

Resource Efficiency: What does it mean and why is it relevant?



Policy brief

The European Commission has launched a *Resource-Efficient Europe*¹ as one of its seven flagship initiatives under the Europe 2020 Strategy² and has published the document *Roadmap to a Resource-Efficient Europe*³, henceforth referred to as the Roadmap. The Roadmap specifies a proposed pathway to action for a resource efficient Europe. DG Environment is coordinating the implementation of the Roadmap.

Several global mega trends are unfolding which strongly negative impact on the quality of vital eco-system services and on the availability of physical natural resources such as fossil fuels. Such trends include notably the growth of world population, growth of non-OECD per capita GDP, growth of global energy demand, growth of demand for fresh water, growth of global biomass demand for food, rising urbanization and increasing geopolitical risks of reduced access for European actors to scarce non-OECD physical resources.⁴ Eco-system services at risk include the capacity of the earth's atmosphere to ensure world-wide sustainable temperatures, clean air, and biodiversity. A long run trend is widely perceived of fundamentally changing production functions at macro, meso and micro level. That is: *resulting from natural resource scarcities, material input costs are set to constitute a cost component gaining significantly in importance, as opposed to labour and capital input costs combined*. This puts a significant comparative advantage bonus on resource-saving innovations, better known as eco-innovation.⁵

These considerations have prompted the European Commission and many European policy makers to deem improving resource efficiency a matter of increasingly high importance. This document sets out to describe the essence of the resource efficiency concept and to sketch the relevance of EU resource efficiency policy for application at EU member state level with special reference to the Netherlands.

In this policy brief the following questions will be addressed:

- What is resource efficiency?
- How does it relate to sustainability and environmental footprint?
- What is the relevance of EU resource efficiency policy for the member states?
- Which aspects of resource efficiency are relevant for the Netherlands?
- To what extent is resource efficiency reflected in current Dutch policies?

¹ European Commission: COM(2011) 21.

² European commission: COM(2010) 2020.

³ European Commission: COM (2011) 571.

⁴ See e.g.: KPMG INTERNATIONAL (2012): Expect the Unexpected: Building business value in a changing world.

⁵ Eco-innovation is the introduction of any new or significantly improved product, organizational change or marketing solution that reduces the use of natural resources and decreases the release of harmful substances across the whole life-cycle. See: Eco-Innovation Observatory (2010): Methodological Report. Downloadable at: www.eco-innovation.eu.

What is resource efficiency?

Several EU member states - such as Germany and Austria - are developing dedicated resource efficiency policy frameworks as a response to expected increasing natural resource scarcities. So far, the resource efficiency concepts adopted at member state level tend to be rather narrow with a focus on raising the efficiency of use of material (input) resources, especially natural resources such as fossil fuels, rare earths and water throughout the national economy.

Under the Resource-Efficient Europe flagship initiative the European Commission is elaborating on the conceptualization of resource efficiency, adopting a much broader conceptual framework. The Commission proposes a strategic and integrated approach that seeks to optimize synergies and to address trade-offs. The Commission defines resources to encompass all natural resources that are inputs to our economy, including both physical resources and eco-system services. The Commission has identified the following main categories of resources: metals, minerals, fuels, fish, timber, water, soil, clean air, biomass, biodiversity and land and sea.⁶ Resource efficiency is a way to deliver more with less (natural resources). It increases aggregate economic value through more productive use of resources, taking their whole life cycle into account. Cases in point are e.g. the upstream effects outside the EU of consuming biofuels or resource-intensive consumer goods, made in low-wage countries. Resource efficiency requires extracting and using natural resources in a sustainable way, within the planet's long-term boundaries.⁷ It also includes minimizing impacts of the use of one resource on other natural resources.⁸ For example, demand for energy can have implications for virtually all resource domains: not only for the quality of essential eco-system services such as an atmosphere with sustainable GHG concentrations, clean air, and for fossil fuels, but also for other physical resources such as timber, biomass, water and metals.

Yet not all of the Commission's recent publications on resource efficiency are entirely clear-cut on relationship between resource efficiency and climate change policy. Is the climate change issue a separate focal theme of primordial importance or rather a (leading) policy domain under the umbrella of resource efficiency? So far, the Commission tends to adhere to two separate but inter-linked frameworks.⁹

⁶ European Commission: SEC(2011) 1067, Part I, p. 5.

⁷ For global environmental threshold values for more or less representative parameters regarding seven of nine identified main earth-system processes: see European Commission, *ibid.*, pp. 5-6 citing Rockstrom et al. (2009): A Safe operating space for Humanity, Nature, Vol. 461, 472-475. Among the identified major natural resource domains climate change is represented by two control variables: atmospheric carbon dioxide concentration and change in radiative forcing. Boundary values for these control variables are already being exceeded.

