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The European Dimension of National Renewable Electricity Policy Making

An analysis of the Dutch experience

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Preface

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Abstract

Last year's adoption of the Renewables Directive has provided an important stimulus for EU Member State governments to increase their renewable energy policy efforts, stipulating indicative targets for the consumption of renewable electricity in each of the Member States. This paper uses the recent experiences in the Dutch green certificate market to illustrate the possible interactions between renewable electricity policy instruments in the different Member States. These interactions may reduce the effectiveness and efficiency of renewable electricity policy and should therefore be taken into account when designing policy instruments. The paper first describes the Dutch green certificate system and renewable support mechanism, as well as the recent developments in the Dutch green certificate market. Consequently, the paper analyses the current problems of the Dutch renewable electricity support framework and explains the interactions with renewable electricity policies in other Member States. Based on the implications of these policy interactions for national renewable electricity policy making the case for co-ordination and harmonisation of renewable energy policy in the EU is developed. The paper elaborates different levels of harmonisation that may be necessary as the internal market for renewable electricity develops. The paper concludes with a set of recommendations at the EU level with regard to a strategy for the harmonisation of the European renewable electricity market.

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1. INTRODUCTION

Last year's adoption of the Renewables Directive[1] has provided an important stimulus for Member State governments to increase their renewable energy policy efforts. The Directive stipulates indicative targets for the consumption of renewable electricity in each of the Member States. This paper uses the recent experiences in the Dutch green certificate market to illustrate the possible interactions between renewable energy policy instruments in the different Member States. Based on the implications of these policy interactions for national renewable electricity policy making the case for co-ordination and harmonisation of renewable energy policy in the EU is developed.

1.1 Renewable electricity policy in the Netherlands

Under the EU renewables directive the Netherlands was allocated a renewable electricity target of 9% of total electricity consumption in 2010 (European Commission, 2001). This European target is slightly higher than the target that was established on the national level in the context of the implementation of the Kyoto Protocol (Ministry of VROM, 1999). In 1995 the government established the long-term target for the penetration of renewable energy of 10% of final energy consumption in 2020 (Ministry of Economic Affairs, 1997). This is equivalent to approximately 17% of total electricity consumption by that time. In view of the greenhouse gas emissions reduction targets for the first commitment period under the Kyoto Protocol the government formulated an intermediate target of 5% of total energy consumption in 2010. This is estimated to be the equivalent of 8.5% of electricity consumption. To meet these targets the Renewable Energy Action Plan (Ministry of Economic Affairs, 1997) announced an intensification of renewable energy policies and defined a number of targeted actions and instruments to accelerate the penetration of renewable energy in the Netherlands.

Before the start of the liberalisation of the electricity market between 1998 and 2000 renewable energy support came from a mix of instruments ranging from feed-in tariffs based on avoided cost, direct subsidies, fiscal investment incentives and a system benefits charge (MAP levy). As a consequence of the greening of the tax system in the mid-nineties the ecotax or regulatory energy tax (REB) on final energy consumption was introduced in 1996. Renewable electricity consumption was exempt from the ecotax. Moreover, producers of renewable electricity receive a production incentive from the ecotax funds collected from non-renewable electricity consumers. Since 1996 this fiscal stimulation has become the dominant policy instrument to promote renewable electricity. Feed-in tariffs are gradually phased out as the electricity market is opened to competition. The system benefits charges (MAP) have been abolished at the end of 2000. Other policy mechanisms such as fiscal investment incentives (depreciation allowances) still remain. In July 2001 the market for renewable electricity was opened to all customers. A tradable green certificate system was set up for the verification, registration and tracking of renewable electricity and to facilitate the trade and retail supply of renewable electricity. The market for non-renewable retail customers will be opened in October 2003 (Platform Energy Liberalisation).

[1] Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market, OJ L283/33, 27 October 2001.

2. THE DUTCH GREEN CERTIFICATE SYSTEM

2.1 Green certificates and the ecotax

Green certificates embody the environmental benefits associated with renewable electricity generation and provide a unique proof that a certain amount of electricity was generated in a renewable way. Green certificates can be traded separately from the physical electricity. A green certificate system comprises institutions, regulations and mechanisms for the issuing, registration, tracking and redeeming of green certificates. In several EU Member States green certificate systems are established to offer enhanced temporal and spatial flexibility in meeting an obligation on producers, suppliers or consumers to fulfil a certain percentage of their electricity generation, supply or consumption from renewable sources. Contrary to other countries the green certificate system in the Netherlands serves to facilitate a voluntary market in renewable electricity. As explained above voluntary demand is stimulated through an exemption of renewable electricity from the ecotax on final energy consumption. The ecotax exemption can be claimed by surrendering a green certificate to the tax authority.

In addition to the ecotax exemption on renewable electricity consumption suppliers can grant a production subsidy to renewable electricity generators from the ecotax revenues on conventional electricity consumption. The administration of this production subsidy is based on power purchase agreements between the producer and the supplier and is not linked to the green certificate system. Figure 2.1 explains the relationship between the Dutch green certificate system and the ecotax incentives for renewable electricity. The figure abstracts from physical electricity flows and transactions, and only considers the transactions related to the green part of renewable electricity production, trade and consumption. Table 2.1 outlines the development of the level of the ecotax and the production subsidy since the implementation of the ecotax in 1996. The table shows that the level of the ecotax and production subsidy has increased consistently over the years.

