E R E F

European Renewable
Energies Federation

Missing targets

How European countries are failing to achieve its renewable electricity targets

Report by EREF

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1. Summary

One year ago, the European Union (EU) committed itself to a significant increase in the use of renewable energy sources for electricity. This report shows that follow-up action by Member States is slow to materialise. Without new and aggressive measures, the EU is certain to fail to achieve its target to consume 22% of its electricity from renewable energy sources by the year 2010.

What emerges from this survey is that new tools such as quota obligations seem to be difficult to implement and still have to be proven. On the contrary, feed-in tariffs have been successful for triggering significant development of renewably generated electricity in most countries where they have been implemented. In addition, failure to address fundamental problems and obstacles including the burden of administrative procedures and delays in obtaining building permits, is jeopardising the achievement of the Directive's objectives.

If EU countries are serious about meeting their national renewable electricity targets, WWF and EREF recommend member states to:

- Adopt feed-in systems when implementing the Renewables Directive.
- Remove rigorously all administrative barriers for new renewable electricity generation.
- Develop planning guidelines at national and regional level for siting of renewable energy projects.
- Implement a guarantee of origin for all electricity sources.

2. Introduction

With the Directive 2001/77/EC of 27 September 2001 on the Promotion of Electricity Produced from Renewable Energy Sources in the Internal Market (published in the OJ 2001 L 283, p. 33 - 27.10.2001) the European Parliament and the Council adopted a legal framework to ensure that the potential of renewable energy sources (RES) is better exploited. The Directive stated that "there is a need to promote renewable energy sources as a priority measure," and cited several reasons, including the security and diversification of energy supply, environmental protection and social and economic cohesion.

The Directive was a follow-up to the 1997 White Paper on renewable sources of energy which set a target of 12% of gross inland energy consumption from renewables for the Community as a whole by 2010, with electricity representing 22.1% of the total. The promotion of renewable represents an essential part of the package of measures needed to comply with the commitments made by the EU under the 1997 Kyoto Protocol on the reduction of greenhouse gas emissions. Companies in the EU are currently among the world leaders in developing new technologies connected with renewable energy sources. The Directive strives to assist an increase of the contribution of these energies while respecting the principles of the internal market.

The Renewables Directive requires Member States "not later than 27 October 2002 and every five years thereafter ," to produce a report "setting national indicative targets for future consumption of electricity produced from renewable energy sources in terms of a percentage of electricity consumption for the next 10 years. The report shall also outline the measures taken or planned, at national level, to achieve these national indicative targets." According to recent information from the European Commission so far only 6 countries – amongst them Ireland, United Kingdom and Sweden - have sent the first report as required subject to Article 3 paragraph 2 of the Renewables Directive.

The Directive also obliges the Member States to publish, not later than 27 October 2003, a report on evaluation by "competent bodies appointed by the Member States" of the existing legislative and regulatory framework and actions taken, among others, to reduce the regulatory and administrative barriers to the increase in RES production, streamlining such procedures and assuring that rules are objective, transparent and non-discriminatory. No later than 31 December 2005, and every five years afterwards, the European Commission will also publish a report on the implementation of the Directive. Also in October 2005, the Commission will present a "well-documented" report on the experience with the support schemes for RES, assessing the success and cost-effectiveness of these mechanisms in meeting the targets.

One year after its adoption, the following report assesses the current status of the implementation of the Directive on Renewable Energies by providing both an overview of the situation in the Member States and also focusing on the developments regarding the different RES technologies. The report has been therefore divided into two parts. The first part evaluates the situation regarding the state of implementation of the Renewables Directive in general. The second part consists of short reports about the situation in the different Member States.

At this point we would like to thank WWF for its input and effort in preparing the first part of the report, which also served as basis for a common press event held end of October 2002 in Brussels.

3. Methodology

This report evaluates the implementation of the European directive on renewables by assessing the likely impacts of policies and measures which received parliamentary approval before September 1, 2002. For several countries, new policies have been introduced since then, which will have an impact on the development of renewably-generated power. The gap analysis does not consider these policies, but their merits or shortcomings are discussed whenever it is relevant.

This report is based on information provided by members to the European Renewable Energy Federation (EREF), input from WWF, backed-up by the analysis recently conducted by ECOFYS research consultancy in the Netherlands. This report is meant not to be merely a survey of the implementation of the Directive, but a guide to "best practices" for the promotion of renewable energies.

4. Where do we stand?

To determine where we currently stand in the implementation process, it is necessary to recall some important cornerstones of the Directive:

- definition of renewable energies
- national targets for renewables
- support mechanisms

This survey has found an extremely mixed picture in the application by Member States of the 2001 EU Directive on the Promotion of Energy from Renewable Sources:

- In **Austria** there has been a complete transposition of Directive into national law. In July 2002 the Parliament adopted a new act (Ökostromgesetz/Green Electricity Act) complying with the targets and definitions of the Renewable Directive. In accordance with the EU Directive, a system of origin has also been established.

