	0	1	0	0	1	0	0	1	1	1	0	0
F9	Energy efficiency agreements in industry to provide an incentive for efficiency improvements	1	1	1	2	1	1	1	1	0	-2	1	1	0	0	-1	0	1	0	-1	2	2	1	0	1
F10	EU/MS to lower VAT (Value Added Tax) for energy saving products	1	1	2	0	0	0	0	0	-1	-1	1	1	0	-2	-1	2	1	0	0	1	1	1	-1	1
F11	Provide for a tax incentive for capital equipment purchasers to choose the most energy efficient equipment	1	1	1	1	1	1	1	1	0	-2	1	1	0	0	0	0	1	0	-1	3	-1	1	0	0
F12	EU/MS to encourage off-balance sheet investments, like leasing in energy efficient technologies, for example by extending low cost earmarked capital to commercial lenders, or credit support to recipient	1	2	1	1	1	1	1	2	1	-1	1	1	1	0	2	1	1	1	0	1	1	2	0	0

F1 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**FINANCING**	
	Characterization of actions		
	Code/action:	Partnership international financing institutions and energy agencies	
	MCA Reference:	F1	
	Category:	Financing	
	Directives:	-	
	Subcategory:	Access to financing	
	Objective	Increase availability/allocation of public funds for energy efficiency measures	
	Action:	Public banking institutions need to identify a way of marketing funds for energy efficiency measures International Financial Institutions (IFI), such as the EIB, EBRD, should establish partnerships with intermediaries like national, local banks or national energy agencies using National guarantee funds to cover investments in energy efficiency	
	Current status	Lack of knowledge of availability of private funds amongst end-users and lack of experience of banks in lending money to energy efficiency projects (leading to higher interest rates)	
	Approach taken	(i) Funds/credits of international banks could be redistributed via an intermediary such as national/regional energy agencies (or national banks) that have more technical and economic expertise in the field of energy efficiency. (ii) A guarantee fund, using (partly) public funds, should decrease risks for banks to provide credits for (small-scale) energy efficiency projects at preferable interest rates. (iii) The establishment of project preparation facilities for those applying for a loan (by energy agencies)	
	Estimated Energy Savings	Less than 1% of energy consumption	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	An increasing number of energy efficiency projects leads to a decreased use of primary energy sources, including oil, natural gas and coal at project sites. Depending on how the approach is earmarked, it could have the potential to increase the amount of distributed generation (mainly CHP). Increasing the share of distributed generation may have both a positive and negative impact on the risk of supply disruption and energy system costs. Positive in a way that more consumers become self-sufficient and increases the diversity of electricity generation options, negative in a way that increasing shares of DG may destabilise the system	1
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Implementation of energy efficiency projects leads to lower energy costs, increasing competitiveness of the EU-based companies involved. Higher investments in energy efficiency projects will be beneficial for manufacturers of EE equipment, but not necessarily of EU-based firms only	1
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Bank loans can usually only be obtained for conventional technologies with relatively low pay-back times and risks. Even when loans are backed with a guarantee fund, they will be used for relatively conventional technologies Innovation impact will be limited, but not hindered either	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Action needs a certain amount of financial sources (guarantee fund, project preparation facility) leading to increasing investments in EE projects. These funds have to be available in the initiation phase already, relatively large upfront investment, minimal costs later on.	-1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation is expected to be proportional to the energy saved, or the investment amount. Consequently a low positive score	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	The main barrier to enterprises investing in energy efficiency measures is financial, such as lack of available capital for energy efficiency projects. Especially for SMEs, this is a major barrier. It is possibly a larger barrier in the new EU MS	2
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	The beneficial macroeconomic effects of improved energy efficiency would assist the EU at micro-economic level, and this measure would help overcome the observed market failures, inherent in human nature, of Energy Efficiency being "obviously the right thing to do" but "not top of the corporate priority list Other more concrete impact: The private banking sector becomes engaged into EE	1

		project financing	
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	This option will directly affect the cost of energy inputs where the funds are only allocated to improvements in energy efficiency. Furthermore it removes the financial barriers for enterprises to undertake these projects thereby providing the potential to bring forward investment decisions	2
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No negative influence on the functioning of the market expected. The need for this action may be higher in the new EU Member States, therefore differences between E- and W-Europe may occur when action only applies to E.- Europe	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	This action will require an allocation of budget to both administer the funds and to provide the funds themselves. Government financing may be required for financing guarantee fund. The establishment of EE project preparation facilities also require some efforts from public organisations	-1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity and heating) This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity and heating) This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	This measure is likely to make business enterprises more aware and therefore informed on the benefits of energy efficiency but dissemination beyond that is probably limited Households possible target group (see	1

		Bulgaria residential energy efficiency credit line). In such countries, energy costs for households form siginificant part of household budget, action may help to lower this.	
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	None	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	The funds should be administered so that the administrative burden lies predominantly on the fund provider. The recipient should be required to prove the likely improvements in energy efficiency of their proposed project and subsequently whether success has been achieved in this regard only. This is likely to place a heavier burden on SMEs who may be less well equipped to deal with these requirements Generally, bank loans for EE projects will easier to obtain than without a fund in place, decreasing administrative costs for those businesses applying for loans	1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	This measure may be of only limited influence, only when the domestic market is directly targeted.	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Credits can be targetted to specific, weaker, regions, or specific sectors as long as a good intermediary is present. Else no effect	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Unlikely to have any effect	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	The administration of funds will require administrative teams and will therefore have an effect on the providing body in this regard	-1
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	In practise, the adoption of this kind of scheme takes time, adoption of the scheme grows gradually. Once loan is takes and measure implemented, there is an immediate	1

		result. Expected increase of energy efficiency projects in both private as public sectors. Easier (for SMEs) to obtain loans from private banks, increasing involvement of banks in the EE sector.	
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	When banks realise that lending money to EE projects is beneficial, private loans may be more sustainable than government funds that are always depending on a certain (limited) state budget with a limited duration, especially in the new EU MS Once enterprises are aware of the availability of funds and understand the real monetary as well as environmental benefits to their own business, repeated applications for funds are likely (dependent on any criteria applicable to obtaining the funds) - word of mouth then becomes an important marketing tool in disseminating information on these funds. In this sense, it is likely to perpetuate and thereby deliver a persistent effect	2
Monitoring & Verification	Can action be monitored and verified?	Possibility to monitor each project separately, getting detailed data about result of action The criteria by which success is measured and monitored need to be defined clearly at the outset with a view to identifying real targets. The annual energy cost savings and likely carbon savings from the project should be measured with the ability to check actual savings during the course of the loan.	1
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	A possible way to engage private banks into energy efficiency, which remains limited up to now, while the financial means could be available	1
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	None	0
	Notes		
	Monitoring		
	Verification		
	References		
		http://www.ifc.org/ceef	
		Commercializing Energy Efficiency Finance (CEEF)	
		http://www.ebrd.com/projects/psd/psd2005/35703.htm	
		EBRD, Bulgaria - Energy efficiency and renewable energy credit line	

F2 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**FINANCING**	
	Characterization of actions		
	Code/action:	Ecological tax reform	
	MCA Reference:	F2	
	Category:	Financing	
	Directives:	Directive for the taxation of energy products (includes only mandatory introduction of energy taxes)	
	Subcategory:	Tax measures	
	Objective	Increase energy taxes while at the same time keeping tax burden at the same level	
	Action:	EU to consider ecological tax reform in line with energy tax harmonisation	
	Current status	No. of countries have introduced taxes on energy products (e.g. natural gas electricity, all EU MS (incl. new MS) should follow within the coming years	
	Approach taken	So-called ecological tax reform implies increase of taxes on energy products and at the same time decrease income / corporate taxes, leading to overall tax neutrality. With such a reform it is possible to further increase energy taxes/tariffs without increasing the tax burden too much	
	Estimated Energy Savings	High	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Security of Supply is often a primary target of such actions, for example historical Danish support for Wind Energy. Similarly, examples exist of markets being set up to reward the avoidance of supply disruption eg UK NETA (1)	2
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Arguably the most emotive aspect to ecological taxation (even if posited as "tax neutral") is its impact on competitiveness. There is well publicised and passionately held opinion on both sides regarding whether economic relocation as a result of this action	-1
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	There is evidence for ecological taxation creating entire industries (eg Danish wind turbines), aswell as R&D on a more basic level. Such taxation effects very clearly affect buyer behaviour, and thus industrial innovation and resource efficiency	3
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	The cost to the EU of requiring such taxation is arguably zero, and the evidence suggests that impact can be very high. Political considerations are not made here.	3
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	As for Competitiveness, Economists argue over whether discriminatory taxation of this kind increases or decreases employment (3). The authors are disposed to think of this favourably, given that Energy costs will rise in the long term, so fiscal measures that accelerate this realisation will on balance be positive. This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation is expected to be proportional to the energy saved, or the investment amount. Consequently a low positive score	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	A fiscal measure aimed at discriminating financially in favour of energy efficiency will clearly address a market barrier, as generally the capital expenditure of such decisions is higher (eg conventional vs low energy light bulbs). The sectoral differences here are substantial, with internationally traded and energy intensive sectors (eg Aluminium, cement) much more involved than non-tradeable, low intensity sectors (eg Retail). Major Energy Users across the EU have formidable lobbying groups to defend their	1

		interests.	
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	As for Employment (above)	1
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Inevitably "zero sum" fiscal measures have winners and losers. Supply chains and investment decisions are disrupted (that, arguably, being the whole point) and some businesses that are unable to adapt for market or management reasons may fold	-2
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	The internal market is not best served by the present situation, in which Member States have widely varying fiscal stances. This action, creating a more homogeneous tax treatment, would lead to cleaner internal competition. Saying that this would be positive is the author's luxury, afforded by our remit, which does not require us to consider political and Energy Policy concerns	2
Government budget	Does the actions require substantial financial support at the cost of the government budget?	If tax neutral as posited (noting that this is generally difficult to deliver) then this action will have a substantial effect at no financial cost to the EU	2
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1

The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Taxation makes the headlines in all Member States, and so this action would definitely have a beneficial educational effect. Very real concerns exist, however, regarding inequality arising from a measure of this kind. In the absence of other social support, then already vulnerable citizens could be materially disadvantaged. In the worst case, low paid workers in industries disadvantaged competitively by ecological taxation would see their employment conditions squeezed at the same time as their disproportionately high energy costs are rising at home. Such Energy Poverty considerations are at the forefront of government thinking in many Member States (1,2)	-2
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Fiscal considerations are very emotive in the EU, and through this the relationship between Member States and the EU would be affected by this action. However there is little direct impact of this fiscal measure on administrative performance	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Dependent upon implementation. There is certainly evidence that similar efforts have historically caused such concerns (for example Climate Change Levy Agreements in the UK, Carbon Trading measures across the EU), but this ought not to be inevitable. Changes to VAT or Income Tax rates are achieved at little administrative cost to companies.C50	-1

Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Where the domestic sector is not exempted (and the evidence of rising demand in the domestic sector across the EU suggests it ought not to be) ecological taxation would impact heavily on households. Such an action could profitably be accompanied by an education effort to ensure that households at least understand the desired behavioural change, rather than simply paying the tax. Energy Poverty issues will be worsened by this action, and will also need to be proactively addressed, though this need not be insurmountable.	-1
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	See Market Barriers above. Sectoral and regional splits may be material as a result of this action. SMEs are unlikely to be specifically advantaged or disadvantaged	-2
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	If applied to the Transport (and particularly fuel) sector, then fiscal measures would clearly have some influence. The evidence is that elasticity of demand is relatively low, ie those countries where, for example fuel duty is highest, there is little difference in car usage.	1
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No effect, unless taxes are levied on a local level.	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Potentially, fiscal change is one of the quickest ways to force change	2
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Assuming that people and businesses can change their behaviour in response to the taxation change, then they could also change back if it were reversed. However most energfy efficiency measures, once adoption is stimulated, are unlikely to be abandoned.	1
Monitoring & Verification	Can action be monitored and verified?	Tax systems are readily monitored	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	It is difficult to define a tax neutral fiscal tool, especially in energy consumption, where demand can be quite insensitive to price. Hypothecated ecological taxation intended to be tax neutral can end up raising a lot of money for a government, which can be spent on other well intended projects.	1
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	The high profile and financial immediacy of fiscal tools is likely to lead to behavioural change, particularly by business, and where alternatives exist	2
	Notes		
	Monitoring		

	Verification		
	References:	1. http://www.hm-treasury.gov.uk/topics/environment/topics_environment_index.cfm	
		2. http://www.environment-agency.gov.uk/aboutus/512398/289428/745840/?version=1&lang=_e&lang=_e	
		3. KPMG Germany, www.internationaltaxreview.com/?Page=10&PUBID=35&ISS=14650&SID=497018&TYPE=20	

F3 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**FINANCING**	
	Characterization of actions		
	Code/action:	energy efficiency and clean urban transport explicit targets in programming of funds for new Member States	
	MCA Reference:	F3	
	Category:	Financing	
	Directives:	-	
	Subcategory:	Access to financing	
	Objective	To achieve more Member State accountability for implementing energy related Directives	
	Action:	EU to increase adoption of existing energy efficiency legislation by linking implementation with structural fund provision to member States	
	Current status	No linking of EU legislation implementation with structural funds payment Eg monitoring of Building regulations implementation	
	Approach taken	Consider whether the Commission is able to make payment of structural or cohesion funds conditional on achieving implementation of energy efficiency directives. This measure could simply encourage countries to enact the legislation, or could go further to police its implementation. Impact could be weak: (eg refocus elements of ERDF and ESF towards energy efficient measures) or strong (eg withhold funding for roads, which would otherwise have a negative effect) (1.)	
	Estimated Energy Savings	High	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The effect of such a measure will be "second order" but positive, as reduced energy demand inherently eases supply security. It will not encourage supply variety in fuels or generating technologies, or reduce the likelihood of supply "glitches"	1
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	This potential sanction could be anticipated to lead to better implementation, and thus reduced energy costs, and an improved balance of trade position for the EU as a whole - again a positive but second order effect	1
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Structural funds are very material for most member states. A material sanction of this kind could be anticipated to introduce strong market drivers for innovation	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	There is arguably no (or indeed negative) cost to the EU from reallocating its funds on the basis of energy efficiency performance, and a high likelihood of achieving material improvements in legislative implementation. The political cost (which is clearly more difficult) is not for consideration here	3
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	It is believed that improving energy efficiency will improve competitivity, and thus employment at the macro-level. However employment is a beneficial secondary effect of energy efficiency, whereas it is a primary target of structural funding. It is likely then that, for the country in question, a withholding of structural funding will reduce employment. (2). This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation is expected to be proportional to the energy saved, or the investment amount. Consequently a low negative score as witholding funds on the basis of stifling job creation is a powerful arguement	-1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Legislative implementation is known to be a problem. As examples, the UK is now overdue the implementation of a Directive, and several countries that have implemented have no credible mechanism for ensuring observance. In itself, this represents a market barrier, which can be unblocked through adding "teeth"	2

Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	As for Employment (above) the beneficial macroeconomic effects of energy efficiency may be more than offset by the disruption of Structural Funds in countries that are failing their obligations	-1
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	One of the reasons held up for the patchy implementation of existing energy efficiency directives has been their effect on supply markets, for example in finding, training and funding sufficient staff for Building Energy monitoring. Product and business competitiveness, finance and investment are all similarly affected, however, it is the Directives that are responsible for these effects, not this action	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Withholding structural funds would necessarily affect the internal market. Weaker countries, the beneficiaries of Structural Funding, would be influenced regarding Energy Efficiency rather than simply competitiveness.	-1
Government budget	Does the actions require substantial financial support at the cost of the government budget?	No additional funding would be necessary - arguably spending could reduce	1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Citizens of Member States affected, who already tend to be relatively disadvantaged, have potential to be held back if structural funds are withheld. On the other hand, the media focus that would ensue if sanction were threatened would definitely improve public awareness, and sensitive implementation (eg rechanneling Regional Development funding	0

		into "Warm Zones" rather than other initiatives)(3) need not disadvantage any groups. On balance we believe this can be neutral.	
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	This action encourages the good enactment and implementation of Directives, and as such is targeted very firmly on informing both national governements and citizens of their obligations	3
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	The cost of Energy Efficiency Directives is undoubtedbly material, and may be borne by business / lead to bureaucracy, depending upon how it is implemented. However this is an effect of the Directives, not this action.	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	The cost of Energy Efficiency Directives is undoubtedbly material, and may be borne by business / lead to bureaucracy, depending upon how it is implemented. However this is an effect of the Directives, not this action.	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	This action need have no impact on Sectors or SMEs. If it is to be more than an idle threat, we must expect it to impact upon member states that fail in their energy efficiency obligations. As such, regional inequality is necessarily an outcome of this action, and must be deemed "the lesser of two evils" if this action is to be pursued	-2
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Only if the structural fund sanctions concern transport issues. Neutral	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Energy Efficiency Directives may lead to changes in public authorities, for example in the growth of buildings inspectorates. However this is a function of the Directives, not this action	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Potentially, forcing legislative change is one of the quickest ways to force change	2

Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	If we assume that the Directives will not be universally applied in the absence of this action (which sits uncomfortably with some of the assumptions above, but is nevertheless pragmatic)(4), then yes, a persistent and irreversible change is achieved	1
Monitoring & Verification	Can action be monitored and verified?	Monitoring and verification is central to this action. The presence or absence of legislation is readily measured, and a mechanism for auditing observance would need to be a central part of this	3
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Mechanisms exist for the implementation of all EU Directives to be challenged. Treating Energy Efficiently as "even more special" would seem to the (energy-oriented engineer) authors to be sending a positive message	1
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Through Directive, not action	0
	Notes		
	Monitoring		
	Verification		
	References:	1. "New Europe' smells of fresh asphalt, Friends of the Earth, May 2005	
		2. Structural Funds in Energy and Transport, Eddy Hartog, 2004	
		3. CSE / Energy Saving Trust, Thinking out of the Box, April 2004	
		4. "Action not Talk", Energy Efficient Europe initiative, 2005	

F4 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**FINANCING**	
	Characterization of actions		
	Code/action:	rearrange existing financing mechanisms, including focused organization of clearinghouse-type (new MS), including role of energy companies, pricing, etc.	
	MCA Reference:	F4	
	Category:	Financing	
	Directives:	-	
	Subcategory:	Access to financing	
	Objective	Make energy efficiency funds more available in small amounts through intermediaries	
	Action:	EU to ncentivise the use of intermediaries for small energy efficiency loans etc, for example by extending access to ECB or (through Energy Services Directive obligation) MS capital as a revolving fund for "soft loans"	
	Current status	Available in some countries (eg Carbon Trust Zero Interest loans to SMEs in UK), but not in most	
	Approach taken	To be elaborated	
	Estimated Energy Savings		
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The effect of such a measure will be "second order" but positive, as reduced energy demand inherently eases supply security. It will not encourage supply variety in fuels or generating technologies, or reduce the likelihood of supply "glitches"	1
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	This action will improve the market for otherwise marginal energy efficient products. It would thus stimulate a "home market" which would ultimately benefit EU players when exporting, particularly as energy prices are forecast to continue to rise.	2
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Innovation would be a logical outcome of this action, whether in terms of new products or of innovative financing mechanisms. As ever, the challenge will be identifying the cut-off between qualifying and non-qualifying technologies, and observing that energy efficiency is always a second consideration in equipment designed to achieve a different function	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Making cash available at a low interest rate for qualifying technologies is unlikely to be particularly expensive. Arguably administration of the scheme could be a major cost consideration, unless clear and unambiguous guidelines can be readily achieved. Experience in the UK (CT zero interest loans) shows that this is not insurmountable, particularly if Suppliers' or ESCOs' own marketing expenditure can be leveraged.	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation is expected to be proportional to the energy saved, or the investment amount. Consequently a low positive score	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	This action directly addresses known market barriers. Ready access to capital, particularly for SMEs, is a major concern. Investment horizons for Energy Efficiency CapEx often exceed companies' investment guidelines, so lease alternatives may be very attractive.	3
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	The beneficial macroeconomic effects of improved energy efficiency would assist the EU ata micro-economic level, and this measure would help overcome the observed market failures, inherent in human nature, of Energy Efficiency being "obviously the right thing to do" but "not top of the corporate	1

		priority list"	
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	This measure improves the availability of equipment, as it offers an alternative financing stream. This option value is of benefit to businesses. Suitable intermediaries may not be in existence in some Member States, and this service will be a new offering for others. If ESCOs are selected as intermediaries then a new market can potentially be reached	2
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Funding of this kind already exists in several member states, leading to competitive advantage for recipients. Universal accesibility would benefit the internal market	1
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Making capital available for a programme of this kind is necessarily at the expense of alternative investments. It should be noted that this is lease money - not grants - but inevitably some defaults occur, and such a scheme costs for administration. Increasing cash in circulation will have an inflationary effect from a monetary perspective	-1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1

Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	If universally applicable, this measure is inclusive. It has little communication value	1
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	This action has little effect on public governance	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	This action provides business with options, and thus must be welcome. The benefit is received disproportionately by SMEs, which is a particularly attractive side effect	2
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Lease schemes applicable at the Domestic scale tend to be less cost effective due to the specific energy intensity of the hardware involved. However, there is again the potential to provide options, which are welcome.	1
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Industry sectors where equipment is readily available but a little bit too expensive tend to benefit disproportionately from lease schemes of this kind. An example of this from the UK would be paint dryers used in automotive repair, where many SME customers have been happy to pay a little more for existing energy efficient models when granted access to capital. Some "big ticket" sectors (eg petrochem) will be less well suited to this approach/ It is important to observe that the strength of these sectors will differ by geography, and that networks, trade associations etc have a role to play in education. Otherwise this action will be independent of geography.	1

Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Only if extended to transport products - ie letting taxi firms lease hybrid cars	1
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No change needed, except where the Intermediaries selected are working in Public sector, for example in Regional Energy Agencies	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	In practice the adoption of these kinds of schemes takes time. A "soft" lease is merely an alternative to existing purchase schemes, and customers must be comfortable with the cost benefit. Evidence is that the adoption of such schemes grows only gradually. Once the equipment is procured, however, it has an immediate beneficial effect (unlike some slower behavioural measures)	1
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Improved Equipment, once purchased, has a long term effect.	1
Monitoring & Verification	Can action be monitored and verified?	Most existing schemes validate the availability of leases on the basis of purchase orders etc. in the same way as a commercial bank. This is readily achieved. It can never be guaranteed that, once fitted, the equipment will be optimally operated, but this is in the interests of the owner, and sought ought to be reliable.	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	none	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	This action concerns hardware, not behaviour	0
	Notes		
	Monitoring		
	Verification		
	References:	1. Klinckenberg, Investing in Building Energy Efficiency in Europe, EuroAce, 2005	
		2. CSE / Energy Saving Trust, Thinking out of the Box, April 2004	
		3. Financing Energy Efficiency, IBRD ESMAP May 2006	
		4. "Action not Talk", Energy Efficient Europe initiative	
		5. Ecofys, Cost-Effective Climate Protection in the EU Building Stock, EURIMA, 2005	

F5 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)		
	Multi-Criteria Analysis Matrix of Actions - Supporting Information	
	Category:	**FINANCING**
	Characterization of actions	
	Code/action:	Increasing the utilisation of energy service contracting / ESCO financing types
	MCA Reference:	F5
	Category:	Financing
	Directives:	Energy Service Directive
	Subcategory:	Alternative financing measures / access to financing
	Objective	Increase the utilisation of shared savings financing to increase investments in energy efficiency Making investments in EE projects more attractive through lower interest rates
	Action:	Increase policy support for ESCOs through (1) dissemination of their activities, (2) the development of EU wide quality standards for ESCO projects, (3) standardised project monitoring and verification schemes, (4) model contracts and (5) improve access to (private) financial sources (e.g. cooperation with private banks) These measures could be combined with p*rovidiong low-interest loans to ESCO projects*
	Current status	ESCOs are well developed in a limited number of EU MS, but a large potential for energy efficieny projects through ESCOs remains unexploited EU-wide. Part of these unexploited energy efficiency projects will possibly not be realised otherways due to lack of funds or long pay-back times
	Approach taken	Promote the establishment and development of ESCOs in all EU MS through the measures listed above. Focus will be on the private sector In addition, providing easily accessible loans to ESCOs or their clients may promote the ESCO business
	Estimated Energy Savings	Less than 1% of energy consumption

Assessment criteria	Details	Scoring Narrative	MCA Score
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The effect of such a measure will be "second order" but positive, as reduced energy demand inherently eases supply security. It will not encourage supply variety in fuels or generating technologies, or reduce the likelihood of supply "glitches"	1
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Implementation of energy efficiency projects leads to lower energy costs, increasing competitiveness of the companies involved. Higher investments in energy efficiency projects will be beneficial for manufacturers of EE equipment, but not necessarily of EU-based firms only	1
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Limited, as ESCOs usually invest in conventional technologies with lower pay-back times	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	In countries with little knowledge about ESCO financing the start up costs of such an action may be high before any result is achieved. In countries with experience with ESCOs, some elements listed above may relatively quickly provide results	-1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation is expected to be proportional to the energy saved, or the investment amount. Consequently a low positive score Concretely, this action means extra employment expected through the establishment of new ESCOs	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	The action has a major influence on access to finance, not available for private companies (especially SMEs) in traditional project financing for energy efficiency. Standardisation of the ESCO financing approach may make banks more willing to provide credit, meaning less percieved risks for banks	1

Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Growth of the ESCO business in the EU, macroeconomic impacts remain limited	0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	This option will directly affect the cost of energy inputs. ESCO projects have relatively large transaction costs (especially as this is not the firms core business), but could be reduced by e.g. standardised contracts. However, ESCO projects may be an easier way of getting access to finance	1
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Common standards for ESCO projects improve equal competition within the EU among companies claiming to offer ESCO services. No negative impact on competition within the EU in general	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	The actions presented above require some actions from government agencies and require some government budget. Only when low-interest loans are provided to ECP projects, then this will mean substantial government budget.	-1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity and heating) This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity and heating) This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No impact expected	0

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	No impact expected	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Accreditation / introduction of standardised monitoring and verification present certain new responsibilities for the ESCO The firms that are clients of the ESCO will have to get familiar with the concept. Transaction costs of the clients may be high when they get involved for the first time	-1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	No impact expected	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Specific regions or sectors are not likely to be influenced. The action will lead to the establishment of new ESCOs, some of them SMEs	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No impact expected	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Possible role of government agency in accreditation of ESCOs, taking care of dissemination etc. Costs for national ESCO programme	-1
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The adoption of the ESCO concept by firms takes time, they have to get familiar with the approach and sucha project requires some preparation. When started, an increasing number of EE projects realised by ESCOs to be expected. Good project examples may lead to growing number of ESCOs in the EU	1

Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Once firms are aware of the possibility, they will see the ESCO concept as a good possibility of reducing energy consumption. Projects once realised have a long-term effect. However, not sure whether ESCO business will decrease after attractive and less complicated projects have been realised. Uncertainty about long-term potential of ESCO projects	1
Monitoring & Verification	Can action be monitored and verified?	There is a need to monitor in detail the energy savings of every ESCO project. Therefore it is possible to monitor the no. of projects and total energy savings	1
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	None	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Implemented ESCO projects do not necessarily lead to change in end-user behaviour	0
	Notes		
	Monitoring		
	Verification		
	References:		
		Steve Sorrel, *The Contribution of energy service contracting to a low carbon economy*, Tyndall Centre Technical Report No. 37, November 2005	
		Paolo Bertoldi & Silvia Rezessy, *Energy Service Companies in Europe: Status Report 2005*, European Commission, DG Joint Research Centre, Institute for Environment and Sustainability, Renewable Energies unit, Brussels, 2005	

F6 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**FINANCING**	
	Characterization of actions		
	Code/action:	Producer pays less tax for producing energy efficient goods (US model)	
	MCA Reference:	F6	
	Category:	Financing	
	Directives:	-	
	Subcategory:	Access to financing	
	Objective	Provide complete range of efficiency incentives across full supply chain	
	Action:	EU to incentivise production of energy efficient products through favourable taxation rate in Member States	
	Current status	Incentives for producing energy efficient products are market driven	
	Approach taken	provide a full supply chain model from producer to purchaser/vendor to end-purchaser/installer provide a suite of integrated products by linking measure with, for example, enhanced capital allowance scheme (F13). Would apply to products listed on Energy Efficiency Product Listing or equivalent	
	Estimated Energy Savings		
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	No impact on security of supply; No divergence issues; No risk of supply disruption; Potential for increase in diversity of generation technology, Overall neutral.	0
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	A change in incentivisation for producing energy efficient products increases competition within the EU, providing that it uniformly applied, will give the EU states a competitive advantage over non EU countries. No evidence that it provokes cross border investment flows. A medium positive, +2	2
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	The UK government has already used grants to stimulate the market for new technologies, e.g. 50% grants for photovoltaic installations. Such policies help speed products to reach a self sustaining price more quickly. (Reference 1). Such policies help speed products through the initial high cost, low volume period of their production, hence can reach self sustaining price more quickly. There is a potential for new technologies and production methods. No overall effect on resource efficiency. A medium positive, +2.	2
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Research studies by the Building Research Establishment show that the time when people are more likely to invest in energy efficiency is when purchasing and moving into a new home (Reference 2). The stamp duty paid for the majority of house transactions provides an opportunity for rebates, or a fund for grants to encourage owners to put energy efficiency at the top of their priorities in initial alterations and renovation of their homes. A low positive, +1.	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	An incentivisation of production of energy efficient products will maintain current job levels within the industry and may in the longer term increase the number of specialist jobs in the EU. This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation is expected to be proportional to the energy saved, or the investment amount. Consequently a low positive score.	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	There will need to a uniform adoption of incentivisation across the EU member states and may take some time to agree and implement, a low negative, -1.	-1

Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Certain parts of the energy efficiency industry have already seen demand exceeding the level of trained staff, notably those in fitting gas heating systems. It is suggested that there should be tax allowances for companies training installers, grants payable to trainees, and tax incentives for investors in energy efficiency companies similar to the Enterprise Investment Scheme. Unless some these or similar policies are adopted there will be a skills shortage and / or lack of investment in the energy efficiency market., a low positive.	1
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	The industry is already seeing a shortage in the key skills required for energy efficiency (See also Macroeconomic Environment), no effect on finance, there is a potential to impact on the investment cycle, No other effects, overall neutral, 0.	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	There will need to be a universal adoption of incentives across the EU and this will be by negotiation with member states and may take a period of consultation, low negative, -1.	-1
Government budget	Does the actions require substantial financial support at the cost of the government budget?	It is anticipated that significant financial support from government will be required in order to publicise and fund any energy efficiency incentives, medium negative, -2	-2
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1

Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	The measure is not expected to lead to greater in/equality. The public will be better informed of particular issues.	0
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	The incentivisation of energy efficient products will have to be agreed within the EU. Protocols will need to be established to the address the issue of identifying net efficiency impacts of energy efficiency improvements that qualify for allowances. (Reference 4). There is no change in responsibilities for institutions and administrations. Any savings or gains for the end user will have to publicised by the government. There is no detriment in the access to public information. However these measure will take a period of time, possibly 3+ years to implement if agreement is required across the EU, hence medium negative score, -2	-2
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	There are ongoing burdens on businesses where incentives for energy efficiency measures for different materials and products already exists. Changes will impose burdens particularly on SMEs, There will be a need to change literature to highlight to consumers the advantages of purchasing goods that have effectively been subsidised, hence a low negative, -1.	-1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Incentivising the production of energy efficient products, will bring about price reductions for consumers. For example energy efficient white goods could boost the sale of greener fridges by around 90,000 each year which is a significant step towards reducing energy consumption by households. The CO2 and financial savings to be gained are significant if everyone in the UK installed loft insulation up to 270mm thickness. The amount of money saved would pay for the energy bills of over 800,000 families in a year. A medium positive, +2. (Reference 3)	2
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	The measure is not expected to impact on certain sectors or regions or SMEs.	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No effect on demand for transport, hence neutral. Increase in demand for transport vehicles??	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	There will be a requirement to either restructure or setup a new authority in order to administer and monitor the incentivisation production of energy efficient products., a low negative.	-1

Short time for effect	Does the action have a significant immediate or quick impact following implementation?	There will be an immediate and perceivable reduction in cost of energy efficient products which in turn would drive a consumer towards those products. The downside is that in order to achieve to uniform incentives across the EU will take a period of time to implement. Overall a neutral effect.	0
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	There will be a persistence level providing incentives are maintained for energy efficient products. A lo positive, +1.	1
Monitoring & Verification	Can action be monitored and verified?	The action can be monitored and verified. For products that have received incentives at the production stages, will need to be clearly labelled and identified with benefits to the consumer or end user otherwise any advantages are lost, score low positive, +1.	1
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	No other known effects.	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	There is potential for a consumer to make a more informed choice in the purchase of goods. Score low positive +1.	1
	Notes		
	Monitoring		
	Verification		
	References:		
	1	web www.ukace.org/pubs/consult/treas1002.pdf Treasury Consultation on Economic Instruments to Improve Household Energy Efficiency	
	2	Evaluation the Effectiveness of Home Energy Report, Rosie Parnell, Sheffield University, September 2001 (BRE have reached similar conclusions)	
	3	B&Q commissioned report (April 2006) conducted by Centre for Economics & Business Research (CEBR)	
	4	web www.aceee.org/energy/multipulate.htm American Council for an Energy Efficient Economy	

F7 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**FINANCING**	
	Characterization of actions		
	Code/action:	Variable minimum tax-levels to keep consumer energy prices at constant level, even when energy prices decrease world-wide	
	MCA Reference:	F7	
	Category:	Financing	
	Directives:	-	
	Subcategory:	Taxation	
	Objective	Stabilising energy prices at minimum level	
	Action:	Stabilising energy prices at minimum level through varying tax rates. I.e. agree on minimum energy prices, when market prices decrease, increase the energy tax rates.	
	Current status	the volatility of energy prices in many markets may mean that this measure would provide an uncertain level of energy taxation reducing the effectiveness of this measure	
	Approach taken	Agree a minimum tax rate that forms a basic tax income for the government. When energy prices decrease, raise the energy tax level. Use this additional tax revenue for energy efficiency programmes. As a result: 1) consumers will continue with saving energy even when energy prices decrease as the price for them will be the same and 2) the additional tax revenue will be invested in enenrgy efficiency in times that energy efficiency projects are less protitable due to lower energy prices	
	Estimated Energy Savings	Between 1-5% of energy consumption (?)	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption?	The effect of such a measure will be "second order" but positive, as reduced energy demand inherently eases supply security. It will not encourage supply variety in fuels or generating technologies, or reduce the likelihood of supply "glitches"	1

	Does the action increase the diversity of generation technology options?		
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Competitive position on EU firms will be negatively influenced. In times of lower energy prices they cannot profit from this as their prices are kept higher due to raising taxes. Mainly energy intensive industries will be negatively influenced	-3
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Private companies and consumers in general will be motivated to invest earlier in more energy efficienct technologies. They will, however, first of all look at technologies available on the market. In case additional tax revenues used for innovation, then the impact is positive	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Increasing energy prices in general and increasing energy tax in particular is a powerful tool in promoting energy efficiency.	2
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation is expected to be proportional to the energy saved, or the investment amount. However, this action will have large ecomomic impact. There are job losses expected in the energy intensive industries, which is compensated by job gains in the EE sector, service sector etc where more jobs are gained per unit of production. Therefore a slight positive impact.	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Important impact on the pay-back times of energy efficiency investments, decreasing substantially the investment barrier	1
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	The beneficial macroeconomic effects of improved energy efficiency would assist the EU at micro-economic level, and this measure would help overcome market failures of Energy Efficiency being "obviously the right thing to do" but "not top of the corporate priority list. Increasing energy prices will move energyefficiency upward on the priority list	1
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited?	In first instance, the costs of energy inputs will rise. This will motivate companies in reducing energy intensity of production, leading to higher reductions than possible before the introduction of the new energy tax. It influences therefore also investment decisions	1

	Will it directly lead to the closing down of businesses?		
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	High risk of disturbing effects on the internal electricity market. Stabilising energy prices at minimum level will remove the incentive among energy companies to compete.	-3
Government budget	Does the actions require substantial financial support at the cost of the government budget?	No substantial budget needed, only for managing the extra tax revenues	-1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity and heating) This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity and heating) This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Risk of social inequality when job losses occur in energy intensive industries. Former employees from these firms are not those finding new jobs in the EE sector	-1
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	This action has little effect on pubilc governance	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and	No significant impact expected	0

	Medium Enterprises)?		
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	The action will in the first place lead to higher energy costs for households, but will motivate them to save energy. As it is not certain whether the energy costs will increase or decrease, score is kept neutral (0)	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Significant impact expected on energy intensive industrial sectors (job losses), which may be located in certain regions. The positive impact on energy efficiency sector will not be regionally specific as tax increase is a generic measure	-1
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No impact expected, unless action includes transport sector also.	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No siginifact change needed	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Action will be a powerful motivation to implement short-term energy efficiency measures directly to decrease energy costs	2
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	When energy prices remain stable at a high level then companies / consumers will adapt their activities accordingly leading to lower energy consumption levels	3
Monitoring & Verification	Can action be monitored and verified?	Monitoring possible on micro-economic level. But impacts are high on macro-economic level where monitoring cannot be carried out very precise	0
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	None	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Action promotes changes in end-user behaviour as higher energy prices "force" consumers to save energy.	3
	Notes		
	Monitoring		
	Verification		
	References	Oil Crises & Climate Challenges- 30 Years of Energy Use in IEA Countries, IEA, 2004	

F8 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**FINANCING**	
	Characterization of actions		
	Code/action:	Energy performance contracting in public buildings	
	MCA Reference:	F8	
	Category:	Financing	
	Directives:	Energy Service Directive (Art. 5 and 6)	
	Subcategory:	Alternative financing mechanisms	
	Objective	Increase financing of energy efficiency projects in the public sector through energy performance contracting	
	Action:	Encourage energy performance contracting in public buildings. Example: Berliner Energieagentur scheme to upgrade public buildings in a situation where public financing was limited, and obtained via a shared savings scheme run by an ESCO	
	Current status	Examples like in Berlin show that this type of financing (energy performance contracting by ESCOs) is possible for public organsations with little capital to carry out refurbishments. However, the use of private financing for public sector projects remains a problem in a number of EU MS because of budgetary rules.	
	Approach taken	Possibility to use this approach in all Member States (where public funding is limited). The action should include the exchange of best practices but also overcome the (regulatory) barriers to the use of private financing in the public sector. This action will focus on the public sector (in contrast to F5 focusing on the private sector)	
	Estimated Energy Savings	Less than 1% of energy consumption	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The effect of such a measure will be "second order" but positive, as reduced energy demand inherently eases supply security. It will not encourage supply variety in fuels or generating technologies, or reduce the likelihood of supply "glitches"	1
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Higher investments in energy efficiency projects will be beneficial for manufacturers of EE equipment, but not necessarily of EU-based firms only	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Limited, as ESCOs usually invest in conventional technologies with lower pay-back times	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	In countries with little knowledge about ESCO financing the start up costs of such an action may be high before any result is achieved. In countries with experience with ESCOs, some elements listed above may relatively quickly provide results	-1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation is expected to be proportional to the energy saved, or the investment amount. Consequently a low positive score Concretely, this action means extra employment expected through the establishment of new ESCOs	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	The action has major influence on the availability and access to finance. Government agencies / public buildings etc. do not always have the financial means for energy efficiency investments (because of tight budgetary rules), not can they get a loan from banks. ESCO financing solves this (major) barrier	2
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Growth of the ESCO business in the EU, macroeconomic impacts remain limited	0

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	None, option related to the public sector	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No impact expected	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	The actions presented above require some actions from government agencies and require some (limited) government budget to set up a programme for the establishment of contacts between public agencies and ESCOs, drafting contracts etc.	-1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity and heating) This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity and heating) This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Energy efficiency measures at public buildings / institutions can potentially be a good example for citizens, increasing their interest in energy efficiency. But impact on behaviour of citizens is expected to be minimal	0

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Energy efficiency measures specifically supported in public buildings. Government leading by example through projects in their own buildings	1
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Possible accreditation of ESCOs required, presenting some costs for ESCOs	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	No impact expected	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	MS could target certain (weak) regions with the EPC programme, where pubic budget for energy efficiency is even more limited than elsewhere	1
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No impact expected	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Each public agency or building should have a contact point / person to deal with the contract. Limited impact however.	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The adoption of the ESCO concept by public organisations takes time, they have to get familiar with the approach and such a project requires some preparation. When started, an increasing number of EE projects realised by ESCOs to be expected. Good project examples may lead to growing number of ESCOs in the EU	1
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Once started and realised some successful projects, the programme may significantly reduce energy consumption in the public sector. Projects once realised have a long-term effect.	1

		However, not sure whether ESCO business will decrease after attractive and less complicated projects have been realised. Uncertainty about long-term potential of ESCO projects	
Monitoring & Verification	Can action be monitored and verified?	There is a need to monitor in detail the energy savings of every ESCO project. Therefore it is possible to monitor the no. of projects and total energy savings	1
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	None	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Governments leads by example, but the impact on behaviour of end-users may be limited	0
	Notes		
	Monitoring		
	Verification		
	References:	Energy Performance Contracting in Berlin, Germany	
		http://www.managenergy.net/download/2002goldmann.pdf	
		Performance Contracting: Energy Saving Partnership - A Berlin Success Model Berliner Energie-Agentur	
		www.berliner-energieagentur.de/ pdf_files/Publikation_Broschuere_ESP02.pdf	

F9 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**FINANCING**	
	Characterization of actions		
	Code/action:	Energy efficiency targets in combination with grant schemes	
	MCA Reference:	F9	
	Category:	Financing	
	Directives:	-	
	Subcategory:	Energy efficiency obligation / agreement	
	Objective	Energy efficiency target for industry, giving them the freedom to determine where most cost-effective measures can be taken, combined with a special grant scheme (and/or certain tax exemptions)	
	Action:	Energy efficiency agreements in industry to provide an incentive for efficiency improvements	
	Current status	Long-term (voluntary) agreements on energy efficiency improvement between government (energy agency) and industrial branches exist in DK, FIN and NL. E.g. in Finland companies subscribeto the agreement and agree to carry out energy audits and implement cost effective measures. The government subsidises energy audits as well as certain EE investments.	
	Approach taken	Industry agrees on an energy efficiency target with government/energy agency and in return will benefit from certain grant programmes or tax exemptions. Programmes have to specifically target EE investments	
	Estimated Energy Savings	Around 2% of energy consumption	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The effect of such a measure will be "second order" but positive, as reduced energy demand inherently eases supply security. It will not encourage supply variety in fuels or generating technologies, or reduce the likelihood of supply "glitches"	1
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Implementation of energy efficiency measures / projects leads to lower energy costs, increasing international competitiveness of European industry. Higher investments in specific energy efficiency projects	1
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Limited when left to industry alone (will look at projects financially attractive, meaning conventional technologies). However, government has the possibility to directly support innovative EE projects that would not have taken place elseway	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Target sector has relative freedom in determining the way how to implement energy efficiency without to much government involvement. This will most likely lead to more cost-efficient measures	2
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation is expected to be proportional to the energy saved, or the investment amount. Consequently a low positive score	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	EE becomes an issue in industry, leading to transformation to more energy efficient production EU-wide. The action tackles the awareness and information barrier and also partly the financing barrier as grants are available for certain technologies	1
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	The beneficial macroeconomic effects of improved energy efficiency would assist the EU at micro-economic level, and this measure would help overcome the observed market failures, inherent in human nature, of Energy Efficiency being "obviously the right thing to do" but "not top of the corporate priority list	1

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Lower energy costs for businesses	1
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Depending on type of grants offered, e.g. tax incentives are measures with limited market distortion effect. Harmonisation of measures can limit distortion even more. Business has to do substantial efforts for support, grants should therefore not lead to distortions	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Substantial government budget required for certain grant schemes	-2
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity and heating) This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity and heating) This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	None	0

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	None	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Costs for applying for grants, tax deductions. Costs for setting up energy saving plans that lead to certain targets	-1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	None	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Agreements can be introduced to specific sectors, those with highest EE potential	1
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	None	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Public authorities will need to have up to date information about new technologies on the market providing only grants / tax deduction for the more innovative technologies	-1
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Increase of energy efficiency due to additional investments in EE technology. Replacement of technologies in an earlier stage. Companies are free to chose most effective ways of svaing energy	2
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Presistence is dependent on the type of agreement and whether the targets are renewed / sthengthened after the first target is reached. As companies are responsible for energy efficiency themselves, there may be more commitment to continue with such measures in teh future than when government	2

		imposes strict regulation	
Monitoring & Verification	Can action be monitored and verified?	Possibility to monitor each project separately, getting detailed data about result of action	1
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?		0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Change of behaviour of industry is possible	1
	Notes		
	Monitoring		
	Verification		
	References:	Long Term Agreements in the Netherlands, SenterNovem	
		http://www.senternovem.nl/LTA/publications/lta_results/index.asp	
		Energy Conservation Agreements Finland, Progress review 2005	
		http:/www.motiva.fi/	

F10 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**FINANCING**	
	Characterization of actions		
	Code/action:	Lower VAT for energy saving products	
	MCA Reference:	F10	
	Category:	Financing	
	Directives:	-	
	Subcategory:	Tax measures	
	Objective	Make the purchase of EE products more attractive through lower VAT rates	
	Action:	EU/MS to lower VAT (Value Added Tax) for energy saving products	
	Current status	Lower VAT rates for EE products existing in France; The UK government already has a number of policies in place to improve household energy efficiency including VAT reductions. 5% VAT rates for DIY energy saving materials, energy efficient equipment, most microgeneration technologies, and the supply and installation of energy efficient products or materials in non grant schemes when households employ contractors. However the government has said that it would need to negotiate with its European partners to extend the reduced rate of VAT on energy saving materials and equipment.	
	Approach taken	Lower VAT rates could be charged for EE products like CFLs, insulation material, double glazing, micro-CHP installations, heat pumps etc.	
	Estimated Energy Savings		
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	No impact on security of supply; No divergence issues; No risk of supply disruption; Potential for increase in diversity of generation technology, Overall low positive, +1	1
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	A lowering of the price through reduce VAT rates helps correct market failure by reflecting more closely the cost to the environment of less efficient products. No evidence that it provokes cross border investment flows. A low positive, +1	1
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	The UK government has already used grants to stimulate the market for new technologies, e.g. 50% grants for photovoltaic installations. Such policies help speed products to reach a self sustaining price more quickly. (Reference 1). There is no reason why the effect on research into energy efficient products with a reduction in VAT should not follow an analogous route. Potential for new technologies, production methods. No overall effect on resource efficiency. A medium positive, +2.	2
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	No evidence for whether this measure is cost effective	0
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation is expected to be proportional to the energy saved, or the investment amount. Consequently a low positive score	0
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	No effects expected	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No effects expected	0