Table 2.1 *Development of the level of the ecotax exemption and production subsidy for renewable electricity in the Netherlands (all numbers in €/kWh)*

User category [kWh]	1996	1997	1998	1999	2000	2001	2002
Ecotax							
0 - 800	0	0	0	0	0	0.0583	0.0601
800 - 10.000	0.0134	0.0134	0.0134	0.0225	0.0372	0.0583	0.0601
10.000 - 50.000	0.0134	0.0134	0.0134	0.0147	0.0161	0.0194	0.0200
50.000 - 10 million.	0	0	0	0.0010	0.0022	0.0059	0.0061
> 10 million.	0	0	0	0	0	0	0
Production subsidy	0.0134	0.0134	0.0134	0.0147	0.0161	0.0194	0.0200

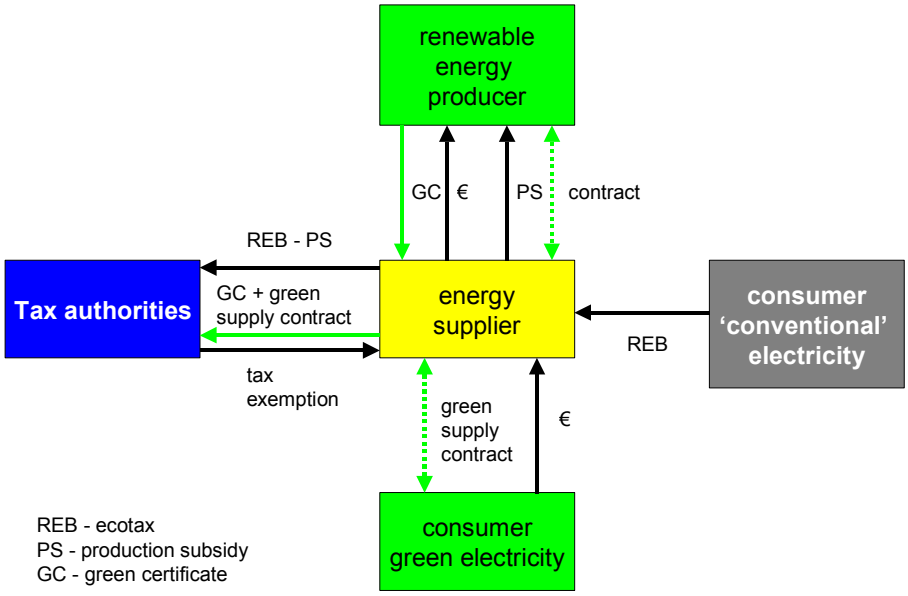

Figure 2.1 *Relation between the Dutch green certificate system and the ecotax*
Electricity suppliers collect the ecotax (REB) from conventional electricity customers. Green electricity customers pay a premium (€) for the green electricity but do not pay the ecotax (REB). The suppliers buy enough green certificates (GC) from renewable generators to match their supply of renewable electricity to green customers. Furthermore, based on the power purchase contract between the supplier and the renewable generator, the supplier may grant a production subsidy (PS) to the renewable generator from the ecotax revenues. The supplier transfers the total amount of ecotax collected from its customers minus the sum of the production subsidies to renewable generators (REB - PS) to the tax authorities. Moreover, in order to claim the ecotax exemption on renewable electricity consumption the supplier surrenders its green supply contracts along with a matching supply of green certificates (GC) to the tax authorities.

2.2 Implementation of the Dutch green certificate system

The Dutch GC system started its operation on the 1st of July 2001 concurrent with the opening of the green electricity market to retail competition. The Green Certificate Body - a 100% daughter of the national transmission system operator, Tennet - is responsible for the implementation and operation of the system. Initially only domestic renewable electricity production was eligible for the issuing of green certificates. As a consequence only Dutch renewable electricity generation was able to claim the tax benefits associated with the ecotax regulations. However, it was clear from the beginning that such a discriminatory arrangement could not be upheld in view of European regulations. Therefore, with the introduction of the green certificate system the Minister announced that the conditions under which imports would become eligible would be studied and further regulations on this matter would follow (Ministry of Economic Affairs, 2001a).

2.3 Conditions for the import of renewable electricity

As of January 2002 foreign renewable electricity became eligible for Dutch green certificates, subject to the following conditions (Ministry of Economic Affairs, 2001d):

Reciprocity
Only imports from countries that meet the reciprocity criterion as laid down in article 19 of EU Electricity Directive (European Commission, 1996) and as implemented through articles 44 and 45 of the Dutch Electricity Law of 1998 are eligible. This reciprocity clause means that customers in Netherlands for whom renewable electricity is imported should be a non-captive/eligible customer in the country of origin of the renewable electricity. This effectively means that re-

newable electricity can only be imported from European countries, which have implemented full retail competition.

No double subsidisation
Importers of renewable electricity have to sign a declaration that the renewable electricity for which the issuance of green certificates is requested has not been sold or subsidised as renewable electricity elsewhere.

Metering data and plant verification
Metering data as well as information relating to the type of plant has to be provided to the green certificate body by the competent authorities in the country of origin. The Ministry of Economic Affairs has made a list of all parties that have the authority to verify the type of plant and to meter the electricity delivered to the grid according to the national legislation and regulations in all EU Member States plus Norway and Switzerland (Van Sambeek et al., 2002).