- **Sweden** has also adopted a new law setting up a green certification system

- **France**, **Spain** and **Denmark** have resorted to other measures such as announcing a national policy or setting in train an administrative process with these objectives.

- At the other extreme are countries such as **Greece**, **Italy** or **Portugal,** where the first has yet to move to even acknowledge its commitment, and the other two have made scant progress in translating their promise into concrete legislative action.

4.1 Definition of renewable energies

Renewable energy sources should be defined as all the non-fossil sources, including: biogases, biomass, geothermal, hydro-power, landfill gas, sewage treatment plant gas, solar and wind. It is considered as being produced from renewable energy sources if the electricity is obtained by plants using only renewable energy sources, as well as the proportion of electricity produced in hybrid plants that use conventional energy sources. Electricity used for filling storage systems is included; electricity produced as a result of the storage system is excluded.

A key issue for the definition of renewables is the inclusion of municipal solid waste. The European directive on renewable electricity states that only the biodegradable part can be counted as renewable source. Furthermore, recital n. 8 clearly excludes all municipal wastes to be eligible to a future European harmonised support system.

However, up to date the following countries still have definitions which are in contradiction with the European Directive:

- **Italy**: national legislation includes all wastes in the definition of renewable energies. A warring development is the inclusion of a coal-based fuel in the proposal for the implementation of the European Directive.

- **Spain:** Spanish renewable energy plants count municipal solid waste incineration within the renewable energy target.

4.2 National targets

The Annex of the Renewables Directive contains reference values for national indicative targets on electricity produced from RES until 2010. Deadline for the transposition into national law is set for 27 October 2003. The table below shows the existing difference between the EU targets and the targets currently in place at national level. Most of these targets do not have a legal value but are more part of "soft" legislation and are included in policy papers or national energy plans.

Table 1: National targets for renewably generated electricity

	RES-E % in 1997	**RES-E % in 2010**	**National RES-E**	**Status**	**Source**
Austria	70.0	78.1	No target, but quota system and feed-in tariff reflect this.	Political	New green electricity law (August 2002)
Belgium	1.1	6.0	No national target Regional targets: 8 % Wallon Region 5 % Flanders	Political	Regional energy plans
Denmark	8.7	29.0	29%	Political	Policy declaration adopting EU target
Germany	4.5	12.5	12.5%	Legal	EEG target: doubling share RES-E
Greece	8.6	20.1	None		
France	15.0	21.0	21%	Political	ADEME renewable energy plan
Ireland	3.6	13.2			
Italy	16.0	25.0	+2% new RES-E	Political Proposal for +0.3% every year from 2005.	- National renewable energy plan - Proposal for a new electricity decree
Luxembourg	2.1	5.7	RES targets derived from other targets (see note)		1998 national plan for sustainable development
Netherlands	3.5	9.0	17% RES-E in 2010; interim target 9% in 2010	Legal	
Portugal	38.5	39.0	- 39% - technology targets in law	Political and Legal	Cabinet Resolution no. 154/2001 of 19 October 2002
Finland	24.7	31.5	Technology targets adopted	Political	Action Plan for Renewable Energy Sources (December 1999)
Sweden	49.1	60.0	51-52% proposed in new electricity law	Potentially legal	Proposal for new electricity law (not adopted yet)
Spain	19.9	29.4	29,4%	Political	Spanish Electricity and gas Infrastructure Plan 2002-2011
United Kingdom	1.7	10.0	10% RES-E by 2010		
EU	**13.9**	**22.1%**			

Luxembourg has set several targets in its 1998 national plan for sustainable development. This includes:

- Increase share RES from 2.5% in 1997 to 5% in 2010.
- Increase share electricity auto-production (in which RES-E takes a large share) from 10% in 1997 to 45% in 2005.
- Double share of wood in final energy consumption from 0.5% in 1997 to 1% in 2010

4.3 Support mechanisms

Article 4 of the directive refers to support schemes. Member States have adopted different mechanisms to providing support for a guaranteed market for renewable generation, but generally there are three main mechanisms which governments have used:

- *Feed-in systems* (FS) consist of an obligation for energy utilities to purchase renewably generated electricity and to pay a minimum tariff per kWh, varying with the technology used. The amount of renewable generation is determined by the payment but there is no explicit quota. Spain for example requires that a fixed price of 3.1 euro/cents is paid per kWh of wind energy. Under FS, renewable producers have a secure base for planning investment and acceptance problems are reduced because they do not force renewables production to concentrate on the best locations, which are often in areas of high natural or recreational value.

