



**The European Renewable Electricity Certificate Trading Project
(RECerT)**

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Task 1.2 Country Reviews

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0 SUMMARY

The results presented are based on country reviews from EU member states and Norway produced under Task 1.2 of the RECerT project. The focus has been on the situation of renewable energy sources (RES) in the supply systems, and especially on the development of green certificate trading.

Results are presented for the coverage by RES in each country with a focus on electricity produced by RES (RES-E). The results are presented with and without inclusion of large hydro. Overall, by far the largest contributions are due to large hydro – except in those countries that have no potential for this type of energy (e.g. Denmark and the Netherlands). The RES contribution in these countries is mainly based on wind power and energy from biomass.

The country reports illustrate the existence of a considerable spread in the opening of electricity markets among the investigated countries. Some EU Member States are lacking behind the opening stipulated by the EU directive, while other countries already have a 100% opening of their market. It is expected, however, that within the next five years or so most of the countries will have established full market opening.

Most countries have only indicative RES and RES-E targets and only vague (or no) action plan for RES and RES-E.

The promotional schemes for RES-E vary significantly between the investigated countries. Thus, seven countries rely on some version of the feed-in model, while another seven countries are in the process of introducing different versions of green certificate trading in combination with different versions of green quota. The remaining two countries apply tender systems or green pricing.

The experience with feed-in models (e.g. in Denmark, Germany and Spain) has documented a high degree of effectiveness in promoting RES-E. A controversy concerning a possible conflict with EU rules for State Aid has been resolved by the EU Court in March 2001. The Court has ruled that the German feed-in model is acceptable within the framework of the EU rules.

It has been discussed whether the green certificate model with obligatory quota or the feed-in model should be considered most market conform. There is no clear answer on this question. The certificate model with quota in practice fixes the quantity of green electricity and leaves the price determination to the market. In contrast, the feed-in model fixes the price and leaves the quantity of green electricity to the market.

The seven countries that are involved in the development of TGC are following different routes, especially as concerns the combination with quotas for the coverage by green electricity. Some countries aim at obligatory consumer quota (e.g. Denmark), other countries prefer production quota (e.g. the UK), while the Netherlands so far prefer voluntary negotiated quota, albeit with the possibility for the government to switch to obligatory green quota.

There is no consensus so far concerning the definition of “green electricity”. Thus, the question whether large hydro and waste (and even nuclear power) should be included is still up for discussion. These and other questions will have to be solved before a large volume of international trade is to be expected.

A number of countries presently relying on feed-in models, tender models or green pricing are considering switching to TGC. However, it should also be noted that France has recently decided to introduce a feed-in model, so the overall future development is uncertain at this time. It should not be overlooked that there are opposition to the switch to TGC in several countries from green movements and RES-E producers due to uncertainties concerning the resulting economy for producers in a system based on green certificates. The success of TGC will be dependent on the attractiveness of the system for investors in new production of RES-E, i.e. the degree of certainty concerning the profitability of such investments.

As an example of the importance of present uncertainty concerning the future value of green certificates, in Denmark the private investments in wind turbines has experienced a sudden stop when the feed-in model was replaced by the certificate model by January 2000. For the past 18 months practically no private investments in wind power have been made in Denmark in strong contrast to the previous years. Thus more than 400 MW of wind capacity was installed during year 2000 funded by private investors and ordered before January 2000.

The institutional framework for TGC is in an early phase in most countries, but may be expected to develop rather fast within the next couple of years.

The following tables and figures illustrate some of the main results.

Market share of RE-electricity

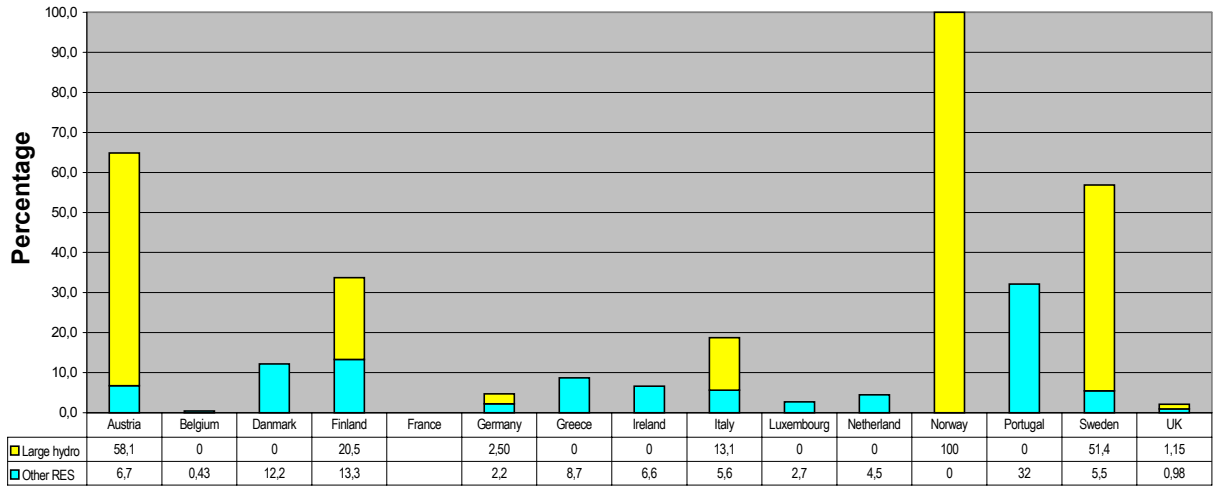


Figure 0-1 Percentage market share of RE-electricity divided into hydropower and other RE-technologies. Note that the countries with large market shares of RE-electricity also are the countries with large production from hydropower. Values for France are missing due to lack of data.

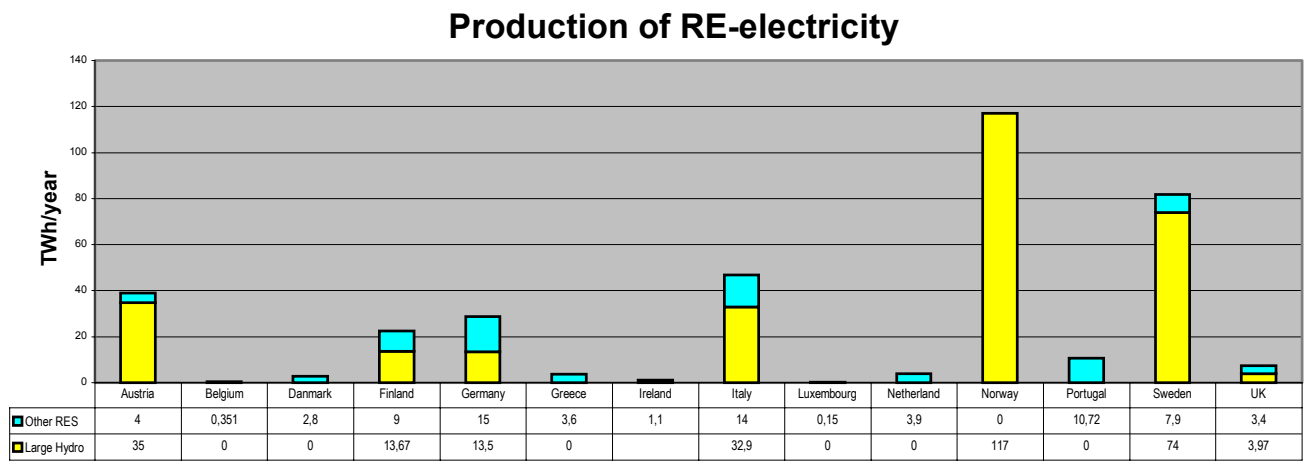


Figure 0-2 Production of renewable electricity in TWh/year. Note that large-scale hydro is the dominating renewable electricity source.

Table 0-1 Overview of European promotional schemes for Renewable Electricity.

	Au	Be	Dk	Fi	Fr	Ge	Gr	Ir	It	Lu	NL	No	Po	Sp	Sw	UK	Total
Feed in	X				X	X	X			X			X	X			7 (6)
Tender					(x)			X									1 (2)
Green pricing				X								(x)					1 (2)
TGC*		X	X						X		X	X			X	X	7 (6)

* TGC's are in most cases only in preparation.

Table 0-2 on the next page gives an overview of the countries that currently are discussing, planning or implementing national TGC-systems. As can be seen from the Table, there are large differences between the systems with regard to both coverage, demand driver and the existence of minimum and maximum prices.

More detailed information on the countries can be found in chapter 4 in this report.

Table 0-2 Summary of national TGC systems in Europe

Country	Legal Status for TGC System	TGC Market Starting Date	Demand Driver	Sources Excluded	Minimum Price of Green Certificate	Maximum Price of Green Certificate	Penalty for Non Compliance	Period of Validity, Banking and Borrowing	International Trading
Flanders (Belgium)	Directive approved	2001	Supplier obligation	Waste incineration	None	Determined by penalty	2001: 2 BF/kWh 2002: 3 BF/kWh 2003: 4 BF/kWh 2004: 5 BF/kWh Penalty paid to the regulator	2 year validity. Banking allowed Borrowing ?	Trading restricted to Flandern until bilateral agreement is reached.
Denmark	Confirmed	2002	End user obligation 20% by 2003	Waste Hydro>10 MW	0.10 DKK pr. kWh.	Determined by penalty	0.27 DKK/kWh paid to RES-E-Fund	Unlimited validity Banking allowed. Borrowing with deposit	Expected - Subject to restrictions.
Italy	Confirmed	2001	Supplier obligation	Pumping hydro	Set by fixed selling price of issuing body	None	Access to the grid denied	2 year validity. No Banking. Borrowing against a penalty price.	Yes – if accompanied by actual electricity import.
Austria	Confirmed	2001	End user obligation	?	?	?	?	?	No
Netherlands	Voluntary	2001	Voluntary	Waste incineration	?	?	None		Yes
Sweden	Government bill expected in autumn 2001.	Suggested 2003	Consumer or distributor obligation	Large scale hydro is expected to be excluded	?	?	?	?	Yes: Expected from 2005
UK	Planned	1st Oct 2001	Suppliers' obligation 5% by 2003, 10% by 2010	Hydro>10MWh Waste incineration.	None	Determined by penalty plus financial reward to compliant suppliers.	Approx. 5 euro cents /kWh (3p/kWh)	Indefinite, limited banking and borrowing	Foreign Certificates acceptable, subject to restrictions

*Possibly supplier obligation combined with eco-tax exceptions in the future

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1 INTRODUCTION

The current report is a synthesis of the country review reports that have been produced under Task 1.2 of the RECerT project. The main goal of the country reviews is to describe the 'baseline' situation in each country, and to identify the potential stakeholders and a potential institutional framework that could support the issuing, trade, and redemption of certificates in each country. The sources used in the report are listed in the individual country reports that are attached as annexes to this report. The InTraCert country reports have also been used as a source for this synthesis report.