Import capacity
Importers have to demonstrate that they have acquired sufficient transport capacity on the cross-border interconnectors to physically import an amount of electricity corresponding with the amount for which the issuance of green certificates is requested.

Renewable according to the Dutch definition
Imported renewable electricity should qualify as renewable electricity according to the definition given in article 53 of the Dutch Electricity Law of 1998. This definition includes wind, solar-pv, hydropower under 15 MW, and biomass. Waste is not eligible for green certificates.

3. RECENT DEVELOPMENTS IN THE RENEWABLE ELECTRICITY MARKET

The ecotax exemption has been a very effective means of stimulating the consumption of renewable electricity in the Netherlands. Because of the high level of the ecotax renewable electricity can be offered to retail customers at around the same rate as conventional electricity. Thus there is currently no financial barrier to switch to renewable electricity. A further stimulus to the promotion of the renewable electricity market is the fact that as of July 2001 the renewable electricity market is the only retail segment that has been opened to competition. Until the electricity market is fully liberalised the renewable energy market provides the only opportunity to expand a supplier's retail customer base. Furthermore, renewable electricity has a strong marketing appeal, which may be a valuable instrument once full competition enters into force. Finally, because of the favourable ecotax regulations the margins on renewable electricity supply are relatively high. The suppliers therefore have a strong incentive to promote the development of a green electricity market. As a consequence of the negligible price difference between renewable electricity and conventional electricity and the marketing efforts of suppliers the number of renewable electricity customers has increased from some 200,000 at the beginning of 2001 to approximately one million in mid 2002. Figure 3.1 illustrates the steep increase in renewable electricity customers since mid 2001.

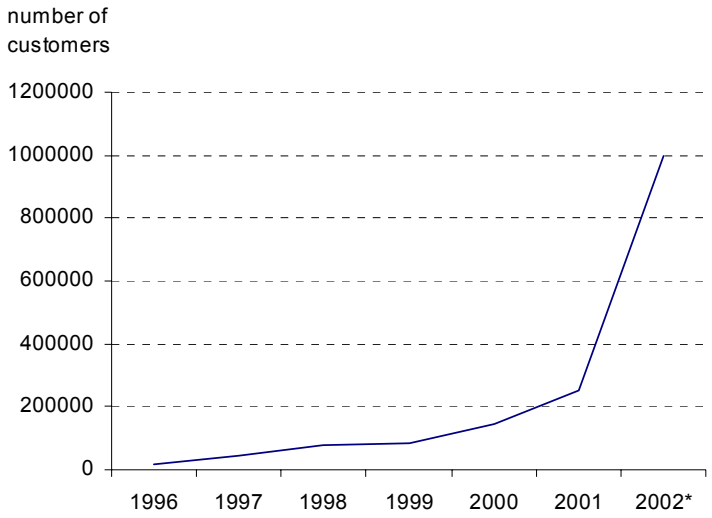

Figure 3.1 *Increase in the number of renewable electricity customers*
(Source: Scheepers et al. 2001 and www.greenprices.com). * Mid 2002.

The current domestic renewable electricity production is sufficient to supply approximately 500.000 households (Platform Energy Liberalisation, 2001). Consequently a large proportion of demand is met through imports of renewable electricity. Figure 3.2 gives the volumes of imported and domestic green certificates issued and traded over time. While imports became eligible for green certificates in January 2002 there has been some delay in issuing the green certificates. Therefore the graph shows that the first green certificates for imported renewable electricity were issued in February 2002. Nevertheless, imports of renewable electricity had been going on for some time before 2002. It is estimated that the total volume of renewable electricity imports increased from 1.4 TWh in 2000 (CBS, 2001) to approximately 7.5 TWh in 2001 (Kroon, 2002). It should be noted that all of these imports were at least eligible for the production subsidy. Furthermore, except for the period from July 2001 to January 2002 these imports were also eligible for the ecotax exemption. Imports of renewable electricity thus lead to a vast cost in

terms of avoided tax revenues to the Dutch government. Total avoided of tax revenues in 2001 to support renewable electricity are currently estimated at 205 million Euro: 23 million Euro as a consequence of the ecotax exemption and 182 million euro from the production subsidy (Parliament, 2002). With total eligible renewable electricity production in the Netherlands in 2001 of around 1.6 TWh and imports of around 7.5 TWh the majority of these costs can be attributed to the import of renewable electricity. From the green certificate statistics (Green Certificate Body, 2002) it can be inferred that cost of avoided tax revenues due to imports from January till October 2002 amounts to almost 250 million Euro. These imports come from existing plants that have been realised in absence of the Dutch renewable electricity policy. Moreover, these plants would have continued to operate under their national support schemes if the Dutch market wouldn't be more attractive. Thus, the Dutch policy does not trigger additional investments in renewable energy projects abroad.