- *Quota system* (QS), generators receive a certificate for each unit of renewably produced power. A quota is set, whereby utilities are obliged to supply a minimum share of electricity from renewables. To meet this obligation, utilities have to hand over the corresponding amount of certificates. UK for instance has introduced a QS, with an obligation of 10% by 2010. As the price of a certificate can fluctuate considerably - as equities - QSs introduce high levels of insecurity into the new green electricity market. This system may also put small renewable generators at a disadvantage.

- *A tendering system* (TS) requires the government to periodically award contracts for a set quota of renewable generation to those renewable producers who bid at the lowest price. The UK, for example, has issued four calls for proposals. This system has several problems including: high bidding costs, relative to the size of the contracts, high administrative costs, a large number of projects that are not implemented, and many problems of local acceptance due to the high concentration of wind developments.

The table below provides an overview of the mechanisms implemented by the different countries, and for different technologies. Since the approval of the directive, key developments include:

- **Austria:** the new green electricity act implements a feed-in system for renewable energy sources which is also applicable to small hydro (up to 10 MW).
- **Denmark**: the new government has introduced deep reductions in funding for renewable energies, while the proposal for a quota system has been put on hold because of administrative difficulties to implement it.
- **Italy**: three years after its adoption, the quota system is still not yet functioning. Different and contrasting price estimates for green certificates by the grid operator result in high uncertainty for investments in renewable energy.
- **Netherlands**: A new feed-in system should be introduced as from 1 April 2003, bringing secure income to investors for at least ten years (however due to the resignation of the new cabinet, the actual date of introduction is currently uncertain).
- **Sweden**: the government decided to introduce a green certificate system from 1 May 2003. The implications of this new system for renewable energy uptake are unpredictable.

Table 2: Overview of national support systems, by technology

	Generic	Wind	Hydro	Biomass	PV	Geothermal	Solar Thermal
Austria	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff
Belgium	Feed in tariff Quota system		Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff
Denmark	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff
Finland	Tax incentives	Tax incentives	Tax incentives	Tax incentives	Tax incentives	Tax incentives	Tax incentives
France	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff Investment support	Feed-in tariff	Feed-in tariff
Germany	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff
Greece	Feed-in tariff Investment support	Feed-in tariff Investment support	Feed-in tariff Investment support	Feed-in tariff Investment support	Feed-in tariff Investment support	Feed-in tariff Investment support	Feed-in tariff Investment support
Ireland	Investment support Tax incentives	Tax incentives Bidding Scheme	Tax incentives Bidding Scheme	Tax incentives Bidding Scheme	Tax incentives	DNA	Tax incentives
Italy	Quota system	Quota system	Quota system	Quota system	Quota system	Quota system	Quota system
Luxembourg							
Netherlands*	Tax incentives Feed-in tariff	Tax incentives Feed-in tariff	Investment support Feed-in tariff	Tax incentives Feed-in tariff	Tax incentives Feed-in tariff	Investment support Feed-in tariff	Tax incentives Feed-in tariff
Portugal	Investment support Feed-in tariff	Investment support Feed-in tariff	Investment support Feed-in tariff	Investment support Feed-in tariff	Investment support Feed-in tariff	DNA	Investment support Feed-in tariff
Spain	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff
Sweden**	Quota system	Quota system	Quota system	Quota system	Quota system	Quota system	Quota system
United Kingdom	Quota system Climate Change Levy (CCL)	Quota system	None	Quota system Investment support	Quota system Investment support	DNA	Quota system
EU							

* Feed-in tariff expected as from 1st April 2003.

** Quota system (purchase obligation) as from 1st May 2003.

5. What is the expected gap?

A review of the current status in the Member States leads to the indisputable conclusion that the European Union will fail to achieve the targets set in the Renewables Directive, without new measures. The development forecast for the different technologies shows very clearly that there is and will continue to be a gap in each Member State between the current situation and the targets for 2010 as set in the Directive and the previous White Paper on renewable energy sources.

Most supporting measures, even those which have being judged most effective to increase renewable energy production, appear as insufficient. In addition, failure to address fundamental problems and obstacles including the burden of administrative procedures and delays in obtaining building permits, could further jeopardise the achievement of the Directive's objectives. Such continuing handicaps could weigh heavily on the results by the end of the decade.

As shown in the table 3, a substantial shortfall of approximately 5% in reaching the 22% objective of the Directive by 2010 would not only translate into a large amount of additional greenhouse gases released, but would also be a tremendously significant failure in the leadership of the European Union on climate protection. In addition, it would also represent a crucial industrial and business failure in fully develop the potential of a technology and market in which EU producers have an unquestioned lead.