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	A reduction in VAT will not impact on any areas concerned with operating costs and conduct of business. Neutral effect.	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	There will need to be a universal decrease the rate of VAT across the EU and this will be by negotiation with member states and may take a period of consultation, low negative, -1.	-1
Government budget	Does the actions require substantial financial support at the cost of the government budget?	It is anticipated that minimal financial support from government will be required in order to publicise the change in VAT and the advantages to the consumer., low negative, -1.	-1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	On DIY, those least well off in society are those who would benefit the most from a reduction in the VAT rate on energy savings materials and are most likely to want to buy DIY materials. The Association for the Conservation of Energy believes that it is perverse to allow a wealthy householder paying a contractor to install energy saving products to benefit from a reduced arte of VAT, but not allow a less well household fitting materials themselves to save money of the same opportunity. The opportunity is also a clear market distortion in terms of DIY market versus contractors.	0

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	The decision for lower rates of VAT will have to be agreed within the EU and is limited by the VAT directive. The UK government has stated that it would need to negotiate with its European partners to extend the reduced rate of VAT on energy savings materials and energy efficient equipment. There is no change in responsibilities for institutions and administrations. Any reductions in the VAT rate will be publicised by the government and media, hence the public will be informed, there is no detriment in the access to public information. However these measure will take a period of time, possibly 3+ years to implement if agreement is required across the EU, hence medium negative score, -2	-2
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	There are ongoing burdens on businesses where different rates of VAT exist for different materials and products, with the potential to cause confusion. Changes of VAT will impose burdens particularly SMEs, There will be a need to change point of sales literature, adjusting vat rates at sales points and re-training of staff where computer systems may not be in use, hence a low negative, -1.	-1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Removing VAT on energy efficient white goods could boost the sale of greener fridges by around 90,000 each year which is a significant step towards reducing energy consumption by households. The CO2 and financial savings to be gained are significant if everyone in the UK installed loft insulation up to 270mm thickness. The amount of money saved would pay for the energy bills of over 800,000 families in a year. A medium positive, +2. (Reference 3)	2
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	The introduction of reduced rate of VAT for wood fuelled boilers is an extension of reduced rates for a range of energy saving materials that have a limited impact on small firms. The compliance burden will fall on installers, some of whom will be small firms, if they also install standard rated equipment. However reduced rates have been successfully introduced for installations of other energy saving products in recent years. (Reference 2), hence a small positive, +1.	1
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No effect on demand for transport, hence neutral. Increase in demand for transport vehicles??	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No direct restructuring or establishing of existing public authorities since changes to VAT would be a national decision, Cost neutral.	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	There will be an immediate and perceivable reduction in cost for energy efficient products which in turn would drive a consumer towards those products. A low positive, +1.	1

Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	There will be a persistence level providing reduced VAT rates are maintained, score low positive, +1.	1
Monitoring & Verification	Can action be monitored and verified?	Any reduction in VAT can be monitored and verified . Sanctions imposed for non compliance in the UK will be those laid down in the VAT Act 1994. Score low positive as energy efficient products with a reduce rate of VAT will need to be clearly labelled and identified with benefits to the consumer or end user otherwise any advantages are lost, score low positive, +1.	1
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	VAT reductions for efficient products could apply equally to energy, water and waste, but is limited by the VAT Directive and the need for European agreement, low negative, -1.	-1
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	There is potential for a consumer to make a more informed choice in the purchase of goods. Score low positive +1.	1
	Notes		
	Monitoring		
	Verification		
	References:		
	1	web www.ukace.org/pubs/consult/treas1002.pdf Treasury Consultation on Economic Instruments to Improve Household Energy Efficiency	
	2	Web www..hmrc.gov.uk/ria/vat-wood-fuelled.pdf Full Regulatory Impact Assessment. John Healy MP Financial Secretary to the Treasury	
	3	B&Q commissioned report (April 2006) conducted by Centre for Economics & Business Research (CEBR)	
	4	Economic Instruments to Improve Household Energy Efficiency, Consulation Document on Specific Measures, Summary7 of Response Dec 2003, HM Treasury	

F11 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**FINANCING**	
	Characterization of actions		
	Code/action:	Tax incentives for energy efficiency equipment	
	MCA Reference:	F11	
	Category:	Financing	
	Directives:	-	
		Promote investments in EE measures and technologies through preferable tax rates	
	Subcategory:	Access to financing	
	Objective	Incentivise the purchase of identified energy efficient equipment through preferable tax rates	
	Action:	Provide for a tax incentive for capital equipment purchasers to choose the most energy efficient equipment	
	Current status	Deduction of corporate tax when investing in a certain EE technology exists in the Netherlands, UK and a number of other EU MS. E.g. the Carbon Trust offers scheme in the UK with an Energy Technology List of recognised efficient equipment and works in conjunction with the Inland Revenue to provide 100% capital allowances for equipment shown on this list	
	Approach taken	Works as a double edged incentive for both suppliers (to encourage them to use identified equipment as there is an additional sales benefit) and purchasers (to reduce the impact on their accounts of energy related investments). Could use existing product performance sources or maybe harmonised Product Energy efficiency listing	
		Introduce tax incentives to increase investments in new EE technologies (e.g. high-efficiency CHP)	
	Estimated Energy Savings	Around 1% of energy consumption	

Assessment criteria	Details	Scoring Narrative	MCA Score
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The effect of such a measure will be "second order" but positive, as reduced energy demand inherently eases supply security. It will not encourage supply variety in fuels or generating technologies, or reduce the likelihood of supply "glitches"	1
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Implementation of energy efficiency measures / projects leads to lower energy costs, increasing international competitiveness of European industry. Increased investments in specific energy efficiency projects	1
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Tax incentives can be focused on innovative EE projects / technologies that would not have taken place without the action	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Sector is motivated to invest in technologies that were not accessible without tax reimbursement	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation is expected to be proportional to the energy saved, or the investment amount. Consequently a low positive score	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Impact on high upfront investments, that are now lowered	1
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	The beneficial macroeconomic effects of improved energy efficiency would assist the EU at micro-economic level, and this measure would help overcome the observed market failures, inherent in human nature, of Energy Efficiency being "obviously the right thing to do" but "not top of the corporate priority list	1

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Lower energy costs for businesses	1
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Tax incentives are measures with limited market distortion effect	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Substantial government budget required as the action reduces tax revenues.	-2
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity and heating) This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity and heating) This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	None	0

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	This action has little effect on public governance	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Applying for tax deduction results in certain (marginal) transaction costs	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	None	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Not directly, but specific (energy intensive) industrial sectors could be targetted more than others.	1
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	None	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Public authorities will need to have up to date information about new technologies on the market providing only tax deduction for the more energy efficient or innovative technologies	-1
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The action has no long start-up phase and will almost directly lead to Increase of energy efficiency due to additional investments in EE technology, replacement of technologies for new efficient ones in an earlier stage than without tax deduction	3
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	The action will remain dependent on availability of public budget. Not sure whether it will have a persistent effect. Risk of free rider effect	-1

Monitoring & Verification	Can action be monitored and verified?	Possibility to monitor all applications	1
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?		0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Change in end-user behaviour only for the time that the tax deduction exists	0
	Notes		
	Monitoring		
	Verification		
	References:	Energy Investment Deduction	
		http://www.senternovem.nl/eia/	
		Reducing Greenhouse Gases, the Dutch Approach	
		http://www.senternovem.nl/mmfiles/Greenweek%202005_tcm24-122873.pdf	

F12 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**FINANCING**	
	Characterization of actions		
	Code/action:	Off-balance sheet investments in energy efficiency	
	MCA Reference:	F12	
	Category:	Financing	
	Directives:	-	
	Subcategory:	Alternative financing mechanisms	
	Objective	To reduce high investment cost return barrier for energy efficient technologies	
	Action:	EU/MS to encourage off-balance sheet investments, like leasing in energy efficient technologies, for example by extending low cost earmarked capital to commercial lenders, or credit support to recipient	
	Current status	Private companies usually require a high return on investments when investing own capital. Off-balance sheet investments, e,g, through leasing, could solve this barrier	
	Approach taken	Leasing agreements between industrial companies and service companies, examples existing in several countries	
	Estimated Energy Savings	Low	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The effect of such a measure will be "second order" but positive, as reduced energy demand inherently eases supply security. It will not encourage supply variety in fuels or generating technologies, or reduce the likelihood of supply "glitches"	1
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	This action will improve the market for otherwise marginal energy efficient products. It would thus stimulate a "home market" which would ultimately benefit EU players when exporting, particularly as energy prices are forecast to continue to rise.	2
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Innovation would be a logical outcome of this action, whether in terms of new products or of innovative financing mechanisms. As ever, the challenge will be identifying the cut-off between qualifying and non-qualifying technologies, and observing that energy efficiency is always a second consideration in equipment designed to achieve a different function	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Making cash available at a low interest rate for qualifying technologies is unlikely to be particularly expensive. Using Commercial leasing companies to administer the scheme minimises operating cost	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	This assessment assumes that any energy efficiency measure will have a positive effect in creating employment opportunities either directly or indirectly. The magnitude of the job creation is expected to be proportional to the energy saved, or the investment amount. Consequently a low positive score	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	This action directly addresses known market barriers. Ready access to capital, particularly for SMEs, is a major concern. Investment horizons for Energy Efficiency CapEx often exceed companies' investment guidelines, so lease alternatives may be very attractive. However, using existing commercial leasing companies may constrain market reach, as they will be disposed towards an existing customer set.	1
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	The beneficial macroeconomic effects of improved energy efficiency would assist the EU ata micro-economic level, and this measure would help overcome the observed market failures, inherent in human nature, of Energy Efficiency being "obviously the right thing to do" but "not top of the corporate priority list"	1

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	This measure improves the availability of equipment, as it offers an alternative financing stream. This option value is of benefit to businesses.	2
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Funding of this kind already exists in several member states. Universal accesibility would benefit the internal market	1
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Making capital available for a programme of this kind is necessarily at the expense of alternative investments. It should be noted that this is credit support or lease money - not grants - but inevitably some defaults occur. Increasing cash in circulation will have an inflationary effect from a monetary perspective	-1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. This assessment assumes that any energy efficiency measure will have a positive effect in improving air quality. The magnitude of improvement is expected to be proportional to the energy saved. Score low positive	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	If universally applicable, this measure is inclusive. It has little communication value	1

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	This action has little effect on public governance	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	This action provides business with options, and thus must be welcome. The benefit is received disproportionately by SMEs (that suffer from higher costs of borrowing), which is a particularly attractive side effect	2
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Lease schemes applicable at the Domestic scale tend to be less cost effective due to the specific energy intensity of the hardware involved. Few existing commercial lease companies have experience of working direct with customers (except in the Hire Purchase arena). However, there is again the potential to provide options, which are welcome.	1
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Industry sectors where equipment is readily available but a little bit too expensive tend to benefit disproportionately from lease schemes of this kind. An example of this from the UK would be paint dryers used in automotive repair, where many SME customers have been happy to pay a little more for existing energy efficient models when granted access to capital. Some "big ticket" sectors (eg petrochem) will be less well suited to this approach/ It is important to observe that the strength of these sectors will differ by geography, and that networks, trade associations etc have a role to play in education. Otherwise this action will be independent of geography.	1
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Only if extended to transport products - ie letting taxi firms lease hybrid cars	1
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No change needed	0

Short time for effect	Does the action have a significant immediate or quick impact following implementation?	In practice the adoption of these kinds of schemes takes time. A "soft" lease is merely an alternative to existing purchase schemes, and customers must be comfortable with the cost benefit. Evidence is that the adoption of such schemes grows only gradually. Once the equipment is procured, however, it has an immediate beneficial effect (unlike some slower behavioural measures)	1
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Improved Equipment, once purchased, has a long term effect.	1
Monitoring & Verification	Can action be monitored and verified?	Most existing schemes validate the availability of leases on the basis of purchase orders etc. in the same way as a commercial bank. This is readily achieved. It can never be guaranteed that, once fitted, the equipment will be optimally operated, but this is in the interests of the owner, and sought ought to be reliable.	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	none	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	This action concerns hardware, not behaviour	0
	Notes		
	Monitoring		
	Verification		
	References:	1. Klinckenberg, Investing in Building Energy Efficiency in Europe, EuroAce, 2005	
		2. CSE / Energy Saving Trust, Thinking out of the Box, April 2004	
		3. Financing Energy Efficiency, IBRD ESMAP May 2006	
		4. "Action not Talk", Energy Efficient Europe initiative	
		5. Ecofys, Cost-Effective Climate Protection in the EU Building Stock, EURIMA, 2005	

5. Awareness Actions

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Multi-Criteria Analysis Matrix of Actions

Actions Category: **AWARENESS**

	MCA Performance Matrix	Impact Criteria																								
	Reference			Economic												Environmental		Social							Other		
	Actions	Security of Supply	Competitiveness, trade and investment	Innovation and research	Cost Effectiveness	Employment & labour	Market Barriers	Macroeconomic Environment	Operating costs and conduct of	Competition in the internal	Government budget	Air Quality	The Climate	Social inclusion & protection of	Governance participation, good	Administrative costs on businesses	Consumers &	Specific Regions or	Mobility and the use of	Public Authorities	Short time for effect	Persistence	Monitoring & Verification	Tangible Added value	Change in behaviour of	
A1	EU to increase means of recognition for organisations providing links etc to EU Energy Efficiency information sources.	0	1	0	2	1	2	0	0	0	0	1	1	1	1	1	2	1	0	0	1	2	3	0	1	
A2	EU to encourage development of scheme recognising retailers providing trained sales personnel or information on energy efficiency by allowing public recognition through logo or certification scheme. MS to provide information packs or equivalent to be supplied providing information on labelling scheme, Energy Efficiency Products Listing or equivalent for product category.	0	1	0	1	1	2	0	0	0	-1	1	1	1	1	-1	2	-1	0	0	1	1	2	2	2	
A3	EU to encourage Member States to include energy efficiency training and information in national education curriculum for primary and secondary schools as part of sustainability awareness.	0	0	1	3	1	0	0	0	0	-3	1	1	1	1	0	2	-1	1	2	2	2	1	0	2	
A4	EU/MS to oblige energy suppliers to include information on energy bill (power and heat) interpretation and how relates to energy efficiency and taking advantage of new metering technology.	0	0	2	1	1	-1	0	-2	-1	0	2	2	1	1	0	1	0	0	-1	-2	2	2	2	2	
A5	EU/MS to harmonise all product related energy efficiency information into one Energy Efficiency Product Listing portal	0	0	0	1	1	1	0	0	0	0	1	1	1	1	1	2	0	0	0	1	1	2	2	1	
A6	EU to include operational costs in Energy Efficiency Product Listing or equivalent consumer information	0	0	1	3	1	3	0	0	0	0	1	1	1	1	0	3	0	0	0	1	3	3	0	2	
A7	EU/MS to include Eco Labelling organisations and products on appliance/service performance listing source	0	1	1	1	1	0	0	0	0	0	1	1	1	1	1	2	0	0	0	1	1	3	1	2	
A8	EU to extend existing/create new labelling schemes to make end users aware of consequences of energy use.	0	0	1	1	1	2	0	1	0	0	1	1	1	1	1	1	0	1	0	1	2	2	1	2	
A9	EU/MS to stimulate the use of more energy efficient transport modes by providing information on the differences in energy use (and other effects) for different modes of transport.	0	0	0	1	1	3	0	1	0	-1	1	1	1	1	1	1	0	2	0	0	1	2	2	1	

A1 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**AWARENESS**	
	Characterization of actions		
	Code/action:	Voluntary Agreements with information suppliers regarding publicising sources of information	
	MCA Reference:	A1	
	Category:	Awareness	
	Directives:	-	
	Subcategory:	Voluntary agreements	
	Objective	To increase awareness of EU energy efficiency support	
	Action:	EU to increase means of recognition for organisations providing links etc to EU Energy Efficiency information sources.	
	Current status	Except for GreenLight, Motor Challenge and similar endorsed organisations, there is little incentive for product and service suppliers to promote programmes	
	Approach taken	More recognition for product and service suppliers providing links to EU information sources such as logo inclusion, certification and listing on EU websites etc	
	Estimated Energy Savings	Results from voluntary agreements promoting energy efficient behaviour with business/industry/public sector have produced savings of 2-3% in initial years at a national level. It is logical to assume a similar level of savings could be achieved across the EU although there is a lack of hard evidence to support this.	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption?	Any action that assists in the uptake of energy efficient goods/services will reduce energy demand. This in turn reduces dependence on external suppliers to some degree. No effect on energy sources, supply disruption or generation technologies. Overall score of zero.	0

	Does the action increase the diversity of generation technology options?		
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	A recognition scheme for product and service suppliers is likely to have a positive impact in terms of consumer perception for EU firms (in comparison with non EU firms without equivalent recognition)	1
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	No effect expected	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	The act of puclicising energy efficiency products and services which are known to be very cost effective in themselves is widely regarded as worthwhile financially. A high efficiency future scenario modelled by the ACEEE (for Midwest USA) stated that "a $104 billion investment in energy efficiency technologies between 1995 and 2010 would yield a cumulative energy bill savings of $183 billion over that same period (all values in 1990 dollars). This implies a benefit-cost ratio of 1.75 over the 16-year period of analysis. But this understates the cost-effectiveness of the energy efficiency investments since energy savings will continue for many years after 2010." (Reference 6)	2
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	Study by EST (Reference 4) stresses importance of indirect employment, from re-spending of money saved through energy saving. Although hard to quantify, EST report looking at 7 UK energy efficiency initiatives shows direct employment of 10-58 per £1M invested and modelled significantly more long term indirect employment, over 15 years. Logical to include that all measures promoting awareness and energy efficenct behaviour will have some positive impact on employment market. Low positive effect.	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Lack of information is recognised as one of the main barriers to the implementation of energy efficiency. An ISIS (SEPCo) study states 'Lack of information or imperfect knowledge on the part of consumers, vendors, manufacturers and policy makers may hamper the introduction of efficiency measures in situations where they make technical and economic sense. Consumers are frequently unaware of practices and technologies	2

		available to conserve energy. Developers, architects, and facilities managers often have misconceptions about new or unfamiliar technologies.' (Reference 9). A voluntary agreement to publicise information sources will have a very positive impact on this barrier. No additional barriers affected.	
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No effect expected	0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	No effect expected on availability or cost of inputs (except for minimal staff time on marketing and administrative burden), access to finance or investment cycle. Action will promote the most efficient technologies available over inefficient technologies.	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No effect expected	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Voluntary agreements are characterized by the use of relatively low cost incentive programs for participating parties. There is evidence to suggest that the most effective VA's have adequate government funding. Overall minimal impact on government budget expected.	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. Publicity will increase the awareness of the consequences of energy consumption.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. Publicity will increase the awareness of the consequences of energy consumption.	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Better publicised information sources can be expected to be accessed by more members of the public and therefore make the public better informed. No equality issues.	1

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Voluntary agreements to publicise energy efficiency would largely involve manufacturers and other service suppliers and promotors (Local and National Energy Agencies). No significant impact on public administrations. Better publicised information will logically have a positive impact on public understanding/awareness of energy efficiency.	1
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Increasing the awareness of energy efficient products (via voluntary agreements) would logically reduce the administrative burden in sourcing information, where energy efficiency is already part of procurement policy. This should apply to all businesses. Overall positive effect.	1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Positive - increased quantity, availability and access to information would enable informed consumer choice and lead to a greater uptake of energy efficient goods/services. Informed choice would take account of running costs and the knock-on effect is then the financial benefit in energy savings. Paybacks will range from short to medium to long term depending on the measure involved. There is significant evidence from Energy Star (Reference 3) to demonstrate increased sales and awareness of branded energy efficiency products following the introduction of the brand. These can be taken as evidence of end user behavioural change from information provided although behavioural change for many is also dependent on other actions. A well publicised (singular) information source could have a similar positive impact on consumers.	2
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Stimulating demand for energy efficiency services will maintain or increase employment in manufacturing, installation, managing investment programmes and various other additional areas eg retail and marketing. Most energy efficiency jobs are manual labour in manufacturing and installation (EST - Reference 4). Unemployment tends to be higher in heavily populated areas and cities and so these are likely to see more benefit from job creation. Many installation companies are SME's and so will see a benefit. The ACEEE estimate that most sectors of the economy will gain jobs from energy efficiency promition, particularly the construction, retail trade, and services industries (Reference 5). Overall picture is hard to quantify so scored as low positive	1

		effect.	
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Increasing public awareness of energy efficiency issues ideally will lead to more informed choices regarding transport and mobility. However, no direct evidence so scored as no effect.	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Publicised voluntary agreements will be accessible to existing national and regional public authorities for consideration. Scored as no effect as no significant public authority restructuring will be required	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The Carbon Trust's UK Energy Efficiency Accreditation Scheme promotes end user energy efficient behaviour and provides recognition for achievements through awards, certification, brand logo, publicity 'billboard campaigns' etc. Organisations also receive assistance with UK Climate Change Levy tax exemption. Since taking over the scheme in 2004, more than 200 organisations are accredited. Accreditation lasts for 3 years then must be reassessed (Reference 8). The 'carrot' approach appears to have been very successful at obtaining voluntary participation with measures in place to ensure energy efficiency standards must be maintained to stay accredited. An energy efficiency voluntary agreement set up in Finland in 1997 has been particularly successful in achieving industry savings and participation (Reference 7). Goals for different sectors were set in line with Finnish national energy policy. These examples demonstrate results from voluntary participation of business/industry sectors within 2-5 year	1
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Publicised sources of information on energy efficient products/services can be seen to lead to positive action by end users and increasing uptake, gradually transofrming the market. For example, the growing list of success stories on the US Energy Star website (Reference 2) demonstrates savings made per company and per state as a result of adopting the publicised branded services. Voluntary agreements, publicity campaigns to date have successfully transformed the market for eg white goods irreversibly, however newer consumer goods brought onto the market are not necessarily efficient although low energy consumption (Reference 1).	2
Monitoring & Verification	Can action be monitored and verified?	Yes, commitment obtained via registration forms and personnel appointed as contacts, monitoring possible from numbers who 'sign up', web listings etc.	3

Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	No additional benefits identified	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	The end use of energy can ultimately be explained as the product of energy-using appliances, their numbers, and the way they are utilised. The decisions and actions of individuals and organisations lie at the heart of all energy efficiency measures—whether these involve choosing energy-efficient products, services or buildings, or choosing how to use them. At their most fundamental level, all policies to improve energy efficiency must therefore change our behaviour, but there are many different ways to attain this, and provision of information is only one tool out of many. Assuming a well publicised provision of information, scored as a low positive effect.	1
	Notes		
	Monitoring		
	Verification		
	References		
	1	HOUSE OF LORDS, Science and Technology Committee, 2nd Report of Session 2005-06 Energy Efficiency, Volume II: Evidence. Ref: HL Paper 21-II The Development and Promotion of Energy-Efficient Consumer Goods 15. Under the current EEC programme supplier activity has led to a considerable transformation of the cold and wet appliance markets: now most products sold are A-rated, the most eYcient until a recent change in the classification. With respect to new consumer goods coming onto the market, such as brown goods and settop boxes, there appears to be little attention to their energy consuming performance. The risk of this is that manufacturers, looking to minimise their costs, give little regard to the efficiency of each product. While each product in itself might only use a small amount of energy, the large volume sold could undermine the progress that has been made by the energy efficiency sc	
	2	http://www.energystar.gov/index.cfm?c=sb_success.sb_successstories_state	
	3	http://www.energystar.gov/ia/partners/manuf_res/ENERGYSTAR_Value-General.doc	
	4	http://www.ukace.org/pubs/reportfo/EST2330.pdf	
	5	http://www.aceee.org/pubs/ed922.htm	
	6	http://www.aceee.org/store/proddetail.cfm?CFID=425464&CFTOKEN=13898787&ItemID=120&CategoryID=7	
	7	http://www.worldenergy.org/wec-geis/congress/abstracts/sirkeinenu0904.pdf	
	8	http://www.carbontrust.co.uk/energy/takingact	

		ion/why_join.htm	
	9	http://www.ises.org/sepconew/Pages/EE_Policy_in_Germany/1.html	

A2 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**AWARENESS**	
	Characterization of actions		
	Code/action:	Sales Force Training	
	MCA Reference:	A2	
	Category:	Awareness	
	Directives:	-	
	Subcategory:	Voluntary Agreements suppliers particularly appliance/vehicle retailers	
	Objective	Ensure that informed advice is available to purchasers at the point of sale (either retail outlet or on-line sales) from sales staff. EU to ensure availability of information packs for sales persons and on-line suppliers describing labelling scheme and key aspects of energy efficiency characteristics	
	Action:	EU to encourage development of scheme recognising retailers providing trained sales personnel or information on energy efficiency by allowing public recognition through logo or certification scheme. MS to provide information packs or equivalent to be supplied providing information on labelling scheme, Energy Efficiency Products Listing or equivalent for product category.	
	Current status	Some information available to consumers regarding labels, but little else to direct purchasers to look at information available from EU or other national organisations. In many cases sales force do not understand energy efficiency aspects from purchasers perspective. The voluntary European Greenlight Programme fits with the approach taken.	

	Approach taken	Requires underlying information to be readily available and understandable for non-professional sales staff. Then public recognition credits to claim 'green' credentials for those retailing organisations who participate in the a suitable scheme. Compliments existing labelling schemes. Action applies to all those who are selling energy labelled goods including EU EnergyStar rated goods.	
	Estimated Energy Savings		
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Energy savings arising from developing energy efficiency schemes increase the security of supply by virtue that less primary energy is required, but will not impact directly on generation capacity divergence in terms of fuel type or technology. No effect on the risk of energy supply disruption. No identifiable negative effects. On balance no direct link to security of supply so score of 0.	0
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Having a more motivated knowledgeable work force will positively enhance EU commerce competitiveness. Skillsmart Retail is the licensed SectorSkills Council (SSC) for the retail industry in the UK. The long term aim of the SSC is that by 2009, retail employers of all sizes across the UK will be operating at skill levels and qualification agenda which will contribute directly to improved productivity growth. (Reference 1). This leads to a small positive. No significant effect on cross border investment flows. No identifiable negative effects.	1
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	No effects expected	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	There is little information to suggest any positive or negative effects in economic terms and ultimately will be determined by market forces. Reasonable to expect costs of adding additional energy efficiency training to existing staff training will be minimal compared with potential increase in sales. Low positive on balance.	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	The development of recognised energy efficiency training schemes through employers or external agencies involves those already employed although a barrier has been identified suggesting better qualified staff are	1

		required. Consequently there may be a minor positive benefit on job creation or labour markets and no identifiable negative effect. Overall balance score of 1.	
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Staff delivering information at point of sale maximises impact of available information and informs consumer choice, minimising information gap. Therefore medium positive.	2
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No effects expected	0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Will have a direct affect on the labour availability of a business. The development of a retailer scheme, where trained personnel or energy efficiency is recognised through a certification scheme is not expected to impact in this area. However there will be an additional training burden on businesses and will affect cost of labour. See also 'Administrative Costs on Businesses' where this is take account of. No other significant effects.	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No effects expected	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Provision of supporting information packs would require financing at direct national level or through retail organisations. Additional finance will be required, possibly from government but minimal effect expected. Low negative.	-1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. The development of a national certification scheme will increase the awareness of the consequences of energy consumption amongst retailers and consumers. There will be a slight positive, hence 1.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. The development of a national certification scheme will increase the awareness of the consequences of energy consumption amongst retailers and	1

		consumers. Households are responsible for carbon emissions of 40MtC per annum, with around 25% of this contribution from lights and appliances. (Reference 1). There will be a slight positive, hence 2.	
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Introducing a national sales training scheme is unlikely to lead to greater inequality. Providing advice on energy at the point of sale has an immediate benefit to consumers. The public is better informed and thus can make an informed choice, knowing that they can have an immediate impact on the amount of energy consumed. Score positive +1	1
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	No effect on governance, some increased involvement for administering recognition element eg the certification system. Better informed public, better access to information gives the consumer increased visibility of available energy reduction options. Slight positive	1
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	If there are additional requirements for a business to conform or be part of an certification system then this will have an additional overhead costs and place greater pressure on functions in the sector that are already struggling to cope. It is probable SMEs will find it difficult to release people for training. (Reference 1). Many staff employed in the retail sector are part time based covering peak purchase periods incl weekends. Hence a score of -1 as part time staff have high turnover and ongoing training burden.	-1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Using energy efficiency point of sales material and certification schemes is expected to be a successful strategy in positively changing buying behaviour with resulting reductions in energy bills (Energy Matters programme in UK). However, the instantaneous target audience is restricted to those purchasing or contemplating a purchase. In the medium to long term a certification scheme will deliver benefits. The market has been transformed with average energy consumption of new appliances decreasing for 30 years, noticeably in the UK where replacement appliances used 20% less energy than the item being replaced (Reference 3). Score medium positive +2.	2

Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	It is expected that the a certification scheme will not have an impact on certain sectors, or regions across the EU. A small number of additional jobs may be created in order to support the training and monitoring requirements for any training scheme. It is perceived that this will be an additional burden for SMEs involved in retail of EU label products/services. In the absence of more information the assumption is that the overall effect is neutral, hence Score 0.	-1
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Provision of information for the consumer at the point of sale will lead to more informed choice for the consumer. There is no evidence to suggest that this has an impact on transport, so scored as no effect.	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No significant effects expected.	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The use of a sales force training scheme may not have an significant impact on consumer behaviour for a number of years. There will be lead in time for the design and production of Information Packs and Training Requirements so is unlikely to become fully effective for between 2 to 3 years. However trained staff will have an immediate impact on consumer behaviour. In a survey for the Dept for Transport (Reference 7) car showroom sales staff were generally either positive or neutral in reaction to the concept of vehicle energy labelling. The labels were commonly seen as providing useful additional information in a relatively simple layout. Moreover, the labels were recognised as being more 'official' than some of the current manufacturers' labels that are used. For some dealers, such as Ford, the pilot labels are easier to use than the current ones, which are specific to individual cars. Score low positive +1.	1
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	In the short term positive benefits are expected although there are no studies found to support persistence. Any energy efficienct white goods purchased tend to have extended expected lifetime of 10 years. Also overall there should be a beneficial positive in competitive advantage to retailers providing this information.	1
Monitoring & Verification	Can action be monitored and verified?	Any certification scheme can be monitored and verified by virtue of organisations applying for recognition.	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Encourages and increases engagement of retail organisations and good behaviour in energy conservation. Score medium positive.	2

Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	There is potential for a consumer to make a more informed choice in the purchase of goods. Labelling schemes have proved effective in influencing consumer choice (Reference 5), logical to assume that more informed trained sales force will reinforce this. The impact of sales staff in influencing consumer choice is hard to quantify, and consumers tend to under estimate their influence. Study by ECI/TRI (Reference 6) surveying consumers shows that sales staff were ranked more useful than all other sources of information eg brochures, websites when it came to purchasing cars. Score medium positive +2.	2
	Notes		
	Monitoring		
	Verification		
	References:		
	1	A Review of Skills and Training for Domestic Energy efficiency, DG Associates March 2005	
	2	Energy Efficiency Innovation Review Summary Report	
	3	World Energy Council, Energy Efficiency Policies and Indicators Report October 2001	
	4	Centre for Sustainable Energy - Energy Education Hitting Home 2004 - A summary of the evaluation report into the impact of the energy matters programme	
	5	http://www.energystar.gov/ia/partners/manuf_res/ENERGYSTAR_Value-General.doc	
	6	Choosing Cleaner Cars - Final report on Vehicle Rating Scheme. Boardman, B., Banks, N., Kirby, H., Keay-Bright, S., Hutting, B., Stradling, S. 2000. Transport Research Institute, Napier University and Environmental Change Institute, University of Oxford, UK. http://www.eci.ox.ac.uk/lowercf/transport.html	
	7	Comparative colour-coded labels for passenger cars, survey conducted by MORI (Market & Opinion Research International Ltd) on behalf of the Department for Transport, UK	

A3 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**AWARENESS**	
	Characterization of actions		
	Code/action:	School Children Education	
	MCA Reference:	A3	
	Category:	Awareness	
	Directives:	-	
	Subcategory:	Voluntary Agreements with Examination Boards	
	Objective	Educate future generations on sustainable living particularly energy conservation	
	Action:	EU to encourage Member States to include energy efficiency training and information in national education curriculum for primary and secondary schools as part of sustainability awareness.	
	Current status	No known community obligations to include energy efficiency awareness for primary and secondary schools (although many schools do undertake such training on a voluntary basis or ask external organisations to provide). The importance of education particularly in schools has long been recognised by the EU; however setting of national eductaion curricula is carried out by Member States. The EU strategy has been to demonstrate successful engagement of local agencies paricularly energy agencies etc through supporting demonstration projects; specifically FEEDU under the Save Programme (Kids4energy) until 2004 and now the ManageEnergy element of Intelligent Energy (1). The situation is well described and there is a high availablility of information from resources within the Member States and the United States to promote education in schools. In some cases sustainable energy and efficincy is included in the National School Curriculum e.g. UK (2). ManagEnergy (1) idendentified the largest barrier to activities in s	

	Approach taken	Energy efficiency teaching is now a mandatory action in some Member States. Encouraging energy efficency content in all national education curricular is a priority action for all Member States. Would require teachers to be trained in sustainable living including energy efficiency. Educational content should be suitable for different age groups eg transport issues for older children. Education curricula content, resource allocation and timing are national decisions made at national and/or regional level (3). Consequently a route for the Commission may be voluntary agreements with Member States on reporting progress on energy education implementation annually using established statistical routes. This would monitor the situation and identify areas of concern.	
	Estimated Energy Savings	A 2004 UK report (4) stated that benefits from Energy Matters programme were lower fuel bills (40% of respondents) and that 76% of parents changed their behaviour to save energy and 54% installed energy saving light bulbs.	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Energy savings arising from education increase the security of supply by virtue that less primary energy is required, but will not impact directly on generation capacity divergence in terms of fuel type or technology. No effect on the risk of energy supply disruption. No identifiable negative effects. On balance no direct link to security of supply so score of 0	0
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Having more a motivated knowledgeable work force will positively enhance EU commerce competitiveness, however no direct link to enhanced energy education. No significant affect on cross border investment flows. No identifiable negative effects. On balance a score of 0	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Educating our next generation will provide greater efficiency immediately (reference 4) and is likely to provide a positive stimulus to students in taking up higher education pathways towards sustainable energy use/technology development. No direct evidence for this; however likely effect. No significant negative effects. Score 1	1

Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Quantified references to energy savings being directly attributed to costed educational programmes are rare; the EU (3) quoted savings attributed to education in Brasil of 0.01 US$/kWh compared to training at 0.02 US$/kWh and other programmes of over 13 US$/kWh. Other reports suggested cost effectiveness of 0.034 and 0.038 $/kWh for appliance standards and utility DSM in year 2000 (5) in the US and the 2005 IEA paper (6) cited several studies reporting a cost effectiveness of around 0.03$/kWh for DSM programmes. An analysis of funding and savings for energy efficiency programmes 2000 to 2004 in California found an average cost of 0.0295 $/kWh for DSM programmes. Taking the available evidence as energy efficiency programmes are cheaper than energy supplied and that energy savings from education are cheaper than DSM programmes; then educational programmes score a positive high of +3	3
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	The local delivery of energy education through teachers or external agencies involves those already employed although a barrier has been identified suggesting better qualified staff are required to integrate with the national curriculum requirements. Consequently there may bea minor positive benefit on job creation or labour markets and no identifiable negative effect. Overall balance score of 1.	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	No effects expected	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No effects expected	0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Energy education is not expected to impact in this area	0

Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No effects expected	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	A major obstacle to activities in schools and education has been identified as a lack of funding and resources (1). Therefore improved implementation will require additional resources which will require additional funding. This is a medium negative as EU support under the Socrates Programme and similar, focusses on supporting actions only. In many countries Energy Agencies are funded by other means to deliver educational services although they may lack the specific knowledge to integrate with national curriculum requirements on a longer term basis. Nevertheless a significant barrier; score high negative -3.	-3
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. Education will increase the awareness of the consequences of energy consumption.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. Education will increase the awareness of the consequences of energy consumption.	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Including sustainable energy use and energy efficiency in national curricula for schools throughout the EUpromotes greater equality. Providing energy education provides immediate benefit to students and schools with significant positive benefit reported from parent households reported although this will only be the child rearing generation. Score low positive +1	1
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Education provision is a Member State responsibility delivered locally through national , regional authorities and local schools. Imposition of additional obligations regarding monitoring and reporting of energy education as part of national curricula will be another requirement although this is happening in many cases through the school inspection regime. This will require additional resources and therefore is a low negative in terms of additional responsibilities although there is much support available to offset resourcing requirements from external organisations eg NGO's. A major obstacle to activities in schools and education as lack of funding and	1

		resources (1). Utilising education to inform students and also parents is a benefit provided that parents are not well informed already and therefore this is a medium positive for maximising the opportunity. Better educated students encourages schools to be more energy efficienct. Education will affect the public's access to information in a positive man	
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	No effect on businesses or SMEs	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Using energy educated school children and students as vectors of change in households has been reported as a successful strategy (4) in positively changing behaviour (e.g. heating control, purchasing CFLs etc) with resulting reductions in energy bills (Energy Matters programme in UK). However, the instantaneous target audience is restricted to those with children or students although a sustained programme will deliver the long term benefits. Score medium positive +2.	2
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	No information was found on the extent that energy education has been incorporated into national curricula across member states for children and teacher training. In some Member States energy education is part of the national curriculum (e.g. UK - reference 2), but no data found on other Member States. Consequently any EU action regarding positively influencing Member States will impact more heavily on those yet to implement (although increased reporting would be an equivalent burden for all). In the absence of more information the assumption is that this is a low negative. Score -1	-1
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Educating our next generation ideally will lead to more informed choices regarding transport and mobility. However, no direct evidence so scored as low positive.	1
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Energy education is being provided through existing national and regional public authorities and therefore is utilising existing pathways. Score medium positive as no significant public authority restructuring will be required.	2

Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Using energy educated school children and students as vectors of change in households has been reported as a successful strategy (4) in positively changing behaviour (e.g. heating control, purchasing CFLs etc) with resulting reductions in energy bills (Energy Matters programme in UK). Score medium positive +2.	2
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Short term positive benefits are reported from educational programmes although there was no data found to support persistence. Some evidence to suggest that longer term engagement of energy agencies with schools is harder to achieve than 'one- off' presentations. However logically influencing behaviours at an early stage with future reinforcement is a powerful strategy and therefore is scored as a medium positive +2.	2
Monitoring & Verification	Can action be monitored and verified?	Education information is already collected from Member States under the Eurydice programme (Socrates Action 6 Observation & Innovation). Would require development of indicators and measures. Score low positive as an undeveloped programme is in place for education information, but this is not yet sufficiently developed to address energy education implementation.	1
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	No additional benefits identified	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Using energy educated school children and students as vectors of change in households has been reported as a successful strategy (4) in positively changing behaviour (e.g. heating control, purchasing CFLs etc) with resulting reductions in energy bills (Energy Matters programme in UK). Significant short term positive effect reported with no detriment in environment when households have probably been targeted by DSM programmes already. Score medium positive +2.	2
	Notes		
	Monitoring	SOCRATES programme including EURYDICE initiative	
	Verification	SOCRATES programme including EURYDICE initiative	
	References:		
	1	ManagEnergy - Reflection Document on a EU-wide Co-operation of Local Actors on Sustainable Energy Education 2004	
	2	http://www.teachernet.gov.uk/wholeschool/sd/focuson/energy/curriculum/	
	3	European commission DGTREN Education on Energy - teaching tomorrow's energy consumers 2006 ISBN 92-79-00772-6	

	4	Centre for Sustainable Energy - Energy Education Hitting Home 2004 - A summary of the evaluation report into the impact of the energy matters programme	
	5	Kenneth Gillingham, Richard Newell, and Karen Palmer 2004 Retrospective Examination of Demand-Side Energy Efficiency Policies June 2004, revised Sept. 2004 • Discussion Paper 04-19 rev Paper prepared by Resources for the Future http://www.energycommission.org/files/finalReport/III.2.a%20-%20Retrospective%20of%20Demand.pdf	
	6	Geller H, Attali S; The Experience with Energy Efficiency Policies and Programmes in IEA Countries 2005 IEA Information Paper	

A4 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**AWARENESS**	
	Characterization of actions		
	Code/action:	Metering and billing consumer support	
	MCA Reference:	A4	
	Category:	Awareness	
	Directives:	Energy Services Directive	
	Subcategory:	Directive	
	Objective	To support enhanced metering and billing for grid energy consumers to monitor energy consumption and make informed choices	
	Action:	EU/MS to oblige energy suppliers to include information on energy bill (power and heat) interpretation and how relates to energy efficiency and taking advantage of new metering technology.	
	Current status	Energy suppliers may not supply end users with specific information on energy consumption data interpretation and how to link to energy efficiency or support sources. End users may need guidance on how to interpret complex billing information. Some countries suppliers do give simple tips on energy efficiency savings e.g. for domestic users. Smart metering has different meanings for different people. Energy End Use & Energy Efficiency Directive compels Member States to provide customers with competitively priced meters showing actual energy consumption and time of use, frequent and understandable billing and other information eg environmental impact.	
	Approach taken	Assessment of actions already undertaken in some Member States including the Energy Services Directive.	