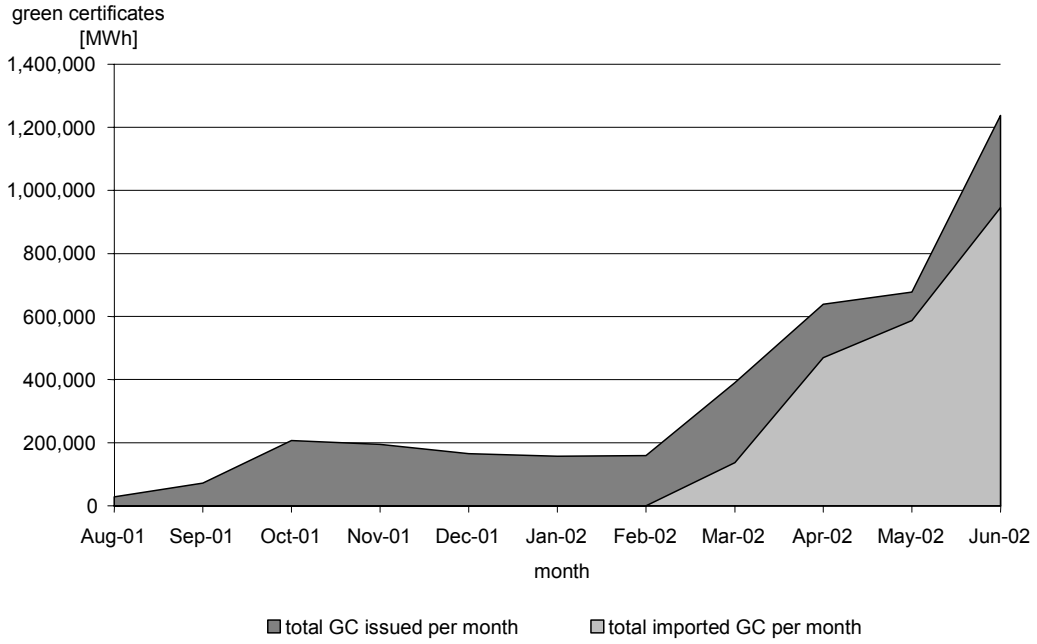

Figure 3.2 *Total green certificate volume versus imports*
(Source: Green Certificate Body)

3.1 Sustainability of the Dutch renewable energy support framework

The number of renewable electricity customers is still rising. Moreover, there is increasing interest from the business sectors to purchase renewable electricity (www.greenprices.com). As domestic supply is fixed in the short run the increase in demand will principally be fulfilled with imports. As renewable generating capacity in the EU is also fixed in the short run the ecotax exemption and production subsidy effectively only establish a reallocation of foreign production from their respective domestic markets to the Dutch renewable electricity market. However, the Dutch support scheme triggers no additional capacity investments in these export countries. If the current favourable investment conditions in the Netherlands are maintained it can be anticipated that new domestic capacity should be added in the coming years to fulfil some of the demand increase. However, exactly here lies the paradox of the Dutch renewables policy framework. Because the support framework is so favourable, including to imports of non-additional renewable electricity, the loss of ecotax revenue to other countries renders the this very support scheme politically and financially unsustainable in the long run. Investors anticipate changes to the support framework to correct for the loss of tax revenue. Therefore, the scheme is ineffective in providing the long-term revenue security that is needed for investments in new renewable capacity - in the Netherlands or in other countries.

4. ANALYSIS OF THE POLICY PROBLEM FOR THE NETHERLANDS

From the above it becomes clear that the primary policy challenge for the Netherlands is to create investor security to stimulate domestic production and to limit import volumes to reduce tax losses. An analysis of optimal trade flows of renewable electricity to meet the Member State consumption targets under the Renewables Directive with the REBUS model[2] shows that for the Netherlands it is cost-effective to import about 1,3 TWh in 2010 (Voogt et al., 2001). In other words, a cost-effective implementation of the Renewables Directive in the Netherlands requires a certain level of import. Therefore, imports cannot simply be discarded. A sustainable solution to incorporating imports in the renewables policy framework has to be found.

The above considerations with respect to the import of renewable electricity make that the success of the Dutch renewable energy policy is directly linked to the renewable energy policies in other Member States. The value of renewable electricity in any country is primarily determined by the policy framework. Furthermore, trade will always take place in the direction of the highest value. Therefore we need to have a careful look at the policy conditions in other Member States to attune the Dutch policy framework to these conditions.

4.1 Renewable electricity support policies in the EU

The dominant renewable electricity policy instruments can be categorised as supply or demand oriented, and quantity or price based. Figure 4.1 gives a categorisation of the main policy instruments applied in the EU according to these criteria. Figure 4.1 shows that the Netherlands is the only Member State that uses a combination of consumption stimulation and price based policy through the ecotax. Moreover, the ecotax regulations are generic. That is, they apply to both domestic production and eligible foreign production. The categorisation in Figure 4.1 can be used to identify how the different policy instruments impact on the supply and demand curve for renewable electricity in the Member States. With these supply and demand curves the REBUS model can simulate the trade flows between the different Member States, and evaluate the effect of the ecotax regulations on the value of renewable electricity in the EU and on the volume of import to the Netherlands. As an example Figure 4.2 shows the an example of the supply and demand curves for the Dutch renewable electricity market in 2005 taking into account the policies in the reciprocal Member States[3]. Unless new policies are announced a continuation of current policies is assumed. New policies are taken into account to the extent that they are known[4].

[2] REBUS stands for Renewable Energy Burden Sharing. The model contains costs and realisable potentials for all renewables in the EU-15. These can be used to evaluate the consequences of the implementation of renewable energy targets and the role of renewable electricity trading. The model assumes a completely open market for green certificates in the EU in 2010. Currently the model is expanded and updated to model the effects of policy interactions on renewable electricity trade and investment.