Table 3: Scenarios for the uptake of renewably generated electricity

	1999	**2001**		
		EU targets	**Current scenario**	**Active scenario**
	%	%	%	%
AT	72%	78%	63%	63.00%
BE	1%	6%	1%	3.00%
DE	6%	13%	11%	12.00%
DK	13%	29%	23%	32.00%
ES	19%	29%	22%	28.00%
FI	26%	32%	31%	31.00%
FR	15%	21%	13%	16.00%
GR	10%	20%	12%	15.00%
IE	5%	13%	11%	15.00%
IT	17%	25%	17%	18.00%
LU	3%	6%	5%	5.00%
NL	2%	9%	6%	8.50%
PT	36%	39%	27%	38.00%
SE	50%	60%	52%	57.00%
UK	2%	10%	4%	4.00%
EU	**14%**	**22%**	**15%**	**17.00%**

Sources: EREF calculations based on Ecofys 2002.
Active Policy: results implementing the current policies.
Continued Policy: results assuming that policies will be continued.

The largest gap in absolute terms occurs in **France**, where the resulting RES-E production is expected to be in the range of 76-94 Tera Watt hours (TWh), with a gap of between 27 and 29 TWh compared to the EU target. Renewable electricity development in France has been very slow in the last years, but some promising new policy developments are taking place. Large amounts of wind energy are in an advanced stage of planning, confirming the effectiveness of the new feed-in legislation. Enhanced growth in biomass electricity could occur if the existing feed-in tariff is extended to bio-electricity based on anaerobic digestion, as announced by the French policy makers. Clearly, all possible actions are required to bring France closer to meeting its RES-E target.

The second largest gap is likely to occur in the **United Kingdom (UK)**. In this country it is still largely questionable whether the resulting increase in renewably generated production will reach 10% of electricity consumption. The national target is based on a far lower estimate on energy demand growth than included in the EU energy outlook (483 TWh). The British government policy is based on the assumption of keeping a modest national electricity consumption growth.

Italy is another country that is likely to lag far behind the EU target, without aggressive investment incentives**.** In 2001, the country made a shift away from a feed-in system which had guaranteed a relative increase in renewable energy production, in favour of a quota-based system. However, given the generosity of Italy's definition of renewable energy (which could include coal-based emulsion), the very low target for renewable generation in the new plan (2% of the total energy produced), the lack of certainty on the exact targets the industry will be subject to after 2002 (a proposal for a yearly increase of 0.025% still waiting for parliamentary approval) and the lack of monetary sanctions for non compliance, the prospects of any uptake of renewable energy, let alone the achievement of the Renewables Directive target, are very slim.

On the contrary, **Germany** shows the way to guarantee a favourable investment environment for the uptake of renewable electricity. With an estimated production of 67 to 73 TWh in 2010, Germany will be only three to nine TWh behind its renewable electricity targets, which means that the country will have produced 11 to 12 % of the expected 13% of renewable electricity. In the last year, Germany also raised its available budget to support solar energy, abstaining from the earlier maximum capacity of 350 MWp.

The **Spanish** support scheme is to be considered as a good example of how to combine market forces and incentives for *clean* energies without complex mechanisms or bureaucracy. Moreover, this framework is able to deliver quite good results at an affordable cost: RES-E generators within the *Special Regime* received last year premiums under this scheme that totalled Mio 335 EUR, which represents only 2.4% of the total electricity supply revenues. However, under current policies, the 2010-2011 goals are achievable for wind but not for other RES technologies (4000 MW installed since 1990), such as biomass whose premiums are too low. Additional measures would be required to control fast growing electricity demand – 50% rise in last decade and 30% more expected by 2011.

6. What does and what does not work?

The EU Member States have begun the process – according to their own perception of the need and their own political traditions - to apply support mechanisms to promote the consumption of renewable energy electricity as visualised in Article 4 of the Directive. According to the Directive, they should contribute to the achievement of the indicative targets, be compatible with the principles of the EU internal electricity market, take into account the different RES, technological and geographic characteristics, be simple and cost-effective and should be sufficiently long to establish investor confidence. Some of these as well as their impact and effectiveness are discussed below.

In addition, the European Commission has committed itself to evaluating whether such mechanisms are in compliance with the EU competition rules against trade restrictions. By October 2005, the Commission should present a well-documented report on the success and cost-effectiveness of these measures and recommend a Community framework for such measures if necessary.

6.1 Support mechanisms

Feed-in systems

In evaluating the positive and negative aspects of the current system, the development and the experiences of the past establish that a support system based on feed-in tariffs is the most favourable solution to increase the potential of RES. The major advantage of feed-in tariffs is that they are flexible, fast and easy to establish. These advantages are key, especially given the need to step-up the efforts to reach the EU targets by 2010. Feed-in tariffs have been successful in all countries where they have been introduced to guarantee a fair payment. That has been proven especially by Germany, Denmark and Spain.

However, where the premium has been set too low, the feed-in system has not been successful to promote the development of a specific energy technology:

- In **Spain**, this is the case of bioelectricity, where the level of the premium is not sufficient to incentive private investments in this market.
- In **Denmark**, the compensation in form of guaranteed feed-in tariffs is almost insufficient to attract new investments. Only for biogas until 1. January 2003 and for wind power until 1. January 2002 the tariffs are or have been attractive.
- In **France**, the extension of the feed-in tariff to bioelectricity based on anaerobic digestion is needed to enhance growth in biomass electricity.