	Estimated Energy Savings	A two year Canadian study has suggested Smart Meters and price incentives could reduce overall consumption by 10%. (Reference 4). To quote Reference 6: "There is growing recognition that the provision of better information to consumers can lead to energy savings. A desk study carried out for Ofgem, based on evidence from overseas, concluded that sustained savings of 5–10 per cent could be achieved by presenting clear historical information on bills (Reference 3). More recent research, carried out through focus groups in the UK, revealed a preference for simple graphically presented data on recent consumption (Reference 7). Defra, DTI and Ofgem, under the auspices of the Joint Working Group on Energy and the Environment are currently reviewing the evidence and options for action."	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	No effect on security of supply, No increase in divergence of supply, No risk to disruption of supply, No increase in diversity of generation technology options, hence score 0.	0
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	No effect	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Research and development will be required for "Smart Meters" which provide more meaningful displays, have an ability to be read remotely and or internet meters which would allow consumers to monitor energy wastage. There will be a requirement to provided standardised equipment or protocols for equipment. Hence +2.	2
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Savings of 10 to 12% for the consumer are reported in trials where there is continued information publication (References 3,4 & 7). Low positive, +1.	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	A small number of jobs will be created as a result of having to develop and install new technologies. Smart technologies may be used to remotely monitor and read energy usage, thus eliminating the need for visiting premises. Overall effect low positive.	1

Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Technical problems associated with metering on district heating and cooling systems - could be expensive to retrofit existing systems. Low negative score.	-1
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No effect;	0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	There is no effect on the cost or availability of inputs. However there is a need to follow up consumer information given on a one to one basis. Any consumers showing an interest should have a course of action they can take eg by phoning a helpline (Reference 5). Therefore additional resource required. There is typically an obligation for suppliers to replace meters periodically. There is no supply cost benefit to replace and invest in newer, smarter technolgy. Hence a medium negative impact of -2 because of the investment required and operation of newer technology without a financial return, score -2.	-2
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Does not affect policy because it applies to all member states. In a liberalised market would require compliance monitoring, hence a low negative score of -1.	-1
Government budget	Does the actions require substantial financial support at the cost of the government budget?	All costs would have to be borne by suppliers.	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. Provision of information to consumers will increase the awareness of the consequences of energy consumption. Primary energy savings of 10 to 12% are reported as associated with suppliers providing feedback to the consumer therefore a positive score of +2 for this	2
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. A benefit of consumer awareness of the consequences of energy consumption. Primary energy savings of 10 to 12% are reported as associated with providing feedback to the consumer therefore a positive score of +2 for this action.	2

Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	This effect is unlikely to effect inequality. Educating consumers brings some immediate benefits through being better informed. However usually requires supporting helpline so consumers can access further information if required (Reference EST consultation). One consultee said "It helps but only for those who are really interested. There is less than a 1% hit rate however it's a cheap measure and relatively cost effective." Low positive effect +1	1
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	No effect in stakeholders in issues of governance. Additional administration is imposed upon the provider / suppliers and places the onus for the continued issue of information in formats that are easily understood by consumers. The option ensures that consumers are better informed about their energy usage and associated cost. An increase in information available to the end user. A small positive of +1.	1
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Additional information is required to be published (paper, electronic) and will increase to a small extent the overall administrative complexity. There is no negative effect on consumers inclding SMEs. Overall neutral score.	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	There is a direct impact and influence on consumers purchasing equipment which will consume less power and hence leading to reduced fuel bills. Consumers are unlikely to replace large items until they are worn out, but better visibility of billing information may drive consumers to make energy efficient decisions. Supporting resource needed eg helpline to maximise use if information provided. There will need to be a willingness amongst consumers to use the information, hence a low positive effect.	1
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	There is no effect on certain sectors, a small number of jobs will be created in order to service this option with no specific consequences to SMEs. Overall neutral effect.	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No effect	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	This would require or need to be a regulated function and part of a regulatory administration system and hence a burden.	-1

		Score low negative -1	
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Extended timescales would be required for implementation, hence negative -2.	-2
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Persistent feedback promotes persistent energy conservation behaviour and also has implications for the development of technology. During Norwegian trials the longer the duration, the more persistent the effects were likely to be. Savings were shown to fall off when consumption monitoring was removed from homes. Average savings of over 10% were seen by customers of Oslo Energi based on actual reading bi-monthly bills (increase in frequency of actual billing), rising to 12% when bills were supplemented by feedback to the consumer. (Reference 1). Score medium positive.	2
Monitoring & Verification	Can action be monitored and verified?	Metering information can be readily monitored internally by the supplier and externally an independent body using existing administration. Medium positive effect	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Higher specification metering may have some demand management benefits for the supplier as well as financial incentives for the consumer. Also regularly delivered message to consumers via billing. Medium positive effect.	2
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	The end user will in due course attempt to purchase equipment which is likely to reduce their overall fuel consumption. This mindset will only persist if there is continued information presented to enable the consumer to make informed choices. Medium positive as likely to be ongoing.	2
	Notes		
	Monitoring		
	Verification		
	References:		
	1	The Effectiveness of Feedback on Energy Consumption, A review for DEFRA of the Literature on Metering, Billing and Direct Displays, Environmental Change Institute University of Oxford April 2006	
	2	Towards Effective Energy Information, Improving Consumer Feedback on Energy Consumption, A Report to OFGEM by The Centre for Sustainable Energy July 2003	
	3	Making it Obvious, Designing Feedback into Energy Consumption, Sarah Darby	
	4	Weblink http://news.bbc.co.uk/1/hi/sci/tech/4754109.st	

		m; Bringing Meters Out of the Closet by Mark Kinver 18 May 2006	
	5	Energy Savings Trust consultation	
	6	HOUSE OF LORDS, Science and Technology Committee, 2nd Report of Session 2005-06 Energy Efficiency, Volume II: Evidence. Ref: HL Paper 21-II	
	7	"Consumer preferences for improving energy consumption feedback". Centre for Sustainable Energy 2004)	

A5 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**AWARENESS**	
	Characterization of actions		
	Code/action:	Single Energy Efficiency Product List Portal	
	MCA Reference:	A5	
	Category:	Awareness	
	Directives:	Eco Design, Labelling, Vehicles	
	Subcategory:		
	Objective	Harmonise all EU Programme Energy Efficiency information for products (eg Energy Star, List of Products etc, labelling) into one place	
	Action:	EU/MS to harmonise all product related energy efficiency information into one Energy Efficiency Product Listing portal	
	Current status	Multiple sites are available for consumers to research energy efficiency product information prior to purchase, but consumers may have to identify and visit several sites to find information required (References 1-13 are examples). Single List divided by product type would provide authoritative listing for underpinning other measures eg taxation initiatives. Also clear for product suppliers to how to/why apply for listing on a voluntary basis.	
	Approach taken	Multiple sites for consumer energy efficiency information at the Community as well as National level is confusing for users and product suppliers. A single entity combining all lists and labelling will harmonise underpinning information/data for programmes, Member States and ensure clarity for stakeholders. The portal structure exists already on Europa websites eg for info on all aspects of energy activity and legislation (Reference 1) and the Eco-label site (Reference 2) contains product listings and links to national information eco labelling schemes. This existing approach could be extended to form a harmonized portal.	
	Estimated Energy Savings	No evidence found to support quantified energy savings	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers?	Any action that assists in the access to information and uptake of energy efficient behaviour will reduce energy demand. This in turn reduces dependence on external suppliers to some degree. No effect on energy sources, supply disruption or generation technologies. Overall score of zero.	0

	Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?		
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	No effect expected.	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	No effect expected.	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Harmonizing all information into a single source can be expected to reduce ongoing administration and marketing costs in the promotion of energy efficient products, as well as encouraging consumers to make cost effective choices at an individual level.	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	Study by EST (Reference 15) stresses importance of indirect employment, from re-spending of money saved through energy saving. Although hard to quantify, EST report looking at 7 UK energy efficiency initiatives shows direct employment of 10-58 per £1M invested and modelled significantly more long term indirect employment, over 15 years. Logical to include that all measures promoting awareness and energy efficenct behaviour will have some positive impact on employment market. Low positive effect.	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Lack of awareness and information is a barrier to increasing energy efficient consumer choices. Harmonizing product information would address the difficulty of finding relevant information and so improve the market. No additional barriers identified. Overall positive effect.	1
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No effect expected.	0

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	No effect expected on availability or cost of inputs, access to finance or investment cycle. Action will promote the most efficient technologies available over inefficient technologies in market. Not expected to lead to closing of businesses.	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Does not affect policy because it applies to all member states. No effect expected.	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	An internet portal would require financial support to set up but would not be expected to be a significant long term burden.	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. A single product portal will make access to information easier and therefore promote informed consumer choice and energy savings.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. A single portal will make access to information easier and therefore promote informed consumer choice and energy savings.	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Technical and programmatic information for the residential, commercial, institutional, industrial and transportation sectors is immediately available through the EERE Web site (Reference 4). A similar single EU information source/portal would benefit all, and make the public better informed about available products. No equality issues.	1
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions	No effect on stakeholders in issues of governance. Additional administration is imposed upon the provider / suppliers and places the onus for the continued issue of updated product information and promotion of the portal (eg web links). The option ensures an increase in information available to the end user. A small positive of +1.	1

	and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?		
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Increasing the awareness of energy efficient products (via portal) would logically reduce the administrative burden in sourcing information, where energy efficiency is already part of procurement policy. This should apply to all businesses. Overall positive effect.	1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	EST (Reference 6) estimate household savings of up to £45 annually for each individual appliance replaced eg fridge and up to £240 for boiler replacement. Since 1970 improvements in UK homes has resulted in the doubling of energy efficiency with consumers benefiting by saving £10 billion. A portal providing all information in one place will logically encourage consumer choice towards both these short and long term savings.	2
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	A single information source would be available to all sectors, regions and businesses alike. No negative or positive impact expected.	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No effect expected on demand for transport or modal split. Product information extending to efficiency of cars may influence consumer choice of personal transport. On balance scored as neutral effect.	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No effect expected.	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	A single portal may not have an significant impact on consumer behaviour for a number of years. There will be lead in time for the portal development and for awareness of the portal to become widespread, so it is unlikely to become fully effective for between 1 to 2 years. However portal will have an immediate impact on those motivated consumers who access it once it is available. Score low positive +1.	1

Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Harmonizing all information into a single portal which can be continually updated will help to support persistence, particularly once well established. Portal one of many tools which will support market transformation. Low positive effect.	1
Monitoring & Verification	Can action be monitored and verified?	Action can be monitored and verified by the number of harmonized schemes and individual products listed in new portal.	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Added value is inclusion of product listing and all other related information for EU energy related business eg tax incentives	2
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	The EERE Information Center answers questions on EERE's products, services, and 11 technology programs, refers callers to the most appropriate EERE resources, and refers qualified callers to the appropriate expert networks (Reference 4). A back up advice line of this kind to support users would support ongoing behavioural change in addition to the information available on a portal. A single portal is likely to be accepted as more user friendly and in itself promote access to information required to change behaviour. Project in Brussells to change consumer behaviour in shopping also used a website and helpline combination (Reference 14). Requires willingness on part of end user so low positive effect.	1
	Notes		
	Monitoring		
	Verification		
	References		
	1	http://europa.eu/pol/ener/index_en.htm	
	2	http://ec.europa.eu/environment/ecolabel/index_en.htm	
	3	http://ec.europa.eu/environment/ecolabel/other/int_ecolabel_en.htm	
	4	US Dept of Energy, Energy Efficiency and Renewable Energy: http://www.eere.energy.gov/	
	5	http://www.gsa.gov/Portal/gsa/ep/programView.do?pageTypeId=8207&ooid=9854&programPage=%2Fep%2Fprogram%2FgsaDocument.jsp&programId=8550&channelId=-12974	
	6	http://www.est.org.uk/myhome/	
	7	http://www.carbontrust.co.uk/energy	
	8	http://www.eca.gov.uk/etl/search.asp?pagecode=000100020001 0001	
	9	http://www.lowcvp.org.uk/newsandevents/news.cfm?news_id=160	
	10	http://www.energystar.gov/	
	11	http://www.buyenergyefficient.org/	
	12	http://oikos.com/green_products/index.php	
	13	http://energy-efficient-products.ebuild.com/	
	14	http://www.acrr.org/resourcities/dematerialisation/practices/Products.htm#Menu0	
	15	http://www.ukace.org/pubs/reportfo/EST2330.pdf	

A6 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**AWARENESS**	
	Characterization of actions		
	Code/action:	Increased information on appliance running costs	
	MCA Reference:	A6	
	Category:	Awareness	
	Directives:	Ecodesign Directive 2005/32/EC. The framework directive defines the principles, conditions and criteria for setting environmental requirements for energy-using appliances. It therefore makes no direct provision for mandatory requirements for specific products; this will be done at a later stage for given products via implementing measures which will apply following consultations with interested parties and an impact assessment. (Reference 12)	
	Subcategory:	Voluntary agreement with manufacturers	
	Objective	Increase visibility of operational costs of energy consuming devices to aid consumer choice	
	Action:	EU to include operational costs in Energy Efficiency Product Listing or equivalent consumer information	
	Current status	Insufficient awareness of concentrated operational costs for consumer decisions. There is a wealth of information available on the web provided by energy suppliers, local authorities, environmental agencies etc (small sample shown in References 1-4). Mostly this focusses on the % split of use by type of appliance, or guidance on how to calculate the running costs of different applicances yourself. Many manufacturers (eg References 6&7) publish running and standby power consumption in Watts in technical spec sheets, but this varies by manufacturer and product type. The Australian Energy Label sets a precedent for including both a star rating and annual consumption data. Overall lack of easily available consumer information	

		on other aspects of appliance operation.	
	Approach taken	Would require development of new test criteria for equipment suppliers to rate products Information would then be added to Product Listing or equivalent Could be included on Energy Labelling as well as existing information sources. "In order to improve the labelling scheme greater clarity is needed in the test procedures and lower tolerances should be adopted. In addition, the Commission could require public deposition of test data by manufacturers. Further, there is a need for vigorous enforcement, particularly where a manufacturer's declared energy consumption are shown to be incorrect. Greater co-ordination of enforcement across member states would be beneficial." (Reference 13).	
	Estimated Energy Savings	From the NAEEE there is evidence to demonstrate decreases in energy consumption of 1 - 6% and increases in energy efficiency of 1.4 - 3.6% across the use of 5 main appliances during the period 1993-2001 (Reference 8).	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Any action that assists in the uptake of energy efficient behaviour will reduce energy demand. This in turn reduces dependence on external suppliers to some degree. No effect on energy sources, supply disruption or generation technologies. Overall score of zero.	0

Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Increased consumer /workforce awareness will positively enhance EU competitiveness, however no direct link to increased trade. No significant affect on cross border investment flows. No identifiable negative effects. On balance a score of 0	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Suppliers may be stimulated to research more efficient technology on all aspects of resource consumption. Low positive effect.	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Using only energy savings as a benefit (that is allocating no monetary value to the environmental benefits), the NAEEEP is projected to deliver almost $4.2 billion dollars to the community (after the projected $2.6 billion costs are deducted from the $6.8 billion energy savings NPV at 10 % discount rate by 2018 (Reference 9). This experience of the Australian NAEEEP (National Appliance and Equipment Energy Efficiency Programme) suggests that such schemes to increase awareness of running costs/energy efficiency are cost effective.	3
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	The provision of appliance running costs involves the administration and monitoring of the action but primarily those already employed by manufactuers, the burden imposed will vary depending on the degree of information the manufacturer already provides. Consequently there may be a minor positive benefit on job creation or labour markets and no identifiable negative effect. Overall balance score of 1.	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Lack of information is recognised as one of the main barriers to the implementation of energy efficiency. Increasing visibility of running costs would have a positive impact on this barrier. No additional barriers affected.	3
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No effect expected.	0

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	No effect expected on availability or cost of inputs, access to finance or investment cycle. Action will promote the most efficient technologies available over inefficient technologies. Increased requirement for manufacturer to provide information which should be readily available. Not expected to lead to closing of businesses. Overall neutral effect.	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No effects expected	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	No effects expected	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. Action will increase the awareness of the consequences of energy consumption.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. Action will increase the awareness of the consequences of energy consumption.	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Better information provided by manufacturers about appliances if made easily available would clearly make the public better informed about running costs. No equality issues.	1
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Voluntary agreements to provide running cost information would largely involve manufacturers and EU level organisation. More visible information will logically have a positive impact on public understanding/awareness of running costs and energy efficiency. Overall low positive effect.	1

Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	No consumer costs expected. Neutral score.	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Increased quantity, quality and availability of running cost information would enable better informed consumer choice. There is abundant evidence from existing labelling schemes to demonstrate increased sales of energy efficiency products following the introduction of performance indicators. It is logical to assume that providing running cost information would create a more positive impact.	3
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	An EU action to improve information provided by manufacturers would be available to all, no impact expected in particular regions. There may be some job creation in the appliance manufacturing industry/energy advisors but this is difficuly to quantify. No specific consequences for SME's. Overall neutral effect.	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No effect expected.	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No effect expected.	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Availability of information at the point of sale will not have an marked impact on consumer behaviour for a number of years. There will be lead in time for the development of the information format and then subsequent growth effect as consumers renew appliances. There will be some immediate impact once the information is accessible, but unlikely to be significant for a number of years. Score low positive +1.	1
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Product information (eg through labelling) is designed to effect market transformation through consumer choice. The most significant energy-using household appliances are now sold with a mandatory A-G rating, and the Energy Saving Trust's "Energy Efficiency Recommended" label identifies the top performing models within each appliance market. When coupled with financial incentives on the best, and regulation to remove the worst, these schemes have proved very successful at shifting consumer purchases towards the top end of the scale. From the NAEEE (Reference 8) there is evidence to demonstrate decreases in energy consumption of 1 - 6% and increases in energy efficiency of 1.4 - 3.6% across the use	3

		of 5 main appliances during the period 1993-2001. Average ratings of appliances on the market also improved after the introduction of better consumer running cost information while sale numbers remained steady. Purchase decisions of energy efficient appliances tend to be effective for extended period of produc	
Monitoring & Verification	Can action be monitored and verified?	Market trends and energy efficient behaviour resulting from the action can be monitored and verified (evidence of the impact of Australia's energy labelling scheme (which incorporates consumption information) has been monitored since 1993 Reference 8). The number of appliances, manufacturers which receive a label or provide information can also be monitored.	3
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	No additional benefits identified	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	The more efficient use of energy is influenced by the choices people make about appliance purchases and the way the equipment is used. A survey from 1994 by the University of Oxford's Environmental Change Institute states that "After energy labels were introduced, the DECADE survey found that only 37% reported seeing the label. Of these, two-thirds would have liked more information, either on the label, through the sales staff, or on a poster in the shop. The biggest demand was for information on running cost implications. People whose work or educational background is focused on scientific and technical types of activity were more receptive to the energy label. When consumers notice the label and can obtain information, one third are influenced 'a great deal' or 'quite a lot' in the purchase they subsequently make. There are correlations between background factors (socio-economic group and age), contextual influences (local community attachment and early learning), levels of knowledge on environmental	2
	Notes		
	Monitoring		
	Verification		
	References:		
	1	http://www.aceee.org/consumerguide/mostenef.htm	
	2	http://www.horizonpower.com.au/environmen	

		t/smart_ways/in_your_home/running_costs.html	
	3	http://www.newcastle.gov.uk/core.nsf/a/energyrunningcosts	
	4	http://www.countryenergy.com.au/internet/cewebpub.nsf/Content/h_eff_buying+appliances	
	5	http://www.energyrating.gov.au/	
	6	http://www.sony-europe.com/	
	7	http://h41111.www4.hp.com/globalcitizenship/uk/en/environment/productdesign/energyefficiency.html	
	8	"Greening Whitegoods" a third report into the energy efficiency trends of major household appliances in Australia from 1993 to 2001	
	9	NATIONAL APPLIANCE AND EQUIPMENT ENERGY EFFICIENCY PROGRAM: WHEN YOU CAN MEASURE IT, YOU KNOW SOMETHING ABOUT IT PROJECTED IMPACTS 2000-2020	
	10	http://www.eci.ox.ac.uk/lowercf/decade.html	
	11	http://www.energystar.gov/index.cfm?c=news.nr_news	
	12	http://europa.eu/scadplus/leg/en/lvb/l32037.htm	
	13	Cool Labels - The first three years of the European Energy Label, 'Winward, J, Schiellerup, P and Boardman, B (1998) Cool Labels, Energy and Environment Programme, Environmental Change Unit, Oxford University, UK. (For executive summary see http://www.eci.ox.ac.uk/lowercf/coolabels.html)	

A7 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**AWARENESS**	
	Characterization of actions		
	Code/action:	Harmonise Energy Labelling & Product Performance sources with Eco Labelling Scheme	
	MCA Reference:	A7	
	Category:	Awareness	
	Directives:	Eco Labelling	
	Subcategory:	internal	
	Objective	Provide more visibility of organisations meeting the Eco labelling scheme criteria with products passing the tests for energy efficient appliances	
	Action:	EU/MS to include Eco Labelling organisations and products on appliance/service performance listing source	
	Current status	The energy labelling performance information (e.g. Energy Star) websites do not include reference to Eco labelling achievers which is held on a different website. Organisations undertaking the voluntary Eco labelling scheme would benefit from more widespread recognition of their commitment	
	Approach taken	This needs to be considered in the context of rationalising all energy related performance information into one place eg the Energy Efficiency Product List Portal (Action A11)	
	Estimated Energy Savings	No evidence found to support quantified energy savings	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Any action that assists in the access to information and uptake of energy efficient behaviour will reduce energy demand. This in turn reduces dependence on external suppliers to some degree. No effect on energy sources, supply disruption or generation technologies. Overall score of zero.	0
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	More recognition for product and service suppliers is likely to have a positive impact in terms of consumer perception for EU firms (in comparison with non EU firms without equivalent recognition)	1
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Suppliers may be stimulated to research more efficient technology in response to greater recognition. Low positive effect.	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	In the context of harmonizing all information into a single source can be expected to reduce ongoing administration and marketing costs in the promotion of energy efficient products, as well as encouraging consumers to make cost effective choices at an individual level.	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	Study by EST (Reference 3) stresses importance of indirect employment, from re-spending of money saved through energy saving. Although hard to quantify, EST report looking at 7 UK energy efficiency initiatives shows direct employment of 10-58 per £1M invested and modelled significantly more long term indirect employment, over 15 years. Logical to include that all measures promoting awareness and energy efficenct behaviour will have some positive impact on employment market. Low positive effect.	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	In the context of a harmonized portal lack of information barrier is addressed. Already recognised under A11 so neutral score.	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No effect expected.	0

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	No effect expected on availability or cost of inputs, access to finance or investment cycle. Action will promote the most efficient technologies available over inefficient technologies in market. Not expected to lead to closing of businesses.	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Does not affect policy because it applies to all member states. No effect expected.	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Some initial cost required to set-up harmonized arrangements (including portal) but building on existing processes for existing schemes so not expected to be a significant long term burden.	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. A single product/preformance portal will make access to information easier and therefore promote informed consumer choice and energy savings.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. A single product/performance portal will make access to information easier and therefore promote informed consumer choice and energy savings.	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Action provides higher recognition/promotion for suppliers of energy efficient services and consumers purchasing those services. Expected to stimulate market towards greater efficiency but no equality issues. Higher recognition of products and good behaviour should increase public awareness, particularly in context of harmonized portal. Low positive effect.	1

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	No effect on stakeholders in issues of governance. No significant impact on public administrations. Recognition for 'good products' and 'good behaviour' (and in the context of a portal better access to information) will logically have a positive impact on public understanding/awareness of energy efficiency. Low positive effect.	1
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Increasing the awareness of energy efficient products (via recognition and/or portal) would logically reduce the administrative burden in sourcing information, where energy efficiency is already part of procurement policy. This should apply to all businesses. Overall positive effect.	1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Positive - increased recognition would enable informed consumer choice by highlighting 'good' suppliers as well as encouraging 'good behaviour'. Informed choice promotes energy efficiency increases and the knock-on effect is the financial benefit in energy savings. Paybacks will range from short to medium to long term depending on the measure involved. There is significant evidence from Energy Star (Reference 2) to demonstrate increased sales and awareness of branded energy efficiency products following the introduction of the brand. These can be taken as evidence of end user behavioural change from information provided although behavioural change for many is also dependent on other actions. Harmonizing the eco-label (Reference 1) and Energy Star brand recognition with product listings and via a well publicised information source (eg portal) is expected similar positive impact on consumer choice.	2
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Information would be visible to all sectors, regions and businesses alike. No negative or positive impact expected.	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No effect expected.	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No effect expected.	0

Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Harmonizing existing schemes/sources may not have an significant impact on consumer behaviour for a number of years. There will be lead in time for the development of the harmonized setup (and portal development in context of A11) and for awareness of the new to become widespread, so it is unlikely to become fully effective for between 1 to 2 years. However portal will have an immediate impact on those motivated consumers who access it once it is available. Score low positive +1.	1
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Harmonizing schemes/sources of information will help to avoid public confusion and support persistence, particularly once well established. Context of portal would be additional tool to support market transformation. Low positive effect.	1
Monitoring & Verification	Can action be monitored and verified?	Action can be monitored and verified by the number of schemes and individual products/suppliers listed/cross referenced under harmonized set up (eg new portal)	3
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Encourages awareness of other resource conservation eg water.	1
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Evidence from Energy Star (Reference 2) demonstrates increased sales and awareness of branded energy efficiency products following the introduction of the brand. This can be taken as evidence of end user behavioural change from brand recognition although behavioural change for many is also dependent on other actions. Harmonizing the eco-label (Reference 1) and Energy Star brand recognition with product listings and via a well publicised information source (eg portal) is expected to re-inforce and positive effect on user behaviour.	2
	Notes		
	Monitoring		
	Verification		
	References:		
	1	http://ec.europa.eu/environment/ecolabel/index_en.htm	
	2	http://www.energystar.gov/ia/partners/manuf_res/ENERGYSTAR_Value-General.doc	
	3	http://www.ukace.org/pubs/reportfo/EST2330.pdf	

A8 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**AWARENESS**	
	Characterization of actions		
	Code/action:	Energy Consumption 'Health' Warning label	
	MCA Reference:	A8	
	Category:	Awareness	
	Directives:	-	
	Subcategory:	Energy labelling	
	Objective	Mandatory labelling of 'energy unit' consumption consequences at point of sale	
	Action:	EU to extend existing/create new labelling schemes to make end users aware of consequences of energy use.	
	Current status	Energy consumers may not be aware of the consequences of their energy consuming action, some public awareness campaigns (eg Reference 1) to promote car sharing and public transport in general but little comparative information on fuel use. Fuel economy labels for cars have been introduced in some countries eg UK (Reference 3) and Australia (Reference 2) but there is no information at the point of sale for fuel. There are many different 'quality labels' for green electricity, which seek to guarantee that a green tariff meets certain environmental standards but no similar info for 'standard electricity'.	

	Approach taken	Label energy purchases (e.g. electricity, gas, petrol) with consequences of action - exact wording of warning to be agreed regarding reference to climate change etc. Label could give actual data for organisation's energy product/or service or use default data; e.g. electricity suppliers would be able to reflect fuel mix selection, coach travel could reflect bio-diesel use. Energy suppliers with higher efficiency would be identified. Label would be displayed on energy supply bills, fuel pumps, transport provider publicity etc. Consider Energy points scheme. ECI report (Reference 9) suggests "For many countries, like the UK, fuel switching is a contentious subject, but could be tackled through developing a carbon market. This could include carbon budgets for the utilities, to be reduced annually, and information provided to the householder, through an annual carbon bill. A carbon market unites supply and demand-side issues - efficiency, fuel switching and renewables – and clarifies when fuel switching provid	
	Estimated Energy Savings	The Impact of Real-Time Feedback on Residential Electricity Consumption (Reference 8) suggests that "if the real time monitor is used in conjunction with other conservation and/or price measures, an overall average reduction of between 7 and 10% is feasible" (6.5% savings were achieved in electricity use and 8.2% for non electric heating households). Adding further information about the environmental impact to energy bills will logically encourage further savings. A study in the UK/Netherlands/Portugal (Reference 9) CADENCE - Carbon Dioxide from Domestic Equipment: End Use Efficiency and Consumer Education states: The savings result from technologies that are cost-effective for the consumer and come from increased energy efficiency, fuel switching from gas to electricity and from LPG to natural gas in Portugal. Most savings (80%) come from more electrical efficiency, particularly cold appliances, lighting and consumer electronics. Only 5% of the savings come from more efficient gas and the remaining 15%	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Any action that assists in the uptake of energy efficient behaviour will reduce energy demand. This in turn reduces dependence on external suppliers to some degree. No effect on energy sources, supply disruption or generation technologies. Overall score of zero.	0

Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Increased consumer /workforce awareness will positively enhance EU competitiveness, however no direct link to increased trade. No significant affect on cross border investment flows. No identifiable negative effects. On balance a score of 0	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Suppliers may be stimulated to research more efficient technology on all aspects of resource consumption. Low positive effect.	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Logical to assume influencing consumers to reduce energy in domestic and transport use would be cost effective given savings potential, however no direct evidence regarding cost of fuel labelling schemes. Scored as low positive effect.	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	Study by EST (Reference 10) stresses importance of indirect employment, from re-spending of money saved through energy saving. Although hard to quantify, EST report looking at 7 UK energy efficiency initiatives shows direct employment of 10-58 per £1M invested and modelled significantly more long term indirect employment, over 15 years. Logical to conclude that all measures promoting awareness and energy efficenct behaviour will have some positive impact on employment market. Low positive effect.	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Lack of awareness and information is a barrier to energy efficient behaviour by consumers. Providing point of sale information addresses the difficulty of finding relevant information. No additional barriers identified. Overall medium positive effect.	2
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No effect expected.	0

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	By promoting energy conservation in all aspects of transport use there will be some degree of financial savings which can have a positive impact on business. No effect expected on certain products or closing of businesses. Scored as low positive effect.	1
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No effects expected	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	The action would require some budget to introduce labelling, not expected to be significant.	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. A single product/preformance portal will make access to information easier and therefore promote informed consumer choice and energy savings.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. A single product/performance portal will make access to information easier and therefore promote informed consumer choice and energy savings.	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Action provides better information regarding fuel use to all consumers, no equality issues. Point of sale/billing information will increase public awareness. Low positive effect.	1
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	No effect on stakeholders in issues of governance. No significant impact on public administrations. Information provided at point of sale and on energy bills will logically have a positive impact on public understanding/awareness of energy efficiency. Low positive effect.	1

Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	No additional administration expected. May ease burden of environmental reporting for businesses - currently guidelines and online tools (References 6&7) available for converting transport fuel usage or distances travelled, by road, rail, air or sea, into carbon dioxide equivalents but onus on end users to calculate individual impact. Low positive effect	1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	In the US the Public Utility Commission of Texas (PUC) provides electric customers with information to make an "apples to apples" comparison of offers from competitive Retail Electric Providers (REP). 'Electricity Facts Labels' provide information on price, contract, source of generation and emissions (including a scale to show comparison with average emissions for all REPs in the state) (Reference 4). Information presented in this way is likely to impact on consumer choice. Consumer choice is cuurently price driven so no significant financial consequences expected. Scored as low positive effect due to lack of evidence.	1
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Health warning labells would be visible to all and therefore should benefit all sectors in terms of enabling improved environmental behaviour. Sectors heavily dependent on transport may benefit most. No evidence found regarding impact on job creation or SME's. On balance a neutral score.	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Making consumers more aware of fuel running costs may encourage the use of public transport over car journeys and encourage businesses to select the most environmentally friendly form of freight transport. These decisions will vary depending on the options available locally but should promote greater transport conservation overall. Low positive effect.	1
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No effect expected.	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Availability of information at the point of sale will not have an marked impact on consumer behaviour for a number of years. There will be lead in time for the development of the information format and then time for the awareness and understanding of labelling to become widespread. There will be some immediate impact once the information is accessible, but unlikely to be significant for a number of years. Score low positive +1.	1
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	There is evidence to support the argument that product information (eg through labelling) effects market transformation through consumer choice, eg. The success of white good labelling. There are now green electricity tariffs available in Germany (over 200), Netherlands, Finland, Sweden, Norway, Ireland, Switzerland and the US which demonstrate that providing	2

		information on renewable sources in recent years has had a positive impact on the market (Reference 5). Logical to expect that better information on the environmental impact of non renewable energy would also achieve a long term affect via consumer choice and behaviour. Medium positive effect.	
Monitoring & Verification	Can action be monitored and verified?	Action can be monitored and verified by the number of electricity suppliers, fuel suppliers engaged.	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Highlights impact at individual level and encourages personal action.	1
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	'The concept of buying green electricity is taking off all around the world. Consumers are increasingly concerned about the environmental impacts of their use of electricity, and are choosing to buy their power from environmentally sound sources. This is especially true as more and more countries 'liberalise' their electricity markets, enabling customers to choose their electricity company. Green tariffs are very popular in many European countries, with over a million people signed up across Europe. Green tariffs first appeared in the USA in 1993, and they are currently available in around 30 States. Hundreds of thousands of consumers in the USA have switched to green electricity, and as more States are liberalised, so more green tariffs are launched' (Reference 5). The environmental impact of renewable energy sources is well understood and can be seen to change behaviour by the uptake in green tariffs. Making the environmental consequences of non renewable fuels more transparent via labelling at point of	2
	Notes		
	Monitoring		
	Verification		
	References:		
	1	http://www.chooseanotherway.com/travel_awareness/	
	2	http://www.greenhouse.gov.au/fuellabel/label.html	
	3	http://www.vcacarfueldata.org.uk/information/emissions-testing.asp	
	4	http://ptc.puc.state.tx.us/publications/efl_brochure.pdf	
	5	http://www.greenelectricity.org/international.html	
	6	http://www.defra.gov.uk/Environment/business/envrp/gas/index.htm	
	7	http://chooseclimate.org/flying/	
	8	http://www.energyfuture.org.uk/index.php?optio	

		n=com_content&task=view&id=129	
	9	http://www.eci.ox.ac.uk/lowercf/cadence.html	
	10	http://www.ukace.org/pubs/reportfo/EST2330.pdf	

A9 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**AWARENESS**	
	Characterization of actions		
	Code/action:	Traveller Information	
	MCA Reference:	A9	
	Category:	Awareness	
	Directives:	Possibility of extending Emissions Trading Scheme to include aviation, also June 2006 mid term review of the 2001 "European Transport Policy for 2010:Time to decide" White Paper	
	Subcategory:		
	Objective	Change modal split to less energy consuming mode by providing traveller information	
	Action:	EU/MS to stimulate the use of more energy efficient transport modes by providing information on the differences in energy use (and other effects) for different modes of transport.	
	Current status	Governments make high costs for public transport, but in all countries passenger car transport is the main transport mode and air traffic is fast growing. Consumers do not know about the differences in energy use. US websites (References 2 & 9) rate environmental performance of cars and allow for comparisons by class and manufacturer.	
	Approach taken	Give realistic information (taking account of actual occupancy rates) about the costs and the energy effects at point of purchase. Public transport has other benefits as well. Information could be delivered in several ways such as through Local Energy Advice Centres, within MOT procedures, as part of specific campaigns such as fuel efficiency labelling of cars or as part of green travel campaigns	

	Estimated Energy Savings	A case study from the Canadian Office of Energy Efficiency demonstrates achieveable gains of at least a 10 percent in efficiency by completing a transition to lighter, more efficient equipment. This particular example was for a fleet of trucks in the forestry industry but serves to demonstrate the order of savings possible from better information (Reference 8). The project "Energy saving in transport of goods - a pilot project in rural natural resource based industries" (Reference 10) demonstrated transferral from road to rail and ferry for case routes. One case showed rail based transport (shipping dried cod to Italy from Norway) reached a reduction in energy use at 60% compared with lorry based transport. Evidence to show savings vary significantly by end user.	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Any action that assists in the uptake of energy efficient behaviour will reduce energy demand. This in turn reduces dependence on external suppliers to some degree. No effect on energy sources, supply disruption or generation technologies. Overall score of zero.	0
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Increased consumer /workforce awareness will positively enhance EU competitiveness, however no direct link to increased trade. All forms of transport important in facilitating economic and cultural exchange but no significant affect on cross border investment flows expected from provision of traveller information. No identifiable negative effects. On balance a score of 0	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	No effect expected.	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Logical to assume influencing consumers to reduce energy in transport use would be cost effective given savings potential (and hidden costs in environmental impact), however no direct evidence regarding cost of traveller information schemes. Scored as low positive effect.	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	Study by EST (Reference 11) stresses importance of indirect employment, from re-spending of money saved through energy saving. Although hard to quantify, EST report looking at 7 UK energy efficiency initiatives shows direct employment of 10-58	1

		per £1M invested and modelled significantly more long term indirect employment, over 15 years. Logical to include that all measures promoting awareness and energy efficenct behaviour will have some positive impact on employment market. Low positive effect.	
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	'There is a limited understanding of how cars need to be improved to make them more environmentally-friendly, and few people think that unleaded petrol, diesel or catalytic converters make a car environmentally-friendly. Instead, they are more likely connect this to alternative fuels, low emissions and low fuel consumption. There is poor understanding of the link between carbon emissions and fuel consumption, and Vehicle Excise Duty (VED) does not have a significant impact on car buying. Understanding that VED is based on carbon emissions is patchy, and - given limited environmental concern - for most people, the differences between bands are not large enough to be taken into account when other costs are considered' (Reference 4). The lack of awareness among car owners of the energy impact of their own vehicles can be extrapolated to the general lack of awareness of the impact of all transport options. Providing comparative information for travellers would address this significant barrier.	3
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No effect expected.	0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	By promoting energy conservation in all aspects of transport use there will be some degree of financial savings which can have a positive impact on business. No effect expected on certain products or closing of businesses. Scored as low positive effect.	1
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No effects expected	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	The action would require member state budget to police information provided. Therefore low negative score.	-1

Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Primary energy savings from any source will improve air quality in terms of reduced emissions of particulates, carbon dioxide, sulphur dioxide, nitrogen oxides, and similar to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. Increasing travel information will make access to information easier and therefore promote informed consumer choice and energy savings.	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Primary energy savings from any source will reduce greenhouse gas (principally carbon dioxide) to an extent depending on the regional or national fuel mix (for electricity) and emission source e.g. cars. GHG emissions from international civil aviation as reported by EU Member States to the United Nations Framework Conventions on Climate Change (UNFCCC) increased by 73% from 1990 to 2003, or about 4.3% pr year on average, thus increasing its share of from an equivalent of 1.2 to 2.3 % of total EU GHG emissions. This represents a minimum estimate of the climate change impact as it does not include the significant non-CO2 effects from aviation. In 1999, the Intergovernmental Panel on Climate Change (IPCC) estimated the total climate change effect of aviation to be 2-4 times greater than the effect of its CO2 emissions alone, even without considering any potential effects from cirrus cloud enhancement (Reference 5). Point of sale access to traveller information (for all sectors) would promote informed consume	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Action provides better information regarding transport choice to all consumers, no equality issues. Point of sale information will increase public awareness. Low positive effect.	1
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	More visible information for travellers will logically have a positive impact on public understanding/awareness of the consequences of their decisions. Overall low positive effect.	1

Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	No additional administration expected. May ease burden of environmental reporting for businesses - currently guidelines and online tools (References 12&13) available for converting transport fuel usage or distances travelled, by road, rail, air or sea, into carbon dioxide equivalents but onus on end users to calculate individual impact. Low positive effect	1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Traveller information is designed to influence choice of transport modes which are already available to them. May be financial savings made by individuals/households by reevaluating their transport options, but will depend on factors like individual car dependence. Scored as low positive effect.	1
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Information would be visible to all sectors, regions and businesses alike. No negative or positive impact expected.	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Overall demand for transport likely to remain unchanged. Information on energy costs and other environmental benefits at the point of sale/use can be expected to promote informed consumer choice away from the existing 'single car driver' mentality. Likely to affect modal split eg increase demand for public transport/car sharing from individuals and influence businesses to use the most environmentally friendly freight option available to them. Positive effect.	2
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No effect expected.	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Studies (Reference 14) show that the car is dominant as a mode of transport and therefore it will take a number of years to change this trend towards more energy conscious choices. Score neutral for immediate effect.	0
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	No evidence found to support persistent effect from traveller information, but logical to assume some persistent effect from informed end-users who are already 'environmentally concerned'. Score as low positive effect	1
Monitoring & Verification	Can action be monitored and verified?	Yes, modal energy intensities and splits are monitored (eg in the US (Reference 1), UK (Reference 6) and throughout Europe (Reference 7)) and data can be used to monitor trends.	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Encourages and increases engagement of end users and good behaviour in other aspects of energy conservation - eg recyclability of	2

		vehicles. Score medium positive.	
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	(Reference 4) 'Fuel consumption efficiency is much more important to car buyers than any consideration about emissions, principally due to the financial impact that commuting and recreational driving has on households. Environmental factors could become more persuasive in the decision-making process of buying cars - if this incurs no additional cost, particularly if there are cost savings'. An ECI survey (Reference 3) revealed 'high levels of concern about 'quality of life' issues linked to travel. These factors such as time, stress and the ability to find and keep employment - seemingly offer the best levers for future attempts to modify travel behaviour'. Therefore comparative information stressing consumption and cost information is expected to influence consumer choice when considering transport choices but is one of many factors.	1
	Notes		
	Monitoring		
	Verification		
	References:		
	1	US Dept of Energy's Transportation Energy Data Book http://cta.ornl.gov/data/download25.shtml	
	2	http://www.fueleconomy.gov/	
	3	http://www.eci.ox.ac.uk/pdfdownload/travelep.pdf	
	4	Comparative colour-coded labels for passenger cars, survey conducted by MORI (Market & Opinion Research International Ltd) on behalf of the Department for Transport, UK	
	5	Annex to the: Communication from the Commission "Reducing the Climate Change Impact of Aviation" Impact Assessment {COM(2005) 459 final} http://ec.europa.eu/environment/climat/pdf/ia_aviation.pdf	
	6	DfT Transport Statistics for Great Britain Chapter 1: Passenger Transport - Data Tables	
	7	http://www.est.org.uk/uploads/documents/fleet/Facts_and_figures_european_passenger_travel_by_mode.pdf	
	8	Canadian Office of Energy Efficiency http://oee.nrcan.gc.ca/transportation/business/documents/case-studies/forestry.cfm?attr=16	
	9	Green Vehicle Guide http://www.epa.gov/autoemissions/	
	10	http://www.vestforsk.no/dok/samandrag/r4-	

		01.asp	
	11	http://www.ukace.org/pubs/reportfo/EST2330.pdf	
	12	http://www.defra.gov.uk/Environment/business/envrp/gas/index.htm	
	13	http://chooseclimate.org/flying/	
	14	http://www.scotland.gov.uk/Publications/2005/08/0193550/35570	

6. Legislation Actions

L1 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**LEGISLATION**	
	Characterization of actions		
	Code/action:	Harmonise energy audit schemes at EU level (excluding EPBD)	
	MCA Reference:	L1	
	Category:	Legislation	
	Directives:	2006/32/EC	
	Subcategory:		
	Objective	Increased energy savings due to high quality energy audits through adopting EU wide standard	
	Action:	Harmonise energy audit scheme certification through adoption of EU wide standard	
	Current status	There have been numerous good examples of audit schemes (Klinckenberg, 2006). However, the quality of audits varies considerably between EU-countries and is often not very effective (Remas, 2006). Despite efforts to disseminate best practice these defferences remain, at the cost of not realising the full saving potenial. On the other hand the situation differs per country, thus limiting a common EU-approach. However, minimum requirement specifications are useful to strengthen the role of audits in all countries, to create a level playing field for any organisation requiring advice on energy savings and when using audit results to give financial support. Due to the accomplished standardisation of audits for buildings in the EPBD this does not regard buildings and dwellings.	
	Approach taken	Develop accreditation scheme, recognising achievement in various countries, which assures a minimum quality level for audits that can be used to underpin other schemes providing energy efficiency	

		incentives.	
	Estimated Energy Savings	Energy consumption in companies and tertiary, excluding buildings, is about 400 Mtoe. Assume saving potential of 20% until 2020 and 1% extra savings due to better audits > 4 Mtoe.	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generatio	Extra savings due to harmonised audits decrease all energy use in industry (mainly consisting of gas and oil) and electricity use in tertiary (partly generated on basis of gas or oil), thus contributing to increasing security of supply.	**1**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Better audits regard mainly smaller industrial users because energy-intensive industry performs their own investigations into energy (cost) savings. For these industry, and also tetiary, energy costs are not an important factor and therefore competiveness is hardly influenced by executing audits or not. Moreover, these energy users mostly do not compete in the world market	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Audits generally focus on state-of-the-art saving options, due to the restrictions on audit costs and the vast potential of conventioal saving options. Therefore audits will not stimulate advanced saving options.	**0**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Audits concentrate by nature on cost-effective saving options, but bad audits can results in costly saving measures. Guaranteed quality audits assure cost-effectiveness. Therefore audits score positive on cost-effectivenness.	**1**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	See general text on employment effect. Harmonised audit certification can increase the costs of audits and thus decrease the demand for audits and adjacent employment. Moreover, it raises pressure on scarce high skilled workers. However, better audits can lead to extra implementation of saving measures, thus creating extra (lower skilled) employment. Despite some decrease in employment in energy supply the overall employment effect is positieve.	**1**

Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	An important barrier for energy users is trustworthy knowledge on cost-effective saving options. A harmonised audit quality can increase trust in the advice and thus stimualte implementation of saving options.	**1**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No traceble effect on GDP, compared to baseline with same support and less savings.	**0**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the mark	Audits by certified auditors can facilitate the possibilities for (external) financing of the saving options, as banks have a guarantee that savings are real and cost-effective.	**1**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Harmonisation of the certification of auditors provides a level playing field for auditors throughout Europe as all have to fulfill the same minimum requirements. However, due to the limited room in the directive on Services for providing services abroad, auditors are normally working in thier own country only.	**0**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	EU-wide harmonisation means that some lagging countries have to create a body that certifies the auditors and checks the quality of their audits regularly. Moreover, high quality audits will demand more money and, as audits are subsidized normally, more government budget too.	**-1**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Extra energy savings lead in principle to less SO2 and NOx-emissions, but actual effect depends on overall policy, e.g. a fixed cap on total emissions whereextra reductions are compensated for by les reductions elswhere. Thus only a small effect on air quality is expected.	**0**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	The extra enery savings, mainly on gas or oil use in industry, lead to less CO2-emissions.	**-1**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Not relevant as it regards industrial savings.	**0**

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance? Does the implementation of the proposed measures affect public institutions and administrations, for example in responsibility?	The harmonised approach asks for most countries extra government efforts and responsibility.	**-1**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	The harmonisation of certification leads to extra administrtive demands on auditors. It does not affect the burden on energy users as they decide themselves to have the audit done and better audits do lead to more administration.	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / househ	Not relevant	**0**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	No effect on specific regions or sectors. However, industry in countries with considerable support and free riders can lose some money..	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	not relevant	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Present authorities can handle the requirements on auditors.	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The better saving results due to harmonised audits can take effect quite quickly. However, an increased use of audits due to better quality will take time. Overall an average speed of implementation.	**0**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	After harmonisation of requirements on auditors the quality of audits will increase and stay on a higher level, provided that the quality is checked regularly.	**1**
Monitoring & Verification	Can action be monitored and verified?	Monitoring of the quality of executed audits is already done in some countries, e.g. by study of the reports, interviews with the clients, etc. However, good monitoring must be integrated in the set up of the audit scheme and can be costly.	**-1**

Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Not known	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Not relevant	**0**
		Harmonise energy audit schemes at EU level (excluding EPBD)	
	Notes		
	Monitoring		
	Verification		
	References:	Klinckenberg, june 2006, Building Blueprint:	
		- audits on energy and water consumption and options in Finalnd	
		- EPA in the Netherlands, especially for housing corporations	
		Remas, may 2006: study on environmentl management systems failed to find compelling evidence that EMS improve performance among businesses.	
		SAVE-project AUDIT-II, Topic report Energy audit models, 2004?: scope, thoroughess or aim, walk-through, preliminary, selective, targeted, system specific, comprehensive, multi-phase, re-auditing. Finland: set of different auditing models.	
		SAVE-project AUDITI, Energy audit management procedures, Part 1, 2001?: key players Administrator, Operating agent, Auditor and Audit client. Audit programme without subsidy not likely to be a success. Commitment of top level is essential for full benefit of audits. Coupling with implmentation can reduce number of audits but will increase fraction of implemented measures. Without quality control of audits no remarkable results can be expected. Barriers: program administrator and client have different driving forces, low prices, low cost fraction, no investment room, no time, no responsibility. In Finland audits decreased with booming business.	
		Boye Olesen, OVE, DK, 2002?, Energy audits-European examples: common EU framework for audits proposed in EPBD due to building certification, inspection of installations and requirement son auditors	

L2 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**LEGISLATION**	
	Characterization of actions		
	Code/action:	Obligation on ICT appliance suppliers and software suppliers to provide the optimum power saving settings as default set-up.	
	MCA Reference:	L2	
	Category:	Legislation	
	Directives:	Energy Star	
	Subcategory:	Voluntary Agreement	
	Objective	To ensure that optimum energy management settings are default on ICT appliances (as most end users do not change power management settings through lack of understanding)	
	Action:	Obligation to for product suppliers to set optimum power management settings as default on pre-configured products and software default settings.	
	Current status	No obligation for suppliers of ICT equipment to take into account energy efficiency when pre-installing software and selecting appliance operation defaults. Likewise standard installations of software. Where users require more intensive product use requiring different power management, they are more likely to be able to reconfigure products accordingly. i.e. presumption is that products are configured for energy efficiency as default for most users	
	Approach taken	Voluntary agreement with product suppliers	
	Estimated Energy Savings	Since the energy use of ICT equipment is just small in absolute terms, the energy savings are relatively small.	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation	No impact, because of small energy saving	**0**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	No impact, because the action doesn't discriminate between EU or non-EU firms	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	No, the action is based on existing techniques	**0**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	There are no costs involved in this action.	**3**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	No impact	**0**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	No impact	**0**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No impact	**0**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the mark	No impact	**0**

Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No impact	**0**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	No impact	**0**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	This action helps to improve air quality inside of buildings. Computer equipment can have a small impact on air quality	**0**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Very little impact	**0**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No impact	**0**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in r	No impact	**0**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	No impact	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households	This action changes the way ICT products become available and in this way automatically save energy and costs within households	**1**

Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	This action does only have an impact on ICT producers	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No impact	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No impact	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	This action has an immediate effect on energy use of new computer equipment. Since these appliances have a very short economic life span, this action will effect almost all ICT appliances within years	**2**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	The effect remains as long as the obligation is still in force	**2**
Monitoring & Verification	Can action be monitored and verified?	The energy use of appliances can be monitored relatively easy	**1**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?		**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.		**0**
		Obligation on ICT appliance suppliers and software suppliers to provide the optimum power saving settings as default set-up.	
	Notes		
	Monitoring		
	Verification		
	References:	DG-JRC. Memo/05/218, 22 June 2005: Stand-by analyses, stakeholder forum, VA manufacturers	
		ECEEE proceedings 2005, Harris, LBNL: Agreement between Danish DEST and national buyers organisation SKI and IR-suppliers in 2004 on PC's including efficient operation in "sleep" and active modes.c.	
		ICLEI,2004 > Local governments for sustainability > LEAP-project EU > combining purchase power of municipalities in different countries for energy-efficient flat-panels	