[3] Hydropower is excluded from the supply curve.

[4] The graph in Figure 4.2 was made towards the end of 2001. Since then there have been changes in current and future policies that underlie the supply and demand curve for the Dutch market. Figure 4.2 therefore reflects what was a likely scenario towards the end of 2001 and is meant for illustrative purposes only.

	price	quantity
supply	Feed-in tariff / green prices (Germany, Austria, Spain, France, Greece, Portugal, Finland)	Tender (Ireland) Obligation for producers (Italy)
demand	Price support of the demand (Netherlands)	Obligation for consumers and suppliers (UK, Sweden, Austria (small hydro), Belgium)

Figure 4.1 *Overview renewable electricity support policies in the EU*

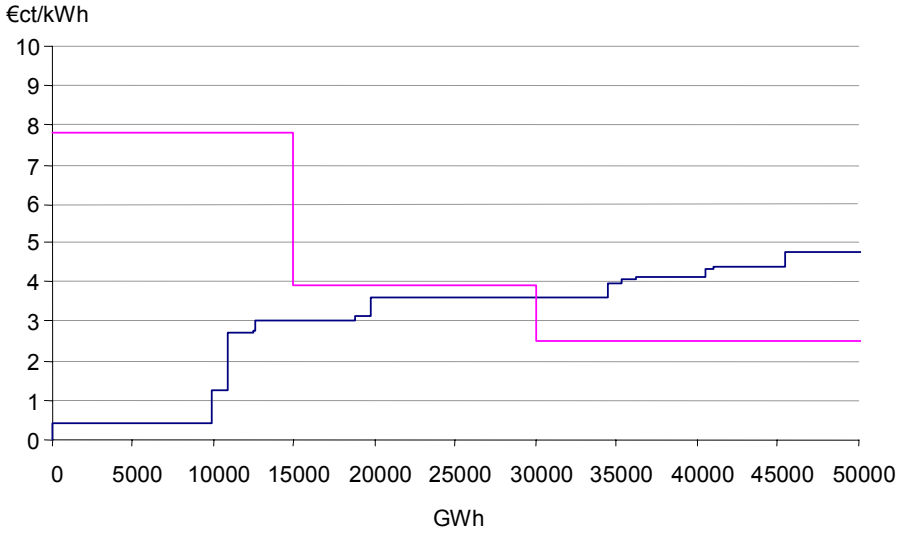

Figure 4.2 *Supply and demand curve for the Netherlands in 2005*

The supply curve for the Dutch market consists of the Dutch domestic supply curve plus the minimum prices for which foreign producers are willing to offer their renewable electricity on the Dutch market. These minimum prices are the higher of the level of support they receive in their own country and their cost of production. In 2005 there will be 9 countries that meet the reciprocity criterion for export to the Netherlands[5]. The demand curve for the Dutch market is built up according to the structure of the ecotax as given in Table 2.1. The 2001 level of the ecotax is assumed to be maintained till 2005. Moreover, it is assumed that there is a maximum demand of approximately 40% per consumer segment under the ecotax[6]. The demand curve reflects both the value of the ecotax exemption and the production subsidy. Both the demand curve and the supply curve exclude the value of the physical power, which is assumed to be traded on the conventional power market. According to the above analysis the equilibrium

[5] By 2005 the following countries meet the reciprocity criterion: Austria, Denmark, Sweden, Norway, Finland, Belgium, Spain, Germany, and the United Kingdom.

[6] If the demand in any segment is lower than the assumed maximum of 40% the demand curve will shift to the left. If demand is higher than 40% the demand curve will shift to the right.

amount of renewable electricity consumption in the Netherlands is approximately 30 TWh. The equilibrium price of the green value will lie around 3.6 €ct/kWh[7].

4.2 Implications for government expenditure

In the above analysis the contribution of domestic production to the renewable electricity market amounts to around 2 TWh of the total 30 TWh. The remaining 28 TWh is import. According to Figure 4.2 Dutch energy suppliers can purchase this electricity at a price of about 3.6 €ct/kWh. However, they can claim the tax benefits of the ecotax exemption plus the production subsidy, i.e. the first 15 TWh at 7.8 €ct/kWh and the following 15 TWh at 3.9 €ct/kWh. This amounts to €1.75 billion of tax revenue losses in 2005[8].

The 28 TWh of production that could be imported to the Netherlands would also have been realised if the producers had used their national support schemes. Therefore the additionality of this supply is at least questionable. Moreover, it can be doubted if this supply will be available for the Netherlands in the long run to meet its 2010 consumption target. In conclusion, according to the above scenario the Dutch government will loose €1.75 billion of tax revenue on 28 TWh of imported renewable electricity without any certainty as to whether this will count towards meeting its 2010 target and without providing a significant incentive to increase the level of domestic production.

4.3 Possible policy responses for the Netherlands

Possible policy responses for the Netherlands to reduce the amount of tax losses to foreign renewable electricity production are to abolish the production subsidy (36o) and to reduce the ecotax exemption (36i). For example, the ecotax exemption can be adjusted to reflect the value of the avoided CO_2 emissions. However, even when the ecotax exemption is lowered, in the short run there will always be a large potential of low cost renewable electricity that can be imported into the Netherlands, thus causing an outflow of tax revenues. In the long run this potential is likely to shrink as other Member States increase their policy effort to attain their 2010 renewables targets.