⁸ Next to many positive inter-linkages (synergies) also major trade-offs exists which need to be allowed for and addressed in a comprehensive way. See inter alia: European Commission: COM(2011) 21, pp4-5, SEC(2011) 1067, Part I, pp. 24-25 and Part II, pp. 63-65 (on the rebound effect); and Transatlantic Academy (2012): The Global resource Nexus (on negative interactions and consequential geopolitical ramifications).

⁹ Note that clean air encompasses meeting certain standards for local pollutants such as particulate matter, ground-level ozone, and nitrogen dioxide. No explicit reference is made in the Roadmap and accompanying documents to inclusion of standards for atmospheric GHG concentrations.

How does it relate to sustainability and environmental footprint?

The most quoted definition of sustainability, or rather sustainable development, is the one made by the Brundtland Commission: *"Development which meets the needs of current generations without compromising the ability of future generations to meet their own needs."*¹⁰ Sustainable development would imply actual use of natural resources for the well-being of current generations in such ways that the capacity of future generations to reach comparably high levels of well-being is not pre-empted. Evidently, to mitigate over-usage of natural resources enhancing resource efficiency is paramount.

Sustainability has often been criticized as being too vague and susceptible to usage at will by special interests. To improve the robustness of the sustainability concept attempts have been made to design a set of indicators covering aspects of sustainability.¹¹ Use of sustainability indicators, e.g. for policy making purposes, is still at an early stage. Even so, several of them can also be used as resource efficiency indicators.

Another related concept is environmental footprint. It can be defined as the effect that a person, company, activity, product, etc. has on the environment. Measures are for example the amount of physical resources that these entities use and the amount of harmful gases that they produce.¹² The underlying perception is that every organization should work towards a zero environmental footprint by conserving, restoring, and replacing the natural resources used in its operations. Reducing one's environmental footprint contributes to improving resource efficiency. Developing robust methodologies for environmental footprint determination is one component of the Resource-Efficient Europe flagship initiative. Notable progress has been made in operationalizing the concept of environmental (or ecological) footprint. For example, JRC has issued guidelines for measuring Product Environmental Footprints (PEFs) as a follow-up action of the Roadmap. PEF is a multi-criteria measure of the environmental performance of a good or service throughout its life cycle. A similar approach can be applied to organizations (e.g. companies) to arrive at Organisation Environmental Footprints (OEFs).¹³

What is the relevance of EU resource efficiency policy for the member states?

The European Commission deems that adoption of the Resource-Efficient Europe flagship initiative by the member states is quite relevant in that it will support multiple policy objectives. It will help to:

- Boost economic performance while reducing resource use.
- Identify and create new opportunities for economic growth and greater innovation.

¹⁰ United Nations (1987): Report of the World Commission on Environment and Development. General Assembly Resolution 42/187, 11 December 1987.

¹¹ See e.g.: T.M. Parris et al. (2005): What is sustainable development? Goals, indicators, values and practice. Environment: Science and Policy for Sustainable Development, 47(3), 8-21. Downloaded from: <http://environment.yale.edu/climate/files/WhatsSustainableDevelop.pdf>

UN/DESA (2012): Current Ideas on Sustainable Development Goals and Indicators, Rio 2012 Issues Brief #6. Downloaded from: <http://www.uncsd2012.org/index.php?page=view&type=400&nr=218&menu=45>

¹² Cambridge Business English Dictionary. Downloaded from:

<http://dictionary.cambridge.org/dictionary/business-english/environmental-footprint>

¹³ European Commission/JRC (2012): Product Environmental Footprint Guide. Ispra, Italy, July 17, 2012

- Boost economy-wide competitiveness.
- Ensure security of supply of essential resources.
- Mitigate climate change.
- Limit other environmental impacts of resource use.¹⁴

Member states are called upon to put a resource efficiency policy framework in place in line with the EU flagship initiative concerned and coherent with other interacting policy domains.

Important activities and milestones announced in the Roadmap to a Resource Efficient Europe¹⁵ with potential impact on the member states include:

- *Enhancing dialogue.* Active involvement by member states and private stakeholders in the EU flagship initiative helps to influence its outcomes;
- *Investing in the transition.* The proposed Multiannual Financial Framework 2014-2020 of the EU budget seeks to integrate resource efficiency in activities to be financed. Hence it represents a key perspective for member states to apply for funding ;
- *Developing indicators and potential targets.* Again, active involvement helps to influence the outcomes of this important flagship initiative activity;
- ***By 2020 stakeholders at all levels will be mobilized to ensure that policy, financing, investment, research and innovation are coherent and mutually reinforcing. Ambitious resource efficiency targets and robust, timely indicators will guide public and private decision-makers in the transformation of the economy towards greater resource efficiency.***