1.1 COUNTRY REPORTS AS AN ELEMENT OF RECERT, INTRACERT, ELGREEN AND RECS PROJECTS

The RECerT project cooperates with three other projects within the field of green certificates. As such the RECerT project is an associated measure to these projects, which are:

- 'InTraCert': 'The role of an integrated tradable green certificate system in a liberalising market', led by the Netherlands Energy Research Foundation, ECN.
- ElGreen: 'Organising a joint green European electricity market', led by the Technical University of Vienna, Institute of Energy Economics, IEW
- 'RECS': 'Renewable Energy Certificate System'. This is neither a legal organisation nor a tightly defined single project. It is rather a process that is driven by committed companies and organisations in Europe that wish to explore and promote the idea of a European green certificate market

According to agreements among the projects, the information in the country reviews have been gathered by the country partners to satisfy a number of different needs in the projects:

- RECerT Task 1.4: Information from the country reports are required to feed into the assessment of the size and value of the European Trade of Green Certificates (TGC) market up to 2010. This assessment is needed to build up the RECerT Internet trading simulation of green certificates.
- The RECS project group has adopted a country report format. As part of the relationship between RECerT and RECS, RECerT needs to provide sufficient information to enable the production of the RECS-format reports for each of the 16 RECerT partner countries.
- The RECerT, InTraCert and ElGreen projects form a cluster of projects. The country reviews will be published as a joint document for these projects and should thus include information of general interest to the projects. The InTraCert project has already completed its information gathering, which was specific to that project.

Other criteria:

The information has been gathered while keeping an eye on two additional criteria:

- The information template should be kept as short and simple as possible, while accessing sufficient information.
- The template has been designed for easy update in 2001, ahead of the final international workshop.

1.2 PARTICIPATING COUNTRIES

The 15 participating countries in the RECerT project included in this report are the EU-15 countries except for Spain but including Norway. That is Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Norway, Portugal, Sweden, and United Kingdom. Some information from Spain is also included in the report, however, for completeness.

1.3 MAIN ELEMENTS OF QUESTIONNAIRE

The questionnaire that was sent to the partners was aimed at giving general and specific information from each country in a standardised format to make the information comparable. The questionnaire that can be found as Annex 1 to this report was divided into four main parts:

- 1) General and renewable energy: statistics
- 2) Energy markets: liberalisation and the role of different players
- 3) Energy and environment policy: legislation and targets for renewable energy
- 4) Tradable Green Certificates: state of development and details

The main parts were broken down into the following sections:

- 1.1 General energy supply and demand statistics
- 1.2 Renewable energy supply and demand statistics (supply curve etc.)
- 1.3 Generation mix

- 2.1 Timetable for electricity market opening, ability of customers to choose supplier
- 2.2 Number of players, their size and market share
- 2.3 Trading arrangements for electricity
- 2.4 Market values, and amount of value traded through different means

- 3.1 Kyoto targets, historic and projected carbon emissions from the electricity sector
- 3.2 Stated renewable energy policy, arguments, targets and timetables
- 3.3 Specific renewable energy support mechanisms and schemes

- 4.1 Extent of interest / discussions in TGCs, and policy drivers
- 4.2 Establishment of institutional infrastructure for TGCs
- 4.3 Certificate details
- 4.4 International trade in TGCs

2 ENERGY MARKETS

This chapter gives an overview of the size and trends in energy markets in the different countries. The main focus is on general energy statistics - and especially electricity statistics. This forms the background information for the rest of the report.

The report uses the year 1990 as a base year for assessment of the energy systems as this is the base year of the Kyoto protocol on GHG reduction. For the assessment of the future development, the report uses the year 2010 as a focus point. Using these years as reference points has the advantage, that the statistical material in general are of good standard for 1990 and that the countries have published goals for the energy systems for 2010, as this is in the middle of the period when the committed reductions in the Kyoto protocol should be met.

2.1 GENERAL ENERGY STATISTICS

Taking 1990 as a base year for comparison, the primary energy consumption has grown in all the involved countries of this study except for Germany and Luxembourg. The trend can be seen in Table 2-1 below that show the actual energy consumption in the involved countries in Peta Joule.

Table 2-1 Total primary energy consumption in the involved countries. All numbers are in Peta Joule.

PJ	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Austria	1116			1096	1090	1120	1169	1193	1186	
Belgium	1972			2,061	2,130	2,205	2,346	2,352	2,400	2,395
Danmark*	751	831	792	815	844	837	945	877	855	839
Finland	1139	1122	1105	1139	1214	1193	1248	1281	1298	1310
France										
Germany	14,912	14,610	14,314	14,308	14,185	14,267	14,742	14,510	14,320	14,200
Greece	954					1034				
Ireland	11.99								17.77	
Italy	6844							7535		
Luxembourg	148	155	158	160	155	139	142	139	137	144
Netherland	2720						3056	2954	2990	2900
Norway	695	700	700	715	725	740	775	780	805	815
Portugal	688.8	697.2	747.6	735	760.2	802.2	793.8			
Sweden	1569.6	1566	1576.8	1591.2	1659.6	1692	1746	1702.8	1728	
UK	9004	9226	9130	9268	9193	9252	9763	9503	9591	

* The numbers for Denmark are not corrected for net export of electricity that varies considerably from year to year.

Another illustration of the trend can be seen in Figure 2-1 below that shows an index of the latest energy consumption numbers available compared to the 1990 base year consumption. The development of the energy consumption shows a range from a 5% decrease of the energy consumption in Germany up to a 48% increase in Ireland. The overall result is that the total energy consumption has risen by 4.8% as a weighted average of the countries.

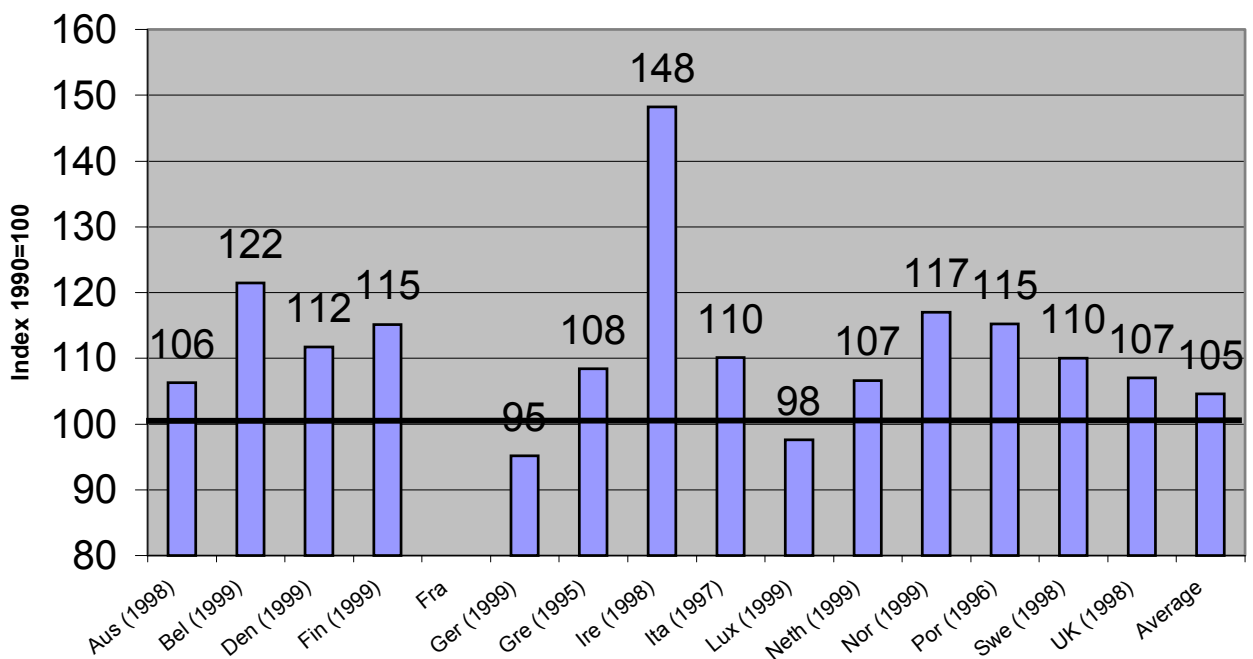


Figure 2-1 Primary energy consumption in the year stated for each country compared to 1990, which is the base year for the Kyoto protocol. Numbers for France are missing due to lack of data.

The development of the electricity consumptions shows the same tendency as for total energy consumption except that the consumption has risen in all the countries – including Germany and Luxembourg as shown in Figure 2-2.

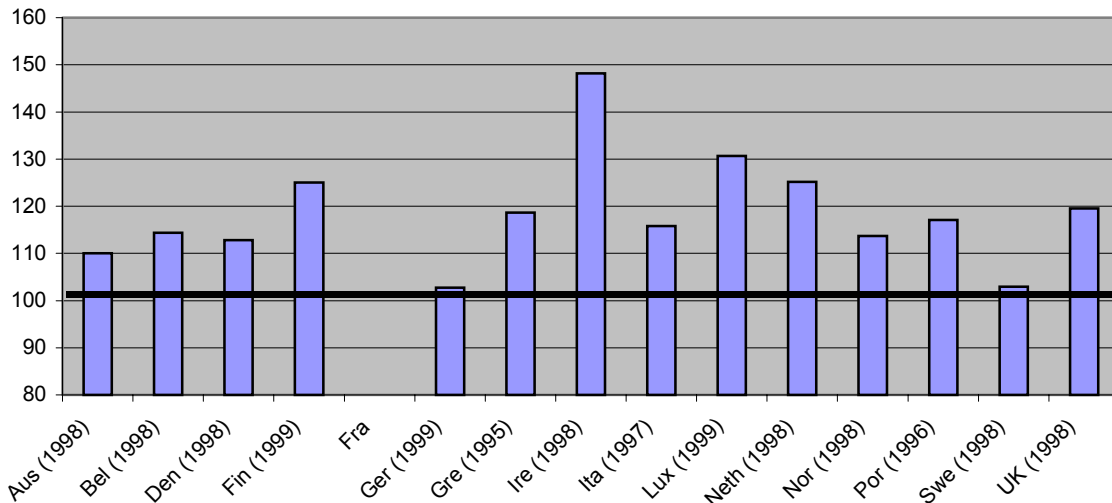
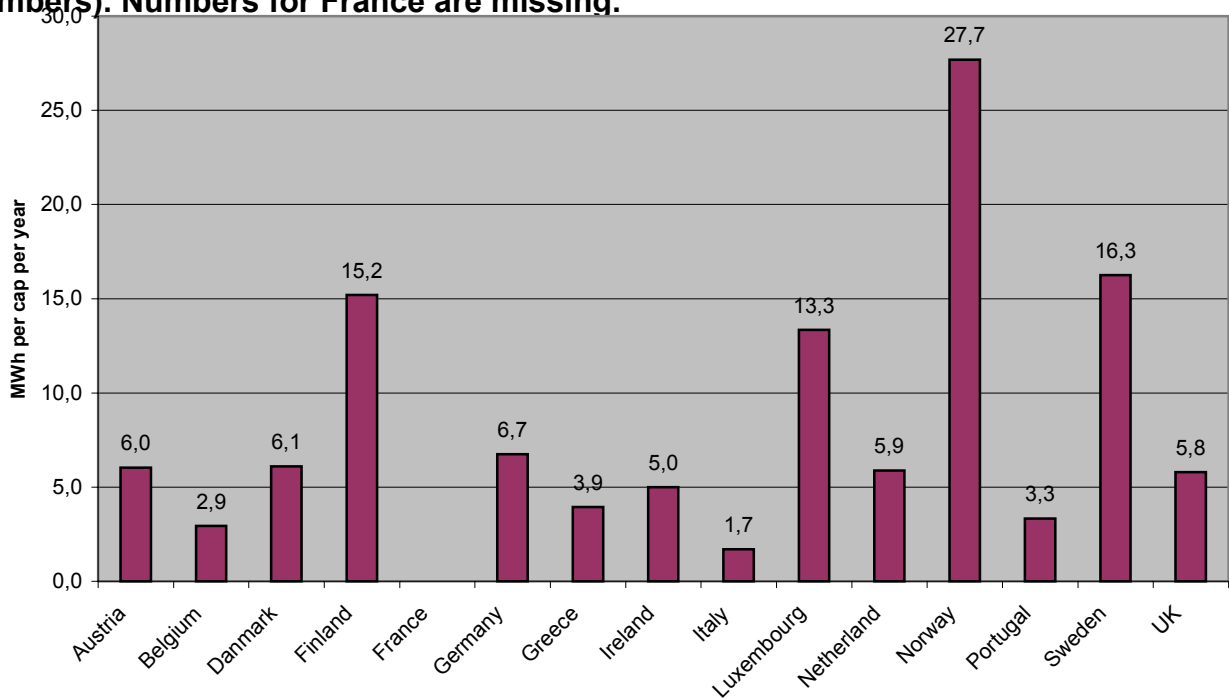


Figure 2-2 Electricity consumption in the different countries in the year stated compared to 1990 (Index). For Austria, Belgium and Germany later years have been taken as base years. Numbers for France are missing due to lack of data.