The above ecotax measures can be employed to restrict the problem of tax revenue losses due to imports of renewable electricity. However, they do not resolve the issue of providing investor security to stimulate domestic production. There are two principle policy instruments that are employed throughout the EU to stimulate the production of renewable electricity. These are feed-in tariffs and quota systems. Under a feed-in system producers of renewable electricity receive a fixed tariff per kWh delivered to the grid. Under a quota system producers, suppliers or consumers of electricity are obliged to meet a certain percentage of their production, supply or demand with renewable electricity. Such a quota system can be facilitated through a tradable green certificate system as already in place in the Netherlands. Both feed-in tariffs and quota systems can be used in parallel to the ecotax incentives. Also, both can be used to provide a secure investment climate for renewable energy investors.

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[7] Of course, the supply and demand curves can include uncertainties, which may cause the equilibrium price and amount to be different than elaborated in this example. However, it is likely that the equilibrium price will roughly lie between 3 and 4 €c/kWh and that the equilibrium quantity will be between 15 and 30 TWh. These are broad margins, but in any case a lot of tax money is involved.

[8] The actual amount of tax losses in 2005 may deviate from this number for several reasons. First, the level of ecotax may change. Second, the total amount of imports is limited by the maximum available import capacity, which is currently around 20 TWh per year.

5. INTERACTIONS BETWEEN NATIONAL RENEWABLE ELECTRICITY SUPPORT POLICIES

Above some possible policy responses of the Netherlands to increase domestic renewable production and restrict tax losses were outlined. In choosing a set of policy instruments and in the design of these instruments the government also needs to take account of the developments in other Member States.

5.1 Possible policy interactions

In 2003 all Member States are required to have implemented a system of guarantees of origin to authenticate the sources of renewable electricity production. The guarantees of origin will be used as a proof of compliance of the Member States with their target under the Renewables directive. Although guarantees of origin are not necessarily tradable it is likely that in many countries they will be. Certainly in the view of the market, guarantees of origin are likely to get the same status of green certificates. Moreover, several Member States have explicitly indicated the possibility to open their renewable market to imports from other Member States on the basis of reciprocal trade arrangements[9]. For example, Italy is currently investigating the possibilities of allowing imports of green certificates on the condition that the CO_2 rights attached to the certificate are imported along with the certificate. The establishment of a more standardised system of guarantees of origin throughout the EU is likely to facilitate the trade of renewable electricity between Member States. As Member States open their renewable electricity market for foreign production markets will become more directly linked. As a consequence the success of renewable energy policy is no longer only dependent on domestic policies, but also depends on the policies in other Member States. For example, depending on the value of renewable electricity in other Member States renewable electricity that is currently exported to the Netherlands may shift to a competing market (e.g. Italy) and thus no longer count for the Dutch renewables target. Thus, if imports are to play a role in the Dutch policy effort to attain the Dutch target under the Renewables directive the Dutch government must seek a fine balance of attracting sufficient imports while not unduly increasing the cost of their renewable electricity policy.

Even when markets are not directly linked there may be indirect relations between the effects of policies in different countries. For example, the Belgium region of Flanders operates a green certificate system, which does not allow the export of certificates outside Belgium. Thus, no direct international trade of green certificates from Flanders is possible. Nevertheless, an operator of a wind park in Flanders may chose not to apply for Flemish certificates, but apply for Dutch certificates instead if the value of the green certificate is higher in the Netherlands than in Flanders. In this case part of the supply would be withdrawn from the Flemish market. This may complicate compliance in Flanders and increase the social cost due to penalty payments. Moreover, the production from this wind park cannot be counted for Belgium target under the Renewables Directive. Similar indirect interactions can exist between countries with a feed-in system and with green certificate systems.

5.2 Implications for the European green certificate market and investment climate

The case of the Netherlands illustrates the direct and indirect interactions that exist between the policy frameworks in the different Member States. In absence of a harmonised trading framework, and given the differences in support schemes between member states the value of RES

[9] Denmark, Sweden, UK, Italy.

varies per country according to the support mechanisms that are in place. Due to the trading of renewable electricity these differences in the value of renewable electricity affect the effectiveness of support mechanisms in the different Member States. This may cause policy makers to frequently adapt the national support frameworks in view of developments in the other Member States. Such frequent adaptation in different Member States causes a great deal of policy uncertainty - not only because the value of a project may keep changing, but also because investors are constantly reassessing which national market to target. Of course such uncertainty predominantly plays a role in the transition to a harmonised market and support framework for renewable electricity in Europe. In a completely harmonised market the price signal should be the same in each country. Thus while the transition period allowed for in the Renewables directive was meant to provide enough certainty to provide investors confidence in the transition to a harmonised market, the effect may be the reverse. Due to the prolonged transition adaptations in the national support policies are likely to continue which increases uncertainty.