Quota systems

The ability of quota system to provide similar positive aspects is not yet proven. Initial evidence suggests that quota systems have the following setbacks:

- **Administrative implementation**: for instance in Austria a certificate system was established for small hydro power plants until it was replaced by a feed-in system recently because of practical problems.

- **Uncertainty about actual investment**. In the case of the Austrian small hydropower quota system, low penalties for non-compliance with the quota led to low electricity prices resulting in

unprofitable renewable energies projects. In Sweden, the penalty maximum is estimated at 2,2 eurocent/kWh. This will lead a low maximum prize level for green certificates.

- **Volatile revenues**. Example of Italy, where the official estimate of price of green certificates has changed 4 times in the last 12 months.

Bidding systems

- In **Ireland**, the Alternative Energy Requirement Programme (AER) regularly organises bidding procedure for installation of new electricity generation capacity. One of the main flaws of the AER was that approved projects failed to gain planning permission, thus did not go ahead. The AER so far has only been directed to near-commercial applications. Higher-cost options such as solar, wave and tidal energy are not directly stimulated.

A positive development of renewable energy technologies requires more than a well-balanced investment support mechanism and depends on still other circumstances. A realistic economical evaluation of each RES technology is required to estimate and set a correct tariff. Because of the specific situation for each technology, it is impossible to create a general RES cost calculation scheme.

6.2 Administrative procedures

Another crucial issue, which seems to be a problem in each Member State at present, is the administrative procedure required for renewable energy projects approval. Streamlining or relaxation of project planning and permission procedures is urgently required because few Member States practice fast-track planning. Without considerable changes in this sector, any rapid increase of renewable projects and of new capacities will be hindered. Key examples include:

- In **Italy** there is no fast-track procedure for renewable energy projects. On the contrary, the permitting procedures for new power plants are slow and bureaucratic. This is particularly penalising the renewable energy operators which do not have the financial capacity to cope with the delays necessary to obtain permits. The situation has got worse with the adoption of the governmental decree so-called *Decreto sblocca centrali*, which has implemented fast-track permit procedures for all power facilities over 300 MW, excluding de facto all renewable energy technologies. Furthermore, the transfer of planning powers to regional and local authorities, given the limited capacity of the letters, has made the permitting process for clean renewable energies even more complex.

In some countries, the realisation of RES projects depends on several different permits and approvals (electricity-generation license, installation license, operation license, pre-siting permit, approval of environmental terms and conditions, approval of intervention on public land) which constitute a difficult obstacle in the effective achievement of commercial-scale RES investments. Since responsibility for granting the respective permissions is also divided amongst local, regional and federal authorities, fast-track planning remains impossible. Key examples include:

- **Austria**: Several authorities are in charge of the procedure, mainly the *Landesregierung* (regional government). There are different permissions that have to be obtained (electricity act, protection of landscape, regional development plan, security of aviation). Only for projects of a certain size (more than 20 MW) is there a concentration of these planning procedures at the *Landesregierung*, a so-called *Umweltverträglichkeitsprüfungsverfahren*.

- **Belgium**: New wind energy has encountered obstacles from the National Defence Ministry, resulting in more than 700 MW of wind capacity put on hold. The Ministry claims that wind turbines could disrupt radar operations.

- A positive example is given by the **Netherlands**. In July 2001 a new government agreement - called "Blow" - was signed jointly by the Ministry of Economic Affairs and others (Environment, Agriculture, Defence and Transport) to promote renewable projects. Accordingly, municipalities and provinces should have assigned locations for new wind parks before the end of 2005. In this, the provinces have the right to by-pass municipalities in proof of default.

6.3 Grid connections

Problems and difficulties regarding the grid infrastructure (such as grid connection costs, grid reinforcement costs, grid access guarantee by the operator, transparency of transmission fees, etc.) must be resolved. As long as investors are not able to estimate project costs and prospect because of uncertainties and risks, they will regularly abstain or at least hesitate on new investment.

- **Austria**: Regarding the grid access situation, Austria has not taken the necessary measures to ensure that grid system operators guarantee the transmission and distribution of RES-E. No priority access to the grid has been given to RES-E either.

- In **Belgium**, obstacles include exaggerated costs for grid connection, pretended grid problems and calls for participation in the grid enforcement.

- In **France**, renewable penetration is limited by the grid (EDF-ARD) to 40 % of the nominal power of each cell of transformer connection device, without any legal basis (technical recommendation). Grid operators do not provide any new RES-E producer wishing to be connected with a comprehensive and detailed estimate of the costs associated with the grid connection. Renewable electricity producers are not allowed to issue a call for tender for the connection work.