The per capita use of electricity differs considerably between the countries as shown in Figure 2-3. The extreme values are 1.7 MWh/cap in Italy and 28 MWh in Norway. The main reason for the large Norwegian value is the availability of large amount of cheap hydropower that makes the use of electricity for industry (e.g. aluminium production) and room heating attractive.

Figure 2-3 Per capita use of electricity in the different countries (newest available numbers). Numbers for France are missing.



2.2 RENEWABLE ENERGY STATISTICS

The market share of renewable electricity varies from close to zero in Belgium to 100 % in Norway, as can be seen in Figure 2-4 below. It should be noted that except for Portugal, large market shares of renewable electricity is a result of large-scale hydropower. It should also be noted, that Norway, Sweden and Finland, which are among the four countries with the largest market share of renewables, also are the countries with the largest per capita consumption of electricity as shown in Figure 2-3 above.

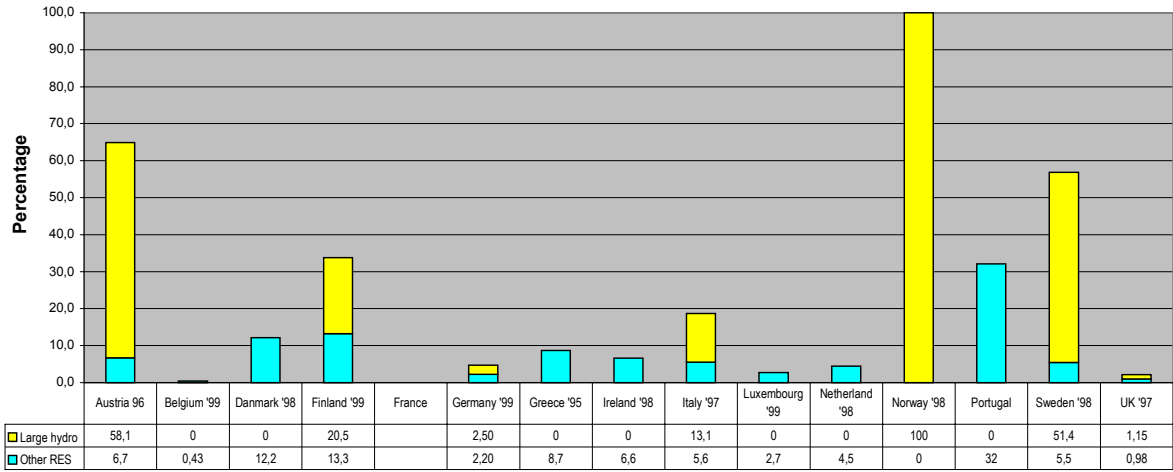


Figure 2-4 Percentage market share of RE-electricity divided into hydropower and other RE-technologies. Note that the countries with large market shares of RE-electricity also are the countries with large production from hydropower.

The picture of large scale hydro as the dominant renewable electricity resource is clearer when looking at the actual production numbers in the countries as seen in Figure 2-5 below.

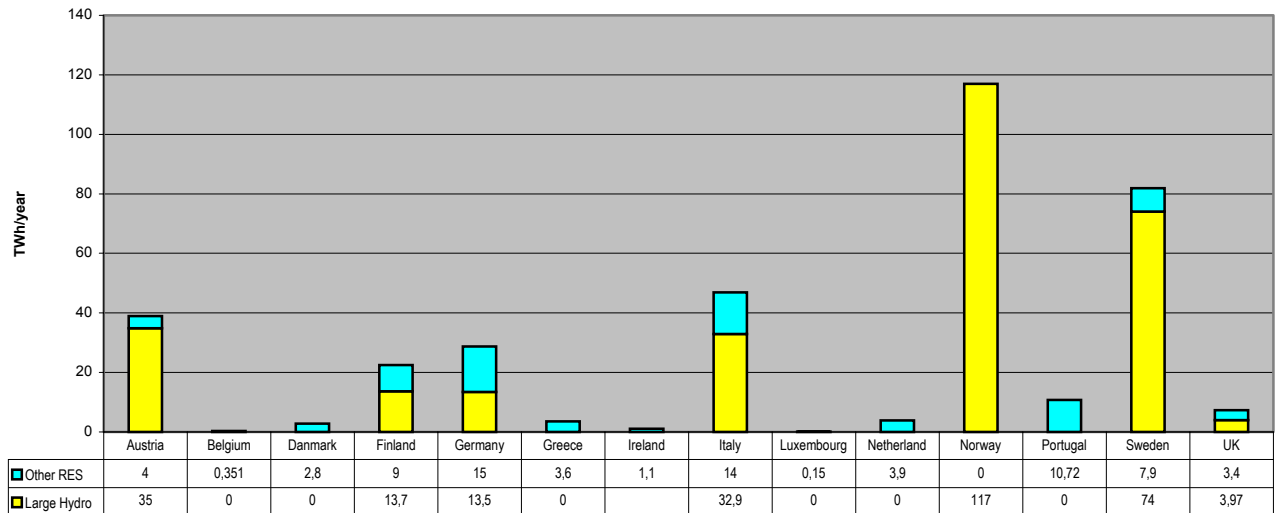


Figure 2-5 Production of renewable electricity in TWh/year (newest available data for each country).

2.3 OPENING OF ENERGY MARKETS

As seen in Table 2-2, five of the analysed countries have a total market opening for electricity trading. These are Finland, Germany, Norway, Sweden and United Kingdom. Of the remaining countries Denmark will have total market opening by 2003, Spain by 2004 and Belgium by 2010. **Table 2-2 Current state of opening of electricity markets in the different countries and plans for further market openings. '?' indicates that further opening is not decided.**

	Au	Be	Dk	Fi	Fr	Ge	Gr	Ir	It	Lu	NL	No	Po	Sp	Sw	UK
Opening by Dec '99 %	27	33	90	100	20	100	0	N/a	30	45	33	100	26	46	100	100
Future opening % Year in ()	50 (03)	100 (10)	100 (03)		?		28-30 (01)	28 (02)	?	?	?		?	100 (04)		

3 ENERGY AND ENVIRONMENTAL POLICIES

3.1 KYOTO/EU TARGETS

At the Conference of Parties in Kyoto in 1997 (COP-3) the European Union was committed to reach a reduction target of 8% by 2008-2012 compared to 1990. Legally, the countries have signed the Kyoto protocol individually and are thus individually committed to the 8% target. The European Union has formed a cluster to rearrange the burden sharing amongst the countries as shown in Table 3-1. Norway has a commitment on maximum one per cent growth in the emission up to 2008-2012.

Table 3-1 Greenhouse gas* emissions and goals in the European Union and in Norway. The Norwegian commitment is part of the Kyoto Protocol, while the European union form a cluster that takes over the individual commitments of the Member States.

	Percentage share of EU emissions in 1990	Emissions in 1990 in Mt (CO ₂) _{eq}	Emissions in 1990 in t (CO ₂) _{eq} per capita	Evolution from 1990 to 1994 (% change)	Evolution from 1990 to 1995 (% change)	Burden sharing	Burden sharing in Mt (CO ₂) _{eq} by 2010
Austria	1,7	74	9,2	-1,3	0,6	-13%	64
Belgium	3,2	139	13,7	4,1	4,4	-7,5%	129
Denmark	1,7	72	13,7	15,2	10,0	-21%	57
Finland	1,7	73	14,2	-3,6	-0,5	0%	73
France	14,7	637	11,0	-2,9	-1,1	0%	637
Germany	27,7	1201	14,7	-12,1	-12,3	-21%	949
Greece	2,4	104	9,9	3,2	4,6	25%	130
Ireland	1,3	57	16,0	2,6	4,3	13%	64
Italy	12,5	542	9,5	-2,9	1,7	-6,5%	506
Luxembourg	0,3	14	34,7	-10,2	-45,0	-28%	10
Netherlands	4,8	208	13,5	3,4	7,5	-6%	196
Portugal	1,6	69	7,0	6,0		27%	87
Spain	7,0	301	7,6	4,0	8,0	15%	347
Sweden	1,6	69	7,9	-2,6	-3,3	4%	72
UK	17,9	775	13,3	-6,9	-8,4	-12,5%	678
Total EU	100	4334	13,1				3998
Norway						1%	

* CO₂ + CH₄ + N₂O Source: "Annual European Community Greenhouse Gas Inventory 1990- 1996, submission to UNFCCC", prepared by the European Environment Agency for the European Commission (DGXI), April 1999

Figure 3-1 shows the per capita emissions of CO₂-equivalents in the EU countries in 1990. The high emission in Luxembourg should partly be seen as a result of cross border trade. This means that the energy traded in Luxembourg is not necessarily consumed in Luxembourg.

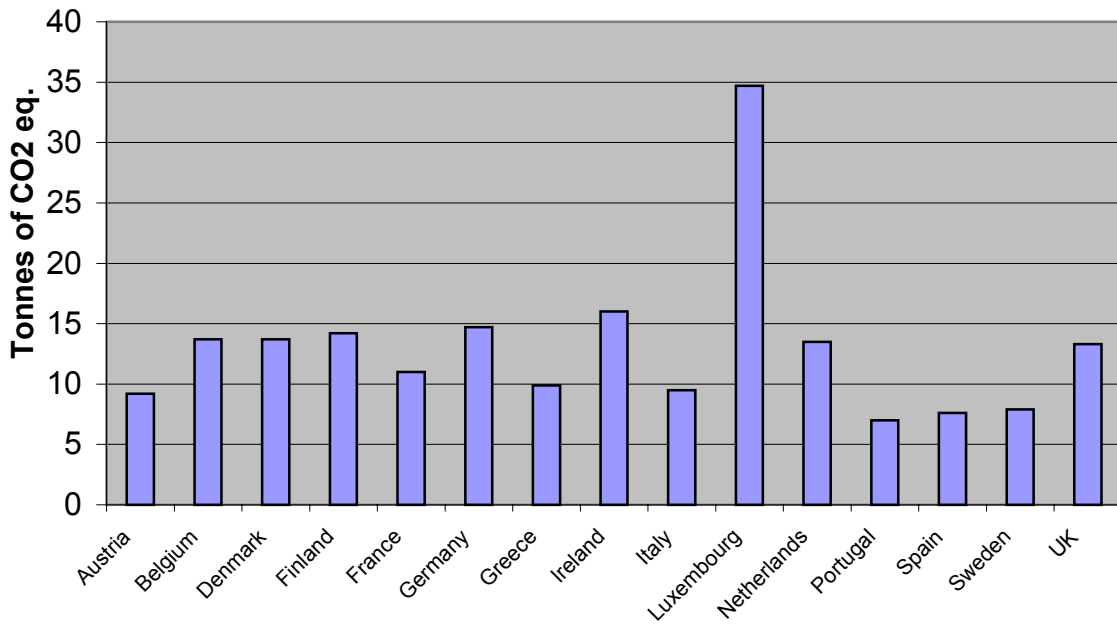


Figure 3-1 Per capita emissions in tonnes CO₂-equivalent in 1990.