5.3 The case for harmonisation of renewable electricity support frameworks in the EU

Whereas to date national renewable energy policy portfolios are mostly aimed at developing the national renewable electricity potential with the aim of reaching national renewable electricity targets, the liberalisation of the EU electricity markets and the Renewables Directive now provide the possibility to reach national targets through European trade of renewable electricity. The trading of renewable electricity across the EU exploits the benefits of varying local circumstances by first using the least expensive options available in the EU. In the REBUS project an assessment of the benefits from a harmonised EU RES trading scheme has been made (Voogt et al., 2001). REBUS demonstrated that total cost savings across the EU-15 of up to 15% can be achieved through the trading of green certificates between Member States.

In addition to the significant cost savings, a harmonised market would have a single equilibrium price that would provide clear short and long-term price signals to investors to establish new plants. Moreover, the size of the combined national markets would also be an important stabilising factor as it provides enhanced flexibility for traders to sell the renewable electricity in different countries. Thus the commercial and political risk of changing market conditions in any single country is limited.

5.4 Levels of harmonisation

Harmonisation is often associated with creating a uniform support framework for renewables. Although this can be the end point of harmonisation, there are many steps in between. By distinguishing the different steps along the harmonisation path we can get a clearer picture of what level of harmonisation is necessary to provide a stable investment climate, to meet the targets under the Renewables Directive and to safeguard a good functioning of the internal market.

In view of the targets set under the Renewables Directive, the first step of harmonisation is to provide a common framework for the registration and verification of renewable electricity that is produced. The Renewables Directive provides for such a common framework by requiring that each Member State set up a system of guarantees of origin. These guarantees of origin will "specify the energy source from which the electricity was produced…" and "serve to enable producers of electricity from renewable energy sources to demonstrate that the electricity they sell is produced from renewable energy sources…". Moreover, guarantees of origin are the "exclusive proof" of renewable electricity production (European Commission, 2001). Each Member State is left to implement its own system of guarantees of origin, but if necessary the Commission may propose common rules on the implementation of these systems.

Guarantees of origin need to be distinguished from tradable green certificates, as guarantees of origin are not necessarily tradable. However, based on guarantees of origin tradable green certificates can be issued. In that case the associated guarantee of origin then has to be attached to the green certificate so that it cannot be used again to issue another green certificate. In the countries that have implemented a green certificate system it is likely that green certificates will also get the function of guarantees of origin. Vice versa, if guarantees of origin are allowed to be traded they will also have the function of tradable green certificates.

The next step is to base the monitoring of the Member States' progress towards reaching their 2010 renewables targets on these guarantees of origin. Member States will have to demonstrate compliance with their targets by surrendering the equivalent amount of guarantees of origin. However, in the Renewables Directive the Member State targets are specified as consumption targets. Therefore, in view of the monitoring of the targets agreements have to be made on how to account for the consumption of renewable electricity. Whatever this agreement is, monitoring of consumption should be based on guarantees of origin.

In addition to the actual consumption by final energy consumers, the use of a support scheme can also be seen as consumption. For example, when a producer surrenders a guarantee of origin to claim a feed-in tariff with a network operator this can be seen as consumption of the guarantee of origin. The network operator consequently has to transfer the guarantee of origin to a national registry where it can be counted for meeting the renewables target. Effectively all support mechanisms that target the output of renewable energy plant (e.g. feed-in tariffs, ecotax exemptions and quota) can in this respect be seen as consumption of renewable electricity and the associated guarantees of origin. Thus, the next step for harmonisation is to establish that the use of output oriented support schemes in a certain Member State counts as consumption of renewable electricity in that Member State and that this is administered through the system of guarantees of origin.

Furthermore, in relation to eligibility rules for national markets and support mechanisms it is important to set common standards for the information content of a guarantee of origin. A key requirement in this regard is that it should be clear whether a renewable energy plant has received investment support. The harmonisation of the information content becomes more important as the role of international trade in renewable electricity increases and producers have multiple support mechanisms and markets to choose from.

So far the basic steps in harmonising the verification, registration and monitoring framework for renewable electricity under the Renewables Directive have been discussed. In conjunction with the harmonisation of the rules for international trade of renewable electricity, this level of harmonisation is sufficient to facilitate international trade in renewable electricity. Such a common framework for verification, registration, monitoring and trade can co-exist along various support schemes. At the same time it provides the possibility to realise some of the benefits associated with international trade.

As alluded before, policy interactions arise from differences in the value of renewable electricity in the different Member States. This in turn is related to the differences in support levels. To avoid undesired policy interactions the level of support in the different Member States can be harmonised. Such harmonisation of the support level can first be established between countries that have a similar support framework, e.g. harmonising penalty levels between quota systems. At a later stage the support frameworks of the different groups of countries with similar policies can be harmonised with each other, until finally harmonisation is completed.

Figure 5.1 outlines the different levels of harmonisation as discussed above. The necessity and level of harmonisation of the support frameworks within the EU has to be established in the light of the experiences gained with co-existing support schemes in the different Member States.