L3 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**LEGISLATION**	
	Characterization of actions		
	Code/action:	Integrated support for high-efficiency cogeneration	
	MCA Reference:	L3	
	Category:	Legislation	
	Directives:	2004/8/EC	
	Subcategory:	adapted EU-legislation	
	Objective	Increasing the effectiveness of the CHP-directive by additional support	
	Action:	Adapt existing EU and national legislation as to strengthen the economic attractiveness of high-quality cogeneration	
	Current status	CHP-directive sets efficiency requirements and removes market and legislative barriers, but sets neither a target nor provides EU-wide support. There is an informal target of 18% by 2010 (COGEN, 2005) against a present fraction in electricity production of 10% (Eurostat, 2002). Electricity and gasprices, that define attractiveness, are determined by the liberalized markets. The (temporarily?) low electricity prices has led to economic optimization of CHP-plants instead of energetic optimization, thus limiting savings. Various national support measures for cogeneration are hampered by the Guidelines on environmental support (ECN, 2005). CHP is sometimes treated favorably in NAP but not on basis of improved efficiency (ECN, 2006)	
	Approach taken	The societal advantages of CHP, such as increasing reliablity of supply, avoided network extensions and avoided external costs (DLR/FhG-ISI, 2006) compared to conventional electricity production, are translated into a consistent set of changes in relevant EU-directives (CHP-directive, ETS-allocation rules, Electricity-directive and EPBD-directive). Insofar MS do not "reward" CHP already appropriately this should force MS to actually expand the fraction of CHP-electricity.	
	Estimated Energy Savings	Extra 5%-point CHP-electricity production in EU-25 in 2020, marginal efficiency 70% (Eurostat-2002-average) against 55% for gas-CC > 20% savings, total fossile fuel transformation losess 400 Mtoe (PRIMES-baseline) > 4 Mtoe	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	CHP saves energy but uses mostly vulnerable gas. Overall contribution depends on replaced conventional alternative: coal, gas, RES or nuclear	**1**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Cost-effective CHP will decrease energy costs and price sensitivity compared to competing firms.	**1**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Applied CHP i s state-of-the art, therefore no innovation effect.	**0**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	The focus of the action is to improve the cost-effectiveness for CHP-producers. However, this will also depend on the fuel/electricity price rate in future energy supply.	**2**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	See general text on employment effects. It is assumed that CHP replaces a steam boiler and puchase of grid-electricity. The employment effect is the difference between the manufacturing and installation of CHP against that of a boiler and a (partly replaced) power station. It is expected that this creates hardly any extra labor compared to alternatives.	**0**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for	Action will remove major barrier, namely financial risk	**3**

	selected sectors?		
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No traceble effect on GDP, compared to baseline with non-CHP production	**0**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Action will ease financial problems of firms but CHP is not part of the core-business.	**1**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No, if teh action is introduced in accordance with EU-rules against distorsion of markets (see directives)	**0**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Depending on prices for gas and electricity, investment costs, etc. small to high support is needed	**-2**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to	Small CHP with gas engine has relatively more NOx-emissions, but large CHP has emissions that are comparable to gas power plants, tking into account avoided emissions of boilers. However the effect is dependent on the conventioanl alternative (coal, RES, STAG or nuclear)	**1**

	deterioration in the environment (polluted soil or rivers etc)?		
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	CHP fuel savings > less emissions, but dependent on replaced alternative: coal, RES, STAG or nuclear	**1**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Only relevant in case of town heating, can be positive or negative, with proper policy no negative effect	**0**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Probably more government responsibility to maintain favorable climate for CHP	**-1**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium	Extra administartion to prove high quality CHP and get support from government	**-1**

	Enterprises)?		
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	only relevant in case of town heating, can be positive or negative, with proper policy no significnt effect	**0**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Sometimes some effects on sectors with high CHP-potential, but negative effect on electricity sector. Overall no significant effect.	**0**
Mobility (with use of energy)	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	not relevant	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Present authorities can handle support policy	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Policy effect can be quick, at least earlier than 10 years (see Dutch trends in nineties)	**2**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	CHP-savings can disappear very fast of circumstances become unfavourable (reversible saving option)	**-2**
Monitoring & Verification	Can action be monitored and verified?	CHP-extension very easy to monitor, but not sure wether it is due to he support or due to market prices.	**2**

Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Not known	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Only relevant for twon heating. Assuming proper implementation and pricing of delivered heat no effect to be awaited	**0**
		Integrated support for high-efficiency cogeneration	
	Notes		
	Monitoring		
	Verification		
	References	COGEN Europe: various position papers on CHP, ESD, EPBD, ETS	
		COGEN, Minett, Milano-energia, 5 oct-2005, NAP and Cogeneration: reduces dependence by 1500 PJ and saves 280 mln ton CO2, informal target of 18% in 2010 from now 11%.	
		DLR, Stuttgart, and FhG-ISI, Karlsruhe, april 2006: Externe kosten de stromerzeugung …….: for modern coal plants external costs are 5 ct/kWh mainly from CO2-costs of 70 Euro/ton	
		COGEN, Minett, 12 november 2001, position Statement "Elements needed in a directive on chp": 80% of Akzo's improvement of energy efficiency in last 15 years from CHP. Needed: targets, certificate trading, obligation for support (as for RES), accounting for avoided network costs and environmental costs	
		ECN, 2005?, Quick-scan besparingsbeleid OECD, appendix intervieuws: Milieu Steun kader beperkt MEP-tarief voor WKK zodat geen nieuw vermogen wordt geplaatst	
		Ecofys, august 2004, Analysis of fctors influencing GHG-emissions in the EU: without increase in CHP for 1990-2001 total GHG-emissions would be 0,4% higher according to IEA, 2003. Questions on effect of CHP-directive without targets	
		ECN, 2006: CHP is sometimes treated favorably in NAP of ETS, but not on basis of efficiency	

L4 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**LEGISLATION**	
	Characterization of actions		
	Code/action:	Include Energy Efficiency in Installer Certification & Supplier certification	
	MCA Reference:	L4	
	Category:	Legislation	
	Directives:	Energy Service Directive	
	Subcategory:	Directive	
	Objective	Ensure that energy service suppliers eg equipment installers understand/promote energy efficiency	
	Action:	Include mandatory Energy Efficiency training in Installer Certification & Supplier certification	
	Current status	Some professional certification for installers and suppliers includes mandatory training on energy efficiency within the installers competences. Eg CORGI registration for central heating installers requires compulsory City & Guilds 6084 level 3 Energy Efficiency training in the UK.	
	Approach taken	Voluntary agreement with certifying authorities in member state. E.g. service purchasers can only procure services from certified persons	
	Estimated Energy Savings	Unknown	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	This action will not have enough effect on energy consumption to increase the security of energy supply.	**0**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	This action doesn't change the competitive position of EU firms	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	No impact on R &D	**0**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	A mandatory training gives small additional costs for companies when they instruct new employees. There are no direct benefits for companies from this action.	**-1**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	See general text on employment effects. For this action, new trainers are needed to instruct installers.	**1**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	This action could help to give energy suppliers an incentive to promote energy saving. Energy advice could become a saleable service next to energy supply.	**1**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	This action has no effect on economic growth.	**0**

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	This action doesn't have an impact on operating costs.	**0**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No impact on EU competition policy.	**0**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	This action doesn't require financial support, unless the government decides to give subsidies for trainings	**0**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Better knowledge of energy use en energy saving techniques by installers might have a small impact on air quality.	**1**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Better knowledge of energy use en energy saving techniques by installers might have a small impact CO2 reduction.	**1**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No impact on social inclusion	**0**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	No impact	**0**

Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	A certification scheme is needed to implement this action, this will require some administration and administrative costs.	**-1**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Information from installers on energy use could help consumers in making better choices when they invest in installations.	**1**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	This action aims at equipment installers and energy service companies. On the one hand these companies are obliged to give training to their employees, on the other hand it gives them the possibility to broaden their services towards their customers. So this action will have both positive and negative impact on the sector.	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No impact on mobility	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Public authorities should enforce this action to make sure companies are trained on energy use.	**-1**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	When service companies or installers give information to consumers on energy use, energy savings and a proper use of installations, this could have an immediate impact. However, the reach of this information will be limited , because of the infrequent contacts between consumers and equipment installers.	**1**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	If training of installers lead to better installed and less energy consuming installations, it could have a persistent effect. Providing of information towards customers will have only a short term effect.	**1**
Monitoring & Verification	Can action be monitored and verified?	It's very hard to monitor the effect of training. It's practically impossible to monitor whether a training of installers will lead to energy savings by end users. You could do a study by comparing the results of trained installers with a control group.	**-2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Training could lead to better installed installations.	**1**

Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	This action aims at a change of end user behaviour, whether or not this will have a significant impact is hard to say.	**1**
		Include Energy Efficiency in Installer Certification & Supplier certification	
	Notes		
	Monitoring		
	Verification		
	References:		

L5 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**LEGISLATION**	
	Characterization of actions		
	Code/action:	Extending EPBD to smaller buildings	
	MCA Reference:	L5	
	Category:	Legislation	
	Directives:	2002/91/EC	
	Subcategory:	adapted EU-legislation	
	Objective	Increase the energy savings effect of EPBD-directive	
	Action:	Extend EPBD to include smaller buildings (<1000 m2), inspection requirements to smaller installations and higher minimum standards for public buildings	
	Current status	EPBD obliges Member States to set energy efficiency standards for new buildings and renovated buildings with a floor space > 1000 m^2, and demands labels (certificates) for all buildings.	
	Approach taken	The minimum floor space in the present EPBD-directive is adapted in such a way that 90% of all existing floor space in buildings has to meet the EPBD-demands. In this way some building types, which are difficult to integrate into the EPBD-scheme, can be left aside, thus limiting the policy burden, while realizing almost the maximum saving effect.	
	Estimated Energy Savings	The existing EPBD is expected to reduce 3465 Pj (83 Mtoe) in 2010 which is 22% energy reduction. This could be doubled if smaller buildings are included. This action could lead to an extra saving of 83 Mtoe.	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Since Natural gas (40%), Electricity (33%) and oil (22%) are the main sources for energy in household, energy-savings in de residential sector have a positive impact on security of supply. There's a big technical potential (ca. 83 Mtoe) in the residential sector, that's not included within the EPBD. Extending the EPBD to small residential buildings could substantially decrease energy demand on the long term.	**3**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	This action points at the European construction and refurbishment sector in which there is hardly any competition of non-eu rivals.	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	The action will lead to an increasing demand for cheaper, simpler and better energy-saving products/ systems specially developed for small residential buildings. This can be seen as a side-effect. Research and development will be limited to improving existing techniques.	**1**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Investments on energy saving measures on the one hand and benefits for avoided energy expenditure on the other, determine to a large extent the cost effectiveness of this action. If the investor and the beneficiary are the same (f.i. homeowners), energy saving in the residential sector are cost effective or even beneficiary if administration costs are not included. If this is not the case, profits will not return toward the initial investor.	**1**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	See general text on employment effects. The impact on job creation is very difficult to predict, because of the complexity and diversity of consequences form the action. Estimates differ from 10.000 to 100.000 jobs created within the construction, renovation and consultancy sector.*	**2**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	The fact that necessary investments have to be made with landlords municipalities or social housing cooperatives, while the benefits are taken by end-users. Especially within central and eastern Europe ther5e is a lack of funds to make the necessary investments. This action in itself doesn't handle with this major economic barrier.	**0**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Investments in energy saving will lead to more economic activity, especially within the construction sector. Added investments are estimated at 15-25 billion euros a year, which is 1-3% of annual construction expenditure in Europe. These investments will be financed partly at the expense of other economic activities and partly with savings on fuel import costs. ON the longer run these investments will result in annual cost-	**1**

		reduction. Overall their will be a limited positive effect on GDP, mainly because expenditures will shift from energy consumption towards energy saving investment on new products and refurbishment.	
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	The action will enlarge construction expenditure with 1-3% which is a significant incentive for this sector. Extra economic activity can lead to scarcity of resources such as materials or labour.	**0**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Since the EPBD is an European directive the internal EU market will not be influenced	**0**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Although subsidies can have an reinforcing interaction, it's not part of this action to give financial support. Measures should be financed by the market itself. But it's not realistic that all cost for the necessary audits are completely paid by the market itself. Subsidies will be needed for this.	**-1**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	This action could lead to an increase in the use of building materials. Some of these can be harmful for the environment.	**-1**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Ecofys calculated that extending the EPBD to all buildings in Europe could save 316 Mt of CO2 emission (technical potential)	**3**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Energy cost have a greater influence on the budget of low-income people in comparison with high-income people. Energy savings thus can have a positive effect on inequality. But only, if low income people aren't forced to make large investment costs.	**1**

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Although many tasks that come from this action must be carried out by market parties, the government needs to control en enforce the framework of the EPBD.	**1**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Calculating energy-use, labelling and founded improvements form the essence of the EPBD. A lot of administration is needed to implement the EPBD. Within the existing EPBD directive, administration was limited to large buildings. If EPBD is extended to small buildings, administration will be much more complicated and sizable.	**-2**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Eventually this action must lead to better quality housing and a decrease in energy costs. Especially households should benefit from this.	**2**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	The action will lead to bigger (administration) costs for homeowners, landlords and housing cooperatives. Consultants and refurbishers will benefit,	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?		**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Public authorities must be trained to be able to check refurbishing plan on their energy performance.	**-1**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	This action leads to effects on the long term	**-1**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Improvement of buildings will have a long lasting effect on energy saving in the future.	**3**
Monitoring & Verification	Can action be monitored and verified?	Calculation method are already developed for the EPBD. Although calculations can differ from actual savings, it offers good insight in the actions results.	**2**

Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	The labelling of houses gives potential buyers/ tenants information about the quality, expected living costs and comfort of dwellings.	**1**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	End-users become more familiar with energy-use and saving possibilities	**1**
		Extending EPBD to smaller buildings	
	Notes		
	Monitoring		
	Verification		
	References:	Eurima, Pres Release 8 June 2006: Buildings waste 270 mld Euro (gross savings excl. investments) across Europe or 3.3 mln bbl/day out of 6. Other effects: 83 Mton CO2 in 2010 and 14 in 2015 and <460 in 2030, 530.000 extra jobs until 2030. About 90% of the potential for energy, CO2 and cost savings are in buildings below 1000 m2.	
		INOFIN, EU-IEE-project, incl. ECN: Financing refurbishment of social housing	
		Ecofys, march 2004, Mitigation of CO2 beyond EPBD: potential 80 (current) to 400 Mton (full scale) for EU-15 when applying new-standards on existing buildings. Given time delays reduction is in 2010 34 (current) to 70 Mton (full scale). Current EPBD covers only 28% of existing stock, not single-family dwellings (45%). National standards after EPBD estimated from expert's opinion. Contribution of new buildings compared to baseline very small because standards are already used in baseline. BAU > retrofit with 20% saving measures. BAU+EPBD-effect without certificate > retrofit with 100% saving measures plus 20% for other buildings. BAU+EPBD+Certificate-effect > 100% for EPBD-part and 40% for other buildings.	

L6 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)		
	Multi-Criteria Analysis Matrix of Actions - Supporting Information	
	Category:	**LEGISLATION**
	Characterization of actions	
	Code/action:	Financial support for saving measures only conditional on efficiency targets in production sectors
	MCA Reference:	L6
	Category:	Legislation
	Directives:	Environmental Support Directive / Guidelines on environmental state aid
	Subcategory:	Adapted regulation
	Objective	Increase effectiveness of policy support for energy efficiency while avoiding distortion of the internal market at the same time.
	Action:	Lift restrictions on support for energy efficiency in the Guidelines on state aid, provided that efficiency targets are agreed on
	Current status	A number of countries (e.g. NL, DK) have subsidies or financial incentives for energy efficiency measures that can be seen as conflicting with the EU-guidelines for support to industry. Sometimes this support is combined with efficiency targets, often as part of Voluntary Agreements on efficiency.
	Approach taken	Government support for energy efficiency measures in industrial sectors is coupled to an obligation to realise a minimum energy efficiency improvement over a period, partly with advanced saving options. In that case the support is not restricted by EU-regulation on government support for industry.
	Estimated Energy Savings	Energy use in industry, agriculture and commercial in the EU-25 in 2020 is 500 Mtoe.With 1%/year savings about 75 Mtoe is saved until 2020. Assume that 20% of total energy savings in EU-industry is realised with help of financial support and that conditional support delivers one-third extra energy savings and no withdrawel of support schemes > effect is 5 Mtoe.

Assessment criteria	Details	Scoring Narrative	MCA Score
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Extra savings decrease all energy use in industry, but mainly oil and gas that are most most vulnerable.	**2**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Present support schemes have to deal with free riders that lower the effectiveness of government support. Conditional support will mainly restrict free riders and still lead to cost-effective savings. Thus competiveness with non-EU companies is not influenced..	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	The extra saving options applied will not necessary constitute of advanced options. But a limited application of advanced options can be made part of the conditions to receive (substantial) support. Thus the action contributes also to innovation.	**1**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Despite the stricter support schemes the saving measures taken will be almost as cost-effective as earlier. Thus a small positive score.	**1**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	See general text on employment effect. Extra saving measures mostly regard more efficient versions of energy systems (not add-on measures). Therefore they create only some extra labor demand, which at overall level is hardly noticeble.	**0**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	The financial support already removes some market barriers; the action does not change that, thus no effect.	**0**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No traceble effect on GDP, compared to baseline with same support and less savings.	**0**

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Action will remove free rider effects but will have no effect on other energy users behaviour.	**0**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Due to the conditions for support the differences between support and saving efforts per country will deminish and therfore market distorting support is avoided. Thus the action actually imporves market functioning.	**2**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Conditions for receiving support can lead to less applications and a lower budget. However, it has been assumed that less suuport for free riders is compensated by more support to other users for extra savings.	**0**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Extra energy savings lead in principle to less SO2 and NOx-emissions, but actual effect depends on overall policy, e.g. a fixed cap on total emissions whereextra reductions are compensated for by les reductions elswhere. Thus only a small effect on air quality is expected.	**1**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Substantial extra enery savings, mainly on gas or oil use in industry, lead to less CO2-emissions.	**2**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Not relevant as it regards industrial savings.	**0**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	The more stringent support asks for more government efforts and responsibility.	**-2**

Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Extra administartion to formulate targets and prove the results.	**-1**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Not relevant	**0**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	No effect on specific regions or sectors. However, industry in countries with considerable support and free riders can lose some money..	**-1**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	not relevant	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Present authorities can handle stricter support policy	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Policy effect can be quick, depending on legislation changes	**2**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Realised extra savings will persist. However, application for support could decrrease.	**0**
Monitoring & Verification	Can action be monitored and verified?	Monitoirng more complcated than with current support?	**-1**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Not known	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Not relevant	**0**
		Financial support for saving measures only conditional on efficiency targets in production sectors	
	Notes		
	Monitoring		

	Verification		
	References:	SN, VA industry 1991-2000: combination of targets and EIA-subsidies (not coupling)	
		EED, 31 May 2006: SEI launched scheme for large industrial users, as part of ESD, requires meeting management standard IS 393 in combination with investment framework.	

L7 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**LEGISLATION**	
	Characterization of actions		
	Code/action:	Maximising Public Procurement for efficient products and demonstration	
	MCA Reference:	L7	
	Category:	Legislation	
	Directives:	-	
	Subcategory:		
	Objective	To ensure that public authorities procure energy efficient equipment and services	
	Action:	Revise public procurement regulations to favour energy efficient appliances, vehicles and services	
	Current status	Member States may not include energy efficiency obligations of sufficient priority within public procurement regulations. Public Authorities may not purchase most efficient ICT products and vehicles as a consequence	
	Approach taken	Revise procurement rules for public authorities	
	Estimated Energy Savings	Potential energy savings within EU-15: Total heat and electricity use of public sector 54 Mtoe possible reduction is 10% or 5 Mtoe in 2020; Estimated potential within new member states 2-3 Mtoe (Estimate heat and electricity use of public sector of 11-13 Mtoe possible reduction 20%)	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	This action leads to savings in both electricity and fossil fuel use. Since savings will occur only after a longer period the effect security of supply will be limited.	**1**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	This action aims at al procurements of public authorities regardless whether products come from in- or outside the EU. There will be no impact on the competitive position of EU-firms.	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Since public authorities have major consumer power influence, it can be expected that companies will put effort in innovation and research to be able to provide energy saving products toward public authorities.	**1**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	The energy savings that result from this action could potentially reduce the annual energy expenditure within the EU of 47 billion euro with 10% in 2020. This makes investing in energy saving very cost effective.	**2**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	No impact	**0**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	This action creates a large market for energy saving products. With this it becomes very attractive for companies to invest in energy saving techniques.	**2**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Public energy expenditure represents less than 1% of total GDP, so energy savings will have no traceable effect on the economy.	**0**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Since public authorities are cliënts, a change towards less energy consuming products could have a major influence on products. It could very well lead to withdrawal of energy in-efficient products and even to closing down of businesses	**-2**

Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	This action add a new criteria for public purchaser next to price, but this doesn't necessarily affect the functioning of the internal market.	**0**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Governments have to invest in energy saving techniques, but this will be more than compensated with savings on energy costs.	**2**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	No impact	**0**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	the amount of GHG will be reduced with this action	**1**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No impact	**0**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Public institutions become responsible to weigh energy use in their purchasing decisions.	**-1**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Businesses will have to provide information on energy use when offering products or services to public authorities.	**-1**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	A side effect of this action can be, that more cheaper energy saving products become available. Household can profit from this supply. On the other hand, there scarcity could originate from the increase in demand.	**0**

Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Almost all sectors will be influenced by this action, on way or the other.	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No impact	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Public authorities will have to become familiar with energy saving products, to be able to make choose between offers of companies	**1**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The effect of this action will become noticeable after a longer period, when more appliances or cars are replaced.	**0**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	The effect of this action will become noticeable after a longer period, when more appliances or cars are replaced.	**2**
Monitoring & Verification	Can action be monitored and verified?	The energy use of authorities could be monitored, but because of the widespread activities of public authorities it's hard to monitor the exact effects of this action.	**1**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	The effect of this action could be seen beyond the public sector alone, it is a major incentive for companies to invest in energy efficiency. It's likely that this will lead to more efficient products which will be sold to non public customers as well.	**2**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	This action will change the behaviour of public end users	**1**
		Maximising Public Procurement for efficient products and demonstration	
	Notes		
	Monitoring		
	Verification		
	References:	ECEEE proceedings 2005, Harris, LBNL: Public sector leadership: transforming the market for efficient products and services. Procurement of computers, office equipment, buildings, CHP, EMS, infrastructure (sewage, water, waste), timers, controls, lighting, solar thermal, elevators, etc.	
		PROST-study "Harnessing the power of the public purse", Borg et al, 2002: 5-10% total energy use, procurement of energy use, products and services, effect of procurement on market transformation will be much stronger if specifications and targets/methodology are harmonised across Europe, e.g. Value-for-Money = lifecycle costs.	

		ICLEI, Buy it green network: less attention for energy efficiency	

L8 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**LEGISLATION**	
	Characterization of actions		
	Code/action:	Public lighting optimization	
	MCA Reference:	L8	
	Category:	Legislation	
	Directives:	2005/32/EC	
	Subcategory:	Adapted regulation	
	Objective	Minimize energy consumption of public lighting	
	Action:	Reduce energy use of public lighting by optimizing lighting systems.	
	Current status	Lighting is often present without an actual need for (the maximum amount) of light. Much light is not focused at the right spot where it is needed. This not only is a waste of electricity but also a nuisance to people and nature.	
	Approach taken	As part of the eco-design measure on lighting the systems for public lighting are standard supplied with heat/movement sensors and with reflectors that concentrate light at the right spot. With aid of government procurement these systems are implemented.	
	Estimated Energy Savings	Electricity-use EU-25 = 228 Mtoe of which lighting is 20% = 40,6 of which street lighting is 38% = 15,4 Mtoe. This action could reduce energy use by 25-50 % = 3,8- 7,6 Mtoe/ Year	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Since Public lighting is powered by electricity, which is generated from several sources next to oil and gas, the impact on supply security is limited.	**0**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	No impact	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	The action could lead to innovative ways of public lighting. But this is only a small research object.	**1**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Yes, energy savings in public lighting is cost effective. ESCO's can offer energy savings on public lighting in a cost effective way. Examples of projects in for instance Portugal show pay-back times of less than 3 years	**3**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	See general text on employment effects. The action effects only a small economic activity so the impact on labour demand and job creation is small.	**0**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Governments are responsible for public lighting. Investments en potential energy savings will directly come at the expense of the government.	**0**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Because the market on public lighting is relatively small, the impact on economic growth is minimal.	**0**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	No impact	**0**

Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No impact	**0**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	No, it will actually save money because of energy costs savings.	**2**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	It can have an effect on light pollution which can cause health problems	**1**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Energy saving on public lighting leads to CO2 emission reduction, but only on a small scale.	**1**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No impact	**0**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Municipalities are not focussed on energy saving within public lighting. This action could make it attractive for governments to call in ESCO's which can take over the public lighting and be responsible for energy savings. ESCO's can finance investments completely from saving on energy costs.	**1**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	No impact	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	No impact	**0**

Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	No impact	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No impact	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No, it could stimulate an outsourcing of public lighting which actually leads to reduction of public functionaries.	**1**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Yes, changes on the public lighting will have an immediate effect.	**2**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Public lighting techniques have a long lifespan. Changes made, have a long persistent effect.	**2**
Monitoring & Verification	Can action be monitored and verified?	Because energy use of public lighting is centrally registered, energy savings can be monitored easily.	**2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Efficient lighting can help to reduce light pollution and in this way can reduce disturbance of animals and humans	**1**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	No impact	**0**
		Public lighting optimization	
	Notes		
	Monitoring		
	Verification		
	References:	Paper on ESCO's in Europe: many on public lighting	
		ECEEE proceedings 2005, Harris, LBNL: public procurement on public lighting > Latvia street lighting case study.	
		Energie-Cites, 2002: separating public lighting from the (public)energy company leads to much more efficiency	

L9 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**LEGISLATION**	
	Characterization of actions		
	Code/action:	Removing outdated inefficient generation capacity	
	MCA Reference:	L9	
	Category:	Legislation	
	Directives:	96/61/EC, 2001/80/EC, 2003/54/EC	
	Subcategory:	adapted legislation	
	Objective	Decrease energy consumption of central electricity production with given fuel mix	
	Action:	Set up of regulation and/or incentives to increase the average conversion efficiency per fuel type by removing old inefficient power plants	
	Current status	The directive on liberalization of energy markets (96/92/EC) sets no limitations to the deployment of old inefficient power plants. The unilateral focus on low production costs stimulates lifetime extension, as decepriated old plants do not have capital costs any more. International and national legislation on environmental performance of power plants (96/61/EC) and (2001/80/EC) often treats existing and new plants differently in such a way that there is even a disincentive to replace old plants. This has resulted in a large fraction of old plants leading to more energy use and emissions than with present technology (IEA, 2004).	
	Approach taken	Average efficiency of electricity supply can be increased by changing the fuel mix from coal and nuclear to gas. However, this can conflict with the policy to increase security of supply. Therefore the action aims at incresing conversion efficiency per fuel type, e.g. all coal based electricity. EU-legislation (IPPC-BREF) is adapted in such a way that differences in emission standards between old and new plants are restricted in time and value, thus stimulating an timely replacement of power stations.	

	Estimated Energy Savings	L21 > 400 Mtoe fossil input for EU-25 in 2020 (PRIMES-baseline), assume removing all old plants (> 25 years lifetime) with efficiency rates that are more than 5%-points below average for the fuel type. Assume > 5% of total plants (MWe) in 2020 above baseline > 20 Mtoe input. Replace by BAT-plants with 10%-point higher efficiency in 2020 or 20% lower input (PRECIP: 20% for all present coal plants) > 4 Mtoe savings on primary fossil input	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The action does not influence the chosen type of power plant but the efficiency; for the same total electricty production it decreases all inputs and thus favors security of supply. However, the choice of plant types for new capacity can differ from the composition of scrapped capacity. Savings are less tah for action L21 (with rating =2), therefore a rating of 1 is given.	**1**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	With world energy prices at present high levels the investments in new power plants with much higher efficiency than the outdated plants are cost-effective. However, the old plants have hardly capital costs, that being the reason whythey were not replaced until now. Overall electricity costs for end-users will probably remain the same or decrease a little. Therefore the action does improve competiveness of EU-companies less than L21.	**1**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Forced replacement of old power plants stimulates the turn over of capacity and thus stimulates innovation to a great extent, thus enabling further futire efficiency increases and lowering of extra costs.	**3**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	With world energy prices at present high levels the investments in new power plants with much higher efficiency than the outdated plants are cost-effective. However, the old plants have hardly capital costs, that being the reason why they were not replaced until now. However, the new plants are cost-effective inn thier own right.	**1**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	See general text on employment effect. Design and erection of new power plants, to replace old plants, will ask for high and low skilled labour. However, old plants demand relatively intensive maintenance and a higher amount of process manpower due to smaller scale. Therefore the net effect is small.	**0**

Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Market barriers are uncertainty on future energy prices and possibly uncertainty about getting a license for a new plant. A replacement could harm the position of companies. The action forces all player to act in the same way and thus removes this barriers.	**2**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	With high energy prices the much more efficient power plants contribute to lower energy costs and a strong position in top-class generation technology, with a traceble effect on GDP	**1**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	The action influences the investment decisions of the producers and forces them to invest, possibly at the cost of their return on investments and shareholder value.	**-2**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	The forced investment costs to replace outdated plants can change the relative position of electricity producers that have a lot of old power plants. However, this is temporarily. In fact, the action leads to a level playing field as it restricts windfall profits due to permission to use environmentally outdated plants. Actually it enforces the proper functioning of the market.	**1**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	No effect on budget because it regards legislation.	**0**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	In principle much lower emissions because old plants often have less stringent environmental standards than new plants. However, this depends too on the old and new fuel type, and on legislation on overall NOx emissions. It is assumed that the the possible decrease in emissions is not (fully) compensated by easening emision standards elswhere. Overall a substantial emission reduction results.	**2**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Given the same fuel-mix for old and new plant the higher conversion efficiencies will lead to lower CO2-emissions in line with the amount of energy savings.	**2**

Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Not relevant	**0**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	The action requires a more active role of license providers, as to provide in time licences for the new plants to be build as soon as possible.	**-1**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	The procedures when building new plants ask an extra effort, on the other hand less effort is needed for license procedures for outdated plants.. Therefore overall no extra red tape expected.	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Given a cost-effective replacement no important changes in electricity cost will occur, thus no effect.	**0**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Possibly regions with many outdated capacity could be affected if new capacity is built elswhere. The extra new power plants will stumualte the subsectors construction & installation. Overall no effect.	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Not relevant.	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Existing public authorities can take care of the procedures for removing outdated plants and building new power plants.	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Presently there is little s[are capacity. The time to build new power plants to replace the old plants defines the time when positive effects occur, probably 5-10 years, thus not really short term.	**-1**

Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Replacement of old by new cannot be reversed. Therefore the effect is very persitent.	**3**
Monitoring & Verification	Can action be monitored and verified?	Saving and reduction effects are easy to monitor due to good data; however the effect can be influenced by market changes that change the running time of these plants.	**2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Not known	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Not relevant	**0**
		Removing outdated inefficient generation capacity	
	Notes		
	Monitoring		
	Verification		
	References:	PRECIP newsletter no.357, june 2006: upgrade coal to state-of-the-art in the EU > 20% reduction of CO2-emissions	
		IEA, Profiles, dec-2005: 45% of coal plants worldwide is older than 25 years, strong financial arguments for extending lifetimes, in developed countries retrofit due to SO2 and NOx, worldwide average efficiency <32%, new better than 46%,	
		Novem, february 2003, Dutch initial document on generic energy efficiency techniques-input for the BREF: on request of EC a proposal for a horizontal BREF is given > overview of policies and technical measures (based on permit procedures, BEES), incl. LCP (grote stookinstallaties) on electricity production with fossil fuel or biomass	
		UK, Environmental Agency, 2006?: IPPC-BREF for 4500 installations, information provided by EIIPPCB (Control Bureau EC), BREF-notes no binding requirements, examples not on power plants	
		KEMA, Eurelectric (workshop?) Vienna, 21 oct-200?: BAT-coal = 43-47%, FB > 41%, incremental improvement of 3%, CCGT = 54-58% new vs 40-54% existing, no BAT-LCP limit value for ETS-installations unless MS choose to do so, e.g. based on BM	
		ECN, 2005?, Quick-scan energy saving policy OECD, appendix interviews: IPPC indicates that installations should be upgraded after 7 years to the level of new installations (with ETS?, PB). Importance of energy savings in license decreased due to broad IPPC-directive? IPPC could be stengthened.	
		IPPC-directive (96/91/EC), M2: the permit shall not include emission limit values for direct GHG unless significant local pollution is caused. MS may choose not to impose requirements relating to energy	

		efficiency in respect of combustion units.

L10 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**LEGISLATION**	
	Characterization of actions		
	Code/action:	Stricter EPBD-standards, depending on sector of use	
	MCA Reference:	L10	
	Category:	Legislation	
	Directives:	2002/91/EC	
	Subcategory:	Adapted legislation	
	Objective	Increase the effect of the EPBD-directive in the longer run	
	Action:	The demands according to the EPBD-directive are strengthened in relation to technological progress and cost reductions.	
	Current status	The EPBD specifies that countries should formulate demands on the energy use of buildings, most countries have legislation on insulation, efficiency of boilers or on energy performance in general. These legislation is changed regularly.	
	Approach taken		
	Estimated Energy Savings	It's very difficult to estimate the amount of energy savings, because energy standard are different in all European countries. Next to that the climate is very diverse. At present the most demanding standard are formulated for new to build buildings. Since this is only a minor part of construction activity, strengthening these demands would have only a small effect. Strengthening energy demands in refurbishing project, could have a much larger impact when long pay-back terms are used.	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Energy-savings in de residential sector have a positive impact on security of supply. If energy savings measures in refurbishment projects have to reflect technical state- of-the-art , it could lead to major energy savings. Both the financial resources and the incentives for landlords and home-owners to invest in energy savings are limited. So it's not realistic that this action on its own could fully fulfil the technical potential within the existing building stock.	**2**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	This action points at the European construction and refurbishment sector in which there is hardly any competition of non-eu rivals.	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	The action will lead to an increasing demand for cheaper, simpler and better energy-saving products/ systems specially developed for small residential buildings. This can be seen as a side-effect. Research and development will be limited to improving existing techniques and to organisational changes.	**1**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Investments on energy saving measures on the one hand and benefits for avoided energy expenditure on the other, determine to a large extent the cost effectiveness of this action. If the investor and the beneficiary are the same (f.i. homeowners), energy saving in the residential sector can be quite cost effective. If this is not the case, investments won't be paid back. ESCO's could be solution in some cases to combine investments and benefits. Insulation measures are only cost-effective if investors satisfy with long pay-back times (20-30 yr.)	**0**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	See general text on employment effects. Strengthening the EPBD standards probably will lead to quality improvement of existing techniques/ construction methods rather than to more construction activity or an increase in energy saving products selling. This will not lead to job creation within the construction and building material sector. Perhaps this action will lead to only a small increase of employment in the energy consultancy sector and within ESCO's.	**0**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	In many countries EPBD demands are already implemented and the most cost effective measures are already taken. Further energy savings must be achieved with less cost-effective measures. Commercial landlords demand short term pay-back times on their investments. Since savings on energy costs benefit the end-user, investors don't have an incentive to invest in energy savings. Within Central and East European countries,	**-1**

		municipalities and landlords don't have enough financial resources to invest in energy savings.	
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Since the effects from this action on energy-supply and employment are limited, the macro-economic environment will not change.	**0**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	If this action is implemented, it could lead to a change in financial products. Investors will need ESCO's that can supply financial products to make long term investments in energy saving profitable.	**1**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Since the EPBD is an European directive the internal EU market will not be influenced	**0**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Although subsidies can have an reinforcing interaction, it's not part of this action to give financial support. Measures should be financed by the market itself.	**0**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	The impact of this action is unknown but probably very limited.	**0**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	This action will mainly affect new to build buildings, which form only a small percentage of dwellings within Europe. Although strengthening EPBD norms will decrease energy demand for this dwellings, the overall effect shall be limited	**1**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	This action doesn't effect inequality within countries on a large scale. There could be an increase of inequality between western and Central an East European countries because the latter lack the funds to invest in energy savings. The differences in living expenses could change because of this action.	**-1**

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	This action only strengthens existing policies, so it doesn't change government participation.	**0**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Because this action aims at already existing standards, it will not increase administrative complexity.	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Newly build houses can become more expensive, because of extra costs for energy saving measures. In the long run these extra costs can be (partly) earned back with energy saving.	**-1**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	The action will lead to an increase of investment costs for the construction and real estate sector.	**-1**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	This action doesn't effect transport demand.	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Since this action aims at existing legislation, no changes in public authorities are needed.	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Strengthening of the demands will be implemented gradually. The action takes effect after a longer period of time.	**-1**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	After a longer period more older buildings will be replaced with new ones so the effect becomes more visible over a longer period. Buildings can have a long lifespan so energy measures taken will heave an long persistence affect.	**2**
Monitoring & Verification	Can action be monitored and verified?	The EPBD demands calculation of energy use. This makes monitoring of the effects easy.	**2**

Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Added energy measures can make houses more expensive, which could make it difficult for low- income people to obtain new dwellings.	**-1**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	If buildings contain more energy saving qualities this automatically must have an impact on end-user behaviour.	**1**
		Stricter EPBD-standards, depending on sector of use	
	Notes		
	Monitoring		
	Verification		
	References:	Building Blueprint, Klinckenberg, June 2006:	
		LEED=certified buildings allowed greater density	
		Same standards per measure as for new buildings in Germany>20% renovated	
		One-stop assessment, rating, contractor bids, supervision of work, post-rating and mortgage arrangement.	
		Eurima, Pres Release 8 June 2006: Buildings waste 270 mld Euro (current prices, gross savings excl. investments) across Europe or 3.3 mln bbl/day out of 6. With 2002-prices cost savings are 115 mld Euro. Other effects: 83 Mton CO2 in 2010 and 14 in 2015 and <460 in 2030, 530.000 extra jobs until 2030. About 90% of the potential for energy, CO2 and cost savings are in buildings below 1000 m2.	
		Quick-scan besparingsbeleid OECD, appendix intervieuws, 2005?: effectiever om bouwregelgeving op nationaal niveau vast te stellen ivm klimaatverschillen	
		Ecofys, march 2004, Mitigation of CO2 beyond EPBD: potential 80 (current) to 400 Mton (full scale) for EU-15 when applying new-standards on existing buildings. Given time delays reduction is in 2010 34 (current) to 70 Mton (full scale). Current EPBD covers only 28% of existing stock, not single-family dwellings (45%). National standards after EPBD estimated from expert's opinion. Contribution of new buildings compared to baseline very small because standards are already used in baseline. BAU > retrofit with 20% saving measures. BAU+EPBD-effect without certificate > retrofit with 100% saving measures plus 20% for other buildings. BAU+EPBD+Certificate-effect > 100% for EPBD-part and 40% for other buildings.	

L11 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**LEGISLATION**	
	Characterization of actions		
	Code/action:	Regular revision of label system for appliances	
	MCA Reference:	L11	
	Category:	Legislation	
	Directives:	92/75/EC	
	Subcategory:	adapted legislation	
	Objective	Continuously decrease energy consumption of new appliances	
	Action:	Adapt appliance label regulation as to regular updating of the label system in order to stimulate the marketing of ever more efficient appliances	
	Current status	due to the directive on labelling of appliances A- to G-labels have been defined for different appliances. However, new appliances are often more efficient than A-label appliances but this cannot be made clear to customers. Thus there is less incentive for manufacturers to further improve appliances	
	Approach taken	The labelling system is updated regularly in such a way that the most efficient appliances that are market ready are labelled accordingly, thus enabling a better promotion of these type of appliances and enable financial support for the most efficient appliances only.	
	Estimated Energy Savings	Mtoe?	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The biggest energy savings are already implemented within appliances. Further improvements will be limited. Next to that, appliances are powered by electricity, which is generated from several sources next to oil and gas, the impact on supply security is limited.	**0**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	As long as appliance label regulation is demanded for both Eu and Non-EU companies, there is no impact on competitiveness.	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	This action will stimulate innovation within the appliance industry, only on a small scale.	**0**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Since there is no obligation to actually save energy, companies will only invest in energy savings if they can be compensated with extra selling.	**0**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	No impact	**0**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	The limited range of energy labelling doesn't offer a market incentive for producers to fabricate appliances which are more energy efficient than label A. This action gives them a opportunity to distinguish themselves from other companies.	**1**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No impact	**0**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	No impact	**0**

Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No impact	**0**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	No impact	**0**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	No impact	**0**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	No impact	**0**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No impact	**0**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	No impact	**0**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Since there is already a regulation on appliances labelling, expanding the labels will not change administrative costs.	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	This action offers consumers more information on energy use of appliances. This gives them the opportunity to choose energy saving appliances.	**1**

Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	No impact	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No impact	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No impact	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	It takes time for producers to develop new appliances, so short time effect s will be limited.	**0**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	This action can have a more persistent effect, because on the long term there will come more energy saving appliances.	**1**
Monitoring & Verification	Can action be monitored and verified?	This action can be monitored if sale figures are specified on energy label.	**2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Energy saving appliances could save household expenditure	**1**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	The action lead to more information on energy use, which could help consumers to change their behaviour.	**1**
		Regular revision of label system for appliances	
	Notes		
	Monitoring		
	Verification		
	References:	High level stake holder advisory group: report EED 28/02/06: dynamically improving efficiency standards,	

L12 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**LEGISLATION**	
	Characterization of actions		
	Code/action:	EU-wide implementation of white certificate schemes	
	MCA Reference:	L12	
	Category:	Legislation	
	Directives:	2006/32/EC	
	Subcategory:	adapted legislation	
	Objective	Increase energy savings by creating a market for energy efficiency measures and energy services	
	Action:	Extend the concept of white certificate schemes, after evaluation of present national schemes, to all EU-countries and implement obligations on energy suppliers to provide energy efficiency	
	Current status	White Certificate schemes have recently be introduced in several MS, in NL and UK comparable schemes without tradable certificates have been/are active. The Energy Service directive favours the creation of markets for energy services and saving options.	
	Approach taken	In the longer run it is desirable that trading in white certificates is possible all over Europe. This is also needed as to create a level playing field for the energy supplier that have the obligation to run the schemes. Therefore white certificate schemes have to be introduced in all or most MS. The set up of the harmonized scheme will depend on the experience gained in running schemes. he directive will we amended as to introduce the scheme in all MS before 2010.	
	Estimated Energy Savings	White certificates could cover half of natural gas (165 Mtoe) and 70% of electricity use in EU-15 (136 Mtoe) or 505 Mtoe in primary energy. Introduction of white certificates can potentially increase energy-efficiency with 15%, saving 76 Mtoe in 2020 (based on free of costs for society). Much of this savings are overlapping with energy savings on account of the EPBD. If this saving will actually be accomplished depends to a high extend on the energy saving target that's set by governments, because white certificates on it self don't offer an incentive to save energy, unless their is a target fixed within legislation.	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	This action has a potential to increase energy-efficiency with 15%, mostly natural gas, which helps to secure energy supply.	**3**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	It aims at internal energy saving and doesn't have an impact on competitiveness. Since energy suppliers act mostly within Europe there is no impact on the competitive position of EU firms.	**0**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	This action has a small positive effect on research for energy saving measures. Energy suppliers will invest in innovative energy saving solutions. It will also stimulate innovation on service products. Service companies and energy suppliers will find innovative ways to save energy.	**2**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Although the system helps to achieve saving on the most cost effective way it also brings additional costs with it. Administration costs and profits made when certificates are sold for high prices are examples of these additional costs. It is expected that the costs will not exceed the benefits. Energy suppliers can sell energy efficiency. The profit which is taken from this compensates the decrease in energy selling.	**1**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	See general text on employment effects. New jobs are created. Most of these are created within the field of certification, administration and consultancy. It also helps to stimulate labour on the production of energy saving products and renovation.	**1**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Yes, it gives energy suppliers an incentive to actively support energy saving. Energy suppliers at the moment benefit from inefficient use of energy. With this action they can benefit from energy efficiency, which they can sell as a product. In this way a major economic barrier to achieve energy efficiency is taken away	**3**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	The overall impact on economic growth is hard to quantify. On the one hand, spendings on energy consumption will be redirected towards spending on energy saving measures. Because this is a more labour intensive and national economic activity this has a positive effect on the economy. On the other hand, the action will confront companies with major administrative costs.	**0**

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	This action can have an impact on access to finance. Energy savings can be profitable of the energy saved can be sold with profit because of the white certificate system. This could make it easier to find funds for investments on energy savings.	**0**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	If saving targets are equalised for all European countries this will benefit countries that are lagging on eco-efficiency. They can easily save energy with relatively low costs. The white certificates they will retrieve from this, can be sold with profit to more progressive countries. It 's possible that customers in countries with a high eco-efficiency because of successful policies of the past, have to pay again to increase eco-efficiency in other countries	**1**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Investments are needed to investigate energy saving and to set up a monitoring and certification system. Much of these actions can be financed by the market itself.	**0**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	The impact on air quality is unknown	**0**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	The action can lead to a CO2 emission reduction of 190 Mtonnes (based on zero-costs)	**1**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No impact on social inclusion or inequality	**0**

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	This action gives the energy market freedom to choose between energy saving possibilities. White certification are a good source of information for consumers, to notice the amount of energy that can be saved.	**1**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Administration cost are high, because of the necessary monitoring and certification. A study for the UK estimates administration costs which exceed 20% of the projects cost but are below 2% of total expenditure of energy suppliers	**-3**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	This action will make it easier for consumers to 'buy' energy savings.	**1**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	The energy suppliers and energy service companies are effected strongly with this action. Investments on energy savings are needed. It will bring extra costs with it and extra employees have to be attracted to organise the implementation of white certificates. It also offer market changes for ESCO's and energy suppliers to offer new energy saving products and services to their costumers.	**1**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Their will be no direct impact on transport	**0**
Public Authorities	Does the option require significant establishing new or restructuring	Public authority has to provide a framework in which the white certificate system can function. Much of the organisational efforts can be outsourced.	**0**

	existing public authorities?		
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The impact of the measure will depend on the demands on energy savings and that national or European authorities will make. Also the period in which these energy saving has to be implemented are important to determine the significance of the action	**1**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	The duration of energy savings most be imbed in the white certificate scheme. Long lasting, persistent energy saving measures will be more attractive this way because they provide more white certificates on the long run.	**2**
Monitoring & Verification	Can action be monitored and verified?	Monitoring and verification is a major element of this action.	**3**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Unknown	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	This action can help to give information on energy consumption to end users and in this way help to change end user behaviour.	**1**
		EU-wide implementation of white certificate schemes	
	Notes		
	Monitoring		
	Verification		
	References	Bertoldi, JRC, 2005: Green and White Certificates	
		Green T-forum, New York, 4 May 2006, Jones-Sterling Power: energy efficiency certificates or White Tags per state	
		Hargreaves, OFGEM, Energy services Working group, November 2003: EEC > special reward for energy services: assessment, advice, cost sharing.	
		EED, 29 may 2006 > France law on WC-system providing 54 TWh of savings or 3.6% of national consumption	
		EED, 2 June 2006: EU parliament > tradable white certificates must wait until ETS has been optimized	
		STROMEN, Storm/ENECO: alternatief voor WC via certificaat+puntensysteem >gecanceld juni !!	