3.2 LEGISLATION AND TARGETS FOR RES

Both the individual countries and the European Union as a whole have targets for renewable energy. National targets for market shares of RE-electricity as known by mid 2000 for the most relevant countries in regard to TGCs are shown in Figure 3-2. Indicative targets for all countries are shown in the following figures.

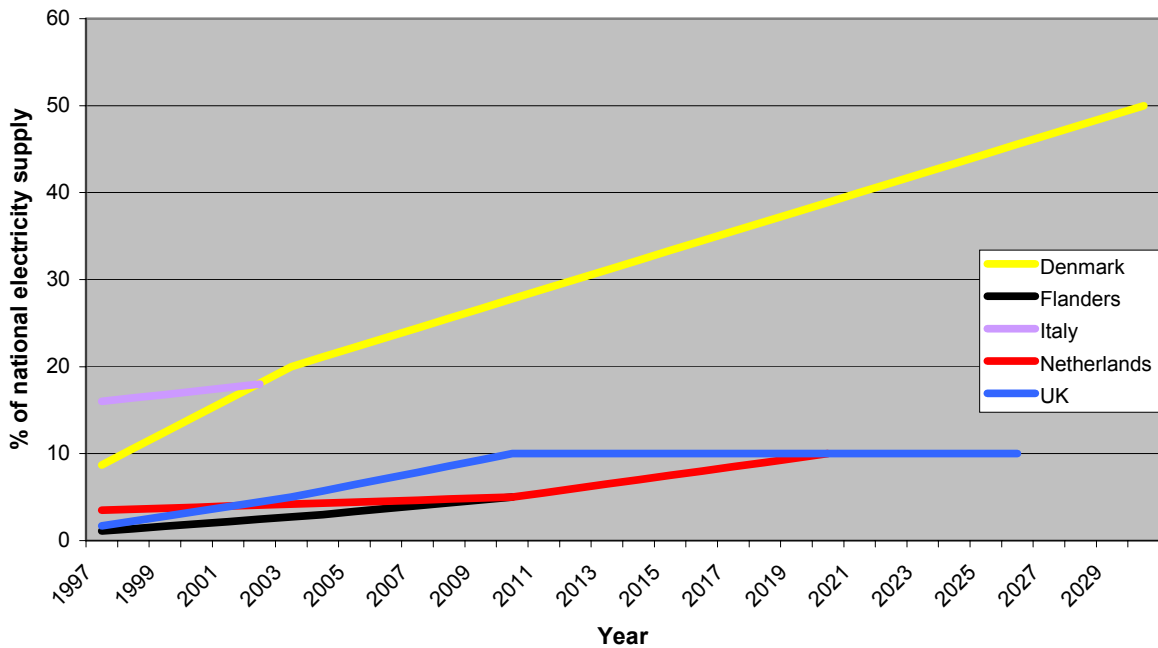


Figure 3-2 National renewable electricity targets in Europe as of mid-2000 for relevant countries in regard to TGCs.

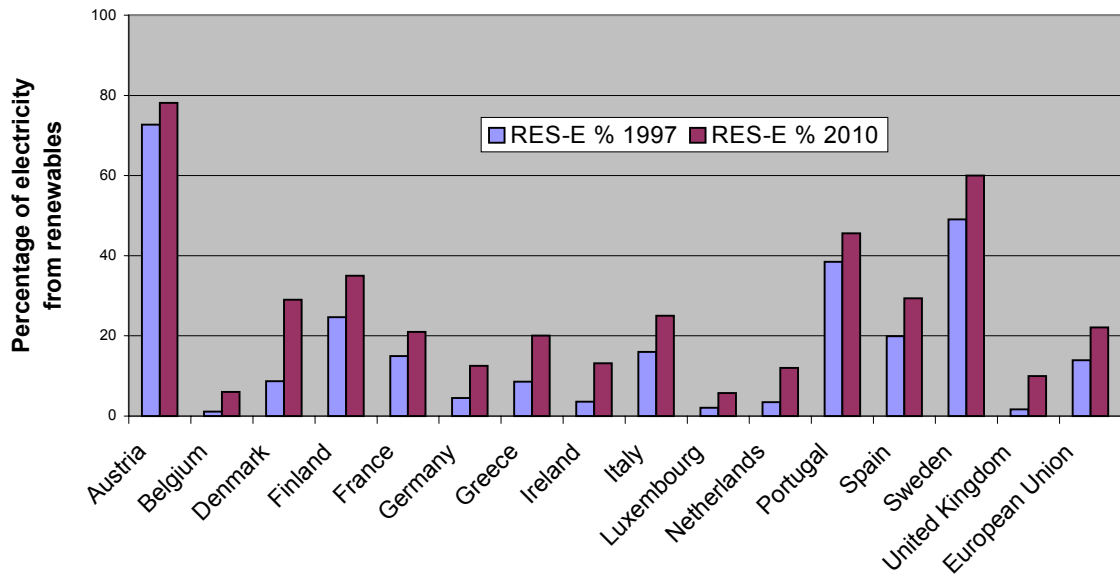


Figure 3-3 European indicative targets for renewable electricity (including large hydro).

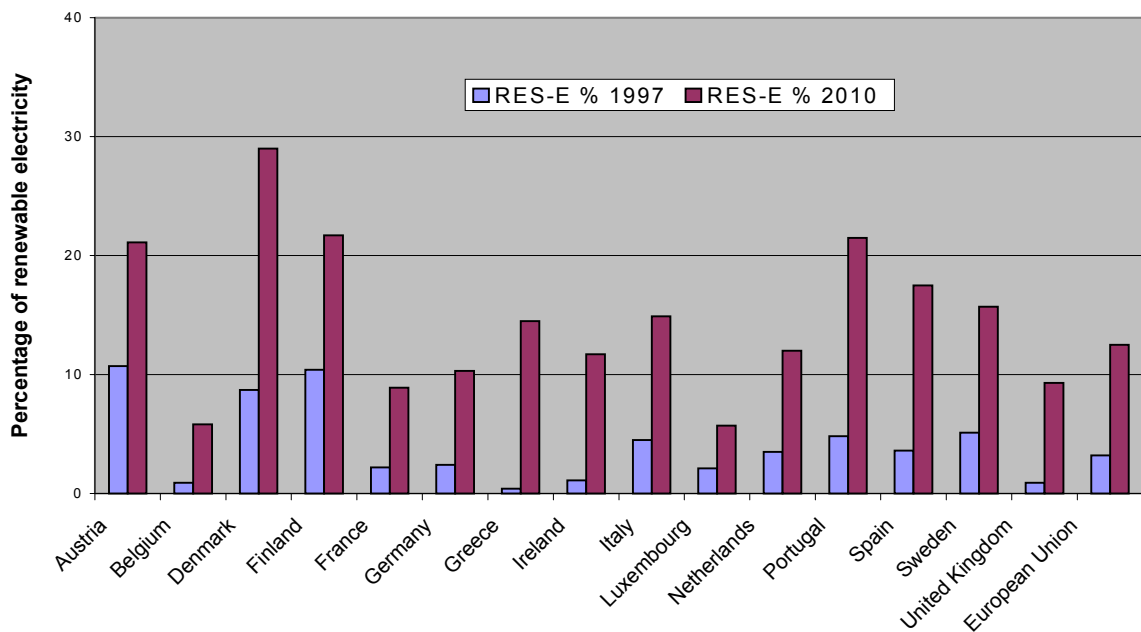


Figure 3-4 European indicative targets for renewable electricity (excluding large hydro).

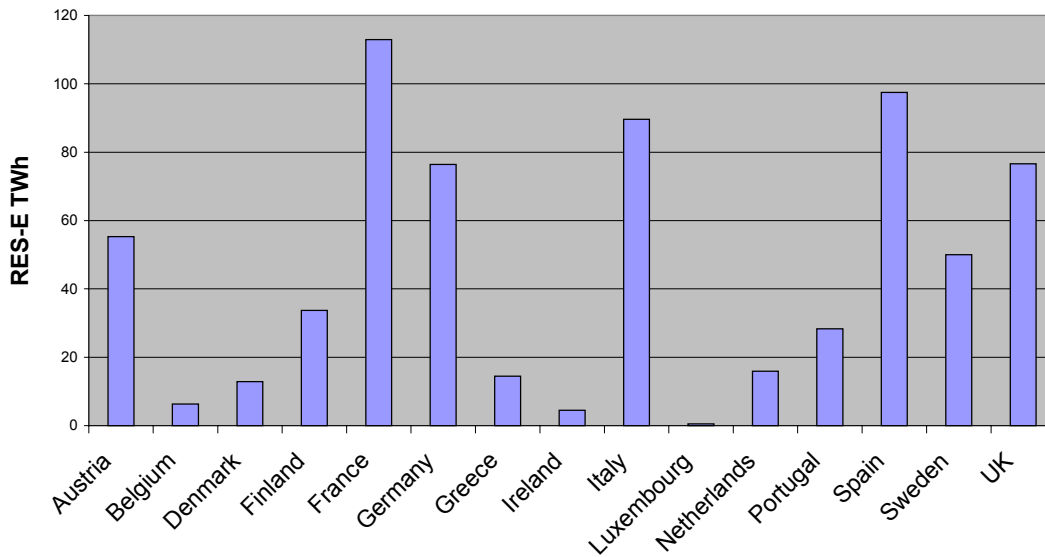


Figure 3-5 Indicative renewable electricity targets by 2010 (including large hydro)

3.3 SUPPORT SCHEMES FOR RES -E

The following Table 3-2 is a brief overview of the support schemes for RES for the individual countries

Table 3-2 Overview of the support schemes for RES-E for the individual countries

Austria	Austria has for some time had a 'feed in' model. The new scheme from May 1998 does, however, have tender elements.
Belgium	TGC market is in preparation to help meeting RES-E obligations (2001: 0.96%; 2004: 3%)
Denmark	The new Danish electricity act from 1999 defines a change in the Danish RES support scheme from a combination of a 'feed in' model with subsidy for green electricity towards a TGC system with specific consumer obligations. Low 'Buy-out' price puts effective cap on certificate value. The aim is to have a working TGC market by 2001-2002. The target for RES-E is 20% by 2003.
Finland	Voluntary "green pricing". Standard green energy accreditation since July 1998 (excludes new hydro, peat and waste). Emphasis on biomass, investment subsidy for wind (35%).
France	Modest tender scheme for wind (15 year power purchase agreement with EdF). New climate action plan aims for 3 GW wind by 2010. Due to a recent decision in the French Parliament a feed-in system will be introduced.
Greece	Feed-in model. New electricity acts supports RES-E (1999). New regulator April 2000. The grid infrastructure is weak.
Germany	Feed-in model. New law from April 2000 with favourable rates. Not submitted for notification at the EU commission electricity regulatory committee. Court decision in March 2001 accepts German feed-in model..
Ireland	Tender scheme. Comparable to UK NFFO scheme. Guarantee to successful developers of a 15 year power purchase agreement with the Irish utility, (part of "Alternative Energy Requirement" of 1994). Installed capacity by 1999 low (100MW - mostly wind and biomass)

Italy	TGC system in preparation. New electricity act Nov. 1999. TGCs by 2002.
Luxembourg	Feed-in model. Favourable tariffs for RES-E. Investment subsidy for wind and PV.
Netherlands	TGC in phase 1. Green pricing since 1995. Since Jan. 1998 no extra tariff. ("Zero tariff") Voluntary agreement with utilities on TGC, operational from January 2001 (uncertain!)
Norway	Modest green pricing. Swedish eco-labelled electricity is offered. Take up rate very low. TGC-system may be presented for initial discussion in autumn 2001 due to a decision in parliament spring 2001.
Portugal	Feed-in model. Favourable tariffs and investment subsidies. Targets for RES-E are only indicative, no concrete action programmes.
Spain	Feed-in model. Favourable premium tariffs regulated by law since 1998. Fast growth of wind power (2 GW).
Sweden	Green pricing. New TGC system just announced
UK	TGC in preparation. New act introduces TGCs and a 10% green electricity obligation on suppliers by 2010 to replace NFFO scheme. 'Buy-out' price puts effective cap on certificate value at approx. 3.8 euro cents/kWh. Presently about 20 green tariffs, but low consumer uptake. Uncertain whether voluntary demand will be additional to official target. New electricity trading arrangements from late 2000.