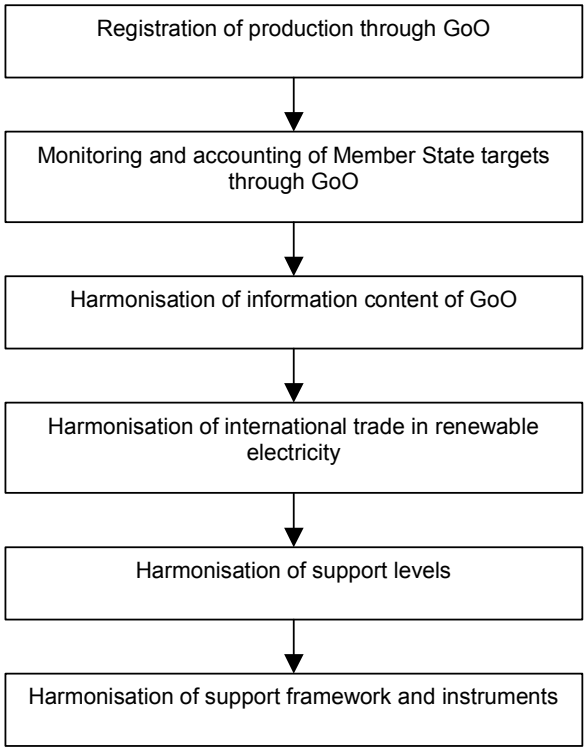

Figure 5.1 *Levels of harmonisation*
(GoO stands for Guarantees of Origin.)

6. THE EUROPEAN POLICY CHALLENGE

The EU Renewables directive provides the principal legal framework for renewable electricity policy at the European and Member State level. It sets indicative targets for the penetration of renewable electricity for each of the Member States for the year 2010 and furthermore stipulates trigger criteria and a timeframe for the potential further harmonisation of the internal market for renewable electricity. A key milestone in the Renewables directive is the 2005 reporting duty of the Commission to the Council and the Parliament on the progress of the Member States towards meeting their indicative targets, as well as the possible interactions between the renewable electricity policy instruments in the different Member States. Based on the analysis presented in this report the Commission may - if necessary - decide to develop further initiatives to promote the penetration of renewables in EU energy mix. Such initiatives may entail mandatory Member State targets and further harmonisation of the support framework for renewable electricity. Recognising that by 2005 the implementation of renewables projects is determined by economic and policy conditions beyond the timeframe of the Renewables directive, the Commission would also need a long-term strategy to underpin potential further policy initiatives.

Having different support schemes in different Member States enables the EU to review the pros and cons of the distinct national approaches to renewable electricity policy. Many research and evaluation projects have been carried out and many discussions have been held in which proponents were trying to convince the opponents of their preferred support schemes. These projects and discussions have led to a thorough understanding of the advantages and disadvantages of the different approaches. But what is probably more important: they show that it is not likely to expect a uniform view on “a best support scheme” to be developed for a harmonised renewable electricity market in Europe. Most studies demonstrate that different policy instruments serve to achieve different policy goals at different administrative levels, such as fuel diversity, industrial development, employment, specific resource utilisation, greenhouse gas emissions reductions, improving local air quality and increasing the share of renewables in the generation mix.

While this diversity of policy instruments is granted in relation to the diversity of policy goals at different administrative levels, the trading of renewable electricity in the internal market for electricity causes that these policy instruments may interact and possibly undermine each other’s effectiveness. International trade of renewable electricity in a non-harmonised market introduces a dependency of the value of renewable electricity on the policy conditions of other Member States. Therefore, it is likely that in the transition period towards a harmonised support framework and EU market for renewable electricity, national governments would have to make regular adjustments to the national support mechanisms in order to compensate for the effects of policy developments in other Member States. Such policy adjustments can cause an uncertain environment for investment. A harmonised support framework can create a more open and stable EU market for renewable electricity and thus provide a more stimulating environment for new investments.

In its harmonisation strategy EU should at minimum establish a common framework for the issuing, registration and consumption of guarantees of origin in relation to the monitoring of the progress of the Member States towards achieving their targets under the Renewables Directive. Furthermore, the rules for European trade in guarantees of origin or tradable green certificates should be harmonised. The ensuing steps of harmonisation consist of first harmonising the support levels and trade between Member States with similar support frameworks and then harmonising the support frameworks between all Member States. Based on experience with the efficiency and effectiveness of the coexistence of various support schemes in different Member States it will have to be decided what minimum level of harmonisation is required. The Dutch experience demonstrates that there are interactions between support mechanisms in different

Member States and that these should be taken into account in designing or adjusting policy instruments. This demonstrates the need for at least some form of co-ordination. In deciding on the level of harmonisation that is necessary the benefits of harmonisation should be balanced with the benefits of pursuing more nationally oriented strategies that may be granted in order to achieve a divers set of policy goals related to renewable energy.

Finally, it is necessary to set a long-term target for the penetration of renewable electricity in the EU and to announce the policy framework in which target is to be reached. Most current renewable energy investments have a lifetime well over the timeframe of the Renewables Directive. The Renewables Directive is thereby an insufficient framework for providing long-term certainty to investors.

6.1 Conclusions

Renewable electricity policy making at the EU level has to balance a diverse set of policy objectives and associated instruments at the local, national, regional and European level with the need to harmonise these instruments with a view to insuring the overall effectiveness of renewable electricity policy at all of these levels. The example of the Netherlands demonstrates that there is a relationship between policy developments at the various national levels, which may affect the effectiveness of national support mechanisms. The effectiveness of national renewables support mechanisms is primarily hampered by the lack of investor security as a consequence of continuously changing and interacting policy and market conditions. To provide a more stable investment climate harmonisation of national renewables support policies is necessary. Moreover, the EU should establish a long-term target for the penetration of renewable electricity in the EU electricity market, as well as the policy framework within which this target is to be achieved in order to create long-term certainty for investors.

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