L13 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**LEGISLATION**	
	Characterization of actions		
	Code/action:	Highly efficient new generation capacity (excluding RES)	
	MCA Reference:	L13	
	Category:	Legislation	
	Directives:	96/61/EC, 2001/80/EC, 2003/54/EC	
	Subcategory:	adapted legislation	
	Objective	Decrease energy consumption of central electricity production with given fuel mix	
	Action:	Set up of regulation and/or incentives to increase the average conversion efficiency per fuel type, by installing new plants with best available technology (BAT)	
	Current status	The directive on Emission Trading system for industry and electricity supply (2003/54/EC) amends the IPCC-directive (96/61/EC, amend M2) and large combustion plant directive (2001/80/EC), as to mandatory emission standards for CO2. However, it allows mandatory efficiency standards in national legislation on environmental performance of power plants. Present average conversion efficiencies (Ecofys, 2004) are much lower than presnt best practices (CE, 2006).	
	Approach taken	Average efficiency of electricity supply can be increased by changing the fuel mix from coal and nuclear to gas. However, this can conflict with the policy to increase security of supply. Therefore the action aims at increasing conversion efficiency per fuel type, e.g. all coal based electricity. EU-legislation (i.e. IPPC-directive) is adapted in such a way that the demands on conversion efficiency in national license procedures for new power stations are harmonised. The demands are based on a regularly executed benchmark of worldwide power plants of the same fuel type.	

	Estimated Energy Savings	Total electricty generation input for EU-25 in 2020 (PRIMES-baseline)= 850 Mtoe, of which < 56% fossil fuel > 400 Mtoe, replacement/extension from 2007 on is 50% of total capacity in 2020 > 200 Mtoe. New plants with on average 5%-point higher efficiency in 2020 > 10% lower input > 20 Mtoe savings on primary fossil input	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The action does not influence the chosen type of power plant but the efficiency; for the same total electricty production it decreases all inputs and thus favors security of supply. This reasoning defers from changes in relative costs that can influence the choice of plant types. To prevent later uilding of new plants, extension of life times of old plants must be avoided by action L34 at the same time! Savings 2% of GIC, thus substantial, therefore rating =2 .	**2**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	With world energy prices at present high levels the extra investments in new power plants with higher efficiency are cost-effective, decrease electricity costs for end-users (given proper market functioning) and thus increase competiveness of EU-companies.	**2**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Higher conversion efficiencies stimulate innovation to a great extent, thus enabling further futire efficiency increases and lowering of extra costs.	**3**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	With world energy prices at present high levels the extra investments in new power plants with higher efficiency are cost-effective, but not with lower prices.	**1**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	See general text on employment effect. Research, design and erection of more efficient power plants will ask for more high skilled technical workers which are already scarce. The conventional part of the new plant uses the same amount of low skiled labor. Therefore, no substantial employment effect is expected.	**0**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Main market barrier is uncertainty on future energy prices and the risk of mis-investments compared to competitors. Action forces all player and thus removes this risk.	**1**

Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	With high energy prices the more efficient power plants contribute to lower energy costs and a strong position in generation technology, with a traceble effect on GDP	**1**
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	The action influences the investment decisions of the producers, possibly at the cost of their return on investments and shareholder value.	**-2**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	The extra investment costs of highly efficient power plant can change the relative production costs per fuel type and thus influence the market. However, the functioning is not at risk.	**0**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	No effect on budget because it regards legislation, however extra R&D-support possibly leads to higher R&D-expenses in general.	**-1**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	In principle lower emissions due to reduced fuel use. However, extra measures needed to keep NOx emissions at same level . It is assumed that the agreed cap on total emissions is not "filled" by easening emision standards. Overall small emission reduction.	**1**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Given the same fuel-mix higher conversion efficiencies will lead to lower CO2-emissions in line with the amount of energy savings.	**3**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Not relevant	**0**

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	The action requires a more active role of license providers, as to check wether producers install the most efficient plant.	**-1**
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	The procedures are the same or conventioanl or high efficiency power plants. Therefore no extra red tape expected.	**0**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Given a cost-effective choice for highly efficient power plants no important changes in electricity cost will occur, thus no effect.	**0**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Assuming no effect on the location of new power plants tjere is no effect on regions. Highly efficient plants will demand more high skilled work, which will favor some subsectors.	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Not relevant.	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Existing public authorities can handle the implementation of highly efficient power plants.	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Given the time to implement the action and time to build these power plants it will take 5-10 years before the effect will emerge, thus not really short term.	**-1**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Highly efficient power plants will last for 25 years., even with lower energy prices because they are always more attractive than conventioanl plants once the investment is done (sunk costs)	**3**

Monitoring & Verification	Can action be monitored and verified?	Saving and reduction effects are easy to monitor due to good data; however the effect can be influenced by market changes that change the running time of these plants.	**2**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Not known	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Not relevant	**0**
		Highly efficient new generation capacity (excluding RES)	
	Notes		
	Monitoring		
	Verification		
	References:	Ecofys, Comparison of power efficiency on grid level, ECS 04028, august 2004: study for CRIEPI on fossil fired power generation efficiency for 1990-2000 and China, Japan, USA, UK, France, Germay andscandinavian countries. Average 37-38% for coal, 36-40% for gas and 36-37% for oil.	
		CE, mei 2006, Nieuwe energiecentrale debat-De CE-bijdrage: voor kolen als referentie Nordjylland 3 in Aalborg met 47% (40% met CO2-afvang), STEG 58% (met afvang 50%), WKK-GM 43+49%, SV 38+52% en WKK-industrie 43+35%, huidige kolentechniek past niet in NEC voor SO2 en reduceert NOx te weinig	
		ECN, 2005?, Quick-scan energy saving policy OECD, appendix interviews: from BM-covenant in NL no substantial improvements to be expected. Minimum standards for new power plants based on actual production circumstances; they should be formulated at EU-level due to market competition.	
		IPPC-directive (96/91/EC), M2: the permit shall not include emission limit values for direct GHG unless significant local pollution is caused. MS may choose not to impose requirements relating to energy efficiency in respect of combustion units.	

L14 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)		
	Multi-Criteria Analysis Matrix of Actions - Supporting Information	
	Category:	**LEGISLATION**
	Characterization of actions	
	Code/action:	Incentive based regulation for network companies to reduce losses
	MCA Reference:	L14
	Category:	Legislation
	Directives:	2003/54/EC
	Subcategory:	adapted legislation
	Objective	Decrease transport and distribution losses in networks for electricity and gas
	Action:	Adaptation of existing EU and national regulation as to the management and capacity planning of networks for electricity and gas in order to decrease energy losses
	Current status	The directive on liberalised markets for electricity and gas only views regulation of networks as to reliable and cost-effective transport and distribution, but does not regard energy efficiency. Network companies only focus on minimal present investment costs, and not on minimal life cycle costs, i.e. investment plus electricity losses over the life time (MCEE, 2001 and PTE, 2003).
	Approach taken	In the regulation of networks new criteria, such as cost-effective reduction of network losses, are introduced. The demands can be met by changes in the network itself (higher voltage level, capacity expansion, new technologies, etc.) but also by decentralized production. The regulation of transport tariffs is changed in such a way that a form of lifecycle cost optimization is stimulated and paid for in the tariffs.
	Estimated Energy Savings	Total electricity generation 4000 TWh in 2020 (PRIMES-baseline), EU-average 6.8% in 1998 (COGEN. 2000), assume in 2020 network losess of 6% => 240 TWh, decrease in losses1990-1998 is about 15%, assume until 2020 10% more savings => 25 TWh less losess or 225 PJ primary input or 5 Mtoe.

Assessment criteria	Details	Scoring Narrative	MCA Score
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	See general text on security effect. Contribution depends on replaced conventional alternative: coal, gas, RES or nuclear (see also tangible effects). However, an optimal lifecycle approach leads to surplus capacity that enhances security iof supply considerably (MCEE, 2001).	**2**
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Cost-effective lower losses will decrease electricity costs and price, thus favour competive position of EU-companies.	**1**
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Applied options partly state-of-the art, and partly innovative?.	**0**
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Cost-effectiveness is based on electricity production costs that are avoided, not end user prices. Split incentive: network losses paid by supplier/users and investment by network owner. Cost-effectiveness depends also on electricity savings to be realized, modest if substantial savings are assumed	**1**
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	See general text on employment effects. Network investments creates hardly any extra labor because activities are combined with planned extensions and renovation of networks.	**0**
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	Action will remove major barrier, namely incentive to invest and overcoming split incentive	**3**
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	No traceble effect on GDP, compared to baseline without network improvements	**0**

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Action will have little impact on business operating as it is part of regular network adaptations.	**0**
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No, if the action is introduced at EU-level and treats all distributors the same. Adaptations to decrease losses can coincide with extension of network capacity and thus contribute to better functioning of the market.	**1**
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Legislation, no government support needed.	**0**
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Less losess means less electricity production and possibly less SO2 and NOx-emissions. However this depends on the replaced power plant (gas, RES, coal or nuclear) and the use of emission caps instead of emissionfactors.	**1**
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Less losess means less electricity production and possibly less CO2-emissions. However this depends on the replaced power plant (gas, RES, coal or nuclear) but predominantly on the NAP-ceilings that probably will be independent of network losess.	**0**
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Very small influence on electricity costs of small end-users, no inequality effects.	**0**
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Small increase in tasks of regulator to regularly adjust transport and distribution tariffs in line with possibilities for decreasing network losess.	**-1**

Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	No extra administative burden for end-users, only some burden for network ownerrs.	**-1**
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Small effect on electricity costs only, thus no effect	**0**
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Small effect on electricity costs of end-users. Assuming general cost-effetiveness rules, the cost effects will be about the same for different sectors and regions.	**0**
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	not relevant	**0**
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Present authorities can handle change in legislation.	**0**
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Policy effect can take long time as it is coupled to gradual adaptations to the network.	**-1**
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Investments in network will last ery long. However, with contineous growth of demand losess can increase again if the network is not adapted in the same pace.	**1**
Monitoring & Verification	Can action be monitored and verified?	Network losess up to lowest 220/380 voltage can be monitoried quite well. However, it is difficult to split changes with respect to cause: spatial structure of load, load factors and loss reduction measures.	**1**
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Reduction of losess can decrease outages and this increase reliability of supply.	**0**
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Not relevant.	**0**
		Incentive based regulation for network companies to reduce losses	
	Notes		

	Monitoring		
	Verification		
	References:	MCEE, dec-2001, Network security of the future UK electricity system: 5-10 times greater capacity than needed lowers network losess and thereby results in lower lifetime costs for distribution over 20 years. UK-losses 9% while germany has 5%. Optimal design provides extra security without extra costs.	
		PTI, feb-2003, Electricity distributiuon losses, a consultation document: cost of losses 3 pence/kWh, trade-of between investments in (extra) capacity and losses during the life time of the network. Presently above optimal losses due to focus on network cost savings.	
		EFET, pp, nov-2000, Transmission tariffs for a EU single market in electricity: variable tariff to cover losses and O&M, loss rates defined on surplus and deficit areas.	
		Aurora, NZ: network loss factors for HV =1,1%, MV = 1,8% and LV = 5,8%, including transmission 6,9%, 6,8% and 10,9%	
		COGEN, sep-2000,Electricity transport regimes and their impact on CHP: network losses in EU 8,2% in 1990 and 6,8% in 1998 (3,9% in NL and Finland, 9,4% in France)	

7. Transport Actions

Multi-Criteria Analysis Matrix of Actions

Actions Category: TRANSPORT

MCA Performance Matrix **Impact Criteria**

Reference		Economic											Environmental	Social								Other						
	Actions	**Security of Supply**	**Competitiveness, trade and**	**Innovation and research**	**Cost Effectiveness**	**Employment & labour markets**	**Market Barriers**	**Macroeconomic Environment**	**Operating costs and conduct of business**	**Competition in the internal**	**Government budget**	**Air Quality**	**The Climate**	**Social inclusion & protection of**	**Governance participation, good**	**Administrative costs on businesses**	**Consumers &**	**Specific Regions or**	**Mobility and the use of energy**	**Public Authorities**	**Short time for effect**	**Persistence**	**Monitoring & Verification**	**Tangible Added value**	**Change in behaviour of**
T1	Make driving costs more km depending. For instance the car of road tax, but also the insurance premium can be made variable. Finally area and congestion charges used for traffic management also have a km reduction efffect.	3	0	0	2	1	0	2	0	0	0	3	3	0	0	0	0	0	3	-2	2	0	-2	1	1
T2	Directive on EU labelling becomes standard for all road vehicles. The label information is extended with the fuel cost at current fuel prices over the first 100 000 km driven.	2	0	0	3	0	0	0	0	0	0	1	2	0	0	-1	1	0	0	0	-1	0	0	0	0
T3	Separation of low speed and high speed traffic is good for traffic safety and can increase the use of low speed modes (walking, bicycling, mopeds). Specific bicycle lanes or tourist routes can also stimulate the use of bicycles instead of the car.	2	0	0	-1	0	0	0	0	0	1	2	2	1	1	0	0	0	1	0	-1	1	1	2	2
T4	For company cars the user tax is related to the specific fuel consumption of the car.	2	0	2	1	0	0	1	0	0	0	1	2	0	0	1	0	0	0	0	-1	0	2	0	0
T5	1) Set maximum CO2 emission standards for different type of cars (absolute, related to specific performance properties, or related to the mean value of all cars sold by one company). 2) More stringent agreement with car and truck producers after 2008-2009.	3	2	2	0	2	0	2	-2	0	0	1	3	0	0	-1	-2	-1	-1	-1	-1	2	1	0	0
T6	Restricting unneccesary power of car engines by technical devices like maximum speed limiters and/or limitation of maximum acceleration. Or limit the maximum power related to the vehicle weight (or maximum load) for new cars and trucks.	3	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	-1	0	-3	0	3	0	-1
T7	To encourage car sharing (multi-passenger) schemes	1	0	0	-1	0	0	0	0	0	1	1	1	0	0	-1	1	0	1	0	2	-1	-1	0	-1
T8	The use of more energy efficient transport modes can be stimulated by infrastructural measure, like more rail for goods transport, building of mode change locations (from truck on trains or ship and vice versa), or locating new business parks nearby rail or water.	3	0	0	1	-1	0	0	1	0	-2	1	3	0	-1	0	0	0	0	0	-1	0	2	2	1
T9	Decrease fuel use by making fuel more expensive. By making the differences between countries less, the incentive of buying cheap fuel across the boarder will decrease. A lower car tax can be introduced when an efficient car is bought,or a financial penalty which make the buying of a less efficient (second hand) car much more expensive. Or a bigger difference in road tax related to the fuel consumption of a car. Even a km charge can be fuel economy dependent.	3	2	1	1	0	0	0	0	0	-1	3	3	1	0	0	0	0	0	0	3	0	2	0	-1
T10	An EU broad policy for fuel efficient tyres, tyre pressure indicators (dashboard tyre pressure sensors mandatory on cars and freight vehicles, valve pressure indicators compulsory on existing vehicles tyres from 2010) and free facilities at service stations	3	0	1	1	0	0	0	0	0	0	2	3	0	0	0	1	0	0	0	1	0	2	0	0
T11	Procurement by government giving a good example by buying efficient technology with a longer pay back period or by joining technology test projects. Furthermore it is possible to use only energy efficient company cars (for instance only A and B labelled passenger cars)	1	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	-1	2	0	1	0	0
T12	To be decided	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

T1 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: Transport

Characterization of actions

Code/action:	Road pricing
MCA Reference:	T1
Category:	Transport
Directives:	-
Subcategory:	
Objective	Reduction of km driven
Action:	Make driving costs more km depending. For instance the car of road tax, but also the insurance premium can be made variable. Finally area and congestion charges used for traffic management also have a km reduction efffect.
Current status	Area pricing in several European cities like London and Stockholm. Road pricing for freight vehicles implemented in Germany and Austria (and Switzerland). Insurance premium is the freedom of the insurance company; estimated annual distance is sometimes (small) factor.
Approach taken	Austria uses a pre pay system with a transponder and manual enforcement (i.e. pulling people over); Germany uses several systems including a on-board unit with GPS. In Stockholm the licence plate is read and a montly bill is send to the owner.
Estimated Energy Savings	< 1 (only freight) to 4% (all vehicles) of road transport. (3-15 Mtoe in 2020). Up to 10% is mentioned in literature. Local savings due to an area tax can be 10-20%.

Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The effect is related to the level of additonal costs. For the USA a complete variabilisation of the the mean insurance premium at a level of 6 ¢/mile (about 10 eurocent/km) could result in a travel reduction effect of 10% (based on 1991 figures). In the EU the level of fuel costs is due to taxation already higher; so the relative increase will be lower. It should be mentioned the minumum tax levels in the EU for gasoline is 0,359 euro/l and for diesel 0,302 euro/l (about 1.5 - 3 eurocent/km). This is about half of total governmental income from cars (incl VAT) (ACEA, 2006). A Dutch study on variablisation of the road tax and part of registrations tax by 2008 estimates the CO2 reduction in 2020 on 6%. But this is with frequently km-use bills and mobi meters. Dutch publications mensiones that not only the level is important, but also how often users have to pay specific km-related bills (how stronger the relation is between trip and bill, how stronger the reduction effect).	3
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	0	
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Production of on-board units combined with GPS might sitmulate industry. Increase in transport cost can lead to efficiency improvements in logistics.	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	If the tax level is calculated once a year, the cost are low € 5 - € 10/y. If the tax level is calculated frequently by using electronic in car equipment (mobi meters) investment cost of € 100 - € 150/car (excl. mounting) cost are higher. Mobility reduction is normaly very cost effective; but additional public transport has also costs. London area tax has also postive effect.	2
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	Yes, jobs in car industry, in manual enforcement and in increased public transport.	1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	0	
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for	Positive	2

	the proper functioning of markets?		
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	No effect expected	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No effect expected	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Substantial investement in reading equipment but lower costs for new roads and road maintenance. Road pricing might be budget neutral by lowering other taxes. In case of insurance change no costs.	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Less mobility is less emissions	3
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	The mobility reduction will lead to a substantial reduction in CO2 emissions	3
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No effect expected	0
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	No effect expected	0

Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	No effect expected	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	They have to pay more (odometer audits or mobi meters) but they gain if their car-mobility is reduced	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	No effect expected	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Mobility will be reduced	3
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Income from fuel tax will decrease. If they have to registrate the car km (for instance by paying the infrastructure for automatic reading of the mobi meters) this will lead to additional costs.	-2
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Positive	2
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	No effect expected	0
Monitoring & Verification	Can action be monitored and verified?	Pay-As-You-Drive pricing requires verified mileage data. Vehicle owners can report odometer readings, by email or mail, with random verification spot checks. Automated data collection is also possible; and done with current technology (mobi meters). Thirdly odometer audits can be done at costs € 5 - €10 with normal vehicle service (VTPI, 2005).	-2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Accidents will decrease in proportion to less vehicles on road	1
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Small effect in more use of public transport and less passenger car km.	1
	Notes		
	Monitoring		

Verification

References

VTPI (2005): Pay-As-You-Drive Vehicle Insurance; Converting Vehicle Insurance Premiums Into Use-Based Charges. TDM Encyclopaedia, Victoria Transport Policy Institute, Victoria, Canada, Updated December 14, 2005 http://www.vtpi.org/tdm/tdm79.htm

ACEA (2006) ACEA's annual Tax Guide 2006. ACEA, Brussels, 2006 http://www.acea.be/ASB20/axidownloads20s.nsf/Category0ACEA/CED7D957932102C5C125714D002D4DF4/$File/2006ACEATaxGuide~Introduction.pdf

Brink, R.M.M. van (2004) Optiedocument verkeersemissies; Effecten van maatregelen op verzuring en klimaatverandering. (Assessment of options for reduction of acidifying and climate changing emissions in the transport sector; in Dutch). RIVM report 773002026/2004, RIVM, Bilthoven. August 2004 http://www.mnp.nl/nl/publicaties/2004/Optiedocument_Verkeersemissies__effecten_van_maatregelen_op_verzuring_en_klimaatverandering.html

T2 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**Transport**	
	Characterization of actions		
	Code/action:	Consumer information when buying a car	
	MCA Reference:	T2	
	Category:	Transport	
	Directives:	1999/94/EC (Commission Directive 2003/73/EC of 24 July 2003 amending Annex III to Directive 1999/94/EC of the European Parliament and of the Council (Text with EEA relevance))	
	Subcategory:		
	Objective	Influence consumers by giving information or other incentives to buy more efficient cars	
	Action:	Directive on EU labelling becomes standard for all road vehicles. The label information is extended with the fuel cost at current fuel prices over the first 100 000 km driven.	
	Current status	EU labels for passenger cars available. No labels for vans and trucks. Fuel consumption on the label differs sometimes substantial from the -real life- consumption of the user.	
	Approach taken	Extend the current approach to more vehicles, apply realistic driving conditions and include fuel cost over a -for the buyer- relevant period.	
	Estimated Energy Savings	If 10% of the buyers buys a 10% more efficient car, the effect is 1% on the long run (3.5 Mton). The 1% is also estimated by (Fickl. 1999) based "willing to act" in questionnaire resulting of 4-5% and taken into account that people do not act really as they intend to do when asked.	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The label makes it possible to compare cars in energy efficieny.	2
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	-	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Can have a minor effect on research for more fuel efficient cars	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Very effective. The more efficient car is often cheaper	3
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	-	0
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	no	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	positive but not substantial	0

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	-	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	no	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	no	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Probably small positive effect	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Yes CO2 reduction	2
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	no	0
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	-	0

Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Yes, al new cars must have a label in the showroom	-1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Better informed about the fuel efficiency. This could be furter improved by including nog only fuel efficiency but also fuel costs and to put also labels on second hand cars	1
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	no	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Very small increase in mobility might be possible	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	no	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The impact is related to new cars entering the park, so the full effect will take 15 years	-1
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	If labels are no longer regulated, the effect might decline in time	0
Monitoring & Verification	Can action be monitored and verified?	yes (but calculating the effect is very difficult)	0
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?		0

Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	yes; but only when the decision about a new car is made. But besides the decision itself, there is no change in behaviour	0
	Notes		
	Monitoring		
	Verification		
	References:		

T3 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**Transport**	
	Characterization of actions		
	Code/action:	Improve quality low speed transport	
	MCA Reference:	T3	
	Category:	Transport	
	Directives:	-	
	Subcategory:		
	Objective	Make less energy consuming passenger transport more attractive	
	Action:	Separation of low speed and high speed traffic is good for traffic safety and can increase the use of low speed modes (walking, bicycling, mopeds). Specific bicycle lanes or tourist routes can also stimulate the use of bicycles instead of the car.	
	Current status	EU started funding. Special funds in some countries already available.	
	Approach taken	Investigate possibilities in road safety policies to stimulate low-speed traffic, based on current country experiences	
	Estimated Energy Savings	If an EU broad increase of 25% could be realized 2 Mtoe	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	According to (OECD/IEA, 2001) the mean amount of walking and bicyling is about 5% of the passenger km. An increase with 25% by special measures would reduce energy use for light duty verhicles with about 1%. The effect can increase if also mopets substitute passenger cars.	2
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	no	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	no	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	The cost of encouraging non-motorized travel can vary widely. Restriping roadways to add bike lanes is inexpensive compared to building dedicated bikeways. In all cases intangible benefits such as safety, reduce travel times and livability may outweigh the monetary costs, but are very difficult to measure (OECD/ IEA, 2001).	-1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	-	0
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	-	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Small effects: positive energy saving and health improvement; negative investment costs.	0

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	-	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	no	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	yes	1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Positive effect. The effect is high compared to the energy saving because heavy poluting small trips in cities are subsituted. More movements with mopeds can decrease the environmental gain.	2
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Yes CO_2 reduction	2
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	Better mobility possibilities for non car owners	1

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Higher costs for roads	1
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	no, but the improvement can also use mobility plans for employers. These plans increase the administrative costs (but have also positive effects).	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	-	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	-	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Can increase non energy consuming transport. Because the mobility increase is non polluting the MCA score is positive	1
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	?	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Substantial change will take time. Infrastructural plants take time: The change can include new bicycle lanes, higher housing densities and exemplified by 'home zones'	-1

		where residential streets are redesigned in favour ofpedestrians and cyclists and where traffic speed is limited to 30 km/h or less (Foley, 2005).	
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Infrastructural measures not easy reversable	1
Monitoring & Verification	Can action be monitored and verified?	Yes, but it takes a lot of small measures to measure an significant effect on country level	1
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Yes; health	2
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Yes, people has to make a (small change) from the car to bicycling or walking, stimulated by better condions for low speed trafel.	2
	Notes		
	Monitoring		
	Verification		
	References:		

T4 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**Transport**	
	Characterization of actions		
	Code/action:	Fuel efficiency part of the costs of company car user	
	MCA Reference:	T4	
	Category:	Transport	
	Directives:	-	
	Subcategory:		
	Objective	More efficient company cars	
	Action:	For company cars the user tax is related to the specific fuel consumption of the car.	
	Current status	The fuel consumption of company car is not paid by the users of company cars. Sometimes they only have to pay income tax related to the selling price of the car.	
	Approach taken	Due to the CO2 related tax the new company cars in the UK are more efficient than the new private cars nowadays. This system can be copied in all EU-countries as to avoid border problems.	
	Estimated Energy Savings	A fleed share of 40% and a reduction of 5% is 2% less of fuel consumption of passenger cars afther a while. (3.3 Mtoe)	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Of all cars sold in the main EU markets in 1999, sales of company cars formed between 35% and 45%. By a change in tax in the UK the emission of het mean company car declined form 178 to 168 g CO_2/km compared with 176 to 174 g/km for private cars in the same period (2002-2004). So a simple measure can reduce consumption with 5%. (COM(2002) 431) (Tarbon, 2005)	2
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	No, unless fuel efficient luxery cars gain market segment in non EU countries	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Yes, because company cars are less sensitive to retail prices this creates a small market market for energy efficient technologies which are still expensive (like hybrid cars)	2
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	The mean effect will be cost effective. If the car price is restricted by the company they will earn money from the lower fuel consumption. In negotiation situations more expensive (and more efficienct) cars can be bought.	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	No	0
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	-	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Small positive effect, due to chepaer cars and less fuel consumption	1

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	-	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	No	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Probably small	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Yes CO2 reduction	2
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No	0

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	-	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Small they have to register the fuel consumption of company cars.	1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	No	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	-	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	It can have aq very small effect on the mobility of the buyers of second-hand company cars.	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The impact is related to new cars entering the park, so the full effect will take 15 years, but because company cars make more km, the effect starts with a fast penetration.	-1

Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	If measure stops the effect will decline in time	0
Monitoring & Verification	Can action be monitored and verified?	Yes	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	-	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	yes; but only when the decision about a new car is made. But besides the decision itself, there is no change in behaviour	0
	Notes		
	Monitoring		
	Verification		
	References:		

T5 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**Transport**	
	Characterization of actions		
	Code/action:	CO_2 emission standard	
	MCA Reference:	T5	
	Category:	Transport	
	Directives:	-	
	Subcategory:	New EU-legislation	
	Objective	New cars having a lower CO_2 emission per km	
	Action:	1) Set maximum CO2 emission standards for different type of cars (absolute, related to specific performance properties, or related to the mean value of all cars sold by one company). 2) More stringent agreement with car and truck producers after 2008-2009.	
	Current status	Voluntary agreement with motor suppliers; Target is CO_2 emissions of new ACEA/JAMA/KAMA passenger cars to be reduced to 140 g CO2/km in 2008/2009. The 5th report is published as COM(2005)69. Status in 2003 164 g/km compared to 186 g/km in 1995	
	Approach taken	New directive which extends some comparable directives already in place on minimum energy efficiency requirements during use. Implementation in Eco design directive (2005/32/EC) is not possible because in het directive cars are excluded.	
	Estimated Energy Savings	If the level would be 120 g CO2/km, the effect might be 14% additional saving to the voluntary agreements. If for other vehicles an effect of 5% could be reached, the energy saving will be 28 Mtoe in 2020 (and 33 Mtoe in 2025).	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The CO_2 emission standard will lead to a substantial reduction in energy use of the transportation sector; depending of the chosen level of 10-30% in 2020.	3

Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Improved efficiency will increase commercial viability. In 2003 the European automobile industry (ACEA) was with 163 g/km already more efficient than JAMA 172 g/km and KAMA 179 g/km.	2
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Strong impulse for new technology development and use of better materials.	2
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	COM(2005)269 gives the producers vision. Both ACEA and JAMA claim in 2003 that - although the technological potential to achieve the Community target of 120 g CO_2/km by 2012 is available, the associated costs would be prohibitive. Market distortions and negative effects on the European economy would also be substantial. They believe that CO_2 reductions equivalent to the Community objective could be achieved in a more cost-efficient manner by using an integrated approach involving the automotive industry and other actors, including public authorities, oil/fuel suppliers, the agriculture sector, customers etc. ACEA nevertheless gave a first indication that a further reduction of 5 % of the average CO_2 emission of the new vehicle fleet between 2008 and 2012 (equal to a target of about 133 g CO_2/km) could be feasible by means of improvements in vehicle technologies. The study of (Harmsen, 2005; page 54) concerning the current voluntary agreement mentiones: "Both France and Germany do not provide data with respect	0
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	Probably more complex cars will be needed which gives a positive impact on employment (no external source)	2
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	No	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Positive: lower oil imports, better export posision for European car producers.	2

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	The cars on the market will changed. Car producers will have to make substantial investments	-2
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	Market competion can be influenced. This can be caused by the substantial differences between carproducers (some make mainly small vehicles other mainly large vehicles). It is not clear what these effect will be and which company will be most influenced. See (SAM, 2005) for the unknown effect of the ACEA agreement. Car producers are companies with large employment, so market shifts will influence employment in member states.	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?		0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	This depends on the chosen technology. For lighter cars or hybrid cars an improvement can be expected (and probably also the emission limits in g/km can be lowered). But an higher share of diesel cars and some improvements of gasoline car engines can increase the emissions of PM10 (ECN).	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	The CO_2 emission standard will lead to a substantial reduction in energy use of the transportation sector.	3
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No effect expected	0
Governance participation, good administration, access to justice, media &	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach?	No effect expected	0

ethics	Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?		
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Car producers will have to match with the standard. This will result in additional administrative costs.	-1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Cars will be more expensive to buy	-2
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	Market competion can be influenced. This can be caused by the substantial differences between carproducers (some make mainly small vehicles other mainly large vehicles). It is not clear what these effect will be and which company will be most influenced. See (SAM, 2005) for the unknown effect of the ACEA agreement. Car producers are companies with large employment, so market shifts will influence employment in member states.	-1
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Due to the lower fuel costs per km some additonal mobility can be expected	-1
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	Tax on new cars will increase but income from fuel tax, and sometimes als the road tax will decrease	-1
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Negative (investment costs will pay back over time)	-1

Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	Positive. Cars will be efficient for there whole lifetime (passenger cars about 15 years; trucks about 10 -12 years). Know how in efficiency will be used for new cars.	2
Monitoring & Verification	Can action be monitored and verified?	Decision No 1753/2000/EC already describes the monitoring for passenger cars	1
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	-	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	-	0
	Notes		
	Monitoring	Decision 1753/2000/EC of the European Parliament and of the Council establishing a scheme to monitor the average specific emissions of CO2 from new passenger cars.	
	Verification		
	References	COM(2004)78 final: Communication from the Commission to the Counsil and the European Parlement Implementing the Community Strategy to Reduce CO_2 Emissions from Cars: Fourth annual report on the effectiveness of the strategy (Reporting year 2002), [SEC(2004)140], 11.02.2004.	
		Harmsen, R., et.al (2003): International CO_2 Policy Benchmark for the Road Transport Sector; Results of a Pilot Study, ECN-C-03-001, ECN and COWI, Petten, February 2003.	
		http://www.ecn.nl/library/reports/2003/c03001.html	
		COM(2005)269: Communication from the Commission to the Council and the European Parliament of 22 June 2005 on implementing the Community strategy to reduce CO_2 emissions from cars: Fifth annual Communication on the effectiveness of the strategy [COM(2005) 269 - Official Journal C 172 of 12.07.2005].	
		http://europa.eu.int/comm/environment/co2/report/com_05_269.pdf	
		Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/94/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and the Council. L191/29, 22 July 2005	
		http://europa.eu.int/comm/enterprise/eco_design/directive_2005_32.pdf	
		Bates, J. et.al. (2001): Economic Evaluation of Sectoral Emission Reduction Objectives for Climate Change; Economic Evaluation of Emissions Reductions in the Transport Sector of the EU; Bottom-up Analysis Final Report (updated version). AEA Technology Environment, Abingdon, United Kingdom, March 2001	
		http://**eu**ropa.**eu**.int/comm/environment/enveco/climate_change/**transport**_update.pdf -	
		SAM (2005): Transparency issues with the ACEA Agreement: are Investors Driving Blindly? SAM Group and World Resources Institute,	

		Zurich, Switzerland, March 2005
		http://www.sam-group.com/downloads/studies/ACEA_Driving_Blindly.pdf
		EC (2000): Decision No 1753/2000/EC of the European Parliament and of the Council of 22 June 2000, establishing a scheme to monitor the average specific emissions of carbon dioxide from new passenger cars. Official Journal L 202, 10/08/2000 P. 0001 - 0013
		http://europa.eu.int/scadplus/leg/en/lvb/l28055.htm

T6 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**Transport**	
	Characterization of actions		
	Code/action:	Vehicle Limitations (engine downsizing)	
	MCA Reference:	T6	
	Category:	Transport	
	Directives:	98/14/EC of 6 February 1998 adapting to technical progress Council Directive 70/156/EEC on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers (Text with EEA relevance)	
	Subcategory:		
	Objective	Reduction of non necessary car mass resulting in more efficient cars	
	Action:	Restricting unneccesary power of car engines by technical devices like maximum speed limiters and/or limitation of maximum acceleration. Or limit the maximum power related to the vehicle weight (or maximum load) for new cars and trucks.	
	Current status	Car speed, car power and car weight still is increasing. Most new cars have a maximum speed of 180-200 km/h, 40% higher than allowed is most EU countries. This results in an inefficient gearbox too. Heavy vehicles have a speed limiter	
	Approach taken	Start high level group with the target of how (and not if) to restrict unneccesary engine power at the detriment of energy efficiency.	
	Estimated Energy Savings	Accoring to (SRU, 2005) engine downsizing combined with a better gearbox can reduce energy use with 10%. Saving potential in 2020 is about , related to gasoline vehicles, in 2020 is at least 11 Mtoe (increasing to 17 Mtoe in 2025)	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	Gasoline and diesel engine attain the best degree of efficiency within a certain performance range. Downsizing and improved transmission aim to ensure that this range is exceeded as rarely as possible. In downsizing, engine capacity reduction forces the engine to work harder. Downsizing is supplemented by forced induction (turbocharging or electronically supported induction) (SRU,2005). It can be followed by reduced vehicle weight and rolling resistance.	3
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Improved efficiency will increase commercial viability.	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Strong impulse for new technology development and use of better materials.	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Yes, engine will be more complex but othjer part of the car can be made lighter	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	-	0
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	-	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	-	0

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Small positive effect can be expected	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	-	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	No	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	It is not clear what the substantial changes in the engine will have for effect on unregulated emissions like PM_{10} for gasoline vehicles..	0
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	The CO_2 emission standard will lead to a substantial reduction in energy use of the transportation sector.	0
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No	0
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	-	0

Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	No	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Yes, driving a car might become cheaper	1
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	No	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Due to the lower fuel cost a small increase in mobility can be expected	-1
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	The design of cars should be changed, this takes time. And when introduced, it takes at least 15 years before complete market penetration is reached.	-3
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	-	0
Monitoring & Verification	Can action be monitored and verified?	Yes	3
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	There ihas been discussion about safety related to the lighter cars resulting from the first USA CAFE measures. It is questionable whether the "arms race" in heavier vehicles to be safer at accidents should not be bend to other forms of	0

		safety measures.	
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Yes, mainly when he decision about a new car is made. But there might be a noticeable cap because some unused and unusefull caracteristics of the new car will differ from the old one.	-1
	Notes		
	Monitoring		
	Verification		
	References:		

T7 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**Transport**	
	Characterization of actions		
	Code/action:	Car Sharing Schemes	
	MCA Reference:	T7	
	Category:	Transport	
	Directives:	-	
	Subcategory:		
	Objective	Decrease single occupant journeys	
	Action:	To encourage car sharing (multi-passenger) schemes	
	Current status	Successful schemes known to exist in US, but an important factor is the quality of public transport (less public transport better results). Over 20 years companies had car sharing programs for their employees. Most succesfull is van pooling to building sites.	
	Approach taken	Investigate existing schemes;	
	Estimated Energy Savings	If the potential is 5% of 25% of the passenger car km, the potential saving in 2020 is 2 Mtoe.	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity	According tot (EEA, 2002) about 25% of passenger travel is for commuting work. And according to (VTPI, 2005c) a well-managed vanpool programs can attract 5-10% of commute trips of more than 30 km in length, and 15-25% of such trips if given significant employer support, financial incentives (such as rider subsidies and parking cash out), High Occupant Vehicles Priority and direct	1

	of generation technology options?	marketing. But the average journey length for commuting in UK and Denmark is around 14 km. So the potential can be estimated at 5%	
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	No	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	No	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	No, companies have to made the effort and employees the profits	-1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	No	0
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	No	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Not substantial	0

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	No, but it can have a positieve effect on employees	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	No. But the government can help with specific "park and pool" parking places. Every car on such a parking place means 30 km less car km.	1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Yes, Better air quality	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	The CO_2 emission will decline	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No	0
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	They might have to simulate companies	0

Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Yes, a car sharing plan for a company is a substantial effort, which also needs substantial "maintenance".	-1
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	Yes, they spend less money in travelling to their work	1
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	No	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Decrease car km	1
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	-	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Yes; the effect can be realized within 5 years	2
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	No, the effect will decrease without proper maintenance	-1
Monitoring & Verification	Can action be monitored and verified?	Difficult. It is hard to see what is the effect of the policy measure and what is autonomous	-1
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	-	0

Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	The empolyee have to share the cart with other persons. There is a decline in freedom and privacy. On the other hand, there is some relaxation because he/she sometimes does not have to drive the car.	-1
	Notes		
	Monitoring		
	Verification		
	References:		

T8 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**Transport**	
	Characterization of actions		
	Code/action:	Modal shift freight transport	
	MCA Reference:	T8	
	Category:	Transport	
	Directives:	-	
	Subcategory:		
	Objective	Change transport to less energy consuming mode	
	Action:	The use of more energy efficient transport modes can be stimulated by infrastructural measure, like more rail for goods transport, building of mode change locations (from truck on trains or ship and vice versa), or locating new business parks nearby rail or water.	
	Current status	Transport with energy efficient modes like train, inland shipping and short see shipping are growing, but truck transport is growing faster. Term 2005 report EEA: "With a 77 % market share, road transport dominates freight transport over land in the EEA Member States	
	Approach taken	Funding for international rail infrastructure, planning of transport-intensive activities near rail or water. Special attention can be given to current obstacles.	
	Estimated Energy Savings	The potential saving is 5% of the energy use of trucks (8 Mtoe)	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	According to an EU workinggroup ist must be possible to shift 10% truck transport to rail and (very minor) inland waterways (JEGTE,2006). According to a CE report (CE, 2003, page 76) the mean energy consumption of a heavy truck varies from 0.83-0.86 MJ/ton km and for a freight train from 0.32 - 0.56 MJ/ton km. So modal shift from road to rail might save 50% of the energy use. There is also energy used in loading and unloading, and sometimes extra km has to be driven.	3
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	-	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	No, but is does stimulate logistic developments.	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Yes, if the government is responsible for the costs of the infrastructure	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	There will be a decline in the number of truck drivers, on the other hand, there will be addition jobs in transhipment companies and in rail and rail related companies	-1
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	No	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Positive, transport cost will be lower.	0

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	Positive, transport cost will be lower.	1
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	-	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Yes, if the government is responsible for the costs of the infrastructure	-2
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	The substantial reduction in truck km will have a positive effect. But the effect can be offset by the use of diesel locomotives or ships with substantial higher emissions levels	1
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	The CO_2 emission will decline	3
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No	0

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	Additional responsibility for (more) infrastructure	-1
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Yes, but they are cost effective.	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	No	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	No	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	No	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	No	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	New infrastructure cost time, but better use of existing infrastructure can be on short term	-1

Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	-	0
Monitoring & Verification	Can action be monitored and verified?	Yes	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	Less traffic acidents	2
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	Transportation companies has to change there way of thinking.	1
	Notes		
	Monitoring		
	Verification		
	References:		

T9 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**Transport**	
	Characterization of actions		
	Code/action:	Increased fuel tax & Financial Incentives for buying efficient vehicles	
	MCA Reference:	T9	
	Category:	Transport	
	Directives:	2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity (Text with EEA relevance)	
	Subcategory:		
	Objective	Decrease fuel use & Influence consumers with financial incentives to buy more efficient cars	
	Action:	Decrease fuel use by making fuel more expensive. By making the differences between countries less, the incentive of buying cheap fuel across the boarder will decrease. A lower car tax can be introduced when an efficient car is bought,or a financial penalty which make the buying of a less efficient (second hand) car much more expensive. Or a bigger difference in road tax related to the fuel consumption of a car. Even a km charge can be fuel economy dependent.	
	Current status	Minimum fuel tax from EU in place. In some countries fuel tax is much higher. Tax incentives for purchase of efficient cars in place in some EU countries	
	Approach taken	Increase tax levels in all EU-countries to close the gap between countries (possibly compensated by lowering other car taxes). Could be stimulated by a new directive: of the EU on stimulating the buying of efficient cars. Each country may choose their own way in this as long as targets for shifts are realiased.	