The support mechanisms can be divided into four types: Feed-in tariffs, Competitive tender systems, Green pricing (special tariffs for green electricity products) and Tradable green certificate (TGC) systems. A summary of the use of the four systems in the 16 countries can be seen in Table 3-3: Seven countries have feed-in tariffs, seven have TGCs systems in preparation, one country runs a tender based system and one has only green pricing.

Table 3-3 Overview of European promotional schemes for Renewable Electricity.

	Au	Be	Dk	Fi	Fr	Ge	Gr	Ir	It	Lu	NL	No	Po	Sp	Sw	UK	Total
Feed in	X				X	X	X			X			X	X			7 (6)
Tender					(x)			X									1 (2)
Green pricing				X								(x)					1 (2)
TGC*		X	X						X		X	X			X	X	7 (6)

* Most TGS-systems are under preparation

The promotional systems can be judged on both a criteria of 'Effectiveness' and criteria of 'Economic efficiency'. The 'Feed-in' system is judged to be most effective in promoting new renewable energy capacity based on previous experience. TGC in combination with green electricity obligations is claimed to have a potential for both effectiveness and economic efficiency. So far, the practical experience with TGC is very limited. The tender system may be economic efficient, but practical experience so far has demonstrated low effectiveness. The judgement of the systems is uncertain and dependent on the specific implementation and accompanying political measures.

As seen in Figure 3-6 only Netherlands, Italy and Belgium have obligations and tradable green certificates today, while the majority of the countries have feed-in tariffs. Finland has green pricing and Ireland has a tender system. This is about to change, as seen in Figure 3-7, as Denmark, Sweden, Norway and United Kingdom have plans for the combination of obligations and tradable green certificates within the next couple of years, while there are discussions going on in the remaining countries.

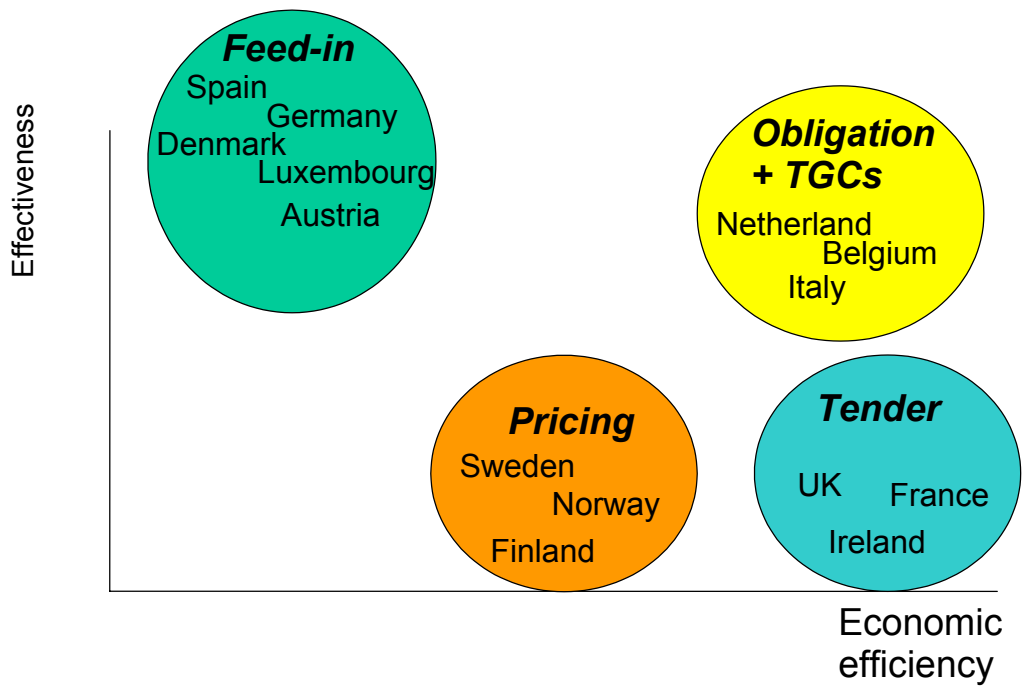


Figure 3-6 Support mechanisms by early 2000 for Renewable electricity production in the analysed countries.

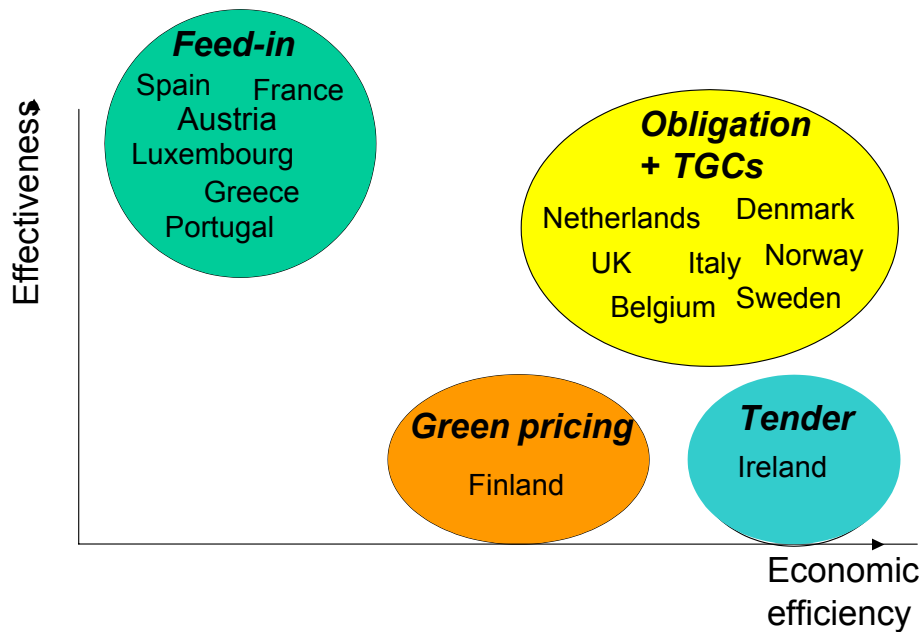


Figure 3-7 Expected support mechanisms for Renewable electricity in the coming years.

4 TRADABLE GREEN CERTIFICATES

The concept of Trading of Green Certificates (TGC) were first introduced in the Netherlands in the beginning of 1998 and subsequently adopted by Denmark in connection with its new electricity act from June 1999. Italy is planning to initiate a certificate market by 2001 and the same is the case for the Flemish government in Belgium. In Norway, a recent decision in Parliament may start planning work on TGC.

The basic feature of this model is that producers of green electricity are paid the market price for electricity plus the price of green certificates. The green certificates are the documentation of the amount of green electricity delivered from the producer. Market forces determine the price of the green certificates. In most cases this is combined with obligatory consumer or producer quota specified by government.

It has been argued that the green certificate model is more market conform than the competing feed-in model, which so far has proved to be most efficient in promoting renewable energy, sources, especially wind power. The feed-in model guarantees a favorable price on green electricity and obliges the utilities to accept all electricity based on renewable energy sources.

In relation to market principles, the green certificate model with obligatory quota fixes the quantity of green electricity but leaves the price determination to the market. In contrast to this, the feed-in model fixes the price but leaves the quantity of green electricity to the market. Whether one of these two models is more market conform than the other depends on the point of view of the observer. Both models have been accepted by the EU-Court as being acceptable within the framework of EU-law.

4.1 STATE OF DEVELOPMENT

It follows from the definition of the green certificate model that the price of green electricity will exceed the market price of electricity by the price of the green certificate. A central question is therefore what should be the incitement for customers to pay more for green electricity. There are several proposed solutions to this problem.

One is related to the concept of "green pricing". In this case, customers are supposed to prefer green electricity for environmental reasons and to be willing to pay a higher price for environmental benign electricity. This has been the starting point for the Dutch model, but it may be replaced by obligatory quota specified by the Dutch government, if green pricing is not efficient enough in promoting green electricity.

Another solution is based on obligatory consumer or producer quota specified by the government. This is the model to be introduced e.g. in Denmark, UK and Italy.

So far the practical experience with these models is very limited. The Danish model was originally planned to start TGC in January 2000. The operational details of the system were evaluated during the second half of 1999 by the Danish Energy Agency, and the conclusion was that there are many practical problems and uncertainties to be solved. As a consequence, the trade was postponed to first 2001 and is now planned to start in 2002 although also this schedule is uncertain.

In the Netherlands some trading has taken place, but the volume is relatively small and it is uncertain whether the voluntary quota system will survive in the long run.

It has been argued that the national volumes of TGC will be too small in relation to the transaction costs, so that an international TGC market is needed. However, this poses a number of problems as long as there is no consensus on the details of the applied models, including the definition of green electricity. The RECS project has been working for some time in order to set up a demonstration project on international TGC.

At present there are work undergoing in some countries on national TGC systems. These are The Netherlands, Italy, Belgium (by the regions), UK, Sweden and Denmark. In Norway a recent decision in the Parliament may start planning work on a TGC system.

Table 4-1 - 4-7 Overview of ongoing work on national TGC systems.