- In **Greece**, RES-E has, by Law 2773/99, priority access to (and guaranteed use of) the grid, but this is purely theoretical. For example, in the country's windy areas (Thrace, Euboea, Cyclades Islands, Lakonia), complete saturation of the grid precludes, currently and for the next 5-6 years, the connection of any new RES installation to the grid.

On the contrary, **Denmark** leads by example. Planning procedures are fairly rapid for biogas installations and for wind power project in designated areas. Denmark has taken the necessary measures to ensure that grid system operators guarantee the transmission and distribution of RES-E and RES-E has been granted priority access to the grid. Denmark has put into place a legal framework setting up objective, transparent and non-discriminatory rules relating to the bearing of costs of technical adaptations required to integrate new RES-E producers into the grid.

7. Which technologies are doing well and which not?

Judging which technologies are successful and which are not requires taking into consideration the fact that industrial and technological sectors as well as conditions are far from identical in the different countries of the European Union. Each country has its own policies and potential. For example, Denmark, Germany and Spain have developed first-rate wind power industries. Italy is leader in geothermal energy. France has a top European position in installed small hydro power capacity and the best production figures of biogas energy have been attained in United Kingdom and Germany. The latter is far ahead of its partners in installed capacity in wind power, photovoltaic energy and thermal solar energy. Under the current circumstances, policies and support measures for some of the technologies could result in considerable growth. But as show in the table below, it is doubtful if this positive development will be sufficient to reach the target of the Directive and the White Paper on RES.

Table 4: White Paper targets for renewable technologies vs. current situation

		1999	Scenario 2010		
	Unit	Imple mented	Active Policy	Continued Policy	White Paper
Wind	GWe	9	37	54	40
Hydro-large (>10 MWe)	GWe	85	85	87	91
Hydro-small (<10 MWe)	GWe	9	11	12	14
Photovoltaic	GWp	0,1	0,5	0,7	3,0
Biomass (fuel input)	Mtoe	55	86	118	135
Geothermal: electricity	GWe	0,6	0,6	0,9	1,0
Geothermal: heat	GWth	1,2	1,8	1,9	5,0
Active solar thermal	million. m^2	9	18	28	100
Total electricity production	TWhe	364	466	539	675
Total primary energy*	Mtoe	85	122	159	182
Share renewable energy	%	6%	8%	10%	12%
* Eurostat convention					

Source: Ecofys 2002
Active Policy: results implementing the current policies.
Continued Policy: results assuming that policies will be continued.

Bioelectricity

Biomass is expected to play a key role among renewable energy sources. The White Paper projects a growth in the electricity production from biomass sources to 230 TWh by 2010, which means a tenfold increase compared to 1998. With the current growth of 10% per year, this target will not be achieved. Generally speaking, compared to other more mature technologies such as wind power, it needs higher financial support for it to take off and compete with other power sources. In addition, the amount of renewable energy generated by means of biomass is not only dependent on the development in the field of renewable energy, but also on policies in others areas like agriculture and forestry.

To secure the raw material supply for bioelectricity production and promote energy crops production, specific agriculture and forestry policies are therefore needed. Experience in the UK and Sweden shows that production of short-rotation coppice have faced difficulties because of a range of barriers,

including the lack of price support for farmers wanting to plant energy crops instead of traditional food crops. These barriers can be overcome by integrating into agriculture policies specific measures to support energy crops. The recent proposal for a specific payment for energy crops within the reform of the Common Agriculture Policy goes into the right direction and should be approved.

Wind energy

Renewable energy from wind power should be considered as the leader among renewables technologies in terms of reaching the expected contribution under the Renewables Directive. Since installed capacity in Europe increased about 35% from 2000 to 2001 under the existing circumstances, the expected contribution of wind power should be achieved even earlier – by about 2006-2008. This is mainly related to the technological progress achieved through strong policy support that have guaranteed an extremely positive background for investment.

Solar PV

Remarkable increase is also predictable for installed capacity of photovoltaic technology. Comparing figures from 1999 to those from 2000, a progression of about 43% has been achieved. The problem of evaluating the current scenario in terms of the White Paper / Directive targets is that the market in the recent years was centred very much on a single country, namely Germany, providing about 60% of the installed capacity. This enormous share is due to the German renewable electricity act providing 0,5 EUR per kWh for the first 350 MW installed. Nevertheless, the current growth rate will fail to reach the envisaged target. Current calculations anticipate only between 1700 -1800 MW installed capacity by 2010, about 30 – 35 % below the 3000 MW targeted.

Hydropower

Figures for hydropower are even less optimistic. For large hydropower, it is estimated that capacity limit has almost been reached. For small hydro the average annual growth rate from 1995-2000 of about 1,5% falls short of the target of 14000 MW installed capacity in 2010.

Geothermal

Little growth is forecast for geothermal energy sources. The European Union recorded a progression of about 6, 5 % in electrical geothermal production in the five years from 1995 to 2000. The main contributors to this increase were Italy, Portugal and France, because they have extensive geothermal resources.