	Estimated Energy Savings	The short term effect of a substantial (!) change can be 12 Mtoe. If also truck diesel is increased this might rase to 15 Mtoe. A car park effect of 4% might increase the effect to 22 mtoe.	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	In a document with transport options for the Netherlands the effect is given for a combination of several tax options, including a substantial higher fuel tax (Brink, 2003). The package is buget neutral for passenger cars. The higher tax is not transfered to trucks because the package contains the introduction of a specific truck-diesel (without a higher tax). The short term reduction is 7% for passenger cars (mainly related to less passenger car km). A shift in car tax, towards CO2 based, can reduce CO2 emissions for new cars with 2-6% (page 138).	3
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Improved efficiency will increase commercial viability.	2
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Impulse for new fuel efficient technology development.	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Yes, finaly the sector will gain from the energy saving.	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	No	0
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	No	0

Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	-	0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	-	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	No	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	Yes. The source of the budget is substantially changed. Because the effect of the changes is influenced by the reaction of the cities, this can result in less tax income.	-1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Less mobility is less emissions	3
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	The mobility reduction will lead to a substantial reduction in CO_2 emissions	3
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	No. Because cars will become cheaper (and using them more expensive), inequality will be less	1

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	-	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	-	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	-	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	-	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	Normaly a tax change which results in more cars can have a mobility effect, but in this case driving becomes more expensive (so more cars, but less km per car).	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	-	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	yes	3

Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	no, as long as the measure is taken.	0
Monitoring & Verification	Can action be monitored and verified?	yes	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	There might be an small increase in demand for parking places. Also the demand for public transport can increase.	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	The measure will have a sbustantial effect on people at het gasoline stations. Because the hihg prices will reduce their mobilty. Small effect in more use of public transport and less passenger car km.	-1
	Notes		
	Monitoring		
	Verification		
	References:		

T10 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**Transport**	
	Characterization of actions		
	Code/action:	Tyres more energy efficient	
	MCA Reference:	T10	
	Category:	Transport	
	Directives:	98/14/EC of 6 February 1998 adapting to technical progress Council Directive 70/156/EEC on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers (Text with EEA relevance)	
	Subcategory:		
	Objective	Reduction of fuel use by less rolling resistance	
	Action:	An EU broad policy for fuel efficient tyres, tyre pressure indicators (dashboard tyre pressure sensors mandatory on cars and freight vehicles, valve pressure indicators compulsory on existing vehicles tyres from 2010) and free facilities at service stations	
	Current status	At this moment no information about the energy efficiency of there tyres is available for the public. The subject is under discussion. In 2005 a IEA workshop was held on Energy Efficient Tyres.	
	Approach taken	More stringent demands for tyres in directive 98/14/EC. New directive for tyre efficiency labeling	
	Estimated Energy Savings	The saving by fuel efficient tyres at the right presure is estimated, for light duty vehicles at 5% (4-6.5). Ith the same figure can be used for trucks the potential energy saving is 17 Mtoe	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The Tyre and Rubber manufactures (BLIC,2005) sees 5 energy saving options relasted to tyres of light-duty vehicles: Tyre sizing by the car producer, Tyre design (3-4%), Tyre inflation pressure maintenance (1-2,5% if always on the right pressure) and road pavement roughess (3-7% increase if road surface is not smooth)	3
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	Export of better tyres	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Yes, in tyre production, but also in pressure indicators	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Yes	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	No	0
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	No	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	Small positive effect	0

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	-	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	-	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	-	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	Less energy use is less emissions. (emission of particulates form tyres can change also)	2
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	The energy saving will lead to a substantial reduction in CO_2 emissions	3
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	-	0
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	-	0

Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	-	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	They may reduce their fuel costs for their car	1
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	-	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	-	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	-	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Not clear of the energy efficient tyre is market ready	1
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	No	0
Monitoring & Verification	Can action be monitored and verified?	Yes	2
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	-	0

Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	The user of the car has to look at the presure of the tyres.	0
	Notes		
	Monitoring		
	Verification		
	References:		

T11 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**Transport**	
	Characterization of actions		
	Code/action:	Public Procurement of efficient vehicles	
	MCA Reference:	T11	
	Category:	Transport	
	Directives:	-	
	Subcategory:		
	Objective	Small saving but governmental example of the use of efficient cars	
	Action:	Procurement by government giving a good example by buying efficient technology with a longer pay back period or by joining technology test projects. Furthermore it is possible to use only energy efficient company cars (for instance only A and B labelled passenger cars)	
	Current status	In some countries initiatives for buying energy efficient cars. A lot of technology projects with in daily practise testing of new technology (often busses) have participation of local authorities.	
	Approach taken	Learn from current country experiences. Can also be extended to EU owned vehicles.	
	Estimated Energy Savings	If energy use would be a main factor in bying new "public" vehicles (for instanst 10% more eficfficient pasenger cars) the energy use in 2020 can be reduced with 3 Mtoe.	
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**

Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	The government buys 1% of the new cars, 5% of the vans, 10% of the heavy duty vehicles and about 55% of the busses.	1
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	-	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	Innovation in energy efficient busses and vans can be stimulated.	1
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	Yes	1
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	-	0
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	-	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	-	0

Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	-	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	-	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	The costs of passenger cars can be lower. But for energy efficient busses and vans the costs might increase	1
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?		0
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	Lower CO2 emissions	1
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	-	0

Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	-	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	Because the buses for public transport are not always governmental property, the contracts with the bus companies has to be changes and energy efficiency standards had to be added.	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	-	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	-	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	-	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	The bying of new vehicles must become more fuel efficient	-1
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	Yes	2

Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	No	0
Monitoring & Verification	Can action be monitored and verified?	Difficult, because it is abouyt a lot of cars	1
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	-	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	-	0
	Notes		
	Monitoring		
	Verification		
	References:		

T12 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)			
	Multi-Criteria Analysis Matrix of Actions - Supporting Information		
	Category:	**Transport**	
	Characterization of actions		
	Code/action:	Modal split passenger transport	
	MCA Reference:	T12	
	Category:	Transport	
	Directives:	-	
	Subcategory:		
	Objective	Impact Aviation	
	Action:	To be decided	
	Current status	To be decided	
	Approach taken	To be decided	
	Estimated Energy Savings		
Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generation technology options?	0	

Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	0
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	0
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the market? Is the marketing of products limited or prohibited? Will it directly lead to the closing down of businesses?	0

Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	0
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	0
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	0
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in regard to their responsibilities? Does the option make the public better informed about a particular issue? Does it affect the public's access to information?	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	0

Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / households, both immediately and in the long run?	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	0
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	0
Monitoring & Verification	Can action be monitored and verified?	0
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	0

Notes

Monitoring

Verification

References:

T13 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: **Transport**

Characterization of actions

Code/action:	Aviation Action (fuel tax)
MCA Reference:	T13
Category:	Transport
Directives:	-
Subcategory:	
Objective	Impact Aviation
Action:	To be decided
Current status	To be decided
Approach taken	To be decided
Estimated Energy Savings	

Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generatio	0	
Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	0	

Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	0
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	0
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the mark	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	0
Government budget	Does the actions require substantial financial support at the cost of the government budget?	0

Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	0
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	0
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	0
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in r	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / househ	0
Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	0

Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	0
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	0
Monitoring & Verification	Can action be monitored and verified?	0
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	0

Notes

Monitoring

Verification

References:

T14 Supporting Evidence

Impact Assessment on the Future Action Plan for Energy Efficiency (CLWP: 2006/TREN/032)		

Multi-Criteria Analysis Matrix of Actions - Supporting Information

Category: Transport

Characterization of actions

Code/action:	Use Galileo satelitte navigation
MCA Reference:	T14
Category:	Transport
Directives:	-
Subcategory:	
Objective	Impact Aviation
Action:	To be decided
Current status	To be decided
Approach taken	To be decided
Estimated Energy Savings	The energy saving is the result from other measure using the data of the satelittes

Assessment criteria	**Details**	**Scoring Narrative**	**MCA Score**
Security of Supply	Does the action have an impact on the security of energy supply in the EU? Does the action increase the divergence of energy sources to suppliers? Does the action impact on the risk of supply disruption? Does the action increase the diversity of generatio		0

Competitiveness, trade and investment flows	Does the option have an impact on the competitive position of EU firms in comparison with their non-EU rivals? Does it provoke cross-border investment flows (including relocation of economic activity)?	0
Innovation and research	Does the option stimulate or hinder research and development? Does it facilitate the introduction and dissemination of new production methods, technologies and products? Does it promote greater resource efficiency?	0
Cost Effectiveness	Is action cost effective for the target sector in economic terms?	0
Employment & labour markets	Does the option facilitate new job creation or leads directly to a loss of jobs? Does it affect the demand for labour?	0
Market Barriers	Does the action impact on known market barriers to implementation? Will the measure impose additional market barriers for selected sectors?	0
Macroeconomic Environment	What are the overall consequences of the option for economic growth and employment? Does it contribute to improving the conditions for investment and for the proper functioning of markets?	0
Operating costs and conduct of business	Does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)? Does it affect access to finance? Does it impact on the investment cycle? Will it entail the withdrawal of certain products from the mark	0
Competition in the internal market	Does the option affect EU competition policy and the functioning of the internal market?	0

Government budget	Does the actions require substantial financial support at the cost of the government budget?	0
Air Quality	Does the option have an effect on emissions of acidifying, eutrophying, photochemical or harmful air pollutants that might affect human health, damage crops or buildings or lead to deterioration in the environment (polluted soil or rivers etc)?	0
The Climate	Does the option affect the emission of ozone-depleting substances (CFCs, HCFCs, etc.) and greenhouse gases (e.g. carbon dioxide, methane etc) into the atmosphere?	0
Social inclusion & protection of particular groups	Does it lead directly or indirectly to greater in/equality? Does the option make the public better informed about a particular issue?	0
Governance participation, good administration, access to justice, media & ethics	Does the option affect the involvement of stakeholders in issues of governance as provided for in the Treaty and the new governance approach? Does the implementation of the proposed measures affect public institutions and administrations, for example in r	0
Administrative costs on businesses	Does the option impose additional administrative requirements on businesses or increase administrative complexity? Do these costs weigh in relative terms heavily on SMEs (Small and Medium Enterprises)?	0
Consumers & Households	Does it have an impact on the quality and availability of the goods/services they buy, and on consumer choice? (cf. in particular non-existing and incomplete markets Does it have significant consequences for the financial situation of individuals / househ	0

Specific Regions or Sectors	Does the option have significant effects on certain sectors? Will it have a specific impact on certain regions, for instance in terms of jobs created or lost? Does it have specific consequences for SMEs?	0
Mobility and the use of energy	Will it increase or decrease the demand for transport (passenger or freight), or influence its modal split?	0
Public Authorities	Does the option require significant establishing new or restructuring existing public authorities?	0
Short time for effect	Does the action have a significant immediate or quick impact following implementation?	0
Persistence	Does the action achieve a persistent affect? Does the action irreversibly transform the market?	0
Monitoring & Verification	Can action be monitored and verified?	0
Tangible Added value of measure	Whether action has material other benefits not covered elsewhere that should be included?	0
Change in behaviour of end user	Does action promote change in end user behaviour? Is action likely to significantly impact on end-user behaviour.	0
	Notes	

Monitoring

Verification

References:

Appendix 7 – Energy Saving Estimate Methodology (18 Policy Options)

Non Narrative Energy Savings Estimations

Referenced as "See Separate sheet" in MCA Supporting Sheets

Introduction

Primary energy savings are calculated either in the MCA sheets using a narrative method leading to a Mtoe saving.

Alternatively where there is insufficient supporting evidence found, we have used the PRIMES baseline scenarios as input data and applied the following method.

From technical saving potential to policy savings estimate per action

The savings figure in Mtoe for each action has been estimated from data on the technical savings potential and a number of discounting factors.

Technical savings potential (TSP)
The technical savings potential is defined as follows: for a specified energy application all energy using systems (including buildings) are replaced at once by the energy-efficient version. E.g. for space heating in existing dwellings all dwellings are insulated according to chosen standards and supplied with a high efficiency boiler.

Discounting factors
a. Stock-effect
The number of systems to be replaced decreases in time. For instance, for the energy application "space heating in existing dwellings" the gradual demolition decreases the stock of existing buildings and thus the saving potential in a future year.

b. Replacement-moment
Most energy-efficient versions can only be implemented at the normal replacement moment, e.g. during renovation of buildings every 30 years, or at the moment of buying a new refrigerator every 10 year. The replacement-rate defines the possible savings potential in future years.

c. Implementation-barriers
Assuming that the saving option is available in the market, the decision maker(s) should have knowledge of the saving option and should be motivated to make the right decision at the moment of replacement. This will depend on costs and benefits to the decision maker(s), but other factors, such as social pressure, can play a role too. Due to differences in circumstances and differences between decision makers only part of the technical potential will be realized. Policy measures, such as information, subsidies, energy taxes and voluntary agreements can influence the decision. Only in case of standards or other obligations full implementation can be assumed.

d. Other restrictions
Apart from knowledge and incentives to choose the efficient saving option other restrictions can limit the implementation. For instance the split-incentive issue for landlords and tenant, lack of space, lack of financing, monuments not to be adapted, etc. Due to these restrictions part of the saving potential will not be realized, but some of these restrictions can be lifted by additional policy measures.

e. Interaction between saving effects
The actual saving effect can depend on the implementation of other saving options. E.g. insulation measures will save less fuel when a condensing boiler is installed at the same time, and vice versa. Electricity savings will save less primary fuels when the conversion efficiency of power plants increases. However, more efficient electric appliances can increase the potential for fuel savings in space heating, due to their lower waste heat production.

f. Overlap between policy measures
The saving effects of various policy measures should not be summed up automatically, as often the combined effect is lower than the sum due to overlapping effects. For instance the effect of the EPBD-directive on standards and certificates for buildings will overlap with the effect of a white certificate scheme that focuses on buildings too.

Policy savings estimate (PSE)
All discounting factors will decrease the energy savings to be actually realized with support of policy measures. This can be highlighted in the following formula:

PSE = (TSP * Stock-factor * Replace-factor * Implement-factor) – (Restrictions - Interact-savings - Interact-policy)

The PSE factor is then applied to the relevant sector energy consumptions derived from the PRIMES energy balance to give a Mtoe estimate.

The following sheets give the PRIMES energy balances used as source data together with the calculation sheet prepared for each non-narrative energy saving estimation.

Table 1 – PRIMES ENERGY BALANCE A

EU25: Baseline scenario													SUMMARY ENERGY BALANCE AND INDICATORS (A)
ktoe	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**'90-'00**	**'00-'10**	**'10-'20**	**'20-'30**
										Annual % Change			
Primary Production	**877543**	**896935**	**898598**	**885035**	**836417**	**741088**	**706521**	**691711**	**685103**	**0.2**	**-0.7**	**-1.7**	**-0.3**
Solids	351650	264403	204139	189650	154528	132849	131082	128136	120197	-5.3	-2.7	-1.6	-0.9
Oil	120396	162231	163631	134107	117178	75189	52958	47721	43449	3.1	-3.3	-7.6	-2.0
Natural gas	139723	174169	196665	197203	172179	124785	98349	88938	79806	3.5	-1.3	-5.4	-2.1
Nuclear	196920	215258	237664	251349	248776	241224	228638	204708	210808	1.9	0.5	-0.8	-0.8
Renewable energy sources	68855	80874	96499	112726	143756	167041	195493	222207	230843	3.4	4.1	3.1	1.7
Hydro	23391	26285	28982	28900	29878	31273	32203	33306	33881	2.2	0.3	0.8	0.5
Biomass & Waste	42151	50608	61865	72595	92408	108094	129192	145563	148880	3.9	4.1	3.4	1.4
Wind	67	351	1913	6492	15786	21012	26241	34291	37942	39.8	23.5	5.2	3.8
Solar and others	145	273	417	1047	1490	2036	2747	3560	4394	11.2	13.6	6.3	4.8
Geothermal	3101	3357	3322	3692	4194	4626	5111	5488	5747	0.7	2.4	2.0	1.2
Net Imports	**711300**	**701364**	**801061**	**903659**	**1024274**	**1166612**	**1231690**	**1243441**	**1265567**	**1.2**	**2.5**	**1.9**	**0.3**
Solids	75449	73961	94307	115387	132287	131963	128394	152744	172919	2.3	3.4	-0.3	3.0
Oil	510017	490616	518147	560229	599698	647165	669865	655402	652449	0.2	1.5	1.1	-0.3
- Crude oil and Feedstocks	479112	471342	496826	520227	561357	611061	636674	626020	626250	0.4	1.2	1.3	-0.2
- Oil products	30905	19274	21321	40002	38341	36104	33190	29382	26199	-3.6	6.0	-1.4	-2.3
Natural gas	123653	135413	186463	225528	290053	385355	431310	433152	437996	4.2	4.5	4.0	0.2
Electricity	2181	1373	2144	2515	2237	2128	2122	2143	2202	-0.2	0.4	-0.5	0.4
Detailed Results													
Gross Inland Consumption	**1556194**	**1571949**	**1653841**	**1743574**	**1812532**	**1856993**	**1885336**	**1881055**	**1895237**	**0.6**	**0.9**	**0.4**	**0.1**
Solids	431944	345411	306538	305037	286815	264812	259476	280880	293117	-3.4	-0.7	-1.0	1.2
Oil	595746	621073	634711	649216	668717	671648	669948	649026	640465	0.6	0.5	0.0	-0.4
Natural gas	260548	307959	376284	422731	462231	510141	529659	522090	517802	3.7	2.1	1.4	-0.2
Nuclear	196920	215258	237664	251349	248776	241224	228638	204708	210808	1.9	0.5	-0.8	-0.8
Electricity	2181	1373	2144	2515	2237	2128	2122	2143	2202	-0.2	0.4	-0.5	0.4
Renewable energy forms	68855	80874	96499	112726	143756	167041	195493	222207	230843	3.4	4.1	3.1	1.7
as % in Gross Inland Consumption													
Solids	27.8	22.0	18.5	17.5	15.8	14.3	13.8	14.9	15.5				
Oil	38.3	39.5	38.4	37.2	36.9	36.2	35.5	34.5	33.8				
Natural gas	16.7	19.6	22.8	24.2	25.5	27.5	28.1	27.8	27.3				
Nuclear	12.7	13.7	14.4	14.4	13.7	13.0	12.1	10.9	11.1				
Renewable energy forms	4.4	5.1	5.8	6.5	7.9	9.0	10.4	11.8	12.2				
Electricity Generation in GWh$_e$	**2455674**	**2608843**	**2900835**	**3177346**	**3483186**	**3764508**	**4005775**	**4212062**	**4366599**	**1.7**	**1.8**	**1.4**	**0.9**
Nuclear	780056	864404	921193	974239	964265	934990	886207	793447	817092	1.7	0.5	-0.8	-0.8
Hydro & wind	272788	309719	359249	412484	532544	610454	683851	792163	843723	2.8	4.0	2.5	2.1
Thermal (incl. biomass)	1402830	1434720	1620392	1790623	1986376	2219064	2435718	2626452	2705784	1.5	2.1	2.1	1.1

Fuel Inputs for Thermal Power Generation [1]	**355362**	**352353**	**385987**	**410276**	**432241**	**449791**	**462771**	**484113**	**490038**	**0.8**	**1.1**	**0.7**	**0.6**
Solids	246377	220956	214488	224313	214950	197852	198501	223929	240311	-1.4	0.0	-0.8	1.9
Oil (including refinery gas)	48954	48762	41870	34457	31633	28252	23312	21168	19795	-1.6	-2.8	-3.0	-1.6
Gas	47057	65292	105480	122896	152826	182201	182731	167191	155248	8.4	3.8	1.8	-1.6
Biomass & Waste	10201	14351	21211	25403	29147	37365	53619	66833	69424	7.6	3.2	6.3	2.6
Geothermal heat	2774	2992	2939	3206	3685	4122	4608	4992	5260	0.6	2.3	2.3	1.3
Hydrogen - Methanol	0	0	0	0	0	0	0	0	0				
Fuel Input in other transformation proc.	**797634**	**778572**	**796450**	**784166**	**812897**	**820512**	**824096**	**805340**	**797066**	**0.0**	**0.2**	**0.1**	**-0.3**
Refineries	642275	675873	710448	705360	728921	733607	734024	715010	708102	1.0	0.3	0.1	-0.4
Biofuels and hydrogen production	2	198	637	5802	16792	23650	31004	34715	36375	81.7	38.7	6.3	1.6
District heating	31035	22310	17261	14918	15251	14747	13819	13938	14736	-5.7	-1.2	-1.0	0.6
Others	124322	80191	68104	58086	51932	48508	45249	41677	37853	-5.8	-2.7	-1.4	-1.8
Energy Branch Consumption	**73032**	**79401**	**80377**	**80698**	**81498**	**81525**	**81166**	**79313**	**78134**	**1.0**	**0.1**	**0.0**	**-0.4**
Non-Energy Uses	**94476**	**103521**	**105950**	**105233**	**107847**	**109684**	**111200**	**111744**	**112165**	**1.2**	**0.2**	**0.3**	**0.1**
Final Energy Demand	**1021913**	**1035507**	**1095359**	**1168130**	**1238006**	**1291672**	**1338504**	**1359581**	**1370453**	**0.7**	**1.2**	**0.8**	**0.2**
by sector													
Industry[1]	341087	316738	330062	339213	356420	372190	382402	388453	391565	-0.3	0.8	0.7	0.2
- energy intensive industries	216809	203107	211616	214509	220760	226326	228392	227150	224932	-0.2	0.4	0.3	-0.2
- other industrial sectors	124278	113631	118446	124704	135661	145864	154010	161303	166633	-0.5	1.4	1.3	0.8
Residential	261006	274620	273302	294612	311966	327949	338741	346027	351285	0.5	1.3	0.8	0.4
Tertiary	146622	149313	158975	173698	188487	201207	211856	219031	225316	0.8	1.7	1.2	0.6
Transport	273198	294836	333020	360607	381133	390326	405505	406070	402286	2.0	1.4	0.6	-0.1
by fuel [1]													
Solids	123937	79722	56633	50602	45201	42330	39419	37162	34024	-7.5	-2.2	-1.4	-1.5
Oil	428121	446290	468312	497166	517341	523867	529895	521728	511836	0.9	1.0	0.2	-0.3
Gas	200242	227244	251885	269385	279174	295721	309725	315455	321396	2.3	1.0	1.0	0.4
Electricity	176468	187817	211352	233767	259310	282344	302918	321035	334043	1.8	2.1	1.6	1.0
Heat (from CHP and District Heating)	63092	59882	68712	74218	80178	83573	87693	91661	95327	0.9	1.6	0.9	0.8
Other	30053	34552	38465	42992	56802	63837	68855	72540	73827	2.5	4.0	1.9	0.7
CO2 Emissions (Mt of CO2)	**3776.1**	**3637.2**	**3674.1**	**3803.2**	**3881.9**	**3911.9**	**3928.6**	**3955.2**	**3955.0**	**-0.3**	**0.6**	**0.1**	**0.1**
Power generation/District heating	1362.6	1268.0	1294.9	1341.9	1361.9	1348.2	1333.3	1390.3	1424.0	-0.5	0.5	-0.2	0.7
Energy Branch	141.5	161.5	144.9	126.5	123.9	120.5	113.9	104.7	99.7	0.2	-1.6	-0.8	-1.3
Industry	698.9	611.0	567.7	576.4	577.0	592.7	595.2	584.0	569.8	-2.1	0.2	0.3	-0.4
Residential	506.1	485.6	452.1	467.7	482.7	493.9	494.9	489.6	486.7	-1.1	0.7	0.3	-0.2
Tertiary	274.2	254.7	244.6	251.8	261.8	269.6	275.8	278.4	281.9	-1.1	0.7	0.5	0.2
Transport	792.7	856.5	969.9	1038.8	1074.6	1087.0	1115.5	1108.1	1092.9	2.0	1.0	0.4	-0.2
CO2 Emissions Index (1990=100)	**100.0**	**96.3**	**97.3**	**100.7**	**102.8**	**103.6**	**104.0**	**104.7**	**104.7**				

Source: PRIMES

TABLE 2 – PRIMES ENERGY BALANCE SUMMARY B

EU25: Baseline scenario													SUMMARY ENERGY BALANCE AND INDICATORS (B)
	1990	1995	2000	2005	2010	2015	2020	2025	2030	'90-'00	'00-'10	'10-'20	'20-'30
										Annual % Change			
Main Energy System Indicators													
Population (Million)	440.788	448.121	452.915	458.842	464.054	467.306	469.270	470.057	469.365	0.3	0.2	0.1	0.0
GDP (in 000 MEUR'00)	7294.7	7794.0	8947.0	9715.5	10946.8	12304.8	13656.3	14963.7	16051.4	2.1	2.0	2.2	1.6
Gross Inl. Cons./GDP (toe/MEUR'00)	213.3	201.7	184.8	179.5	165.6	150.9	138.1	125.7	118.1	-1.4	-1.1	-1.8	-1.6
Gross Inl. Cons./Capita (toe/inhabitant)	3.53	3.51	3.65	3.80	3.91	3.97	4.02	4.00	4.04	0.3	0.7	0.3	0.1
Electricity Generated/Capita (kWh/inhabitant)	5571	5822	6405	6925	7506	8056	8536	8961	9303	1.4	1.6	1.3	0.9
Carbon intensity (t of CO_2/toe of GIC)	2.43	2.31	2.22	2.18	2.14	2.11	2.08	2.10	2.09	-0.9	-0.4	-0.3	0.0
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.57	8.12	8.11	8.29	8.37	8.37	8.37	8.41	8.43	-0.5	0.3	0.0	0.1
CO_2 Emissions to GDP (t of CO_2/MEUR'00)	517.7	466.7	410.7	391.5	354.6	317.9	287.7	264.3	246.4	-2.3	-1.5	-2.1	-1.5
Import Dependency %	44.7	43.6	47.2	50.5	55.0	61.2	63.5	64.3	64.9	0.0	0.0	0.0	0.0
Energy intensity indicators (1990=100)													
Industry (Energy on Value added)	100.0	90.8	83.8	82.2	77.3	71.9	66.7	61.9	58.5	-1.7	-0.8	-1.5	-1.3
Residential (Energy on Private Income)	100.0	99.4	85.8	84.9	80.4	75.6	70.6	66.0	62.5	-1.5	-0.7	-1.3	-1.2
Tertiary (Energy on Value added)	100.0	93.3	84.9	83.7	79.6	74.8	70.6	66.4	63.4	-1.6	-0.7	-1.2	-1.1
Transport (Energy on GDP)	100.0	101.0	99.4	99.1	93.0	84.7	79.3	72.5	66.9	-0.1	-0.7	-1.6	-1.7
Carbon Intensity indicators													
Electricity and Steam production (t of CO_2/MWh)	0.41	0.32	0.30	0.28	0.27	0.25	0.23	0.23	0.23	-3.2	-1.1	-1.4	-0.1
Final energy demand (t of CO_2/toe)	2.22	2.13	2.04	2.00	1.94	1.89	1.85	1.81	1.77	-0.9	-0.5	-0.4	-0.4
Industry	2.05	1.93	1.72	1.70	1.62	1.59	1.56	1.50	1.46	-1.7	-0.6	-0.4	-0.7
Residential	1.94	1.77	1.65	1.59	1.55	1.51	1.46	1.41	1.39	-1.6	-0.7	-0.6	-0.5
Tertiary	1.87	1.71	1.54	1.45	1.39	1.34	1.30	1.27	1.25	-1.9	-1.0	-0.6	-0.4
Transport	2.90	2.90	2.91	2.88	2.82	2.78	2.75	2.73	2.72	0.0	-0.3	-0.2	-0.1
Electricity and steam generation													
Generation Capacity in MW_e			**661750**	**725717**	**810507**	**866290**	**942581**	**1029203**	**1096292**		**2.0**	**1.5**	**1.5**
Nuclear			141082	137466	136430	125468	116936	96762	101216		-0.3	-1.5	-1.4
Hydro (pumping excluded)			97168	99690	103934	106792	108617	110905	112201		0.7	0.4	0.3
Wind			12785	37711	78392	103006	127624	164342	182931		19.9	5.0	3.7
Solar			176	773	1658	2918	4850	7277	10364		25.1	11.3	7.9
Thermal			410539	450077	490094	528106	584554	649917	689580		1.8	1.8	1.7
of which cogeneration units			112958	135302	150870	174826	208961	234795	247999		2.9	3.3	1.7
Solids fired			188879	186736	156536	143186	156806	187936	211236		-1.9	0.0	3.0
Gas fired			131875	170919	245438	287293	321208	344356	360134		6.4	2.7	1.2
Oil fired			74302	74986	66049	59647	47930	41086	34966		-1.2	-3.2	-3.1
Biomass-waste fired			14462	16090	20714	36581	57094	74936	81601		3.7	10.7	3.6
Fuel Cells			0	0	0	0	0	0	0				
Geothermal heat			1022	1346	1356	1398	1517	1602	1643		2.9	1.1	0.8

Indicators													
Efficiency for thermal electricity production (%)			36.1	37.5	39.5	42.4	45.3	46.7	47.5	0.0	0.0	0.0	0.0
Load factor for gross electric capacities (%)			50.0	50.0	49.1	49.6	48.5	46.7	45.5	0.0	0.0	0.0	0.0
CHP indicator (% of electricity from CHP)			14.5	16.4	17.9	19.9	21.8	23.6	24.3	0.0	0.0	0.0	0.0
Non fossil fuels in electricity generation (%)			46.5	46.1	45.8	45.2	45.6	45.7	46.3	0.0	0.0	0.0	0.0
- nuclear			31.8	30.7	27.7	24.8	22.1	18.8	18.7	0.0	0.0	0.0	0.0
- renewable energy forms			14.7	15.4	18.1	20.3	23.4	26.9	27.6	0.0	0.0	0.0	0.0
Transport sector													
Passenger transport activity (Gpkm)	**4640.8**	**4934.2**	**5466.3**	**5893.0**	**6449.4**	**6935.8**	**7402.0**	**7792.2**	**8130.2**	**1.7**	**1.7**	**1.4**	**0.9**
Public road transport	504.1	463.0	480.1	484.4	495.0	487.5	480.6	474.4	466.7	-0.5	0.3	-0.3	-0.3
Private cars and motorcycles	3529.3	3857.5	4253.1	4580.5	5016.6	5408.2	5780.7	6090.1	6358.6	1.9	1.7	1.4	1.0
Rail	411.9	369.4	402.7	422.0	446.4	462.3	478.5	493.7	505.6	-0.2	1.0	0.7	0.6
Aviation	166.3	212.5	296.9	369.7	451.6	535.2	616.7	686.1	749.7	6.0	4.3	3.2	2.0
Inland navigation	29.2	31.9	33.6	36.4	39.7	42.6	45.5	47.8	49.5	1.4	1.7	1.4	0.9
Travel per person (km per capita)	10528	11011	12069	12843	13898	14842	15773	16577	17322	1.4	1.4	1.3	0.9
Freight transport activity (Gtkm)	**1753.9**	**1854.3**	**2131.5**	**2321.3**	**2582.2**	**2815.7**	**3048.7**	**3257.9**	**3431.9**	**2.0**	**1.9**	**1.7**	**1.2**
Trucks	1034.1	1230.4	1486.3	1655.9	1891.2	2098.8	2311.7	2499.5	2657.4	3.7	2.4	2.0	1.4
Rail	461.7	358.5	374.2	386.8	402.0	413.8	421.4	431.4	438.9	-2.1	0.7	0.5	0.4
Inland navigation	258.1	265.4	271.0	278.5	289.0	303.2	315.6	327.0	335.6	0.5	0.6	0.9	0.6
Freight activity per unit of GDP (tkm/000 Euro'00)	240	238	238	239	236	229	223	218	214	-0.1	-0.1	-0.5	-0.4
Energy demand in transport (ktoe)	**273198**	**294836**	**333020**	**360607**	**381133**	**390326**	**405505**	**406070**	**402286**	**2.0**	**1.4**	**0.6**	**-0.1**
Public road transport	7841	6960	7018	7015	7020	6707	6274	5794	5320	-1.1	0.0	-1.1	-1.6
Private cars and motorcycles	138202	146118	158349	169295	170177	164449	168901	166483	159851	1.4	0.7	-0.1	-0.5
Trucks	82444	92357	108068	119824	135648	148374	156830	162445	164385	2.7	2.3	1.5	0.5
Rail	9066	8814	8897	8872	8307	7236	6518	6164	6019	-0.2	-0.7	-2.4	-0.8
Aviation	28932	33702	45320	50029	54174	57511	60777	58885	60358	4.6	1.8	1.2	-0.1
Inland navigation	6714	6884	5368	5571	5808	6048	6205	6300	6352	-2.2	0.8	0.7	0.2
Efficiency indicator (activity related)													
Passenger transport (toe/Mpkm)	39.3	39.4	39.9	39.7	37.0	33.9	32.7	30.4	28.4	0.1	-0.8	-1.2	-1.4
Freight transport (toe/Mtkm)	51.7	54.2	53.9	54.6	55.3	55.2	53.7	52.0	49.9	0.4	0.3	-0.3	-0.7

(1)EUROSTAT Energy Balances do not take into account non-marketed steam, i.e. steam generated -either in boilers or in CHP plants- and used on site by industrial consumers. Using statistical information provided by EUROSTAT on CHP, the non-marketed steam generated in CHP units as well as the corresponding fuel input have been estimated for this study. Steam has been attributed to the demand side and the fuel input to the supply side. This approach ensures a better comparability of historical figures with the projections. However, slight differences exist for certain figures related to steam generation -both in terms of final energy demand and transformation input- in this report compared to EUROSTAT energy balances.

Source: PRIMES

TABLE 3 – PRIMES BASELINE SCENARIO - INDUSTRY

EU25: Baseline scenario													INDUSTRY
	1990	1995	2000	2005	2010	2015	2020	2025	2030	'90-'00	'00-'10	'10-'20	'20-'30
										Annual % Change			
Sectoral Value Added (in 000 MEuro'00)	**1459.69**	**1493.35**	**1685.13**	**1765.55**	**1974.08**	**2216.19**	**2454.43**	**2683.64**	**2863.49**	**1.4**	**1.6**	**2.2**	**1.6**
Iron and steel	48.70	49.16	43.49	45.33	47.77	50.22	52.40	54.15	55.36	-1.1	0.9	0.9	0.6
Non ferrous metals	18.30	18.37	21.27	23.34	25.66	28.14	30.46	32.42	33.95	1.5	1.9	1.7	1.1
Chemicals	139.14	160.60	183.62	203.28	236.54	273.10	308.88	343.54	371.67	2.8	2.6	2.7	1.9
Non metallic minerals	70.13	72.69	79.55	82.23	89.06	97.65	105.89	113.13	118.56	1.3	1.1	1.7	1.1
Paper and pulp	46.43	50.14	51.81	52.33	55.45	60.27	65.59	70.46	74.44	1.1	0.7	1.7	1.3
Food, drink and tobacco	174.85	191.19	203.49	217.43	245.33	276.47	307.15	336.33	359.57	1.5	1.9	2.3	1.6
Engineering	614.27	603.75	721.22	763.20	864.40	977.33	1088.66	1196.38	1280.21	1.6	1.8	2.3	1.6
Textiles	109.81	98.83	92.51	80.93	78.87	78.49	78.39	78.73	79.04	-1.7	-1.6	-0.1	0.1
Other industries	238.07	248.63	288.17	297.47	330.99	374.53	417.01	458.51	490.68	1.9	1.4	2.3	1.6
Final Energy Demand (in ktoe)	**341087**	**316738**	**330062**	**339213**	**356420**	**372190**	**382402**	**388453**	**391565**	**-0.3**	**0.8**	**0.7**	**0.2**
By sector													
Iron and steel	71671	65417	62387	62604	61712	61182	60067	57524	55372	-1.4	-0.1	-0.3	-0.8
Non ferrous metals	12092	10317	11536	11712	12066	12340	12511	12594	12533	-0.5	0.5	0.4	0.0
Chemicals	62407	56860	57584	57838	61383	64664	67169	68923	69707	-0.8	0.6	0.9	0.4
Non metallic minerals	43283	39622	40265	41855	43726	45390	45610	45153	44612	-0.7	0.8	0.4	-0.2
Paper and pulp	27355	30890	39844	40499	41873	42749	43035	42956	42708	3.8	0.5	0.3	-0.1
Food, drink and tobacco	30033	31482	37596	40488	44527	48213	51166	53783	55702	2.3	1.7	1.4	0.9
Engineering	33961	28696	29105	30737	33573	36346	38599	40543	41944	-1.5	1.4	1.4	0.8
Textiles	13460	11425	12265	11441	11004	10647	10200	9866	9607	-0.9	-1.1	-0.8	-0.6
Other industries	46823	42028	39479	42039	46558	50658	54046	57110	59380	-1.7	1.7	1.5	0.9
By fuel													
Solids	73850	54148	43625	42147	38886	37482	35583	33777	30967	-5.1	-1.1	-0.9	-1.4
Oil	54832	52174	45140	51565	54902	57166	55715	52681	50262	-1.9	2.0	0.1	-1.0
Gas	87904	90162	100893	99775	101785	108355	115020	117975	120359	1.4	0.1	1.2	0.5
Electricity	79251	79210	89629	95569	103190	108977	113393	117755	120101	1.2	1.4	0.9	0.6
Heat (from CHP)	36678	31119	40531	44316	48642	51136	54934	58122	61348	1.0	1.8	1.2	1.1
of which non-marketed	*20137*	*23714*	*32250*										
Other	8572	9925	10244	5841	9015	9073	7756	8143	8528	1.8	-1.3	-1.5	1.0
Fuel use as raw material (in ktoe)	**94476**	**103521**	**105950**	**105233**	**107847**	**109684**	**111200**	**111744**	**112165**	**1.2**	**0.2**	**0.3**	**0.1**
By sector													
Petrochemical industry	65275	76715	77203	75146	74219	73182	72776	72381	72128	1.7	-0.4	-0.2	-0.1
Other non energy uses	29201	26805	28747	30087	33628	36501	38424	39363	40037	-0.2	1.6	1.3	0.4
By fuel													
Solids	4067	2450	1176	1075	1146	1280	1468	1770	1845	11.7	-0.3	2.5	2.3
Oil	75534	87923	90899	90419	92793	93510	93811	93303	92627	1.9	0.2	0.1	-0.1
Gas	14875	13148	13875	13739	13908	14893	15921	16671	17693	-0.7	0.0	1.4	1.1
Energy intensity (toe/MEuro'00)	**233.7**	**212.1**	**195.9**	**192.1**	**180.6**	**167.9**	**155.8**	**144.7**	**136.7**	**-1.7**	**-0.8**	**-1.5**	**-1.3**
Iron and steel	1471.5	1330.8	1434.4	1381.2	1291.7	1218.3	1146.3	1062.4	1000.2	-0.3	-1.0	-1.2	-1.4
Non ferrous metals	660.7	561.8	542.4	501.7	470.2	438.5	410.7	388.4	369.2	-2.0	-1.4	-1.3	-1.1

Chemicals	448.5	354.1	313.6	284.5	259.5	236.8	217.5	200.6	187.6	-3.5	-1.9	-1.8	-1.5
Non metallic minerals	617.2	545.1	506.2	509.0	491.0	464.8	430.8	399.1	376.3	-2.0	-0.3	-1.3	-1.3
Paper and pulp	589.2	616.1	769.1	773.9	755.2	709.3	656.1	609.7	573.7	2.7	-0.2	-1.4	-1.3
Food, drink and tobacco	171.8	164.7	184.8	186.2	181.5	174.4	166.6	159.9	154.9	0.7	-0.2	-0.9	-0.7
Engineering	55.3	47.5	40.4	40.3	38.8	37.2	35.5	33.9	32.8	-3.1	-0.4	-0.9	-0.8
Textiles	122.6	115.6	132.6	141.4	139.5	135.6	130.1	125.3	121.5	0.8	0.5	-0.7	-0.7
Other industries	196.7	169.0	137.0	141.3	140.7	135.3	129.6	124.6	121.0	-3.6	0.3	-0.8	-0.7
CO_2 EMISSIONS (in kt CO_2)	**698920**	**610986**	**567709**	**576432**	**576974**	**592695**	**595193**	**583986**	**569840**	**-2.1**	**0.2**	**0.3**	**-0.4**
Iron and steel	227316	202206	186190	183856	175347	170381	165446	154198	144800	-2.0	-0.6	-0.6	-1.3
Non ferrous metals	16954	13399	14699	11306	10862	10957	10981	10913	10655	-1.4	-3.0	0.1	-0.3
Chemicals	99768	90484	75263	72200	71191	74534	73594	69998	67403	-2.8	-0.6	0.3	-0.9
Non metallic minerals	115313	99644	97807	98315	100824	103661	102452	99645	96415	-1.6	0.3	0.2	-0.6
Paper and pulp	28794	28756	30106	36038	34521	33722	33491	32470	30601	0.4	1.4	-0.3	-0.9
Food, drink and tobacco	49823	50969	48826	54360	56944	63316	66921	68873	69494	-0.2	1.5	1.6	0.4
Engineering	53649	42475	38955	39979	42783	46686	49250	51090	52192	-3.1	0.9	1.4	0.6
Textiles	21259	15787	13359	13263	11930	11430	10717	10256	9565	-4.5	-1.1	-1.1	-1.1
Other industries	86043	67266	62504	67116	72572	78007	82341	86542	88716	-3.1	1.5	1.3	0.7
Carbon intensity (in t CO_2/toe)	**2.049**	**1.929**	**1.720**	**1.699**	**1.619**	**1.592**	**1.556**	**1.503**	**1.455**	**-1.7**	**-0.6**	**-0.4**	**-0.7**
Iron and steel	3.172	3.091	2.984	2.937	2.841	2.785	2.754	2.681	2.615	-0.6	-0.5	-0.3	-0.5
Non ferrous metals	1.402	1.299	1.274	0.965	0.900	0.888	0.878	0.867	0.850	-1.0	-3.4	-0.3	-0.3
Chemicals	1.599	1.591	1.307	1.248	1.160	1.153	1.096	1.016	0.967	-2.0	-1.2	-0.6	-1.2
Non metallic minerals	2.664	2.515	2.429	2.349	2.306	2.284	2.246	2.207	2.161	-0.9	-0.5	-0.3	-0.4
Paper and pulp	1.053	0.931	0.756	0.890	0.824	0.789	0.778	0.756	0.717	-3.3	0.9	-0.6	-0.8
Food, drink and tobacco	1.659	1.619	1.299	1.343	1.279	1.313	1.308	1.281	1.248	-2.4	-0.2	0.2	-0.5
Engineering	1.580	1.480	1.338	1.301	1.274	1.284	1.276	1.260	1.244	-1.6	-0.5	0.0	-0.3
Textiles	1.579	1.382	1.089	1.159	1.084	1.074	1.051	1.039	0.996	-3.6	0.0	-0.3	-0.5
Other industries	1.838	1.600	1.583	1.597	1.559	1.540	1.524	1.515	1.494	-1.5	-0.2	-0.2	-0.2

Source: PRIMES

TABLE 4 – PRIMES BASELINE SCENARIO – RESIDENTIAL, SERVICES & AGRICULTURE

EU25: Baseline scenario													RESIDENTIAL, SERVICES AND AGRICULTURE
	1990	1995	2000	2005	2010	2015	2020	2025	2030	'90-'00	'00-'10	'10-'20	'20-'30
										Annual % Change			
RESIDENTIAL SECTOR													
Key indicators													
Household Income (in Euro'00/capita)	9652	10048	11463	12322	13636	15142	16670	18184	19524	1.7	1.8	2.0	1.6
Population (mio)	440.788	448.121	452.915	458.842	464.054	467.306	469.270	470.057	469.365	0.3	0.2	0.1	0.0
Number of households (mio)	166.850	176.768	185.547	195.788	205.202	213.713	220.882	226.995	232.749	1.1	1.0	0.7	0.5
Households size (inhabitants/household)	2.642	2.535	2.441	2.344	2.261	2.187	2.125	2.071	2.017	-0.8	-0.8	-0.6	-0.5
Final Energy Demand (in ktoe)	**260894**	**274487**	**273175**	**294612**	**311966**	**327949**	**338741**	**346027**	**351285**	**0.5**	**1.3**	**0.8**	**0.4**
By end use													
Heating and cooling (incl. cooking)	235495	246090	242279	258264	268326	276090	278067	277163	276278	0.3	1.0	0.4	-0.1
Electric appliances and lighting	25400	28397	30896	36348	43639	51859	60674	68864	75008	2.0	3.5	3.4	2.1
By fuel													
Solids	35023	19067	9960	6951	5421	4209	3391	3052	2733	-11.8	-5.9	-4.6	-2.1
Oil	60005	60610	57635	56378	59966	60379	58652	56250	54179	-0.4	0.4	-0.2	-0.8
Gas	79941	97484	102672	115956	120258	126475	130392	131693	133557	2.5	1.6	0.8	0.2
Electricity	48906	54815	59740	67410	75720	84911	94381	102874	109421	2.0	2.4	2.2	1.5
Heat	16720	20046	18214	19467	20543	20888	20921	21566	21916	0.9	1.2	0.2	0.5
Other	20300	22465	24953	28450	30058	31087	31004	30593	29479	2.1	1.9	0.3	-0.5
Energy intensity													
Household income related (toe/MEuro'00)	61.3	61.0	52.6	52.1	49.3	46.3	43.3	40.5	38.3	-1.5	-0.6	-1.3	-1.2
Population related (toe/capita)	0.592	0.613	0.603	0.642	0.672	0.702	0.722	0.736	0.748	0.2	1.1	0.7	0.4
CO_2 EMISSIONS (in kt CO_2)	**506130**	**485647**	**452080**	**467662**	**482667**	**493900**	**494886**	**489623**	**486733**	**-1.1**	**0.7**	**0.3**	**-0.2**
Carbon intensity													
Household income related (t CO_2/MEuro'00)	119.0	107.9	87.1	82.7	76.3	69.8	63.3	57.3	53.1	-3.1	-1.3	-1.9	-1.7
Population related (t CO_2 per capita)	1.148	1.084	0.998	1.019	1.040	1.057	1.055	1.042	1.037	-1.4	0.4	0.1	-0.2
Fuel consumption related (t CO_2 per toe)	1.940	1.769	1.655	1.587	1.547	1.506	1.461	1.415	1.386	-1.6	-0.7	-0.6	-0.5
SERVICES AND AGRICULTURE SECTOR													
SECTORAL VALUE ADDED (in MEuro'00)	**4659.24**	**5073.52**	**5917.11**	**6534.98**	**7440.22**	**8427.86**	**9378.32**	**10303.15**	**11088.04**	**2.4**	**2.3**	**2.3**	**1.7**
Services	4461.94	4869.94	5695.65	6314.68	7210.42	8186.13	9125.52	10041.08	10818.90	2.5	2.4	2.4	1.7
Market services	1591.92	1760.07	2131.17	2382.47	2740.70	3147.53	3538.37	3923.63	4251.79	3.0	2.5	2.6	1.9
Non market services	1448.19	1568.29	1711.15	1861.38	2077.20	2264.30	2435.86	2584.79	2702.93	1.7	2.0	1.6	1.0
Trade	1421.83	1541.58	1853.33	2070.83	2392.53	2774.30	3151.29	3532.66	3864.17	2.7	2.6	2.8	2.1
Agriculture	197.30	203.58	221.46	220.31	229.79	241.73	252.80	262.07	269.14	1.2	0.4	1.0	0.6
Final Energy Demand (in ktoe)	**146622**	**149313**	**158975**	**173698**	**188487**	**201207**	**211856**	**219031**	**225316**	**0.8**	**1.7**	**1.2**	**0.6**
By sector													
Services	117894	119743	130160	145389	159272	171199	181057	187731	193488	1.0	2.0	1.3	0.7
Agriculture	28728	29570	28815	28309	29215	30007	30799	31300	31828	0.0	0.1	0.5	0.3
By end use													

Heating and cooling	105512	104380	110214	120526	127150	132007	135565	137903	140459	0.4	1.4	0.6	0.4
Electric appliances and lighting	18869	22055	26647	31104	38342	45306	51480	55749	59065	3.5	3.7	3.0	1.4
Agriculture specific uses	22241	22878	22115	22068	22996	23894	24811	25379	25792	-0.1	0.4	0.8	0.4
By fuel													
Solids	14966	6494	3037	1504	894	639	445	333	324	-14.7	-11.5	-6.7	-3.1
Oil	45446	44656	39430	39878	41259	41296	41011	40921	40765	-1.4	0.5	-0.1	-0.1
Gas	32189	39326	47972	53171	56739	60472	63865	65297	67007	4.1	1.7	1.2	0.5
Electricity	43232	48275	56067	64361	73632	81783	88790	94130	98419	2.6	2.8	1.9	1.0
Heat	9693	8717	9967	10434	10993	11548	11838	11973	12063	0.3	1.0	0.7	0.2
Other	1096	1845	2502	4349	4970	5467	5906	6378	6738	8.6	7.1	1.7	1.3
Energy intensity													
Value added related (toe/MEuro'00)	31.5	29.4	26.9	26.6	25.3	23.9	22.6	21.3	20.3	-1.6	-0.6	-1.1	-1.1
Services	26.4	24.6	22.9	23.0	22.1	20.9	19.8	18.7	17.9	-1.4	-0.3	-1.1	-1.0
Agriculture	145.6	145.2	130.1	128.5	127.1	124.1	121.8	119.4	118.3	-1.1	-0.2	-0.4	-0.3
Population related (toe/capita)	0.333	0.333	0.351	0.379	0.406	0.431	0.451	0.466	0.480	0.5	1.5	1.1	0.6
Services	0.267	0.267	0.287	0.317	0.343	0.366	0.386	0.399	0.412	0.7	1.8	1.2	0.7
Agriculture	0.065	0.066	0.064	0.062	0.063	0.064	0.066	0.067	0.068	-0.2	-0.1	0.4	0.3
CO_2 EMISSIONS (in kt CO_2)	**274195**	**254685**	**244583**	**251807**	**261820**	**269589**	**275836**	**278434**	**281875**	**-1.1**	**0.7**	**0.5**	**0.2**
Services	205633	180624	174254	183044	190817	196357	200377	201713	203879	-1.6	0.9	0.5	0.2
Agriculture	68563	74061	70330	68764	71003	73232	75459	76720	77996	0.3	0.1	0.6	0.3
Carbon intensity													
Value added related (t CO_2/MEuro'00)	58.8	50.2	41.3	38.5	35.2	32.0	29.4	27.0	25.4	-3.5	-1.6	-1.8	-1.4
Services	46.1	37.1	30.6	29.0	26.5	24.0	22.0	20.1	18.8	-4.0	-1.4	-1.8	-1.5
Agriculture	347.5	363.8	317.6	312.1	309.0	303.0	298.5	292.7	289.8	-0.9	-0.3	-0.3	-0.3
Population related (t CO_2 per capita)	0.622	0.568	0.540	0.549	0.564	0.577	0.588	0.592	0.601	-1.4	0.4	0.4	0.2
Services	0.467	0.403	0.385	0.399	0.411	0.420	0.427	0.429	0.434	-1.9	0.7	0.4	0.2
Agriculture	0.156	0.165	0.155	0.150	0.153	0.157	0.161	0.163	0.166	0.0	-0.1	0.5	0.3
Fuel consumption related (t CO_2 per toe)	1.870	1.706	1.538	1.450	1.389	1.340	1.302	1.271	1.251	-1.9	-1.0	-0.6	-0.4
Services	1.744	1.508	1.339	1.259	1.198	1.147	1.107	1.074	1.054	-2.6	-1.1	-0.8	-0.5
Agriculture	2.387	2.505	2.441	2.429	2.430	2.440	2.450	2.451	2.451	0.2	0.0	0.1	0.0