Country	The United Kingdom
Legal Status	Planned. Tradable green certificates referred to as Renewable Obligation Certificates (ROCs)
Timetable /start date	<ul style="list-style-type: none"> • Statutory consultation on Renewables Obligation March/April 2001 • Order for Renewables Obligation laid before Parliament April/May 2001 • Order Made June/July 2001 • First period of Obligation begins (i.e. start date) 1st October 2001 • Last period of obligation ends 31st March 2026 The timetable may be affected by Commission approval and splitting of Public Electricity Supply (PES) licenses into separate licenses for supply and distribution may have an impact on the timetable.
State aid and competition law clearance	Commission notified, approval not yet received.
Demand Driver	Obligation on all licensed electricity suppliers in England and Wales, 5% by 2003, 10% by 2010. Obligation is annual, except for the first period which is 18 months (1 Oct 2001 – 31 Mar 2003)
Issuing Body	OFGEM, or appointed agents.
Coexistence with other renewable energy regulation	Capital grants for offshore wind and energy crops.
Technologies excluded	<ul style="list-style-type: none"> • Hydro>10MW • Energy from Waste – energy recovery from municipal solid waste (MSW) and from mixed streams of industrial and commercial waste (ICW)
Non-technology Exclusions	Generation sources current benefiting from NFFO contracts. Only when NFFO contracts expire will they be eligible for the Renewables Obligation.
Banking and Borrowing	Limited banking (to 50% of obligation for that period) and borrowing (to 5% of obligation for that period) of ROCs
Maximum Price	No set maximum price, but proposed penalty price creates de facto maximum price. However the 'recycling' of buy out funds back to compliant suppliers may encourage suppliers to buy ROCs at above the buy out price.
Minimum Price	None.
Penalty for non compliance	Known as the 'buy out' price. Currently proposed at 3p/kWh (about 5 Euro cents).
Period of Validity	Indefinite
International Trading	Foreign certificates acceptable, if issued under a procedure acceptable to OFGEM and under terms of international protocol, and not otherwise receiving support.
Comments	

Country	The Netherlands
Legal Status	No legal framework has been established as the system is based on a voluntary basis by the electricity producers' organisation.
Timetable /start date	Was established in 1998 on a voluntary basis. If the government takes over the system, it is expected to be started in 2001.
State aid and competition law clearance	
Demand Driver	Voluntary purchase of TGCs
Issuing Body	Grid operators
Coexistence with other renewable energy regulation	End use stimulation.
Technologies excluded	<ul style="list-style-type: none"> • Non organic waste • Industrial heat pumps. (Certificates also covers heat and gas).
Non-technology Exclusions	
Banking and Borrowing	Banking: Probably allowed Borrowing:?
Maximum Price	Not relevant
Minimum Price	No
Penalty for non compliance	Not relevant
Period of Validity	One year
International Trading	Foreign certificates will be accepted but may be subject to reciprocity clauses and Dutch certificates can be sold abroad.
Comments	Poor market liquidity at present, due to small market size and compliance procedures. If Dutch consumer or supplier obligation is not set, it is likely that most trade of certificates will be abroad leaving Dutch population as free riders.

Country	Belgium	
Region	Flanders	Walonia
Legal Status	Renewable energy certificate system will be introduced by regional decrees.	
Timetable /start date	<p>The certificate system is being prepared in the W and FL region and will later also be implemented in the Brussels region. It is expected that both systems will be in place in the course of 2001. The timing depends on the approval in the regional parliaments. In Flanders the directive has been approved in July 2000, in Walonia a draft directive has been approved in April 2001.</p> <p>A test phase is being prepared in the FL region.</p>	
State aid and competition law clearance	The regional energy administrations are in charge of the control and organisation of the certificate market.	
Demand Driver	Certificate trading is introduced as a manner of meeting the targets; it is – however – limited to the region where the certificates are delivered.	
Issuing Body	VREG (regional regulator)	CWAPE (Commission Wallonne pour l'Electricité, i.e. the regional Regulator)
Coexistence with other renewable energy regulation	Yes: <ul style="list-style-type: none"> ▪ Investment support ▪ Price support pr. unit of RE-electricity generated ▪ End use stimulation 	
Technologies excluded	The certificates will cover “All other energy sources than fossil fuels or nuclear fission, which can be implemented in a sustainable way” (free translation) <ul style="list-style-type: none"> ▪ Waste incineration excluded. 	The certificates will cover “All other energy sources than fossil fuels and nuclear fission, such as hydropower, wind energy, solar energy, geothermal energy, biogas, organic products and waste from agriculture, forestry and municipal waste” (free translation)
Non-technology Exclusions		
Banking and Borrowing	Banking: yes Borrowing: ?	
Maximum Price	Defined by the penalty.	
Minimum Price	None	
Penalty for non compliance	2001: 2 BF 2002: 3 BF 2003: 4 BF 2004: 5 BF	
Period of Validity	3 years	
International Trading	The certificates are limited to the region where the certificates are delivered. International trade is excluded, unless bi-lateral agreements or European agreement is reached. International certificates are accepted for voluntary purchase (FL).	

Country	Denmark
Legal Status	Electricity supply Act 1999
Timetable /start date	2002. Uncertain if this starting date holds.
State aid and competition law clearance	Electricity supply Act accepted by the European Commission in 2000.
Demand Driver	Consumer obligation 20% green electricity in 2003 – 50% (indicative) in 2030.
Issuing Body	System operator: ELTRA (west) and Elkraft System (east)
Coexistence with other renewable energy regulation	Non-competitive RE-technologies will receive investment subsidies in addition. The subsidy will be for individual technologies and will gradually be reduced with the development of the technology.
Technologies excluded	<ul style="list-style-type: none"> • Waste incineration • Hydro > 10 MW
Non-technology Exclusions	Existing plants in a transition period.
Banking and Borrowing	Banking probably allowed. Borrowing probably with deposit sum.
Maximum Price	Determined by the penalty
Minimum Price	0.10 DKK pr.kWh.
Penalty for non compliance	0.27 DKK paid to Renewable Electricity Fund.
Period of Validity	Probably unlimited
International Trading	Possibility in the future. The system is designed to meet the criteria for international trade.
Comments	The RES-E Fund buys remaining certificates at a market price between 0.10 and 0.27 DKK pr. kWh until the target is met. Thus the RES-E Fund acts as a moderator in the market.

Country	Italy
Legal Status	Renewable energy certificates system is required by law ("Decreto 11 November 1999") and will be in operation by 2002;
Timetable /start date	January 2002, but there will be possibilities for trade in 2001 to fulfil the obligations for 2002.
State aid and competition law clearance	
Demand Driver	Producers and importer of more than 100 GWh/year of electricity shall certify that 2 % of the electricity is produced from renewable sources. If this goal is not achieved from the utilities, it is possible to buy an amount of green certificates on the market, in order to fulfil their obligations.
Issuing Body	TERNA (ISO)
Coexistence with other renewable energy regulation	No
Technologies excluded	<ul style="list-style-type: none"> • Pumping hydro • (waste)
Non-technology Exclusions	
Banking and Borrowing	<ul style="list-style-type: none"> • A cap is not introduced, but the regulator could regulate the level of the price of certificates by issuing a number of certificates in arrears, i.e. certificates related to an expected production (a kind of future); • Future or forward contracts have not yet been used.
Maximum Price	No
Minimum Price	As the issuing body only can sell the certificates at a fixed price, this will determine the minimum price.
Penalty for non compliance	Access to supply to the grid denied.
Period of Validity	1 year
International Trading	Yes – if accompanied by actual import of green electricity.
Comments	A green certificate price between 5,7 – 7,2 €cent/kWh is expected.

Country	Austria
Legal Status	Electricity law 2000 to be executed by Länder.
Timetable /start date	Oct. 2001
State aid and competition law clearance	
Demand Driver	End user obligation of 8% from small hydro (<10 MW) in 2001
Issuing Body	Elektricitätscontrol GmbH.
Coexistence with other renewable energy regulation	Not decided yet
Technologies excluded	Not decided yet
Non-technology Exclusions	Not decided yet
Banking and Borrowing	Not decided yet
Maximum Price	Not decided yet
Minimum Price	Not decided yet
Penalty for non compliance	Not decided yet
Period of Validity	Not decided yet
International Trading	No
Comments	Decisions not made yet.

Country	Sweden
Legal Status	The concept is under preliminary discussion and investigation.
Timetable /start date	The system is suggested to be implemented by the 1 st of January 2003.
State aid and competition law clearance	Not decided yet
Demand Driver	Obligation to either consumer or distributor.
Issuing Body	According to the official report from April 2000, suggested bodies for regulation and control will be established through new organisations and/or already existing authorities like the Swedish Environmental Protection Agency. Licensing of authority to issue certificates may take place through a bidding procedure.
Coexistence with other renewable energy regulation	The trade with certificates will in the long term replace the current support for renewable and small scale electricity production.
Technologies excluded	To be decided. It is believed though, that large scale hydro will be excluded.
Non-technology Exclusions	Not decided yet
Banking and Borrowing	Not decided yet
Maximum Price	Not decided yet
Minimum Price	Not decided yet
Penalty for non compliance	Not decided yet
Period of Validity	Not decided yet
International Trading	The trading system before 2008 and the implementation of the Kyoto Protocol shall also involve trade with neighboring countries and the EU. The Swedish system is therefore suggested to be worked out in accordance to the European Commission's proposal for a trading system within the union. This system is planned to be implemented in 2005. Sweden should be an initial part of the system and an instigator.
Comments	

4.2 INSTITUTIONAL ARRANGEMENTS AND OPERATIONAL DETAILS

It is apparent from the above description that TGC is in its early phase of development. As a consequence the institutional and operational arrangements are mostly on the planning board and not yet finally decided. In the UK Ofgem will oversee certification and monitoring of TGC. In Denmark, the system operators will play an important role in connection with certification and monitoring of TGC.

Decisions will be made in a number of other countries during the coming years concerning national authorities for accreditation and monitoring of green certificates and TGC. The same applies to the operation of the green market where new organisations may be set up, or existing organisations like the NordPool may take up new business areas.

It is not relevant to elaborate on these subjects in the present report considering the early state of development for TGC.

5 CONCLUSIONS

The country reports illustrate the existence of a considerable spread in the opening of electricity markets among the investigated countries. Some EU Member States are lacking behind the opening stipulated by the EU directive, while other countries already have a 100% opening of their market. It is expected, however, that within the next five years or so most of the countries will have established full market opening.

Most countries have only indicative RES and RES-E targets and only vague (or no) action plan for RES and RES-E.

There is a considerable spread in the systems used for promotion of RES-E. Seven countries are using some kind of feed-in principle, while another seven countries are in the process of introducing different versions of TGC in combination with different types of obligation for the coverage by green electricity. The remaining two countries are relying on tender systems or green pricing. The experience with feed-in models (e.g. in Denmark, Germany and Spain) has documented a high degree of effectiveness in promoting RES-E.

It has been argued that the green certificate model is more market conform than the competing feed-in model which so far has proved to be most efficient in promoting renewable energy sources, especially wind power. The feed-in model guarantees a favorable price on green electricity and obliges the utilities to accept all electricity based on renewable energy sources.

In relation to market principles, the green certificate model with obligatory quota fixes the quantity of green electricity but leaves the price determination to the market. In contrast to this, the feed-in model fixes the price but leaves the quantity of green electricity to the market. Whether one of these two models is more market conform than the other depends on the point of view of the observer. Both models have been accepted by the EU-Court as being acceptable within the framework of EU-law.

The EU Commission has introduced a five years period where different types of promotional schemes, including feed-in principles, are permitted to continue in order to obtain empirical results as a basis for a possible subsequent decision on a harmonized set of rules for the trade of green electricity.

The seven countries that are involved in the development of TGC are following different routes, especially as concerns the combination with quotas for the coverage by green electricity. Some countries aim at obligatory consumer quota (e.g. Denmark), other countries prefer production quota (e.g. the UK), while the Netherlands so far prefer voluntary negotiated quota, albeit with the possibility for the government to switch to obligatory green quota.

There is no consensus so far concerning the definition of "green electricity". Thus, the question whether large hydro and waste (and even nuclear power) should be included is still up for discussion. These and other questions will have to be solved before a large volume of international trade is to be expected.

A number of countries presently relying on feed-in models, tender models or green pricing are considering switching to TGC. However, it should also be noted that France has recently decided to introduce a feed-in model, so that the overall development is uncertain at this time. It should not be overlooked that there are opposition to the switch to TGC in several countries from green movements and RES-E producers due to uncertainties concerning the resulting economy

for producers in a system based on green certificates. The success of TGC will be dependent on the attractiveness of the system for investors in new production of RES-E, i.e. the degree of certainty concerning the profitableness of such investments.