8. Recommendations

This report aims to provide policy makers with an initial assessment of "best-practices" and of the problems experienced across the European Union in the promotion of renewably generated electricity. If EU countries are serious about meeting their national renewable electricity targets, they should:

Adopt national feed-in systems when implementing the Renewables Directive.

Given the expected gap in achieving the community target of 22% of electricity from renewables energy sources by 2010, the top policy priority should be to set a favourable environment for renewable energy investments. While new tools as quota obligations seem to be difficult to implement and still have to be proven, feed-in tariffs have been successful for triggering significant development of renewably generated electricity in most countries where they have been implemented. When carefully developed, the major advantage of a feed-in system over other support mechanisms include: a) they are relatively fast to establish; b) they are easy to implement and can be revised for new capacities according technological developments; c) they have lower administrative costs than other policies, such as quota systems.

Remove rigorously all administrative barriers for new renewable electricity generation.

Given the importance of renewable energies, these power technologies should be prioritised in the implementation of national energy plans and programmes. Streamlining or relaxation of project planning and permission procedures is urgently required because few Member States practice fast track planning. Renewables should also be given priority by the transmission system operator in the case of centralised dispatch. Without considerable changes in the administrative procedures, any rapid increase of renewable projects and of new capacities will be hindered.

Develop planning guidelines for siting of renewable energy projects.

Local acceptance and support is key for the future massive uptake of renewable energies. Member states should urgently develop national and regional planning guidelines to assist permitting authorities to ensure both the optimal siting of renewables projects and best management of the potential local impacts. For new technologies such as off-shore wind, future development should not be delayed until all potential problems have been identified and solved. The careful and sensitive development of offshore wind projects should be based on best-practice tools such as Environmental Impact Assessment, with the aim of enhancing the knowledge necessary to develop strategies for the large scale deployment of offshore wind that will be necessary to combat climate change. Furthermore, future developments require focused promotion campaigns to enhance public awareness of the environmental, economic and social benefits of renewable energy investments.

Implement guarantee of origin for all electricity sources.

The Renewable Directive requires countries to implement proof origin systems to track renewable energy sources. Given the current process of energy liberalisation, however, such a requirement should be applied to all sources of energy. A disclosure system, indicating the sources used to generate electricity and the associated environmental impact, would enable consumers to make informed choices about the electricity tariff they wish to choose. This would contribute to level the playing field between conventional and renewable sources, influence the mix of energy sources used to generate electricity, and provide an incentive for electricity suppliers to offer renewable energy options. Member States should adopt the power disclosure requirement contained in the proposed Liberalisation Energy Directive, as amended by the European Parliament.

Country Reports

Austria

1. National renewable energy targets

In July 2002 the Austrian Parliament adopted new legislation to comply with the RES-E directive, the *Ökostromgesetz/Green Electricity Act* (Official Journal BGBl I 2002/244). There is an explicit mention of the RES-E directive. This act implements a feed-in system for RES. There is a purchase-obligation for electricity from RES. What is new in contrast to the former Electricity Act ElWOG (Official Journal BGBl I 2000/121) is that the feed-in system is also applicable to small hydro (up to 10 MW). Up to then (in the Electricity Act ElWOG) there was a system of green certificates for small hydropower plants. This system had never functioned because the green certificate model was, first of all, very complicated itself and therefore had not proven practical in any European country. In addition, the federal preconditions were a complicating factor. This is why this system was abolished and the Green Electricity Act also introduced feed-in tariffs for small hydro.

The feed-in tariffs are laid down by the Minister of Economy, the Minister of Environment, and the Minister of Consumer Protection together with representatives of the provincial governments. The tariffs are expected to take production costs into account. They are guaranteed for at least 10 years.

In addition to the purchase-obligation, the Green Electricity Act fixes minimum percentage targets for RES-electricity for the year 2008: 4% of "new" green electricity (without small hydro) and 9% electricity from small hydro. These targets reflect the 78.1% target of the RES-E directive for Austria, as also mentioned in the Act. The Act also requires adoption, publication and notification to the European Commission of all the reports required by the RES-E directive.

Whether the targets will be reached is mainly a question of the feed-in tariffs that – hopefully – were to be laid down by the end of 2002. Another important point for fulfilment of the targets is access to the grid (see point 9).

2. Investment support schemes

It is not predictable whether the tariffs will be sufficient. The Minister of Economy and the energy regulation office, E-Control, aspire to very low tariffs, whereas the Minister of Environment and representatives of the regions lean toward appropriate tariffs.

As already mentioned, the certificate system for small hydro was abolished. As of 1st of January 2003 there is a purchase obligation also for small hydro (up to 10 MW).