Source: PRIMES

TABLE 5 – PRIMES BASELINE SCENARIO – TRANSPORT

EU25: Baseline scenario													TRANSPORT SECTOR
	1990	1995	2000	2005	2010	2015	2020	2025	2030	'90-'00	'00-'10	'10-'20	'20-'30
										Annual % Change			
Transport activity													
Passenger transport activity (Gpkm)	**4640.8**	**4934.2**	**5466.3**	**5893.0**	**6449.4**	**6935.8**	**7402.0**	**7792.2**	**8130.2**	**1.7**	**1.7**	**1.4**	**0.9**
Public road transport	504.1	463.0	480.1	484.4	495.0	487.5	480.6	474.4	466.7	-0.5	0.3	-0.3	-0.3
Private cars	3399.1	3725.8	4100.0	4417.8	4843.2	5225.9	5589.0	5889.8	6151.3	1.9	1.7	1.4	1.0
Motorcycles	130.2	131.7	153.1	162.7	173.3	182.3	191.7	200.3	207.3	1.6	1.3	1.0	0.8
Rail	411.9	369.4	402.7	422.0	446.4	462.3	478.5	493.7	505.6	-0.2	1.0	0.7	0.6
Aviation	166.3	212.5	296.9	369.7	451.6	535.2	616.7	686.1	749.7	6.0	4.3	3.2	2.0
Inland navigation	29.2	31.9	33.6	36.4	39.7	42.6	45.5	47.8	49.5	1.4	1.7	1.4	0.9
Freight transport activity (Gtkm)	**1753.9**	**1854.3**	**2131.5**	**2321.3**	**2582.2**	**2815.7**	**3048.7**	**3257.9**	**3431.9**	**2.0**	**1.9**	**1.7**	**1.2**
Trucks	1034.1	1230.4	1486.3	1655.9	1891.2	2098.8	2311.7	2499.5	2657.4	3.7	2.4	2.0	1.4
Rail	461.7	358.5	374.2	386.8	402.0	413.8	421.4	431.4	438.9	-2.1	0.7	0.5	0.4
Inland navigation	258.1	265.4	271.0	278.5	289.0	303.2	315.6	327.0	335.6	0.5	0.6	0.9	0.6
Detailed Results													
Activity indicators													
Travel per person (km per capita)	10528	11011	12069	12843	13898	14842	15773	16577	17322	1.4	1.4	1.3	0.9
Freight activity per unit of GDP (tkm/000 Euro'00)	240	238	238	239	236	229	223	218	214	-0.1	-0.1	-0.5	-0.4
Final Energy Demand (in ktoe)	**273198**	**294836**	**333020**	**360607**	**381133**	**390326**	**405505**	**406070**	**402286**	**2.0**	**1.4**	**0.6**	**-0.1**
By transport mean													
Road transport	228487	245435	273435	296135	312845	319530	332005	334721	329557	1.8	1.4	0.6	-0.1
Public road transport	7841	6960	7018	7015	7020	6707	6274	5794	5320	-1.1	0.0	-1.1	-1.6
Motorcycles	1832	1842	2132	2261	2381	2411	2318	2199	2031	1.5	1.1	-0.3	-1.3
Private cars	136369	144276	156217	167034	167796	162038	166582	164284	157820	1.4	0.7	-0.1	-0.5
Trucks	82444	92357	108068	119824	135648	148374	156830	162445	164385	2.7	2.3	1.5	0.5
Rail	9066	8814	8897	8872	8307	7236	6518	6164	6019	-0.2	-0.7	-2.4	-0.8
Aviation	28932	33702	45320	50029	54174	57511	60777	58885	60358	4.6	1.8	1.2	-0.1
Inland navigation	6714	6884	5368	5571	5808	6048	6205	6300	6352	-2.2	0.8	0.7	0.2
By transport activity													
Passenger transport	182454	194418	218088	233782	238353	234851	241715	236705	230995	1.8	0.9	0.1	-0.5
Freight transport	90742	100415	114930	126825	142780	155474	163791	169365	171291	2.4	2.2	1.4	0.4
By fuel													
Solids	98	12	11	0	0	0	0	0	0	-19.4			
Oil	267812	289035	326744	353424	373641	382657	397535	397521	393873	2.0	1.4	0.6	-0.1
Gasoline	131638	131632	129992	142974	146467	143830	148107	146751	142074	-0.1	1.2	0.1	-0.4
of which biofuels	*1*	*87*	*264*	*1852*	*5720*	*7853*	*10298*	*11334*	*11867*	*74.1*	*36.0*	*6.1*	*1.4*
Diesel oil	103596	119565	147419	156525	169018	177464	184754	188047	187678	3.6	1.4	0.9	0.2
of which biofuels	*1*	*111*	*373*	*2227*	*6706*	*9778*	*12720*	*14310*	*15376*	*90.5*	*33.5*	*6.6*	*1.9*
Kerosene	28789	33586	45178	50029	54174	57511	60777	58885	60358	4.6	1.8	1.2	-0.1
Other liquids	3788	4252	4155	3897	3982	3851	3897	3838	3762	0.9	-0.4	-0.2	-0.4
Gas	208	271	348	483	392	418	447	491	474	5.3	1.2	1.3	0.6
Methanol & ethanol	0	0	0	213	258	391	690	978	994			10.3	3.7
Liquified hydrogen	0	0	0	60	75	188	481	804	843			20.4	5.8
Electricity	5080	5517	5916	6427	6768	6672	6352	6277	6102	1.5	1.4	-0.6	-0.4
Biofuels in gasoline and diesel (%)	0.0	0.1	0.2	1.4	3.9	5.5	6.9	7.7	8.3				

Vehicles efficiency													
Passenger transport activity (toe/Mpkm)	**39.3**	**39.4**	**39.9**	**39.7**	**37.0**	**33.9**	**32.7**	**30.4**	**28.4**	**0.1**	**-0.8**	**-1.2**	**-1.4**
Road transport	36.2	35.4	34.9	34.8	32.1	29.0	28.0	26.2	24.2	-0.4	-0.8	-1.4	-1.4
Public road transport	15.6	15.0	14.6	14.5	14.2	13.8	13.1	12.2	11.4	-0.6	-0.3	-0.8	-1.3
Private cars	40.1	38.7	38.1	37.8	34.6	31.0	29.8	27.9	25.7	-0.5	-0.9	-1.5	-1.5
Motorcycles	14.1	14.0	13.9	13.9	13.7	13.2	12.1	11.0	9.8	-0.1	-0.1	-1.3	-2.1
Rail	16.3	18.3	16.8	16.0	13.9	11.6	10.2	9.4	9.0	0.3	-1.9	-3.0	-1.3
Aviation	174.0	158.6	152.7	135.3	120.0	107.5	98.6	85.8	80.5	-1.3	-2.4	-1.9	-2.0
Inland navigation	26.1	27.9	19.3	19.5	19.7	19.5	19.2	18.9	18.5	-3.0	0.2	-0.2	-0.4
Freight transport activity (toe/Mtkm)	**51.7**	**54.2**	**53.9**	**54.6**	**55.3**	**55.2**	**53.7**	**52.0**	**49.9**	**0.4**	**0.3**	**-0.3**	**-0.7**
Trucks	79.7	75.1	72.7	72.4	71.7	70.7	67.8	65.0	61.9	-0.9	-0.1	-0.6	-0.9
Rail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Inland navigation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Energy intensity													
Income related (toe/MEuro'00)	37.5	37.8	37.2	37.1	34.8	31.7	29.7	27.1	25.1	-0.1	-0.7	-1.6	-1.7
Passenger transport (household income related)	42.9	43.2	42.0	41.3	37.7	33.2	30.9	27.7	25.2	-0.2	-1.1	-2.0	-2.0
Freight transport (GDP related)	12.4	12.9	12.8	13.1	13.0	12.6	12.0	11.3	10.7	0.3	0.2	-0.8	-1.2
Population related (toe/capita)	0.620	0.658	0.735	0.786	0.821	0.835	0.864	0.864	0.857	1.7	1.1	0.5	-0.1
Passenger transport	0.414	0.434	0.482	0.510	0.514	0.503	0.515	0.504	0.492	1.5	0.6	0.0	-0.5
Freight transport	0.206	0.224	0.254	0.276	0.308	0.333	0.349	0.360	0.365	2.1	1.9	1.3	0.4
CO_2 EMISSIONS (in kt CO_2)	**792736**	**856489**	**969914**	**1038845**	**1074641**	**1087025**	**1115474**	**1108143**	**1092878**	**2.0**	**1.0**	**0.4**	**-0.2**
Road transport	674008	725266	809913	865727	891324	896055	915357	913417	893643	1.9	1.0	0.3	-0.2
Rail	12314	10126	9157	7685	4874	1901	891	823	810	-2.9	-6.1	-15.6	-1.0
Aviation	85745	99887	134322	148296	160583	170476	180155	174546	178914	4.6	1.8	1.2	-0.1
Inland navigation	20670	21210	16522	17137	17860	18593	19070	19356	19510	-2.2	0.8	0.7	0.2
Carbon intensity (in t CO_2/toe)	**2.902**	**2.905**	**2.912**	**2.881**	**2.820**	**2.785**	**2.751**	**2.729**	**2.717**	**0.0**	**-0.3**	**-0.2**	**-0.1**
Road transport	2.950	2.955	2.962	2.923	2.849	2.804	2.757	2.729	2.712	0.0	-0.4	-0.3	-0.2
Rail	1.358	1.149	1.029	0.866	0.587	0.263	0.137	0.134	0.135	-2.7	-5.5	-13.6	-0.2
Aviation	2.964	2.964	2.964	2.964	2.964	2.964	2.964	2.964	2.964	0.0	0.0	0.0	0.0
Inland navigation	3.079	3.081	3.078	3.076	3.075	3.074	3.073	3.072	3.071	0.0	0.0	0.0	0.0

Source: PRIMES

TABLE 6 - PRIMES BASELINE SCENARIO – POWER GENERATION

EU25: Baseline scenario										POWER GENERATION SECTOR (1)
	2000	2005	2010	2015	2020	2025	2030	'00-'10	'10-'20	'20-'30
								Annual % Change		
Electricity consumption (in GWh)	**2925760**	**3206591**	**3509192**	**3789252**	**4030444**	**4236980**	**4392202**	**1.8**	**1.4**	**0.9**
Final energy demand	2457584	2718220	3015232	3283074	3522297	3732964	3884226	2.1	1.6	1.0
Industry	1042201	1111271	1199887	1267178	1318527	1369242	1396524	1.4	0.9	0.6
Households	694646	783837	880469	987341	1097458	1196204	1272337	2.4	2.2	1.5
Tertiary	651947	748384	856181	950970	1032447	1094534	1144410	2.8	1.9	1.0
Transport	68790	74727	78695	77584	73865	72984	70954	1.4	-0.6	-0.4
Energy branch	267851	290577	298812	305531	312208	314651	317243	1.1	0.4	0.2
Own consumption & pumping	167522	194530	194811	198769	203584	207670	211114	1.5	0.4	0.4
Refineries & other uses	100329	96047	104001	106762	108624	106981	106129	0.4	0.4	-0.2
Transmission and distribution losses	200326	197794	195148	200647	195939	189365	190733	-0.3	0.0	-0.3
Electricity supply (in GWh)	**2925760**	**3206591**	**3509192**	**3789252**	**4030444**	**4236980**	**4392202**	**1.8**	**1.4**	**0.9**
Net imports	24926	29245	26006	24744	24669	24918	25603	0.4	-0.5	0.4
Nuclear power plants production	921193	974239	964265	934990	886207	793447	817092	0.5	-0.8	-0.8
Generation from hydro, wind, solar, tidal etc.	359249	412484	532544	610454	683851	792163	843723	4.0	2.5	2.1
Thermal power plants production (incl. biomass/waste)	1620392	1790623	1986376	2219064	2435718	2626452	2705784	2.1	2.1	1.1
of which in CHP power plants	*419643*	*517758*	*618382*	*745324*	*870208*	*988571*	*1056650*	*4.0*	*3.5*	*2.0*
Steam consumption (in GWh)	**895680**	**975148**	**1064507**	**1114588**	**1177752**	**1242681**	**1291873**	**1.7**	**1.0**	**0.9**
Final energy demand	781607	869722	905228	955257	1015286	1057941	1096881	1.5	1.2	0.8
Industry	471290	515305	565602	594609	638770	675840	713347	1.8	1.2	1.1
Households	194423	233092	211796	226364	238869	242881	243264	0.9	1.2	0.2
Tertiary	115894	121326	127830	134284	137647	139220	140271	1.0	0.7	0.2
Energy branch / Transmission and distribution losses	114073	105426	159279	159331	162466	184740	194992	3.4	0.2	1.8
Steam supply (in GWh)	**895680**	**975148**	**1064507**	**1114588**	**1177752**	**1242681**	**1291873**	**1.7**	**1.0**	**0.9**
CHP power plants production	739540	831535	916874	970883	1040967	1104035	1144652	2.2	1.3	1.0
District Heating units production	156140	143613	147633	143704	136785	138646	147222	-0.6	-0.8	0.7
Electricity generation by fuel type (in GWh)	**2905620**	**3177346**	**3483186**	**3764508**	**4005775**	**4212062**	**4366599**	**1.8**	**1.4**	**0.9**
Nuclear energy	921193	974239	964265	934990	886207	793447	817092	0.5	-0.8	-0.8
Renewables	427838	490082	629638	765446	938941	1131123	1204802	3.9	4.1	2.5
Hydro	337003	336049	347423	363642	374450	387274	393963	0.3	0.8	0.5
Wind	22245	75484	183556	244326	305128	398733	441183	23.5	5.2	3.8
Solar, tidal etc.	1	950	1565	2486	4272	6156	8577	108.7	10.6	7.2
Biomass & waste	63499	72378	91100	148375	247879	331300	353333	3.7	10.5	3.6
Geothermal heat	5090	5220	5995	6618	7212	7659	7745	1.6	1.9	0.7
Fossil fuels	1556588	1713025	1889282	2064071	2180627	2287492	2344705	2.0	1.4	0.7
Coal and lignite	875298	922335	868791	824007	895614	1085425	1203188	-0.1	0.3	3.0
Petroleum products	177080	145196	133891	120963	104056	98424	95188	-2.8	-2.5	-0.9
Natural gas	471479	613833	856729	1090627	1149122	1070231	1014705	6.2	3.0	-1.2
Coke & blast-furnace gasses	32732	31661	29871	28474	31834	33412	31625	-0.9	0.6	-0.1
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0			

Electricity generation by fuel type (in %)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**			
Nuclear energy	31.7	30.7	27.7	24.8	22.1	18.8	18.7			
Renewables	14.7	15.4	18.1	20.3	23.4	26.9	27.6			
Hydro	11.6	10.6	10.0	9.7	9.3	9.2	9.0			
Wind	0.8	2.4	5.3	6.5	7.6	9.5	10.1			
Solar, tidal etc.	0.0	0.0	0.0	0.1	0.1	0.1	0.2			
Biomass & waste	2.2	2.3	2.6	3.9	6.2	7.9	8.1			
Geothermal heat	0.2	0.2	0.2	0.2	0.2	0.2	0.2			
Fossil fuels	53.6	53.9	54.2	54.8	54.4	54.3	53.7			
Coal and lignite	30.1	29.0	24.9	21.9	22.4	25.8	27.6			
Petroleum products	6.1	4.6	3.8	3.2	2.6	2.3	2.2			
Natural gas	16.2	19.3	24.6	29.0	28.7	25.4	23.2			
Coke & blast-furnace gasses	1.1	1.0	0.9	0.8	0.8	0.8	0.7			
Other fuels (hydrogen, methanol)	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Fuel input in thermal power plants (in ktoe)	**385987**	**410276**	**432241**	**449791**	**462771**	**484113**	**490038**	**1.1**	**0.7**	**0.6**
Solids	214488	224313	214950	197852	198501	223929	240311	0.0	-0.8	1.9
Hard coal	148024	155338	159328	152196	145026	167284	184090	0.7	-0.9	2.4
Lignite and other solid fuels	66464	68975	55622	45655	53475	56645	56221	-1.8	-0.4	0.5
Oil	41870	34457	31633	28252	23312	21168	19795	-2.8	-3.0	-1.6
Diesel oil	2453	3153	3085	3139	3232	3405	3382	2.3	0.5	0.5
Fuel oil and other liquid fuels	39417	31305	28548	25114	20080	17763	16412	-3.2	-3.5	-2.0
Gas	105480	122896	152826	182201	182731	167191	155248	3.8	1.8	-1.6
Natural gas	96688	114864	145294	175125	176188	160756	149428	4.2	1.9	-1.6
Other gas fuels	8791	8032	7532	7076	6543	6435	5820	-1.5	-1.4	-1.2
Biomass & waste	21211	25403	29147	37365	53619	66833	69424	3.2	6.3	2.6
Geothermal heat	2939	3206	3685	4122	4608	4992	5260	2.3	2.3	1.3
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0			
Fuel input in nuclear power plants (in ktoe)	**237664**	**251349**	**248776**	**241224**	**228638**	**204708**	**210808**	**0.5**	**-0.8**	**-0.8**
Fuel input in district heating units (in ktoe)	**17259**	**14918**	**15251**	**14747**	**13819**	**13938**	**14736**	**-1.2**	**-1.0**	**0.6**
Solids	5725	5303	4554	4040	2504	2088	2675	-2.3	-5.8	0.7
Oil	2140	1159	1611	1801	1565	1393	1246	-2.8	-0.3	-2.3
Gas	6502	4188	4712	4919	6431	7135	7399	-3.2	3.2	1.4
Biomass & waste	2881	4268	4375	3987	3319	3322	3416	4.3	-2.7	0.3
Geothermal heat	10	0	0	0	0	0	0			
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0			
CO_2 EMISSIONS (in kt CO_2)	**1294888**	**1341945**	**1361880**	**1348186**	**1333253**	**1390345**	**1424035**	**0.5**	**-0.2**	**0.7**
Thermal power plants	1249997	1307740	1328008	1315340	1303679	1361275	1392481	0.6	-0.2	0.7
District heating units	44892	34205	33872	32846	29574	29070	31554	-2.8	-1.3	0.6

(1) Information on installed power generation capacities and selected indicators for electricity production can be found in the second page of this report: "Summary energy balances and indicators (B)" (sheet "indicator")

Source: PRIMES

Policy Option 1 – Mtoe Calculation

Action 1				
Description	**Development of scheme recognising retailers providing information on energy efficiency by allowing public recognition through logo or certification scheme.**			
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	**Comments**
				Evidence to suggest that retailers influence consumer behaviour through highlighting information via staff and brand confidence, when supported by campaigns. The impact of sales staff in influencing consumer choice is hard to quantify, and consumers tend to under estimate their influence. Study by ECI/TRI (Reference 6) surveying consumers shows that sales staff were ranked more useful than all other sources of information eg brochures, websites when it came to purchasing cars.
				This action is indirect eg creates a basis for energy savings, in combination with other policy measures. Difficult to quantify effect of individual action. Reasonable to assume that action would contribute/enhance the level of savings achieved by successful energy labelling information eg, Energy Star, NAEEE etc
Technical Saving Potential		**10.00%**		
Discount Factors - Stock effect - Replacement timing				

- Barriers - Other restrictions	3.00%	Recognition scheme expected to incentivise retailers and have postive impact on consumer behaviour, however effect of action on retailers and hence consumers will depend on level of 'enforcement'. Consumer decisions driven by multiple factors - apathy discount.
- Interaction - Overlap	6.00%	Recognition scheme will work hand in hand with other awareness campaigns, energy labelling, running cost information, traveller information etc
Max poss saving (PSE)	**1.00%**	Retailers expected to have most influence on households (via sales of domestic appliances and vehicles). Assuming recognition scheme extended to industry/service distributors/suppliers savings will extend to other areas also. Not scored here to avoid double counting with A1 which has a larger scope.

INDUSTRY

Final Energy Demand (in ktoe)		
By sector		
Iron and steel	62604	0
Non ferrous metals	11712	0
Chemicals	57838	0
Non metallic minerals	41855	0
Paper and pulp	40499	0
Food, drink and tobacco	40488	0
Engineering	30737	0
Textiles	11441	0
Other industries	42039	0
By fuel	0	
Solids	0	0
Oil	0	0

Gas	0		0
Electricity	0		0
Heat (from CHP)	0		0
	0		
DOMESTIC	0		
Final Energy Demand (in ktoe)	0		
By end use	0		
Heating and cooling (incl. cooking)	258264	1.00%	2582.641906
Electric appliances and lighting	36348	1.00%	363.478125
By fuel	0		
Solids	0		0
Oil	0		0
Gas	0		0
Electricity	0		0
Heat	0		0
Other	0		0
	0		
SERVICES AND AGRICULTURE SECTOR	0		
	0		
Final Energy Demand (in ktoe)	0		
By sector	0		
Services	145389		0
Agriculture	28309		0
By end use	0		
Heating and cooling	0		0
Electric appliances and lighting	0		0
Agriculture specific uses	0		0
By fuel	0		
Solids	0		0
Oil	0		0
Gas	0		0
Electricity	0		0
Heat	0		0
Other	0		0
	0		
Transport	0		
By transport mean	0		
Road transport	0	1.00%	2961.349631

Public road transport	0	0
Motorcycles	0	0
Private cars	0	0
Trucks	0	0
Rail	0	0
Aviation	0	0
Inland navigation	0	0
By transport activity	0	0
Passenger transport	233782	0
Freight transport	126825	0
	0	
Power Generation	0	
Conversion factor for GKW to ktoe	**4.7**	
Energy branch		
Own consumption & pumping	41043	0
Refineries & other uses	20264	0
Transmission and distribution losses	41732	0

Saving in ktoe	5907.469662
Saving in Mtoe	**5.907469662**

Note - Saving % calc dependent upon sector etc.
Within family (eg Industry) segment either by sector or fuel but not both (double counting)
Input Saving % only

References

Policy Option 2 Mtoe Estimation

Action 2				
Description	**Member States to include energy efficiency training and information in national education curriculum for primary and secondary schools as part of sustainability awareness.**			
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	**Comments**
Technical Saving Potential		**40%**		Domestic savings, ref: http://www.defra.gov.uk/environment/energy/review/pdf/tech-overview.pdf
Discount Factors				
- Stock effect				
- Replacement timing		20.00%		DEFRA: By 2010, less than half the current stock ofdomestic appliances would be due for replacement although most tungsten lamps would be replaced at least once, and those in high-use fittings probably every year. However, by 2020, practically all of today's stock would have been replaced. Our estimates for the economic potential for the existing housing stock is around 17-21% for 2010 and 28-32% for 2020.

- Barriers		10.00%	In practice, not quite all of this is achievable, particularly for 2010, because of the time required to make the transition from today's market conditions to the "ideal" ones. The main constraint is the time required to build up the capacity of the supply side, whether it be on production of goods or overcoming skills shortages in the installation industries.
- Other restrictions		7.00%	A 2004 UK report (4) stated that benefits from Energy Matters education programme were lower fuel bills for 40% of respondents (parents of children particpating in the programmes).
- Interaction			
- Overlap			
Max poss saving (PSE)		**3.00%**	
INDUSTRY			
Final Energy Demand (in ktoe)			
By sector			
Iron and steel	62604	0.0	
Non ferrous metals	11712	0.0	
Chemicals	57838	0.0	
Non metallic minerals	41855	0.0	
Paper and pulp	40499	0.0	
Food, drink and tobacco	40488	0.0	
Engineering	30737	0.0	
Textiles	11441	0.0	
Other industries	42039	0.0	
By fuel			
Solids		0.0	
Oil		0.0	
Gas		0.0	
Electricity		0.0	
Heat (from CHP)		0.0	

DOMESTIC				
Final Energy Demand (in ktoe)				
By end use				
Heating and cooling (incl. cooking)	258264	3.0%	7747.9	
Electric appliances and lighting	36348	3.0%	1090.4	
By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat			0.0	
Other			0.0	
SERVICES AND AGRICULTURE SECTOR				
Final Energy Demand (in ktoe)				
By sector				
Services		0.5%	726.9	Some impact in services sector expected in education (school buildings) and workplace (influence on parents)
Agriculture			0.0	
By end use				
Heating and cooling	120526	0.00%	0.0	
Electric appliances and lighting	31104	0.00%	0.0	
Agriculture specific uses	22068	0.00%	0.0	
By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat			0.0	
Other			0.0	
Transport				
By transport mean				
Road transport	296135	0.00%	0.0	
Public road transport				
Motorcycles				

	Private cars			
	Trucks			
	Rail	8872	0.00%	0.0
	Aviation	50029	0.00%	0.0
	Inland navigation	5571	0.00%	0.0
	By transport activity			0.0
	Passenger transport			0.0
	Freight transport			0.0
	POWER GENERATION			
	Conversion factor for GKW to ktoe	**4.7**		
	Electricity consumption (in GWh)			
	Energy branch			
	Own consumption & pumping	41043		0.0
	Refineries & other uses	20264		0.0
	Transmission and distribution losses	41732		0.0
	Saving in MTOe			**10**

Policy Option 3 Mtoe Estimation

Action 3				
Description	**Inclusion of running costs in Energy Efficiency Product Listing / labelling or equivalent consumer information**			
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	**Comments**
Technical Saving Potential		**6%**		Domestic savings, ref: http://www.defra.gov.uk/environment/energy/review/pdf/tech-overview.pdf
Discount Factors				
- Stock effect				
- Replacement timing				DEFRA: By 2010, less than half the current stock ofdomestic appliances would be due for replacement although most tungsten lamps would be replaced at least once, and those in high-use fittings probably every year. However, by 2020, practically all of toda

- Barriers			In practice, not quite all of this is achievable, particularly for 2010, because of the time required to make the transition from today's market conditions to the "ideal" ones. The main constraint is the time required to build up the capacity of the suppl
- Other restrictions		2.00%	A 2004 UK report (4) stated that benefits from Energy Matters education programme were lower fuel bills for 40% of respondents (parents of children particpating in the programmes).
- Interaction			
- Overlap			
Max poss saving (PSE)		**4.00%**	
INDUSTRY			
Final Energy Demand (in ktoe)			
By sector			
Iron and steel	62604	0.0	
Non ferrous metals	11712	0.0	
Chemicals	57838	0.0	
Non metallic minerals	41855	0.0	
Paper and pulp	40499	0.0	
Food, drink and tobacco	40488	0.0	
Engineering	30737	0.0	
Textiles	11441	0.0	
Other industries	42039	0.0	
By fuel			
Solids		0.0	
Oil		0.0	
Gas		0.0	
Electricity		0.0	
Heat (from CHP)		0.0	
DOMESTIC			
Final Energy Demand (in ktoe)			
By end use			

Heating and cooling (incl. cooking)	258264	4.0%	10330.6	
Electric appliances and lighting	36348	4.0%	1453.9	
By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat			0.0	
Other			0.0	
SERVICES AND AGRICULTURE SECTOR				
Final Energy Demand (in ktoe)				
By sector				
Services			0.0	Some impact in services sector expected in education (school buildings) and workplace (influence on parents)
Agriculture			0.0	
By end use				
Heating and cooling	120526	4.00%	4821.1	
Electric appliances and lighting	31104	4.00%	1244.1	
Agriculture specific uses	22068		0.0	
By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat			0.0	
Other			0.0	
Transport				
By transport mean				
Road transport	296135		0.0	
Public road transport				
Motorcycles				
Private cars				
Trucks				
Rail	8872		0.0	

Aviation	50029	0.0
Inland navigation	5571	0.0
By transport activity		0.0
Passenger transport		0.0
Freight transport		0.0
POWER GENERATION		
Conversion factor for GKW to ktoe	**4.7**	
Electricity consumption (in GWh)		
Energy branch		
Own consumption & pumping	41043	0.0
Refineries & other uses	20264	0.0
Transmission and distribution losses	41732	0.0
Saving in MTOe		**18**

Policy Option 7 Mtoe Estimation

Action 7				
Description	**EU/MS to promote/require regulatory change towards facilitation of penetration of "off-grid" power generation – many obstacles to be removed through different measures**			
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	**Comments**
				High efficiency CHP will give primary energy savings of at least 10% compared to separate production (1). Much of the potential off-grid CHP plant will be small scale micro-generation. In reality the technology for this is still at the development stage despite Suppliers' claims to the contrary.
Technical Saving Potential		**10%**		
Discount Factors				
				In the UK the boile replacement rate is 1.5 million/year. (Ref 2). In the future it is confidently expected that micro-generation will be a viable and attractive option. The "stock" starting point for micro generation is almost zero (i.e. very few small buidlings or houses have micro generation) so there is much that can be done, i.e. stock effect is minimum.
- Stock effect		0.02%		
- Replacement timing		0.02%		see above

				There are high regulatory barriers, also the installation costs are high; EU and MS action is needed to remove the former, while costs will reduce as the technlogy become more widely adopted. Off-grid systems are less affected (if at all) by the demands of the electricity companies. There are some larger scale industrial and commercial plants that operate in "island" mode, generally, however, users with larger plants prefer the "security" of a grid connection so there is limited scope for the growth of independent "island" systems. The most significant "barrier" is public acceptance - micro-CHP will not be used in the domestic sector until it is a "must-have" technology for the home for regulatory, economic and social reasons - i.e. as now applies for condensing boilers.
- Barriers		5.00%		
- Other restrictions		1.00%		Slower than hoped for development of commercially viable technology. As building standards continue to improve in response to tighter regulation standards their energy use will decrease. This, in turn, will reduce the potential energy savings achievable from micro-generation.
- Interaction		0.40%		
- Overlap				
Max poss saving (PSE)		**3.56%**		
INDUSTRY				
Final Energy Demand (in ktoe)				
By sector				
Iron and steel	62604	0.0%	0.0	No significant effect on industry
Non ferrous metals	11712	0.0%	0.0	
Chemicals	57838	0.0%	0.0	
Non metallic minerals	41855	0.0%	0.0	
Paper and pulp	40499	0.0%	0.0	

Food, drink and tobacco	40488	0.0%	0.0	
Engineering	30737	0.0%	0.0	
Textiles	11441	0.0%	0.0	
Other industries	42039	0.0%	0.0	
By fuel				
Solids			0	
Oil			0	
Gas			0	
Electricity			0	
Heat (from CHP)			0	
DOMESTIC				
Final Energy Demand (in ktoe)				
By end use				
Heating and cooling (incl. cooking)	258264	3.9%	10072.3	"Off-grid" power generation installations will be significant in the domestic sector
Electric appliances and lighting	36348	0.0%	0.0	
By fuel				
Solids			0	
Oil			0	
Gas			0	
Electricity			0	
Heat			0	
Other			0	
SERVICES AND AGRICULTURE SECTOR				
Final Energy Demand (in ktoe)				
By sector				
Services			0	
Agriculture			0	
By end use				
Heating and cooling	120526	3.90%	4700.5	The major savings will be in the consumptions related to heating and cooling
Electric appliances and lighting	31104	0.00%	0.0	
Agriculture specific uses	22068	0.50%	110.3	
By fuel				
Solids			0	

Oil			
Gas			
Electricity			
Heat			
Other			
Transport			
By transport mean			
Road transport	296135	0.00%	0.0
Public road transport	7015		
Motorcycles	2261		
Private cars	167034		
Trucks	119824		
Rail	8872	0.00%	0.0
Aviation	50029	0.00%	0.0
Inland navigation	5571	0.00%	0.0
By transport activity			
Passenger transport	233782		
Freight transport	126825		
POWER GENERATION			
Conversion factor for GKW to ktoe	**4.7**		
Electricity consumption (in GWh)			
Energy branch			
Own consumption & pumping	41043	0.00%	0.0
Refineries & other uses	20264	0.10%	20.3
Transmission and distribution losses	41732	3.5%	1460.6
Saving in MTOe/1000			**16**

References

1 http://www.opet-chp.net/chpdirective.asp

2 Presentation to the Energy Institute London Branch. 29 June 2006.
Peter Bance Chief Executive Officer, Ceres

Policy Option 8 Mtoe Estimation

Action 8				
Description	**EU/MS to promote/require regulatory change towards facilitation of penetration of "grid-connected" CHP, via different measures**			
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	**Comments**
				High efficiency CHP will give primary energy savings of at least 10% compared to separate production (1): new commercial developments and the upgrade of industrial plants provide the best scope for CHP; there is also the possibility of coverting Heat Only boilerhouses to CHP plants and to make use of heat currently rejected from power plants
Technical Saving Potential		**10%**		
Discount Factors				
- Stock effect		2.00%		There will be some stock effect according to the future uptake of CHP
- Replacement timing		0.50%		The replacement rate of plant and machinery will be high as indutry and commerce strives to maintain competitiveness.

				These are various and numerous, and present to varying extents e.g. Third party access to the grid - this is becoming less of an issue (Ref - Interview with Ofgem); High capital costs Poor project economics - payback periods > 2 years; planning permisison difficult to secure for CHP plants using renewable energy. Lack of engineering skills within potential investing companies to support the design and engineering of CHP plants. Ref: Atkins Multi Coutnry Phare Study - Promotion of Small Scale Co-Gen in CEEC ***Note:*** *The challenge for the EU and MS is to prevent the above from becoming "show-stoppers".*
- Barriers		3.00%		
- Other restrictions		0.00%		Included in above
- Interaction				
- Overlap				
Max poss saving (PSE)		**4.50%**		
INDUSTRY				
Final Energy Demand (in ktoe)				The scope for CHP is highly dependent on there being matched power and heat loads.
By sector				
Iron and steel	62604	0.9%	563.4	
Non ferrous metals	11712	0.9%	105.4	
Chemicals	57838	1.2%	694.1	
Non metallic minerals	41855	1.2%	502.3	
Paper and pulp	40499	0.0%	0.0	CHP is already routine practice
Food, drink and tobacco	40488	1.2%	485.9	
Engineering	30737	0.9%	276.6	
Textiles	11441	1.2%	137.3	

Other industries	42039	1.2%	504.5	
By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat (from CHP)			0.0	
DOMESTIC				
Final Energy Demand (in ktoe)				
By end use				
Heating and cooling (incl. cooking)	258264	2.6%	6714.9	***Check effect of possible increased community heating:***Current Fuel Input for DH is 14,918 kTOe. Assuming 10% increased uptake of Community Heating ***(based on CHP)*** gives fuel increase of 1500 kTOe with associated savings elsewhere of, say, 3000kTOe. Also an allowance, (say equal), should be made for kTOe saving arising from some domestic micro CHP plant being grid-connected.
Electric appliances and lighting	36348	0.0%	0.0	
By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat			0.0	
Other			0.0	
SERVICES AND AGRICULTURE SECTOR				
Final Energy Demand (in ktoe)				
By sector				
Services			0.0	
Agriculture			0.0	
By end use				

Heating and cooling	120526	2.40%	2892.6	
Electric appliances and lighting	31104	1.20%	373.2	
Agriculture specific uses	22068	1.20%	264.8	
By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat			0.0	
Other			0.0	
Transport				
By transport mean				
Road transport	296135	0.00%	0.0	
Public road transport				
Motorcycles				
Private cars				
Trucks				
Rail	8872	0.00%	0.0	
Aviation	50029	0.00%	0.0	
Inland navigation	5571	0.00%	0.0	
By transport activity			0.0	
Passenger transport			0.0	
Freight transport			0.0	
POWER GENERATION				
Conversion factor for GKW to ktoe	**4.7**			
Electricity consumption (in GWh)				
Energy branch				
Own consumption & pumping	41043	0.12%	49.3	
Refineries & other uses	20264	0.12%	24.3	
Transmission and distribution losses	41732	1.2%	500.8	Less savings than for **"off-grid"** CHP
Saving in MTOe			**14**	

References

1 http://www.opet-chp.net/chpdirective.asp

Policy Option 9 Mtoe Estimation

Action 9

Description **EU to introduce new CEN STANDARD to regulate district heating systems**

	EU-25 2005 Consumptions (ktoe or GWh)	Saving (%)	Saving (in ktoe)	Comments
Technical Saving Potential		**20%**		Current Fuel Input for DH is 14,918 kTOe. A new standard could give 20% savings = 2938 kTOe
Discount Factors				
- Stock effect		5.00%		Some large DH systems have been rehabilated and are based on modern technolgy; there are clearly diminishing returns as the DH infrastructure is improved.
- Replacement timing		0.00%		Included in above.
- Barriers		0.00%		None if the standard is mandatory!
- Other restrictions		0.00%		Lack of funding to support investment programmes
- Interaction		1.00%		
- Overlap		1.00%		Overlap with CHP promotion
Max poss saving (PSE)		**13.00%**	**1909.7**	**PSE = 2938 x 13/20**

INDUSTRY

Final Energy Demand (in ktoe)	
By sector	
Iron and steel	62604
Non ferrous metals	11712
Chemicals	57838
Non metallic minerals	41855
Paper and pulp	40499

Food, drink and tobacco	40488
Engineering	30737
Textiles	11441
Other industries	42039
By fuel	
Solids	
Oil	
Gas	
Electricity	
Heat (from CHP)	

DOMESTIC	
Final Energy Demand (in ktoe)	
By end use	
Heating and cooling (incl. cooking)	258264
Electric appliances and lighting	36348
By fuel	
Solids	
Oil	
Gas	
Electricity	
Heat	
Other	

SERVICES AND AGRICULTURE SECTOR	
Final Energy Demand (in ktoe)	
By sector	
Services	
Agriculture	
By end use	
Heating and cooling	120526
Electric appliances and lighting	31104
Agriculture specific uses	22068
By fuel	
Solids	
Oil	
Gas	

Electricity					
Heat					
Other					
Transport					
By transport mean					
Road transport	296135				
Public road transport					
Motorcycles					
Private cars					
Trucks					
Rail	8872				
Aviation	50029				
Inland navigation	5571				
By transport activity					
Passenger transport					
Freight transport					
POWER GENERATION					
Conversion factor for GKW to ktoe	**4.7**				
Electricity consumption (in GWh)					
Energy branch					
Own consumption & pumping	41043				
Refineries & other uses	20264				
Transmission and distribution losses	41732				
Saving in MTOe			**2**	Calculated from fuel used for DH (cell C79 in power generation sheet)	**14918.1** **ktoe**

Policy Option 10 Mtoe Estimation

Action 10				
Description	**EU to incentivise the use of intermediaries for small energy efficiency loans etc, for example by extending access to private capital (through Energy Services Directive obligation) public capital as a revolving fund for "soft loans".**			
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	**Comments**
Technical Saving Potential		**3.00%**		The EU to Encourage - not to insist. Assuming successful, then it is unlikely that soft loans would lead to more than 10% of the (typically) 30% low cost projects being implemented
Discount Factors				
- Stock effect		0.20%		Existing technologies hard to displace for hardware projects
- Replacement timing		0.40%		Hardware projects will usually have a replacement element
- Barriers		0.00%		
- Other		0.00%		
- Interaction				
- Overlap				
Max poss saving (PSE)		**2.40%**		
INDUSTRY				
Final Energy Demand (in ktoe)				
By sector				

Iron and steel				Industry will be the main recipient of this action, as industry is more financially sophisticated and takes on debt readily. Energy Intensive Sectors are likely to have made the available investments already
	62604	1.20%	751.3	
Non ferrous metals	11712	1.20%	140.5	
Chemicals	57838	1.20%	694.1	
Non metallic minerals	41855	1.20%	502.3	Industry will be the main recipient of this action, as industry is more financially sophisticated and takes on debt readily. Less Energy Intensive Sectors are likely to benefit most as they will not have made the available investments already.
Paper and pulp	40499	2.20%	891.0	
Food, drink and tobacco	40488	2.20%	890.7	
Engineering	30737	2.20%	676.2	
Textiles	11441	2.20%	251.7	
Other industries	42039	2.20%	924.9	
By fuel			0.0	
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat (from CHP)			0.0	
			0.0	
DOMESTIC			0.0	
Final Energy Demand (in ktoe)			0.0	
By end use			0.0	
Heating and cooling (incl. cooking)	258264	0.36%	929.8	Households less technically or financially confident than industry. Difficult to see how this action would help households

Electric appliances and lighting	36348	0.36%	130.9	
By fuel			0.0	
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat			0.0	
Other			0.0	
			0.0	
SERVICES AND AGRICULTURE SECTOR			0.0	
			0.0	
Final Energy Demand (in ktoe)			0.0	
By sector			0.0	
Services			0.0	
Agriculture			0.0	
By end use			0.0	
Heating and cooling	120526	2.20%	2651.6	Industry will be the main recipient of this action, as industry is more financially sophisticated and takes on debt readily
Electric appliances and lighting	31104	2.20%	684.3	
Agriculture specific uses	22068	2.20%	485.5	
By fuel			0.0	
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat			0.0	
Other			0.0	
			0.0	
Transport			0.0	
By transport mean			0.0	
Road transport	296135		0.0	
Public road transport	7015		0.0	
Motorcycles	2261	0.60%	13.6	Difficult to implement, but soft loans for personal transport could have an impact

Private cars	167034	0.60%	1002.2	
Trucks	119824		0.0	
				Almost impossible to imagine this sort of loan would really change capex decisions in this sector
Rail	8872	0.012%	1.1	
Aviation	50029	0.012%	6.0	
Inland navigation	5571	0.012%	0.7	
By transport activity			0.0	
Passenger transport	233782	0.00%	0.0	
Freight transport	126825	0.00%	0.0	
			0.0	
Power Generation			0.0	
Conversion factor for GKW to ktoe	**4.7**		0.0	
Energy branch			0.0	
				Industry will be the main recipient of this action, as industry is more financially sophisticated and takes on debt readily
Own consumption & pumping	41043	2.40%	985.0	
Refineries & other uses	20264	2.40%	486.3	
Transmission and distribution losses	41732	0%	0.0	
Saving in ktoe			13099.4	
Saving in MTOe			**13**	

Note - Saving % calc dependent upon sector etc.
Within family (eg Industry) segment either by sector or fuel but not both (double counting)

Policy Option 12 Mtoe Estimation

Action 12				
Description	**Incentivise manufacturers to produce energy efficient products through favourable rates and other incentives.**			
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	
Technical Saving Potential		**1.50%**		**Comments**
				The EU to Encourage - not to insist. Assuming successful, then we assume that the hardware involved will save 15%, but only 10% of hardware will be reached
Discount Factors				
- Stock effect		0.10%		
- Replacement timing		0.25%		
- Barriers		0.00%		
- Other		0.00%		
- Interaction				
- Overlap				
Max poss saving (PSE)		**1.15%**		
INDUSTRY				
Final Energy Demand (in ktoe)				
By sector				
Iron and steel	62604	1.15%	720.0	
Non ferrous metals	11712	1.15%	134.7	
Chemicals	57838	1.15%	665.1	
Non metallic minerals	41855	1.15%	481.3	
Paper and pulp	40499	1.15%	465.7	
Food, drink and tobacco	40488	1.15%	465.6	
Engineering	30737	1.15%	353.5	

Textiles	11441	1.15%	131.6
Other industries	42039	1.15%	483.4
By fuel			
Solids			
Oil			
Gas			
Electricity			
Heat (from CHP)			
DOMESTIC			
Final Energy Demand (in ktoe)			
By end use			
Heating and cooling (incl. cooking)	258264	1.15%	2970.0
Electric appliances and lighting	36348	1.15%	418.0
By fuel			
Solids			
Oil			
Gas			
Electricity			
Heat			
Other			
SERVICES AND AGRICULTURE SECTOR			
Final Energy Demand (in ktoe)			
By sector			
Services			
Agriculture			
By end use			
Heating and cooling	120526	1.15%	1386.1
Electric appliances and lighting	31104	1.15%	357.7
Agriculture specific uses	22068	1.15%	253.8
By fuel			
Solids			
Oil			
Gas			
Electricity			
Heat			

Other				
Transport				
By transport mean				
Road transport		296135	1.15%	3405.6
Public road transport		7015		
Motorcycles		2261		
Private cars		167034		
Trucks		119824		
Rail		8872	1.15%	102.0
Aviation		50029	1.15%	575.3
Inland navigation		5571	1.15%	64.1
By transport activity				
Passenger transport		233782	0.00%	0.0
Freight transport		126825	0.00%	0.0
Power Generation				
Conversion factor for GKW to ktoe	**4.7**			
Energy branch				
Own consumption & pumping		41043	1.15%	472.0
Refineries & other uses		20264	1.15%	233.0
Transmission and distribution losses		41732	1.15%	479.9
Saving in ktoe				14618.4
Saving in MTOe				**15**

88

Note - Saving % calc dependent upon sector etc.
Within family (eg Industry) segment either by sector or fuel but not both (double counting)

Appendix 8 – Energy Saving Methodology for Screened Policy Options

The following calculation sheets follow the same methodology detailed in Appendix 7 where the analyst did not use a narrative method to determine Mtoe.

Note: These energy savings estimations are corrected for overlap, but not using the final method deployed for the 18 options.