The most prominent example among EU member states with a dedicated resource efficiency policy framework in place - and with a significant positive impact on the competitiveness of its national economy - is Germany.¹⁶ Important institutional steps taken were the establishment of respectively the German Material Efficiency Agency (demea; 2006)¹⁷, the centre for resource efficiency (VDI ZRE; 2009)¹⁸, and the German Mineral Resources Agency (2010)¹⁹. The German resource efficiency policy focuses on raising the productivity of material resources in the German economy, amongst others through:

- Periodic monitoring and reporting on material resource efficiency
- Mandatory product, product packaging and production process standards
- Market-based instruments fostering efficient use of material inputs through indirect taxation, recycling fees, etc.
- Eco labeling and setting up information dissemination agencies on resource efficiency
- Last but not least: stimulation of 'eco-innovations' in German manufacturing industry resulting in a large number of resource-efficiency related patents.

Resource efficiency is a central consideration in German industrial innovation policy. Demea especially promotes raising resource efficiency in German small-scale and medium enterprises (SMEs).

¹⁴ European Commission: COM(2011) 21, p.3.

¹⁵ European Commission: COM(2011) 571

¹⁶ BMU (2011): *Umweltwirtschaftsbericht 2011*. Berlin. September 2011; BMU (2012): *Deutsches Ressourceneffizienzprogramm (ProgRes)*. Berlin. 29 February 2012; Eco-Innovation Observatory (2011): *Eco-innovation in Germany - EIO Country Profile 2011*

¹⁷ <http://www.demea.de/>

¹⁸ <http://www.kompetenzpool-re.de/>

¹⁹ http://www.bgr.bund.de/DE/Home/homepage_node.html

Which aspects are relevant for the Netherlands?

With special reference to the Netherlands, improving resource efficiency as a vehicle for improving the competitiveness of the national economy regards among others to the following key policy directions:

1. Harmonized conceptualization, measurement, policy design and implementation of resource efficiency across member states and within member states across policy areas. Main points of action are: (i) active participation in the Resource-Efficient Europe flagship initiative, (ii) establishment of a dedicated resource efficiency policy framework, and (iii) improving cohesion between resource efficiency measures and interacting measures in other national policy domains.
2. More focus on eco-innovation in innovation policy. Main angles for eco-innovation include good generic framework conditions and integrating the resource efficiency perspective in sector and product oriented innovation and market stimulation policy.
3. More focus on resource-efficient spatial planning with strengthening the positive agglomeration effects of regional industrial clusters. This encompasses planning of the location of economic activities, residential areas and associated amenities, coupled with among others adequate inter-linking public transportation infrastructure and energy-efficient (sub)urban energy hubs.
4. Greening the fiscal regime and phasing out measures that are inconsistent with this approach.
5. More focus in education and public-sector communications policy fostering resource efficiency. This is to empower consumers and transmitting policy commitment signals to the business sector to move towards more resource-efficient investment, consumption and production. Both the demand and the supply side matter. The demand side needs more policy attention.

Are current Dutch policies matching resource efficiency?

So far, in the Netherlands no dedicated resource efficiency policy framework is in place. Quite some resistance exists against interventionist policies. Even so, a host of policy initiatives are undertaken in the Netherlands which have potential to become components of an integrated resource efficiency policy framework. These include:²⁰

- Broadly strong generic policies, instruments and legislative framework on the promotion of RD&D, patents, and innovation in general. Some generic instruments are notably targeted at SMEs.
- Implementing advanced waste disposal and recycling policies and regulations
- According to the OECD, with regard to fiscal greening the Dutch fiscal system is relatively well advanced. Even so, quite some scope exists to make further progress.
- The 'Topsectoren (top sectors)' innovation policy focuses on stimulating RD&D in 9 sector domains, including green technology domains. As regards the assessment procedures for proposed research activities, there is scope for putting more emphasis on resource-saving innovations.
- The 'Green Deals' policy seeks to accommodate voluntary green commitments by the private sector. Resource efficiency is to be integrated in the approval procedure to ensure 'greener' deals. Stronger carrots and sticks could make these deals more committing.

²⁰ See also inter alia: Eco-Innovation Observatory (2011): Eco-innovation in the Netherlands - EIO Country Profile 2011; European Environment agency (2011): 2011 Survey of resource efficiency policies in EEA member and cooperating countries - country profile: Netherlands.

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- Quite some emphasis is put on the bio-based economy. As the Netherlands has large, resource-intensive, basic industries, ample scope exists for resource-saving innovation. For example, oil and natural gas as industrial feedstock might be substituted by biomass for certain applications. This type of biomass-based innovation warrants more policy attention.
 - Effective stimulation of more sustainable (resource-efficient) lifestyles as well as sustainable production and consumption needs to be stepped up. The educational system can enhance both more knowledge and more awareness and deliver more knowledgeable workers on resource efficiency; resource efficiency needs to be integrated appreciably better into Dutch transport- and energy infrastructure as well as land use planning practices.