As an example of the importance of present uncertainty concerning the future value of green certificates, in Denmark the private investments in wind turbines has experienced a sudden stop when the feed-in model was replaced by the certificate model by January 2000. For the past 18 months practically no private investments in wind power have been made in Denmark in strong contrast to the previous years. Thus, private investors installed more than 400 MW of wind capacity during year 2000 based on orders made before January 2000.

A special problem in relation to TGC is the handling of new technologies, which are not yet market mature (e.g. PVs, biogas etc.). Such technologies may not be suited for TGC and may have to be promoted by some kind of tender system.

6 ANNEX 1 - DATA TEMPLATE

The data template used for the information gathering is shown in the table below.

Section 1 - General and renewable energy - statistics		
Comments		It should be possible to complete this section quickly, on the basis of published statistics. In all cases please quote the source of statistics or projections of future demand.
Section	Requirements	
<i>Section 1.1 - General energy supply and demand statistics</i>		
1.1.1	Total primary energy consumption	<ul style="list-style-type: none"> Quote the most recently available year, (probably 1998) Historical information - go back to 1990 (use annual statistics if available) Projections - to 2010 (please use as many sources / studies as possible, and comment on the range of projections) Units - PJ/year for absolute consumption, and MJ / capita / year for specific consumption
1.1.2	Of which, total electricity consumption	<ul style="list-style-type: none"> Quote the most recently available year, (probably 1998) Historical information - go back to 1990 (use annual statistics if available) Projections - to 2010 (please use as many sources / studies as possible, and briefly comment on the range of projections) Units - TWh/year for absolute consumption, and MWh / capita / year for specific consumption
1.1.3	Total primary energy production	<ul style="list-style-type: none"> Quote the most recently available year, (probably 1998) Historical information - back to 1990 (use annual statistics if available) Units - PJ/year for absolute production, and MJ / capita / year for specific production
1.1.4	Total electricity production	<ul style="list-style-type: none"> Quote the most recently available year, (probably 1998) Historical information - go back to 1990 (use annual statistics if available) Distinguish fuel sources (if statistics allow, use: coal, oil, natural gas, nuclear, large hydro, renewables) Units - TWh/year for absolute production, and MWh / capita / year for specific production
<i>Section 1.2 - Renewable energy supply and demand statistics</i>		
1.2.1	Total production of renewable energy	<ul style="list-style-type: none"> Quote most recently available year, (probably 1998) Historical information - go back to 1990 (use annual statistics if available) Do not distinguish between energy sources Approximate technical potential (ie theoretical maximum without institutional or market constraints) and market potential (ie realistic potential taking into account market and institutional constraints) for production of renewable energy. Make comments on whether these potentials are likely to change through time. Use and quote as many sources or studies as possible to back up these potentials. Units - PJ/year for absolute, MJ/capita/year for specific

1.2.2	Total production / consumption of renewable electricity	<ul style="list-style-type: none"> • Quote most recently available year, (probably 1998) • Distinguish fuel sources (if statistics allow, use: on-shore wind, off-shore wind, tidal power, wave power, biomass (all forms), solar (to include solar thermal electric generation and PV), geothermal, small hydro (<10MW), large hydro (>10MW), wastes (include all wastes in this category) • Historical information - go back to 1990 (use annual statistics if available) • Approximate technical potential (ie theoretical maximum without institutional or market constraints) and market potential (ie realistic potential taking into account market and institutional constraints) for production of renewable electricity. Make comments on whether these potentials are likely to change through time. Use and quote as many sources or studies as possible to back up these potentials. • Units - TWh/year for consumption / production, also quote installed capacity of renewable electricity generation plant (MWe) if available, and MWh/capita/year for specific production
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Section 2 - Electricity markets - liberalisation and the role of different players

Comments	This section requires some commentary and interpretation. The intention of this section is to present renewable electricity in the context of the current and future electricity market. Of particular importance is the ability of individual (ie, commercial and domestic) consumers to choose supplier, and the existence and success of any voluntary green tariffs. We are looking for brief explanations only, focusing on just the most important points.	
Section	Requirements	
<i>Section 2.1 - Electricity market liberalisation</i>		
2.1.1	Liberalisation general comments	Give general comments on the extent of liberalisation of the electricity market. For example, have any special dispensations been negotiated with the European Commission to delay market opening?
2.1.2	Timetable for market opening	<ul style="list-style-type: none"> • What is the current extent of market opening - which categories of customer are currently able to choose between suppliers? • What is the timetable (if relevant) for the opening of the whole electricity market, down to the level of individual households • For markets that have already opened, what is the extent of customer switching that has already taken place (ie, customers switching from a traditional to a new supplier)? How far is the switching expected to continue?
<i>Section 2.2 - Number of players, their size and market share</i>		
2.2.1	Extent of dis-aggregation (unbundling) of the electricity market	<ul style="list-style-type: none"> • Have vertically-integrated state-owned electricity utilities been broken up into separate generation / transmission / supply / distribution businesses? • For countries that have broken up state-controlled assets, what is the extent of re-integration of separate businesses? (ie, are separate businesses tending to re-form into vertically integrated or horizontally-integrated businesses?) • What is the extent of 'convergence' of companies - ie electricity sector companies merging activity with other businesses, such as gas, telecomms, other retailing etc. • Make other relevant comments on this area.

2.2.2	Number, size and market share of players	<ul style="list-style-type: none"> • What is the current composition (number of actors, size, market share) of the electricity market, in each business area (ie, generation, transmission, supply and distribution) • What trends are seen over the next ten years (to 2010) in the evolution of the market? - ie is there an expectation that mergers and take-overs will dominate the sector, leading to a small number of actors in each sector, or even a small number of actors in the whole industry?
<i>Section 2.3 - Electricity trading arrangements</i>		
2.3.1	Electricity trading	<ul style="list-style-type: none"> • Briefly describe the current and future arrangements for electricity trading. For example, will there be a single pool system, or will there be a bilateral market facilitated by one or more power exchanges? Is the market limited to the country concerned, or is it an international market? • Specifically, comment on the requirement on renewable electricity generators - will they be disadvantaged in any way under the current or proposed trading arrangements? • How is the market for physical electricity expected to evolve through time • Give any further relevant details • Leave any discussion of 'green certificate' systems to section 4
<i>Section 2.4 - Market volumes and values</i>		
2.4.1	Volumes	<ul style="list-style-type: none"> • If the information is available, briefly indicate what volumes of electricity are presently traded under each element of the market (for example, if a pool system, what fraction of trades are 'on-market' and what fraction 'off-market'). • Indicate what volume of electricity is traded in the regulated (ie, un-liberalised) market and the unregulated (ie, liberalised) market • If available, indicate the volume of renewable electricity that is traded across different elements of the market. Distinguish between the regulated and unregulated market. • Units - GWh / year or TWh / year
2.4.2	Values	<ul style="list-style-type: none"> • If the information is available, briefly indicate the value (Euros) of electricity traded. Where possible, distinguish between the unregulated and regulated markets, and distinguish between different trading routes (ie bilateral contracts, pool, etc) • Provide estimates of future prices of bulk electricity, and quote the sources of these estimates • If available, indicate the value of renewable electricity traded in each part of the market (ie regulated and unregulated markets). • Give any further relevant details • Units - millions Euro

<i>Section 2.5 - The green market</i>		
2.5.1	Current	<ul style="list-style-type: none"> Indicate the current ability of electricity consumers of all sizes to choose different offerings, specifically 'green electricity' tariffs, from suppliers Where such offerings exist, what types of generation are included in the tariff, and what are excluded. Are there any national 'standards' or similar means of ensuring quality for consumers? Where such offerings exist, what has been the scale of take-up by consumers? What volume of electricity is sold on green tariffs? (units - GWh / year or similar) How strongly have these offerings been marketed by suppliers? Is the market currently supply-limited or demand-limited? What premiums, if any, are charged by suppliers for 'green' tariffs? (units - euros / MWh or euro cents / kWh) How many suppliers offer such 'green' tariffs? Give any further relevant details, but note that specific government support for green tariffs is covered in section 4 below.
2.5.2	Future	<ul style="list-style-type: none"> Where market opening is not yet complete, indicate the interest that consumers are likely to show in choosing between suppliers, and specifically choosing green tariff offerings. What evidence is there of consumers' interest in renewable electricity? Indicate projections for the growth of the voluntary green market segment (number of consumers, volume of electricity, monetary value of the market), and quote the sources of these projections.

Section 3 - Energy and environment policy - legislation and targets for renewable energy		
Comments	The purpose of this section is to understand the current and planned policy environment for renewable electricity. It will be necessary to provide a commentary to many of the answers, though some (such as information on targets) can be single number answers only. Comments and interpretation should be brief.	
Section	Requirements	
<i>Section 3.1 - Kyoto targets, historic and projected carbon emissions from the electricity sector</i>		
3.1.1	Kyoto target	<ul style="list-style-type: none"> Target for percentage reduction in CO₂ equivalent emissions by the Kyoto compliance period, 2008 - 2012 Comment on the 'achievability' of this target, and whether the country is likely to be a net importer or exporter of carbon credits.
3.1.2	Carbon emissions from the electricity sector	<ul style="list-style-type: none"> Quote most recently available year, (probably 1998) Historical information - back to 1990 (use annual statistics if available) Projections - to 2010 (please use as many sources / studies as possible, and comment on the range of projections) Units - quote both absolute (Tonnes CO₂ / year) and specific (Tonnes CO₂ / TWh) as appropriate
<i>Section 3.2 - Renewable energy policy, targets and timetables</i>		
3.2.1	Renewable energy target	<ul style="list-style-type: none"> If targets are set only for electricity, and not for energy, leave this section blank Target dates and levels for renewable energy (eg, 2003, 2010 etc). Go as

		<p>far in the future as targets have been set (do not stop at a 2010 target)</p> <ul style="list-style-type: none"> • Explain the official (or other) nature of the targets - are they stated in legislation, or merely 'indicative'?, are they fully endorsed by government, or voluntarily adopted by industry? • Specify whether the targets are set for the country, or are broken down by regions • Specify whether the target is for consumption or production of renewable energy, and whether it is absolute (PJ/year) or relative (% of gross inland consumption or similar).
3.2.2	Renewable electricity target	<ul style="list-style-type: none"> • If targets are set only for energy, and not for electricity, leave this section blank. If electricity targets are calculated from a general energy target, explain this calculation. • Target dates and levels for renewable electricity (eg, 2003, 2010 etc). Go as far in the future as targets have been set (do not stop at 2010) • Explain the official (or other) nature of the targets - are they stated in legislation, or merely 'indicative'?, are they fully endorsed by government, or voluntarily adopted by industry, or some other manner of target? • Specify whether target is for consumption, production or generation capacity of renewable electricity, and whether the target is absolute (TWh/year for production, or MW_e for generation), or relative (% of national generation or supply or similar). • State whether the target is flat (ie, includes all renewable electricity sources equally) or whether it is broken down into individual targets for different generation options / sources (ie, on-shore wind, off-shore wind, tidal power, wave power, biomass (all forms), solar (to include solar thermal electric generation and PV), geothermal, small hydro (<10MW), large hydro (>10MW), wastes (include all wastes in this category) • State whether any categories of generation are excluded from the target(s)
3.2.3	Renewable energy and electricity policy	<p>Describe the overall renewable energy and electricity policies, and their state of development, in the context of the country's overall energy balance and electricity generation mix. Reference policy documents where possible. Explain how far the government has been motivated to promote renewable energy / electricity by the Kyoto CO₂ targets. Explain whether the government has any additional justification in setting policy - ie local environmental effects, rural development and employment, industrial development, export promotion etc. Where policy is not yet in place, or is being amended, explain the timetable for this, and whether it is likely that specific targets will be adopted. Briefly mention the policy instruments that have been (will be) adopted, but leave the detail to section 2.3.</p>
<p>Section 3.3 - Specific renewable energy support mechanisms and schemes</p>		
3.3.1	Obligations	<ul style="list-style-type: none"> • Describe any obligations for renewables that are in force or in preparation. Is the obligation to produce or consume renewable energy? Which economic actors are obligated? (ie, electricity suppliers, consumers etc) • Is the obligation system designed to induce competition between market players, or will each market player react to the obligation in isolation? • What penalties are (will be) in force for non-compliance - are they monetary or other penalties? • Which institutions / bodies are responsible for setting / monitoring / enforcing the obligation(s) • For how long is the obligation(s) set? (ie, rolling one year, 20 years etc), and will the obligation increase through time? If so, is this increase planned and