Policy Option A1 Mtoe Estimation

Action A1				
Description	**EU to increase means of recognition for organisations providing links etc to EU Energy Efficiency information sources**			
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	**Comments**
Technical Saving Potential				This action is indirect eg creates a basis for energy savings, in combination with other policy measures. Difficult to quantify effect of individual action.
Discount Factors				
- Stock effect				
- Replacement timing				
- Barriers				
- Other restrictions				
- Interaction				
- Overlap				
Max poss saving (PSE)		**1.00%**		Results from voluntary agreements promoting energy efficient behaviour with business/industry/public sector have produced savings of 2-3% in initial years at a national level. It is logical to assume action would contribute towards this level of savings across the EU although there is a lack of hard evidence to support this.
INDUSTRY				
Final Energy Demand (in ktoe)				
By sector				
Iron and steel	62604	1.00%	626.0	

Non ferrous metals	11712	1.00%	117.1
Chemicals	57838	1.00%	578.4
Non metallic minerals	41855	1.00%	418.6
Paper and pulp	40499	1.00%	405.0
Food, drink and tobacco	40488	1.00%	404.9
Engineering	30737	1.00%	307.4
Textiles	11441	1.00%	114.4
Other industries	42039	1.00%	420.4
By fuel			
Solids			0.0
Oil			0.0
Gas			0.0
Electricity			0.0
Heat (from CHP)			0.0
DOMESTIC			
Final Energy Demand (in ktoe)			
By end use			
Heating and cooling (incl. cooking)	258264	1.00%	2582.6
Electric appliances and lighting	36348	1.00%	363.5
By fuel			
Solids			0.0
Oil			0.0
Gas			0.0
Electricity			0.0
Heat			0.0
Other			0.0
SERVICES AND AGRICULTURE SECTOR			
Final Energy Demand (in ktoe)			
By sector			
Services	145389	1.00%	1453.9
Agriculture	28309	1.00%	283.1
By end use			
Heating and cooling			0.0
Electric appliances and lighting			0.0
Agriculture specific uses			0.0

By fuel			
Solids			0.0
Oil			0.0
Gas			0.0
Electricity			0.0
Heat			0.0
Other			0.0
Transport			
By transport mean			
Road transport			0.0
Public road transport			0.0
Motorcycles			0.0
Private cars			0.0
Trucks			0.0
Rail			0.0
Aviation			0.0
Inland navigation			0.0
By transport activity			0.0
Passenger transport	233782	1.00%	2337.8
Freight transport	126825	1.00%	1268.2
Power Generation			
Conversion factor for GKW to ktoe	**4.7**		
Energy branch			
Own consumption & pumping	41043		0.0
Refineries & other uses	20264		0.0
Transmission and distribution losses	41732		0.0
Saving in ktoe			11681.3
Saving in Mtoe			**12**

High figure reflects fact that action covers ALL energy efficiency information for ALL sectors

Note - Saving % calc dependent upon sector etc.
Within family (eg Industry) segment either by sector or fuel but not both (double counting)
Input Saving % only

Policy Option A4 Mtoe Estimation

Action A4

Description **EU/MS to oblige energy suppliers to include information on energy bill (power and heat) interpretation and how relates to energy efficiency and taking advantage of new metering technology.**

	EU-25 2005 Consumptions (ktoe or GWh)	Saving (%)	Saving (in ktoe)	Comments
Technical Saving Potential		**40.00%**		Domestic savings, ref: http://www.defra.gov.uk/environment/energy/review/pdf/tech-overview.pdf
Discount Factors				
- Stock effect				
- Replacement timing		10.00%		All domestic appliances dependent to large extent on lifetime for replacement to be cost effective
- Barriers		10.00%		Influencing consumer behaviour will require a combination of actions
- Other restrictions				
- Interaction				
- Overlap				
Max poss saving (PSE)		**20.00%**		Savings of 25-37% at peak times have been reported in multiple studies following various forms of feedback on energy use in homes
INDUSTRY				
Final Energy Demand (in ktoe)				

				Carbon Trust states that metering typically helps businesses identify more than 5% energy savings, through better awareness of their use. Logical to take this minimum saving as conservative estimate of the effect from improved billing information.
By sector				
Iron and steel	62604	5.00%	3130.2	
Non ferrous metals	11712	5.00%	585.6	
Chemicals	57838	5.00%	2891.9	
Non metallic minerals	41855	5.00%	2092.8	
Paper and pulp	40499	5.00%	2025.0	
Food, drink and tobacco	40488	5.00%	2024.4	
Engineering	30737	5.00%	1536.8	
Textiles	11441	5.00%	572.1	
Other industries	42039	5.00%	2101.9	
By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat (from CHP)			0.0	
DOMESTIC				
Final Energy Demand (in ktoe)				
				Households are the obvious target for this action as billing simpler than for many industrial/commercial sites
By end use				
Heating and cooling (incl. cooking)	258264	10.00%	25826.4	

Electric appliances and lighting	36348	10.00%	3634.8	Indirect feedback (feedback that has been processed in some way before reaching the energy user, normally via billing) is usually more suitable than direct feedback for demonstrating any effect on consumption of changes in space heating, household composition and the impact of investments in efficiency measures or high-consuming appliances. Savings have ranged from 0-10%, but they vary according to context and the quality of information given.
By fuel				Historic feedback (comparing with previous recorded periods of consumption) appears to be more effective than comparative or normative (comparing with other households, or with a target figure) (1).
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat			0.0	
Other			0.0	
SERVICES AND AGRICULTURE SECTOR				
Final Energy Demand (in ktoe)				
By sector				
Services	145389	5.00%	7269.4	
Agriculture			0.0	
By end use				
Heating and cooling			0.0	
Electric appliances and lighting			0.0	
Agriculture specific uses			0.0	

By fuel		
Solids		0.0
Oil		0.0
Gas		0.0
Electricity		0.0
Heat		0.0
Other		0.0
Transport		
By transport mean		
Road transport		0.0
Public road transport		0.0
Motorcycles		0.0
Private cars		0.0
Trucks		0.0
Rail		0.0
Aviation		0.0
Inland navigation		0.0
By transport activity		0.0
Passenger transport	233782	0.0
Freight transport	126825	0.0
Power Generation		
Conversion factor for GKW to ktoe	**4.7**	
Energy branch		
Own consumption & pumping	41043	0.0
Refineries & other uses	20264	0.0
Transmission and distribution losses	41732	0.0
Saving in ktoe		53691.3
Saving in Mtoe		**54**

Note - Saving % calc dependent upon sector etc.
Within family (eg Industry) segment either by sector or fuel but not both (double counting)
Input Saving % only

References

1 A Review for DEFRA of the Literature On Metering, Billing and Direct Displays

Policy Option A4 Mtoe Estimation

Action A4

Description **EU/MS to harmonise all product related energy efficiency information into one Energy Efficiency Product Listing portal**

	EU-25 2005 Consumptions (ktoe or GWh)	Saving (%)	Saving (in ktoe)	Comments
Technical Saving Potential		**0.00%**		This action is indirect eg creates a basis for energy savings, in combination with other policy measures. Difficult to quantify effect of individual action.
Discount Factors				
- Stock effect		0.00%		
- Replacement timing		0.00%		
- Barriers		0.00%		
- Other restrictions		0.00%		
- Interaction		0.00%		
- Overlap		0.00%		
Max poss saving (PSE)		**0.00%**		Action expected to have positive effect on the public's awareness of measures, products, services and suppliersand access to information but no evidence found of direct savings.
INDUSTRY				
Final Energy Demand (in ktoe)				
By sector				
Iron and steel	62604		0	
Non ferrous metals	11712		0	
Chemicals	57838		0	
Non metallic minerals	41855		0	

Paper and pulp	40499	0
Food, drink and tobacco	40488	0
Engineering	30737	0
Textiles	11441	0
Other industries	42039	0
By fuel		
Solids		0
Oil		0
Gas		0
Electricity		0
Heat (from CHP)		0

DOMESTIC		
Final Energy Demand (in ktoe)		
By end use		
Heating and cooling (incl. cooking)	258264	0
Electric appliances and lighting	36348	0
By fuel		
Solids		0
Oil		0
Gas		0
Electricity		0
Heat		0
Other		0

SERVICES AND AGRICULTURE SECTOR		
Final Energy Demand (in ktoe)		
By sector		
Services	145389	0
Agriculture		0
By end use		
Heating and cooling		0
Electric appliances and lighting		0
Agriculture specific uses		0
By fuel		
Solids		0
Oil		0

Gas			0
Electricity			0
Heat			0
Other			0
Transport			
By transport mean			
Road transport			0
Public road transport			0
Motorcycles			0
Private cars			0
Trucks			0
Rail			0
Aviation			0
Inland navigation			0
By transport activity			0
Passenger transport	233782		0
Freight transport	126825		0
Power Generation			
Conversion factor for GKW to ktoe	**4.7**		
Energy branch			
Own consumption & pumping	41043		0
Refineries & other uses	20264		0
Transmission and distribution losses	41732		0
Saving in ktoe		Not possible	0
Saving in Mtoe			**0**

Policy Option A7 Mtoe Estimation

Action A7				
Description	**EU/MS to include Eco Labelling organisations and products on appliance/service performance listing source**			
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	**Comments**
Technical Saving Potential		**0.00%**		This action is indirect eg creates a basis for energy savings, in combination with other policy measures. Difficult to quantify effect of individual action.
Discount Factors				
- Stock effect		0.00%		
- Replacement timing		0.00%		
- Barriers		0.00%		
- Other restrictions		0.00%		
- Interaction		0.00%		
- Overlap		0.00%		
Max poss saving (PSE)		**0.00%**		Action expected to have positive effect on the public's awareness of measures, products, services and suppliers but no evidence found of direct savings.
INDUSTRY				
Final Energy Demand (in ktoe)				
By sector				
Iron and steel	62604		0	
Non ferrous metals	11712		0	
Chemicals	57838		0	
Non metallic minerals	41855		0	
Paper and pulp	40499		0	
Food, drink and tobacco	40488		0	

Engineering	30737	0
Textiles	11441	0
Other industries	42039	0
By fuel		
Solids		0
Oil		0
Gas		0
Electricity		0
Heat (from CHP)		0
DOMESTIC		
Final Energy Demand (in ktoe)		
By end use		
Heating and cooling (incl. cooking)	258264	0
Electric appliances and lighting	36348	0
By fuel		
Solids		0
Oil		0
Gas		0
Electricity		0
Heat		0
Other		0
SERVICES AND AGRICULTURE SECTOR		
Final Energy Demand (in ktoe)		
By sector		
Services	145389	0
Agriculture		0
By end use		
Heating and cooling	120526	0
Electric appliances and lighting	31104	0
Agriculture specific uses		0
By fuel		
Solids		0
Oil		0
Gas		0
Electricity		0

Heat		0
Other		0
Transport		
By transport mean		
Road transport		0
Public road transport		0
Motorcycles		0
Private cars		0
Trucks		0
Rail		0
Aviation		0
Inland navigation		0
By transport activity		0
Passenger transport	233782	0
Freight transport	126825	0
Power Generation		
Conversion factor for GKW to ktoe	**4.7**	
Energy branch		
Own consumption & pumping	41043	0
Refineries & other uses	20264	0
Transmission and distribution losses	41732	0
Saving in ktoe		0
Saving in Mtoe		**0**

Policy Option A8 Mtoe Estimation

Action A8				
Description	**EU to extend existing/create new labelling schemes to make end users aware of consequences of energy use**			
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	**Comments**
				The Impact of Real-Time Feedback on Residential Electricity Consumption (Reference 8) suggests that "if the real time monitor is used in conjunction with other conservation and/or price measures, an overall average reduction of between 7 and 10% is feasible" (6.5% savings were achieved in electricity use and 8.2% for non electric heating households). Adding further information about the environmental impact to energy bills will logically encourage further savings. A study in the UK/Netherlands/Portugal (Reference 9) CADENCE - Carbon Dioxide from Domestic Equipment: End Use Efficiency and Consumer Education states: The savings result from technologies that are cost-effective for the consumer and come from increased energy efficiency, fuel switching from gas to electricity and from LPG to natural gas in Portugal. Most savings (80%) come from more electrical efficiency, particularly cold appliances, lighting and consumer electronics. Only 5% of the savings come from more efficient gas and the remaining 15% from fuel switching. Logical to conclude that information about different fuel uses in the home via billing would help to achieve these 20% savings by promoting fuel switching.
Technical Saving Potential		**10%**		

Discount Factors
- Stock effect
- Replacement timing
- Barriers
- Other restrictions

- Interaction - Overlap		9.00%	This action provides direct feedback to consumers and is therefore has potential to stimulate up to 10% savings. However, environmental impact/efficiency labelling of fuel source is less likely to widely influence consumer choice than eg labelling products with running costs. Action expected to contribute to energy savings, in combination with other policy measures eg for passenger transport where mobility choices are based on many factors. Difficult to quantify effect of individual action but conservative estimate made of low impact.
Max poss saving (PSE)		**1.00%**	Label energy purchases (e.g. electricity, gas, petrol) with consequences of action. Label could give actual data for organisation's energy product/or service or use default data; e.g. electricity suppliers would be able to reflect fuel mix selection, coach travel could reflect bio-diesel use. Energy suppliers with higher efficiency would be identified.
			Label would be displayed on energy supply bills, fuel pumps, transport provider publicity etc. Savings expected across domestic, service and transport sectors.
INDUSTRY			
Final Energy Demand (in ktoe)			
By sector			
Iron and steel	62604	0.0	
Non ferrous metals	11712	0.0	
Chemicals	57838	0.0	
Non metallic minerals	41855	0.0	
Paper and pulp	40499	0.0	
Food, drink and tobacco	40488	0.0	
Engineering	30737	0.0	
Textiles	11441	0.0	
Other industries	42039	0.0	
By fuel			
Solids		0.0	
Oil		0.0	
Gas		0.0	

Electricity			0.0
Heat (from CHP)			0.0
DOMESTIC			
Final Energy Demand (in ktoe)			
By end use			
Heating and cooling (incl. cooking)	258264		0.0
Electric appliances and lighting	36348		0.0
By fuel			
Solids		1.00%	69.5
Oil		1.00%	563.8
Gas		1.00%	1159.6
Electricity		1.00%	674.1
Heat		1.00%	194.7
Other		1.00%	284.5
SERVICES AND AGRICULTURE SECTOR			
Final Energy Demand (in ktoe)			
By sector			
Services	145389		0.0
Agriculture			0.0
By end use			
Heating and cooling	120526		0.0
Electric appliances and lighting	31104		0.0
Agriculture specific uses			0.0
By fuel			
Solids		1.00%	15.0
Oil		1.00%	398.8
Gas		1.00%	531.7
Electricity		1.00%	643.6
Heat		1.00%	104.3
Other		1.00%	43.5
Transport			
By transport mean			
Road transport			0.0
Public road transport			0.0

Motorcycles			0.0
Private cars			0.0
Trucks			0.0
Rail			0.0
Aviation			0.0
Inland navigation			0.0
By transport activity			0.0
Passenger transport	233782	1.00%	2337.8
Freight transport	126825	1.00%	1268.2
Power Generation			
Conversion factor for GKW to ktoe	**4.7**		
Energy branch			
Own consumption & pumping	41043		0.0
Refineries & other uses	20264		0.0
Transmission and distribution losses	41732		0.0
Saving in ktoe			8289.2
Saving in Mtoe			**8**

Note - Saving % calc dependent upon sector etc.
Within family (eg Industry) segment either by sector or fuel but not both (double counting)
Input Saving % only

Policy Option A9 Mtoe Estimation

Action A9				
Description	**EU/MS to stimulate the use of more energy efficient transport modes by providing information on the differences in energy use (and other effects) for different modes of transport.**			
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	**Comments**
Technical Saving Potential		**10.00%**		The project "Energy saving in transport of goods - a pilot project in rural natural resource based industries" (Reference 10) demonstrated transferral from road to rail and ferry for case routes. One case study found showed rail based transport (shipping dried cod to Italy from Norway) reached a reduction in energy use at 60% compared with lorry based transport. However, savings vary significantly by end user and by level of information/support provided. Various UK case studies demonstrate support positive changes of around 10% in mileage reduction, fuel savings, modal shifts etc from EST support programme.

Discount Factors
- Stock effect
- Replacement timing
- Barriers
- Other restrictions
- Interaction

- Overlap		9.00%		This action is indirect eg creates a basis for energy savings, in combination with other policy measures. Difficult to quantify effect of individual action. Evidence of significant savings > 10% from education of transport mode impacts, however information generally supported by on site advice, individual travel plans etc. Information alone will have limited effect on influencing behaviour. Assume awareness will contribute to transport sector savings, particularly impacting on single car drivers and business fleets.
Max poss saving (PSE)		**1.00%**		A case study from the Canadian Office of Energy Efficiency demonstrates achieveable gains of at least a 10 percent in efficiency by completing a transition to lighter, more efficient equipment. This particular example was for a fleet of trucks in the forestry industry but serves to demonstrate the order of savings possible from better information (Reference 8). Evidence to show savings vary significantly by end user.
INDUSTRY				Industry savings related to freight transport
Final Energy Demand (in ktoe)				
By sector				
Iron and steel	62604	0.00%	0.0	
Non ferrous metals	11712	0.00%	0.0	
Chemicals	57838	0.00%	0.0	
Non metallic minerals	41855	0.00%	0.0	
Paper and pulp	40499	0.00%	0.0	
Food, drink and tobacco	40488	0.00%	0.0	
Engineering	30737	0.00%	0.0	
Textiles	11441	0.00%	0.0	
Other industries	42039	0.00%	0.0	

By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat (from CHP)			0.0	
DOMESTIC				Individuals savings related to passenger transport
Final Energy Demand (in ktoe)				
By end use				
Heating and cooling (incl. cooking)	258264	0.00%	0.0	
Electric appliances and lighting	36348	0.00%	0.0	
By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat			0.0	
Other			0.0	
SERVICES AND AGRICULTURE SECTOR				
Final Energy Demand (in ktoe)				
By sector				
Services	145389	0.00%	0.0	
Agriculture			0.0	
By end use				
Heating and cooling	120526	0.00%	0.0	
Electric appliances and lighting	31104	0.00%	0.0	
Agriculture specific uses			0.0	
By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat			0.0	
Other			0.0	

Transport				
By transport mean				
Road transport			0.0	
Public road transport	7015	1.00%	70.2	Evidence of significant savings > 10% from education of transport impacts, however assume information alone will have limited effect on influencing behaviour, needs to be combined with other measures. Estimate 1% from well delivered information campaign.
Motorcycles			0.0	
Private cars	167034	1.00%	1670.3	
Trucks	119824	1.00%	1198.2	
Rail			0.0	
Aviation			0.0	
Inland navigation			0.0	
By transport activity			0.0	
Passenger transport	233782		0.0	
Freight transport	126825	0.00%	0.0	
Power Generation				
Conversion factor for GKW to ktoe	**4.7**			
Energy branch				
Own consumption & pumping	41043	0.00%	0.0	
Refineries & other uses	20264	0.00%	0.0	
Transmission and distribution losses	41732	0.00%	0.0	
Saving in ktoe			2938.7	
Saving in Mtoe			**3**	

Note - Saving % calc dependent upon sector etc.
Within family (eg Industry) segment either by sector or fuel but not both (double counting)
Input Saving % only

Policy Option G1 Mtoe Estimation

Action G1

Description: **EU to place Obligation on Member States for variable subsidy for gap between cost and production for CHP**

	EU-25 2005 Consumptions (ktoe or GWh)	Saving (%)	Saving (in ktoe)	Comments
Technical Saving Potential				Placing Obligation on MS for variable subsidies is one of the potential measures (together with Actions G2 - G6) that can be taken to support the wider implementation of "off-grid" and "grid-connected" CHP.

We have estimated that the total energy savings for Action 7 and Action 8 is 24 Mtoe, which arises through a combination of the Actions G1-G6. It is reasonable to assume that their contributory can be summed directly (as shown below) because the "overlapping effect" has already been considered as one of the discount factors in deriving the cumulative total of 24 Mtoe for all CHP.

Discount Factors		
- Stock effect	G1	3
- Replacement timing	G2	3
- Barriers	G3	6
- Other	G4	6
- Interaction	G5	3
- Overlap	G6	3
		24

Max poss saving (PSE)

INDUSTRY

Final Energy Demand (in ktoe)		
By sector		
Iron and steel	62604	0
Non ferrous metals	11712	0
Chemicals	57838	0
Non metallic minerals	41855	0
Paper and pulp	40499	0
Food, drink and tobacco	40488	0
Engineering	30737	0
Textiles	11441	0
Other industries	42039	0
By fuel		
Solids		0
Oil		0
Gas		0
Electricity		0
Heat (from CHP)		0

DOMESTIC		
Final Energy Demand (in ktoe)		
By end use		
Heating and cooling (incl. cooking)	258264	0
Electric appliances and lighting		0
By fuel		
Solids		0
Oil		0
Gas		0
Electricity		0
Heat		0
Other		0

SERVICES AND AGRICULTURE SECTOR		
Final Energy Demand (in ktoe)		
By sector		
Services		0
Agriculture		0
By end use		

Heating and cooling	120526	0	
Electric appliances and lighting		0	
Agriculture specific uses		0	
By fuel			
Solids		0	
Oil		0	
Gas		0	
Electricity		0	
Heat		0	
Other		0	
Transport			
By transport mean			
Road transport		0	
Public road transport		0	
Motorcycles		0	
Private cars		0	
Trucks		0	
Rail		0	
Aviation		0	
Inland navigation		0	
By transport activity		0	
Passenger transport		0	
Freight transport		0	
POWER GENERATION			
Conversion factor for GKW to ktoe	**4.7**		
Electricity consumption (in GWh)			
Energy branch			
Own consumption & pumping	41043	0	
Refineries & other uses	20264	0	
Transmission and distribution losses	41732	0	

Saving in MTOe **3** (see comments on Technical Saving Potential)

Note - Saving % calc dependent upon sector etc.
Within family (eg Industry) segment either by sector or fuel but not both (double counting)
Input Saving % only

Policy Option G2 Mtoe Estimation

Action G2				
Description	**EU/MS to require national regulators to ensure energy suppliers incentivise all scale CHP**			
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	**Comments**
Technical Saving Potential				Requiring national regulators to ensure energy suppliers incentivise all scale CHP is one of the potential measures (together with Actions G1 - G6) that can be taken to support the wider implementation of "off-grid" and "grid-connected" CHP.
				We have estimated that the total energy savings for Action 7 and Action 8 is 24 Mtoe, which arises through a combination of the Actions G1-G6. It is reasonable to assume that their contributory can be summed directly (as shown below) because the "overlapping effect" has already been considered as one of the discount factors in deriving the cumulative total of 24 Mtoe for all CHP.
Discount Factors				G1 **3**
- Stock effect				**G2** **3**
- Replacement timing				G3 6
- Barriers				G4 6
- Other				G5 3
- Interaction				G6 3
- Overlap				**24**
Max poss saving (PSE)				

INDUSTRY		
Final Energy Demand (in ktoe)		
By sector		
Iron and steel	62604	0.0
Non ferrous metals	11712	0.0
Chemicals	57838	0.0
Non metallic minerals	41855	0.0
Paper and pulp	40499	0.0
Food, drink and tobacco	40488	0.0
Engineering	30737	0.0
Textiles	11441	0.0
Other industries	42039	0.0
By fuel		
Solids		0.0
Oil		0.0
Gas		0.0
Electricity		0.0
Heat (from CHP)		0.0
DOMESTIC		
Final Energy Demand (in ktoe)		
By end use		
Heating and cooling (incl. cooking)	258264	0.0
Electric appliances and lighting	36348	0.0
By fuel		
Solids		0.0
Oil		0.0
Gas		0.0
Electricity		0.0
Heat		0.0
Other		0.0
SERVICES AND AGRICULTURE SECTOR		
Final Energy Demand (in ktoe)		
By sector		
Services		0.0
Agriculture		0.0

By end use		
Heating and cooling	120526	0.0
Electric appliances and lighting	31104	0.0
Agriculture specific uses	22068	0.0
By fuel		
Solids		0.0
Oil		0.0
Gas		0.0
Electricity		0.0
Heat		0.0
Other		0.0

Transport		
By transport mean		
Road transport	296135	0.0
Public road transport		0.0
Motorcycles		0.0
Private cars		0.0
Trucks		0.0
Rail	8872	0.0
Aviation	50029	0.0
Inland navigation	5571	0.0
By transport activity		0.0
Passenger transport		0.0
Freight transport		0.0

POWER GENERATION		
Conversion factor for GKW to ktoe	**4.7**	
Electricity consumption (in GWh)		
Energy branch		
Own consumption & pumping	41043	0.0
Refineries & other uses	20264	0.0
Transmission and distribution losses	41732	0.0

Saving in MTOe **3** (see comments on Technical Saving Potential)

Policy Option G3 Mtoe Estimation

Action G3					
Description	**EU/MS to enable fair access and fair rules for CHP in competitive markets in the EU**				
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	**Comments**	
Technical Saving Potential				Promoting a fair access and fair rules for CHO in EU markets is one of the potential measures (together with Actions G1 - G6) that can be taken to support the wider implementation of "off-grid" and "grid-connected" CHP.	
				We have estimated that the total energy savings for Action 7 and Action 8 is 24 Mtoe, which arises through a combination of the Actions G1-G6. It is reasonable to assume that their contributory can be summed directly (as shown below) because the "overlapping effect" has already been considered as one of the discount factors in deriving the cumulative total of 24 Mtoe for all CHP.	
Discount Factors				G1	**3**
- Stock effect				G2	3
- Replacement timing				**G3**	**6**
- Barriers				G4	6
- Other				G5	3
- Interaction				G6	3
- Overlap					**24**
Max poss saving (PSE)					

INDUSTRY		
Final Energy Demand (in ktoe)		
By sector		
Iron and steel	62604	0.0
Non ferrous metals	11712	0.0
Chemicals	57838	0.0
Non metallic minerals	41855	0.0
Paper and pulp	40499	0.0
Food, drink and tobacco	40488	0.0
Engineering	30737	0.0
Textiles	11441	0.0
Other industries	42039	0.0
By fuel		
Solids		0.0
Oil		0.0
Gas		0.0
Electricity		0.0
Heat (from CHP)		0.0
DOMESTIC		
Final Energy Demand (in ktoe)		
By end use		
Heating and cooling (incl. cooking)	258264	0.0
Electric appliances and lighting	36348	0.0
By fuel		
Solids		0.0
Oil		0.0
Gas		0.0
Electricity		0.0
Heat		0.0
Other		0.0
SERVICES AND AGRICULTURE SECTOR		
Final Energy Demand (in ktoe)		
By sector		
Services		0.0
Agriculture		0.0

By end use		
Heating and cooling	120526	0.0
Electric appliances and lighting	31104	0.0
Agriculture specific uses	22068	0.0
By fuel		
Solids		0.0
Oil		0.0
Gas		0.0
Electricity		0.0
Heat		0.0
Other		0.0
Transport		
By transport mean		
Road transport	296135	0.0
Public road transport		0.0
Motorcycles		0.0
Private cars		0.0
Trucks		0.0
Rail	8872	0.0
Aviation	50029	0.0
Inland navigation	5571	0.0
By transport activity		0.0
Passenger transport		0.0
Freight transport		0.0
POWER GENERATION		
Conversion factor for GKW to ktoe	**4.7**	
Electricity consumption (in GWh)		
Energy branch		
Own consumption & pumping	41043	0.0
Refineries & other uses	20264	0.0
Transmission and distribution losses	41732	0.0

Saving in MTOe **6** (see comments on Technical Saving Potential)

Note - Saving % calc dependent upon sector etc.
Within family (eg Industry) segment either by sector or fuel but not both (double counting)
Input Saving % only

Policy Option G4 Mtoe Estimation

Action G4

Description **EU/MS to addressing the administrative burdens placed on smaller generators e.g. for grid connection and incentivising the utilisation of distributed generation.**

	EU-25 2005 Consumptions (ktoe or GWh)	Saving (%)	Saving (in ktoe)	Comments	
Technical Saving Potential				Addressing the administrative burdens placed on small generators is one of the potential measures (together with Actions G1 - G6) that can be taken to support the wider implementation of "off-grid" and "grid-connected" CHP.	
				We have estimated that the total energy savings for Action 7 and Action 8 is 24 Mtoe, which arises through a combination of the Actions G1-G6. It is reasonable to assume that their contributory can be summed directly (as shown below) because the "overlapping effect" has already been considered as one of the discount factors in deriving the cumulative total of 24 Mtoe for all CHP.	
Discount Factors				G1	**3**
- Stock effect				G2	3
- Replacement timing				G3	6
- Barriers				**G4**	**6**
- Other				G5	3
- Interaction				G6	3
- Overlap					**24**
Max poss saving (PSE)					
INDUSTRY					

Final Energy Demand (in ktoe)		
By sector		
Iron and steel	62604	0.0
Non ferrous metals	11712	0.0
Chemicals	57838	0.0
Non metallic minerals	41855	0.0
Paper and pulp	40499	0.0
Food, drink and tobacco	40488	0.0
Engineering	30737	0.0
Textiles	11441	0.0
Other industries	42039	0.0
By fuel		
Solids		0.0
Oil		0.0
Gas		0.0
Electricity		0.0
Heat (from CHP)		0.0

DOMESTIC		
Final Energy Demand (in ktoe)		
By end use		
Heating and cooling (incl. cooking)	258264	0.0
Electric appliances and lighting	36348	0.0
By fuel		
Solids		0.0
Oil		0.0
Gas		0.0
Electricity		0.0
Heat		0.0
Other		0.0

SERVICES AND AGRICULTURE SECTOR	
Final Energy Demand (in ktoe)	
By sector	
Services	0.0
Agriculture	0.0
By end use	

Heating and cooling	120526	0.0
Electric appliances and lighting	31104	0.0
Agriculture specific uses	22068	0.0
By fuel		
Solids		0.0
Oil		0.0
Gas		0.0
Electricity		0.0
Heat		0.0
Other		0.0
Transport		
By transport mean		
Road transport	296135	0.0
Public road transport		0.0
Motorcycles		0.0
Private cars		0.0
Trucks		0.0
Rail	8872	0.0
Aviation	50029	0.0
Inland navigation	5571	0.0
By transport activity		0.0
Passenger transport		0.0
Freight transport		0.0
POWER GENERATION		
Conversion factor for GKW to ktoe	**4.7**	
Electricity consumption (in GWh)		
Energy branch		
Own consumption & pumping	41043	0.0
Refineries & other uses	20264	0.0
Transmission and distribution losses	41732	0.0

Saving in MTOe	**6**	(see comments on Technical Saving Potential)

Policy Option G5 Mtoe Estimation

Action G5

Description **EU/MS implementation of fiscal incentives across all EU to facilitate investment in high-efficiency power generation**

	EU-25 2005 Consumptions (ktoe or GWh)	Saving (%)	Saving (in ktoe)	Comments	
Technical Saving Potential				Implementation of fiscal incentives across all EU is one of the potential measures (together with Actions G1 - G6) that can be taken to support the wider implementation of "off-grid" and "grid-connected" CHP.	
				We have estimated that the total energy savings for Action 7 and Action 8 is 24 Mtoe, which arises through a combination of the Actions G1-G6. It is reasonable to assume that their contributory can be summed directly (as shown below) because the "overlapping effect" has already been considered as one of the discount factors in deriving the cumulative total of 24 Mtoe for all CHP.	
Discount Factors				G1	**3**
- Stock effect				G2	3
- Replacement timing				G3	6
- Barriers				G4	6
- Other				**G5**	**3**
- Interaction				G6	3
- Overlap					**24**
Max poss saving (PSE)					

INDUSTRY		
Final Energy Demand (in ktoe)		
By sector		
Iron and steel	62604	0.0
Non ferrous metals	11712	0.0
Chemicals	57838	0.0
Non metallic minerals	41855	0.0
Paper and pulp	40499	0.0
Food, drink and tobacco	40488	0.0
Engineering	30737	0.0
Textiles	11441	0.0
Other industries	42039	0.0
By fuel		
Solids		0.0
Oil		0.0
Gas		0.0
Electricity		0.0
Heat (from CHP)		0.0
DOMESTIC		
Final Energy Demand (in ktoe)		
By end use		
Heating and cooling (incl. cooking)	258264	0.0
Electric appliances and lighting	36348	0.0
By fuel		
Solids		0.0
Oil		0.0
Gas		0.0
Electricity		0.0
Heat		0.0
Other		0.0
SERVICES AND AGRICULTURE SECTOR		
Final Energy Demand (in ktoe)		
By sector		
Services		0.0
Agriculture		0.0

By end use			
Heating and cooling	120526	0.0	
Electric appliances and lighting	31104	0.0	
Agriculture specific uses	22068	0.0	
By fuel			
Solids		0.0	
Oil		0.0	
Gas		0.0	
Electricity		0.0	
Heat		0.0	
Other		0.0	
Transport			
By transport mean			
Road transport	296135	0.0	
Public road transport		0.0	
Motorcycles		0.0	
Private cars		0.0	
Trucks		0.0	
Rail	8872	0.0	
Aviation	50029	0.0	
Inland navigation	5571	0.0	
By transport activity		0.0	
Passenger transport		0.0	
Freight transport		0.0	
POWER GENERATION			
Conversion factor for GKW to ktoe	**4.7**		
Electricity consumption (in GWh)			
Energy branch			
Own consumption & pumping	41043	0.0	
Refineries & other uses	20264	0.0	
Transmission and distribution losses	41732	0.0	

Saving in MTOe **3** (see comments on Technical Saving Potential)

Policy Option G6 Mtoe Estimation

Action G6

Description **EU/MS to require Public Sector adoption of a 15% target to use CHP generated electricity**

	EU-25 2005 Consumptions (ktoe or GWh)	Saving (%)	Saving (in ktoe)	Comments
Technical Saving Potential				Requiring Public Sector to adopt a 15% target is one of the potential measures (together with Actions G1 - G6) that can be taken to support the wider implementation of "off-grid" and "grid-connected" CHP.

We have estimated that the total energy savings for Action 7 and Action 8 is 24 Mtoe, which arises through a combination of the Actions G1-G6. It is reasonable to assume that their contributory can be summed directly (as shown below) because the "overlapping effect" has already been considered as one of the discount factors in deriving the cumulative total of 24 Mtoe for all CHP.

Discount Factors	G1	**3**
- Stock effect	G2	3
- Replacement timing	G3	6
- Barriers	G4	6
- Other	G5	3
- Interaction	**G6**	**3**
- Overlap		**24**

Max poss saving (PSE)

INDUSTRY

Final Energy Demand (in ktoe)

By sector		
Iron and steel	62604	0.0
Non ferrous metals	11712	0.0
Chemicals	57838	0.0
Non metallic minerals	41855	0.0
Paper and pulp	40499	0.0
Food, drink and tobacco	40488	0.0
Engineering	30737	0.0
Textiles	11441	0.0
Other industries	42039	0.0
By fuel		
Solids		0.0
Oil		0.0
Gas		0.0
Electricity		0.0
Heat (from CHP)		0.0
DOMESTIC		
Final Energy Demand (in ktoe)		
By end use		
Heating and cooling (incl. cooking)	258264	0.0
Electric appliances and lighting	36348	0.0
By fuel		
Solids		0.0
Oil		0.0
Gas		0.0
Electricity		0.0
Heat		0.0
Other		0.0
SERVICES AND AGRICULTURE SECTOR		
Final Energy Demand (in ktoe)		
By sector		
Services		0.0
Agriculture		0.0
By end use		
Heating and cooling	120526	0.0

Electric appliances and lighting	31104	0.0	
Agriculture specific uses	22068	0.0	
By fuel			
Solids		0.0	
Oil		0.0	
Gas		0.0	
Electricity		0.0	
Heat		0.0	
Other		0.0	
Transport			
By transport mean			
Road transport	296135	0.0	
Public road transport		0.0	
Motorcycles		0.0	
Private cars		0.0	
Trucks		0.0	
Rail	8872	0.0	
Aviation	50029	0.0	
Inland navigation	5571	0.0	
By transport activity		0.0	
Passenger transport		0.0	
Freight transport		0.0	
POWER GENERATION			
Conversion factor for GKW to ktoe	**4.7**		
Electricity consumption (in GWh)			
Energy branch			
Own consumption & pumping	41043	0.0	
Refineries & other uses	20264	0.0	
Transmission and distribution losses	41732	0.0	

Saving in MTOe **3** (see comments on Technical Saving Potential)

Policy OptionF2 Mtoe Estimation

Action F2				
Description	**EU to consider ecological tax reform in line with energy tax harmonisation.**			
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	**Comments**
Technical Saving Potential		**2.50%**		All products and behaviours have potential to be reached through taxation
Discount Factors				
- Stock effect		0.00%		
- Replacement timing		0.00%		
- Barriers		1.00%		Very difficult to implement, especially given that "tax neutrality" is impossible to guarantee
- Other		0.00%		
- Interaction		0.40%		Interacts with other fiscal measures - esp encouraging OEMs to produce more efficient products
- Overlap				
Max poss saving (PSE)		**1.10%**		
INDUSTRY				
Final Energy Demand (in ktoe)				
By sector				
Iron and steel	62604	1.10%	688.6	hypothetically, all sectors are equally open to fiscal drivers
Non ferrous metals	11712	1.10%	128.8	
Chemicals	57838	1.10%	636.2	
Non metallic minerals	41855	1.10%	460.4	
Paper and pulp	40499	1.10%	445.5	

Food, drink and tobacco	40488	1.10%	445.4
Engineering	30737	1.10%	338.1
Textiles	11441	1.10%	125.9
Other industries	42039	1.10%	462.4
By fuel			
Solids			0
Oil			0
Gas			0
Electricity			0
Heat (from CHP)			0
DOMESTIC			
Final Energy Demand (in ktoe)			
By end use			
Heating and cooling (incl. cooking)	258264	1.10%	2840.9
Electric appliances and lighting	36348	1.10%	399.8
By fuel			
Solids			0
Oil			0
Gas			0
Electricity			0
Heat			0
Other			0
SERVICES AND AGRICULTURE SECTOR			
Final Energy Demand (in ktoe)			
By sector			
Services			0
Agriculture			0
By end use			
Heating and cooling	120526	1.10%	1325.8
Electric appliances and lighting	31104	1.10%	342.1
Agriculture specific uses	22068	1.10%	242.7
By fuel			
Solids			0
Oil			0
Gas			0

Electricity			0
Heat			0
Other			0
Transport			
By transport mean			
Road transport			0
Public road transport			0
Motorcycles			0
Private cars			0
Trucks			0
Rail			0
Aviation			0
Inland navigation			0
By transport activity			
Passenger transport	233781.7247	1.10%	2571.6
Freight transport	126824.8082	1.10%	1395.1
Power Generation			
Conversion factor for GKW to ktoe	**4.7**		
Energy branch			
Own consumption & pumping	41043	1.10%	451.5
Refineries & other uses	20264	1.10%	222.9
Transmission and distribution losses	41732	1.10%	459.0
Saving in ktoe			13982.9
Saving in MTOe			**14**

Note - Saving % calc dependent upon sector etc.
Within family (eg Industry) segment either by sector or fuel but not both (double counting)
Input Saving % only

Policy Option F3 Mtoe Estimation

Action F3				
Description	**EU to increase adoption of existing energy efficiency legislation by linking implementation with structural fund provision to member States.**			
	EU-25 2005 Consumptions (ktoe or GWh)	**Saving (%)**	**Saving (in ktoe)**	**Comments**
Technical Saving Potential		**5.00%**		The present directives, if implemented, would greatly improve energy efficiency in many sectors
Discount Factors				
- Stock effect		0.00%		
- Replacement timing		0.00%		
- Barriers		1.00%		Measurement of compliance would remain difficult, and sanction unlikely in the event of uncertainty
- Other		0.00%		
- Interaction		1.00%		All actions are dependent on "making EU Directives stick"
- Overlap				
Max poss saving (PSE)		**3.00%**		
INDUSTRY				
Final Energy Demand (in ktoe)				
By sector				
Iron and steel	62604	1.50%	939.1	Industry compliance with directives relatively easy to mandate (compared to eg Building directives)
Non ferrous metals	11712	1.50%	175.7	
Chemicals	57838	1.50%	867.6	
Non metallic minerals	41855	1.50%	627.8	

Paper and pulp	40499	1.50%	607.5	
Food, drink and tobacco	40488	1.50%	607.3	
Engineering	30737	1.50%	461.1	
Textiles	11441	1.50%	171.6	
Other industries	42039	1.50%	630.6	
By fuel				
Solids			0	
Oil			0	
Gas			0	
Electricity			0	
Heat (from CHP)			0	
DOMESTIC				
Final Energy Demand (in ktoe)				
By end use				
		3.00%	7747.9	Meeting building directives very difficult to ensure, thus maximum scope for improvement
Heating and cooling (incl. cooking)	258264			
Electric appliances and lighting	36348	3.00%	1090.4	
By fuel				
Solids			0	
Oil			0	
Gas			0	
Electricity			0	
Heat			0	
Other			0	
SERVICES AND AGRICULTURE SECTOR				
Final Energy Demand (in ktoe)				
By sector				
Services			0	
Agriculture			0	
By end use				
		2.00%	2410.5	Mostly buildings, so more scope than industry, but loess than domestic
Heating and cooling	120526			

Electric appliances and lighting	31104	2.00%	622.1	
Agriculture specific uses	22068	1.50%	331.0	As for industry
By fuel				
Solids			0	
Oil			0	
Gas			0	
Electricity			0	
Heat			0	
Other			0	
Transport				
By transport mean				
Road transport			0	
Public road transport			0	
Motorcycles			0	
Private cars			0	
Trucks			0	
Rail			0	
Aviation			0	
Inland navigation			0	
By transport activity				
		2.00%	4675.6	few directives to observe, but the likely effect of withholding structural funding (namely building fewer roads) would likely reduce transport cost
Passenger transport	233782			
Freight transport	126825	2.00%	2536.5	
Power Generation				
Conversion factor for GKW to ktoe	**4.7**			
Energy branch				
Own consumption & pumping	41043	0.00%	0.0	
Refineries & other uses	20264	0.00%	0.0	
Transmission and distribution losses	41732	0.00%	0.0	
Saving in ktoe			24502.3	
Saving in MTOe			**25**	

Policy Option F10 Mtoe Estimation

Action F10

Description **EU/MS to lower VAT for energy saving products.**

	EU-25 2005 Consumptions (ktoe or GWh)	Saving (%)	Saving (in ktoe)	Comments
Technical Saving Potential		**2.50%**		As per encouraging suppliers through tax breaks, except all products can be reached through VAT
Discount Factors				
- Stock effect		0.10%		
- Replacement timing		0.25%		
- Barriers		0.00%		
- Other		0.00%		
- Interaction		0.40%		
- Overlap				
Max poss saving (PSE)		**1.75%**		
INDUSTRY				
Final Energy Demand (in ktoe)				
By sector				
Iron and steel	62604	0.10%	62.6	Most industry VAT exempt
Non ferrous metals	11712	0.10%	11.7	
Chemicals	57838	0.10%	57.8	
Non metallic minerals	41855	0.10%	41.9	
Paper and pulp	40499	0.10%	40.5	
Food, drink and tobacco	40488	0.10%	40.5	
Engineering	30737	0.10%	30.7	
Textiles	11441	0.10%	11.4	
Other industries	42039	0.10%	42.0	
By fuel				

Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat (from CHP)			0.0	
DOMESTIC				
Final Energy Demand (in ktoe)				
By end use				
		1.00%		Heating already VAT exempt in many member states
Heating and cooling (incl. cooking)	258264		2582.6	
		1.75%	636.1	This is where the full extent of this measure would be felt, as domestic consumers are not vat exempt
Electric appliances and lighting	36348			
By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat			0.0	
Other			0.0	
SERVICES AND AGRICULTURE SECTOR				
Final Energy Demand (in ktoe)				
By sector				
Services			0.0	
Agriculture			0.0	
By end use				
Heating and cooling	120526	0.10%	120.5	
Electric appliances and lighting	31104	0.10%	31.1	
Agriculture specific uses	22068	0.10%	22.1	
By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	

Heat			0.0	
Other			0.0	
Transport				
By transport mean				
Road transport			0.0	
Public road transport			0.0	
Motorcycles	2261		0.0	
Private cars	167034		0.0	
Trucks	119824		0.0	
Rail	8872		0.0	
Aviation	50029		0.0	
Inland navigation	5571		0.0	
By transport activity				
		0.50%	1168.9	Not VAT exempt, but switching is more difficult for passengers
Passenger transport	233782			
Freight transport	126825	0.10%	126.8	
Power Generation				
Conversion factor for GKW to ktoe	**4.7**			
Energy branch				
Own consumption & pumping	41043	0.10%	41.0	
Refineries & other uses	20264	0.10%	20.3	
Transmission and distribution losses	41732	0.10%	41.7	
Saving in ktoe			5130.4	
Saving in MTOe			**5**	

Policy Option F12 Mtoe Estimation

Action F12

Description **EU/MS to encourage off-balance sheet investments, like leasing in energy efficient technologies, for example by extending low cost earmarked capital to commercial lenders, or credit support to recipient.**

	EU-25 2005 Consumptions (ktoe or GWh)	Saving (%)	Saving (in ktoe)	Comments
Technical Saving Potential		**2.00%**		
				A substantial number of additional energy efficient schemes would go ahead if not deemed competitive for industry funds, particularly in nations with a traditional focus on ROCE (eg UK). Note: Assumptions closely related to Soft Loans action, but impact lower due to reduced benefit
Discount Factors				
- Stock effect		0.20%		Existing technologies hard to displace for hardware projects
- Replacement timing		0.40%		Hardware projects will usually have a replacement element
- Barriers		0.00%		
- Other		0.00%		
- Interaction		0.40%		Interacts with other fiscal measures - esp encouraging OEMs to produce more efficient products
- Overlap				
Max poss saving (PSE)		**1.00%**		

INDUSTRY

Final Energy Demand (in ktoe)

By sector				
Iron and steel		0.50%	313.0	
	62604			Industry will be the main recipient of this action, as industry is more financially sophisticated and takes on debt readily. Energy Intensive Sectors are likely to have made the available investments already
Non ferrous metals	11712	0.50%	58.6	
Chemicals	57838	0.50%	289.2	
Non metallic minerals	41855	0.50%	209.3	
		1.00%		
Paper and pulp	40499		405.0	Industry will be the main recipient of this action, as industry is more financially sophisticated and takes on debt readily. Less Energy Intensive Sectors are likely to benefit most as they will not have made the available investments already
Food, drink and tobacco	40488	1.00%	404.9	
Engineering	30737	1.00%	307.4	
Textiles	11441	1.00%	114.4	
Other industries	42039	1.00%	420.4	
By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat (from CHP)			0.0	
DOMESTIC				
Final Energy Demand (in ktoe)				
By end use				
		0.00%		Households have no balance sheets
Heating and cooling (incl. cooking)	258264		0.0	
Electric appliances and lighting	36348	0.00%	0.0	
By fuel				

Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat			0.0	
Other			0.0	
SERVICES AND AGRICULTURE SECTOR				
Final Energy Demand (in ktoe)				
By sector				
Services			0.0	
Agriculture			0.0	
By end use				
		1.00%		Industry will be the main recipient of this action, as industry is more financially sophisticated and takes on debt readily
Heating and cooling	120526		1205.3	
Electric appliances and lighting	31104	1.00%	311.0	
Agriculture specific uses	22068	1.00%	220.7	
By fuel				
Solids			0.0	
Oil			0.0	
Gas			0.0	
Electricity			0.0	
Heat			0.0	
Other			0.0	
Transport				
By transport mean				
Road transport			0.0	
Public road transport			0.0	
Motorcycles	2261		0.0	
Private cars	167034		0.0	
Trucks	119824		0.0	
Rail	8872		0.0	
Aviation	50029		0.0	

Inland navigation	5571		0.0	
By transport activity				
Passenger transport	233782		0.0	
Freight transport	126825	0.10%	126.8	
Power Generation				
Conversion factor for GKW to ktoe	**4.7**			
Energy branch				
		1.00%		Industry will be the main recipient of this action, as industry is more financially sophisticated and takes on debt readily
Own consumption & pumping	41043		410.4	
Refineries & other uses	20264	1.00%	202.6	
Transmission and distribution losses	41732	1.00%	417.3	
Saving in ktoe			5416.3	
Saving in MTOe			**5**	

Note - Saving % calc dependent upon sector etc.
Within family (eg Industry) segment either by sector or fuel but not both (double counting)
Input Saving % only