Within the Dutch business sector there are noteworthy innovative actors, eager to develop and implement resource-saving innovations. These include multi-national companies, such as DSM, AKZO, Philips, Unilever, Tata Steel/Corus, Ahold, Imtech, ASML and Tom-Tom as well as smaller Dutch companies such as Kendrion and Avantium. Hence, in fostering the preparation and adoption of a resource efficiency policy framework a significant part of the Dutch business sector can act as a strong proponent and partner.

Effectively integrated resource efficiency policy requires a robust institutional setting. One option for consideration is that it could take the form of a dedicated implementing agency with a strong political mandate. Another less stable, but more flexible setting would be the establishment of a 'Towards a Resource Efficient Economy' Task Force. Important for achieving effective resource efficiency policies and measures is strong involvement of notably the ministries of Economic Affairs (Dutch acronym: EZ), Infrastructure and the Environment (I&M) and Education, Culture and Science (OCW) in dedicated and resource efficiency relevant generic policy initiatives. This should improve both cohesion within the resource efficiency policy domains and their integration in interacting, other policy domains. Bi-lateral inter-governmental and multi-stakeholder consultations with at least Germany and possibly Sweden and Denmark as well on resource efficiency and related policies (e.g. climate, renewables) might yield valuable ideas for further elaboration to both sides.

Annex Developing an EU-wide accepted resource efficiency framework and supporting indicators

Developing a widely accepted comprehensive framework for operationalizing the concept of resource efficiency will further enhance its relevance. Such a framework can be used for applications such as benchmarking member states on their resource efficiency performance, monitoring resource efficiency trends and underlying factors and for integrated impacts assessments of environmental and policy measures. It is also instrumental in identifying and assessing synergies and trade-offs.

To that effect, a major component of the Roadmap is to engage with all key stakeholders to develop resource efficiency indicators and potential targets. A, possibly new, lead indicator on natural capital and environmental impacts of resource use is to be proposed by end of 2013.²¹ To date, for initiating the process the Commission uses a provisional lead indicator, resource productivity, measured by the ratio of GDP to Domestic Material Consumption, expressed in €/tonne, recognizing that this indicator has certain disadvantages. To complement its partial coverage of resource efficiency, the Commission currently uses a limited second-layer set of 'dashboard indicators' and a third layer of 'thematic indicators'.

Ideally, a composite resource efficiency index will be developed as lead indicator which can command widespread agreement among stakeholders. A widely accepted index can be instrumental in monitoring and public communication on resource efficiency. What is more, it can improve policy integration in impact assessments of policies and measures in the realm of environment and energy. The indeed challenging inter-subjective assignment of weights to underlying indicators is to be done through the stakeholder engagement process proposed in the Roadmap. The emerging index should be easily decomposable in selected underlying dashboard indicators and thematic indicators.²² In turn, this will enable a transparent attribution of index changes to changes in underlying resource efficiency factors. As perceptions of the resource situation change over time, a periodical consultative review of the weights - e.g. every 10 years - is desirable.

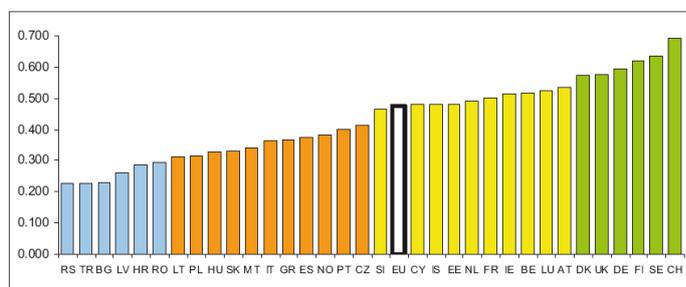
The next picture²³ provides an example of how a composite index can be graphically presented for public communications, e.g. on benchmarking a member state's performance.

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Solely the author is responsible for its contents; it does not necessarily reflect the position of ECN.

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²¹ COM(2011) 571, p. 21.

²² See i.a.: European Commission/DG ENV (2012), Consultation Paper: Options for Resource Efficiency Indicators; OECD and JRC (2008): Handbook on Constructing Composite Indicators; METHODOLOGY AND USER GUIDE. OECD, Paris.

²³ Taken from PRO INNO EUROPE www.proinno-europe.eu. For example: European Commission/ DG Enterprise and Industry (2010): European Innovation Scoreboard (EIS) 2009. PRO INNO EUROPE PAPER No. 15, p.12, Figure 2.