		<p>published, or is the industry unaware of the details of future increases?</p> <ul style="list-style-type: none"> • Distinguish between obligations for renewable energy and renewable electricity, if such distinction exists. • Give any further relevant details
3.3.2	Taxation	<ul style="list-style-type: none"> • Describe all fiscal arrangements that directly or indirectly support renewable energy/ electricity production / consumption • Define who the taxes / tax exemptions apply to (ie, particular categories of electricity consumer, electricity generators) • Define the quantities being taxed (or exempted) - is it energy, electricity, all forms of renewable electricity or just certain technologies etc • Distinguish between direct taxes / exemptions on production / consumption, and indirect taxes / exemptions that give favourable treatment to renewable energy through rateable value, VAT rates, treatment of business taxes etc • Give any further relevant details
3.3.3	Voluntary demand	<ul style="list-style-type: none"> • Explain to what extent the renewable energy policy relies on voluntary demand to reach targets • Describe any voluntary demand stimulation / facilitation measures, or any legal promotion of or obstacles to the voluntary demand market • Explain whether the voluntary market is in conflict with other policy measures
3.3.4	Direct subsidies	<ul style="list-style-type: none"> • Define the nature of any subsidies provided - are they on investment cost for renewable generation plant, feed-in tariffs etc • What is the size of the subsidies available for renewables (quote in Euros or Euro-cents, per kWh or per other quantity), and what restrictions apply to the subsidies - ie are some technologies not included in the schemes • Who is responsible for paying the subsidies - immediately (for example electricity supply or distribution companies), and ultimately (for example central government, or all electricity consumers, or some sub-set of electricity consumers) • Is there any degree of competition in allocating the subsidies (for example the NFFO scheme in the UK had a competitive element because developers had to bid to receive a contract), or are the subsidies available to any and all qualifying schemes (such as the typical 'feed-in tariff') • Give any further relevant details
3.3.5	Other support mechanisms	<ul style="list-style-type: none"> • Define any other support mechanisms or schemes that do not fall into the above categories. Examples would be support for renewable energy commercialisation or research and development. These are worth mentioning only very briefly, but they are not the primary focus of this project.

Section 4 - Tradable Green Certificates developments		
Comments	<p>For countries that have not begun any development of green certificate systems, this section will be largely redundant. However, in this case, the RECerT partner should use this section to indicate whether a Tradable Green Certificate system could be made to work in the context of the electricity sector market structure and the legislative framework for renewable energy. Specifically, comments are required on the existence of any 'voluntary green market', ie electricity consumers motivated by environmental concerns, and the extent to which a certificate trading system could be used to evidence the supply of 'greenness' to such customers.</p> <p>For countries that have begun discussions or development of green certificate systems, this section should be used to record in detail the decisions and progress so far. Where there are uncertainties over future development, please indicate these clearly, and make predictions of future development where possible.</p>	
Section	Requirements	
<i>Section 4.1 - policy and legislative background</i>		
4.1.1	Policy support	<ul style="list-style-type: none"> Does current energy, renewable energy or environment policy support the use of renewable energy certificates, or certificates of origin of renewable electricity generation? Is certificate trading specifically allowed or encouraged (or disallowed) in the context of particular policy mechanisms? Use the categories obligations, taxation, voluntary demand and direct subsidies, as per section 3.3. Link these answers to that section. Provide other relevant information and commentary
4.1.2	Legislative framework	<ul style="list-style-type: none"> Are renewable energy (or electricity) certificate trading systems allowed or required by law? Or are they expected to be? If so, what are the specific provisions for certification, and certificate trading? What definition of renewables is applied (ie, all non-fossil generation excluding nuclear). Put differently, what categories of renewable generation are included in or excluded from the definition of renewables for the purpose of certification? (if appropriate, use the categories: on-shore wind, off-shore wind, tidal power, wave power, biomass (all forms), solar (to include solar thermal electric generation and PV), geothermal, small hydro (<10MW), large hydro (>10MW), wastes (include all wastes in this category)) Provide other relevant information and commentary
<i>Section 4.2 - Timetable for starting a system</i>		
4.2.1	Timetable	<ul style="list-style-type: none"> Where a certificate system is not already in place, or where an existing system is being revised, what is the timetable for the creation of such a system? Explain what stages are planned in terms of system design, testing and implementation.
<i>Section 4.3 - institutional infrastructure</i>		
4.3.1	Regulation and control	<ul style="list-style-type: none"> What bodies, if defined, will be responsible for overall regulation and control of the certificate market and processes? If these bodies are not yet defined, propose what they may be in the future
4.3.2	Certificate	<ul style="list-style-type: none"> Has a certificate issuing authority or executive body or both been defined?

	<p>'issuing' authorities and executive bodies</p>	<ul style="list-style-type: none"> • If so, what is its (their) legal status, what powers does it have, and to whom or to what organisation is it responsible? • What duty of reporting will (they) it have, and what is their degree of independence or otherwise? • What are the limits to the function of these bodies - is there any separation between an overall issuing / regulating authority and an executive body that physically performs the issuing, or are these bodies one and the same? • What will be the precise duties and responsibilities of these bodies - for example will it include generator accreditation, auditing certificate trades, etc, as well as issuing certificates? • What is the geographical responsibility of these bodies - is one issuing body assigned to a region or the whole country? • What is the nature of the relationship between the issuing authority (or overall regulator) and an executive issuing body - eg are issuing bodies regulated, or provided by commercial companies? • Has a protocol for certificate issuing (or equivalent) been defined? • Where no certificate issuing body is appointed or specifically allowed for in legislation, comment on the likely structure and responsibility of such a body in the future. • Where such a body is not already established, what is the timetable for its establishment?
<p>4.3.3</p>	<p>Trade registration / trade registrar</p>	<ul style="list-style-type: none"> • Has a certificate trade registration authority or body been defined? (also called a trade registrar) • If so, what is its legal status, what powers does it have, and to whom or to what organisation is it responsible? • What duty of reporting will it have? • What are the responsibilities of this body, and which other bodies does it interact with in terms of information flow? • Will trade registration body (or bodies) need to be accredited? If so, by whom, and are accreditation criteria or procedures in place? • Where no trade registration body is appointed or specifically allowed for in legislation, comment on the likely structure and responsibility of such a body in the future. • Make other observations as appropriate.
<p>4.3.4</p>	<p>Certificate 'issuing' authorities and executive bodies</p>	<ul style="list-style-type: none"> • Has a certificate issuing authority or executive body or both been defined? • If so, what is its (their) legal status, what powers does it have, and to whom or to what organisation is it responsible? • What duty of reporting will (they) it have? • What are the limits to the function of these bodies - is there any separation between an overall issuing / regulating authority and an executive body that physically performs the issuing, or are these bodies one and the same? • What will be the precise duties and responsibilities of these bodies - for example will it include generator accreditation, auditing certificate trades, etc, as well as issuing certificates? • Where no certificate issuing body is appointed or specifically allowed for in legislation, comment on the likely structure and responsibility of such a body in the future.
<p><i>Section 4.4 - rules and scope of certification</i></p>		

4.4.1	Scope	<ul style="list-style-type: none"> • What renewable energy products does certification cover: electricity, gas, heat? • what types of renewable generation plant are excluded / included - ie defined by the age of plant etc • what arrangements are made for renewable electricity produced under government support schemes - are certificates still issued for these, or are 'special' certificates issued? • are autoproducers (producing own electricity on own premises) eligible to receive certificates? Are these certificates treated in any special way?
4.4.2	Certificate information content	<ul style="list-style-type: none"> • Identify the information content of certificates (either as currently defined or as planned). Do (will) certificates contain: • a unique serial number • an identification of the generator (and in what detail) - ie name of company, identification of site etc • an identification of the renewable energy resource that has been used (eg wind power, hydro power, biomass etc) - and in what detail and in what categories • an identification of specific technology of production (ie wind farm of specific size, size of hydro installation etc) • the period of production and / or the date of issue - ie identifying the period over which production took place, and the allocation of date for the purposes of certificate trading and tax treatment • the location of the production site • the denomination of the certificate (ie, number of kWh or MWh of generation) • the issuing body • an information on related CO₂ benefits or quantities • status of government or other financial support for the production • period of validity of the certificate
<i>Section 4.5 - trading and intervention</i>		
4.5.1	National	<ul style="list-style-type: none"> • Is there a clear procedure for the 'redemption' of the certificate? • Is any 'cap' or maximum price for certificates imposed in the market, and if so by whom? Is the cap linked to penalties for non-compliance with obligations? • Is any 'floor' or minimum price for certificates imposed in the market, and if so by whom, and if so from where is the price supported? • What prices are certificates traded at - give historical information, and projections for future prices where available. Units - euros/MWh or euro cents / kWh • Has a certificate exchange or other single trading environment been created for the certificates? If so, was it defined by government or was it a private sector initiative? If not, is one planned or expected? • Are certificate brokers operating in the market? If so, how many and what proportion of trades are they responsible for? • Have forward contracts, futures contracts, or any other certificate derivatives been offered in the market? If so, was this defined by government or other statutory body, or was it an independent commercial development? • Have generators grouped together in order to take a stronger position in the

		<p>market? If so, give details.</p> <ul style="list-style-type: none"> • Have suppliers or other actors grouped together to take a stronger position in the market? If so, give details. • What evidence is there for the acceptability of certificates as evidence of green production, for green power consumers, if this category of consumer exists in your country. • What is the treatment of tax for certificate trading - ie are certificates exempted from eco-taxes or energy-taxes, and what level of VAT is levied on certificates? • Provide any other relevant information
4.5.2	International	<ul style="list-style-type: none"> • Is international certificate trading allowed, disallowed, encouraged or discouraged? • Under what conditions is (will) international trading be allowed • What reciprocity arrangements are required with other trading countries • Is there any restriction on what types of certificate will be allowed for international trade? • What evidence is there for the acceptability of internationally-sourced green certificates as evidence of green production for green power consumers, if this category of consumer exists in your country. • What is / will be the taxation treatment for internationally-sourced certificates - with respect to eco or energy-tax exemptions, VAT etc. • Give any further comments as appropriate
<i>Section 4.6 - Other information</i>		
4.6.1	Other information	<ul style="list-style-type: none"> • Give any other relevant information, especially on the prospects for national and international trade in tradable green certificates

7 ANNEXES 2 - 16 - COUNTRY INFORMATION

The individual country reports can be found in annexes 2-16 to this report. In some cases the country reports made in the InTraCert project have been used as supplementary information.