Electricity utilities have special green-electricity products at a higher price compared to their usual portfolio. There are also two green-electricity suppliers. But there is not enough demand at such premiums prices, with about 2.000 customers who voluntarily buy green-electricity, according to a monitoring mechanism concerning voluntary green electricity in place.

3. Guarantees of origin

A system of guarantees of origin was established by the Green Electricity Act. Grid operators are obliged to give an electronic guarantee of origin to the RES-producer. The Landeshauptmann, the head of every region, is in charge of this system of guarantee/disclosure of origin, which does not apply to other energy sources.

Since October 2001, utilities have had to disclose the production sources of the electricity they sell on energy bills. They are asked to inform on the percentage of the different production sources (atomic energy, oil, coal, gas, biomass, wind, photovoltaics etc). The disclosure of the overall portfolio is also an innovation of the Green Electricity Act. The previous electricity Act ElWOG was less specific, enabling concealment from consumers, for example of atomic energy by selling it to the industry. Utilities must now document the calculations and information concerning the disclosure. This documentation must be verified by a chartered accountant. The energy regulation office *Energie Control GmbH* supervises the issuing of guarantees of origin.

4. Administrative procedures and grid access

In Austria, a fast-track planning procedure for renewable electricity producers does not exist. Several authorities are in charge of the procedure, mainly the *Landesregierung* (regional government). Different permissions must to be obtained (electricity act, protection of landscape, regional development plan, security of aviation). Only for projects of more than 20 MW is there a concentration of these planning procedures at the *Landesregierung* level, a so-called *Umweltverträglichkeitsprüfungsverfahren*. The existing legislative and regulatory framework has not been evaluated so far in relation to authorisation procedures.

Regarding grid access, Austria has not taken the necessary measures to ensure that grid system operators guarantee the transmission and distribution of RES-E. No priority access to the grid has been given to RES-E either.

RES producers have to bear the costs of all technical adaptations, such as grid connections and grid reinforcements. If the grid operator claims the grid is not strong enough, it is impossible connect to it. There are no clear and transparent rules for the procedure of grid connection, which is a serious problem for windpower operators. Most grids are not strong enough for the capacity of the planned wind turbines. It is crucial yet uncertain whether a higher feed-in tariff would these additional costs into account.

It takes some months to get answers whether connection to the grid is possible and cost details. Sometimes the grid operator promises to offer a grid-connection-concept (if there is a large number of projects in an area) but he does so only with a delay of up to a year. RES-E producers are allowed to issue a call for tender for the connection work.

So far no legal framework has been put in force setting up objective, transparent and non-discriminatory criteria relating to the sharing of costs of systems installations –such as grid connections and reinforcements– between all producers benefiting. Austria has alternatively not required grid system operators to set up and publish standard rules regarding such a sharing of costs either.

In respect to the transmission and distribution of RES-E, the country has not ensured that the charging of transmission and distribution fees does not discriminate against RES-E, in particular RES-E produced in peripheral island or low population density regions.

No legal framework has been put into force to ensure fees for transmission and distribution of RES electricity reflect realisable cost benefits resulting from the plant's connection to the network. Austria does not require grid system operators to ensure such a requirement either.

Finally no report with all the measures taken to facilitate access to the grid system of electricity produced from renewable energy sources has yet been published (Legal deadline: 27th October 2003).

5. Local acceptance

RES have a long tradition in Austria. Apart from small hydro and biomass-power plants, figures of installed capacity per capita of solar heating show Austria is second in the world. Private investors are especially engaged in the RES-business. In the wind sector, these are mainly small companies consisting of local residents, which explains why local acceptance has been very high up to now. There are two stock corporations. An example is the firm WEB Windenergie AG, which develops wind projects together with a broad share ownership among people interested in the "wind business". Anyone can buy shares, with a minimum investment of 1.000 Euro.

Some grid operators have recently founded subsidiary companies, which have become highly involved in the wind business. Unfortunately, they seek to realise their projects very quickly without concern for local acceptance. Therefore local acceptance has become a growing problem, also because of opposition from hunters and bird protection organisations.

In May 2001, the opinion pollster ISMA published a poll on behalf of Greenpeace Austria concerning the nuclear energy policy of the Austrian government. One result indicated that 76% did not want a limitation of the support of RES at the level of 4% (this was the target of the electricity act ELWOG and there were discussions, whether this target should be the limitation of the purchase obligation for RES), 14% wanted to have a guarantee that costs for customers should be limited to a certain amount (about 7 Euros per year), and only 6% did not want to pay anything for the support of RES.

Regarding project citing, in two regions, Lower Austria and Burgenland (the regions with the best conditions for wind power) the authorities (Landesregierung Niederösterreich, Landesregierung Burgenland) are about to issue maps with zones of priority for wind power.

No national promotion campaign for renewable energies exist, but there was a large campaign against nuclear power by the Austrian Freedom Party that was immensely supported by the newspaper Die Krone, with the highest circulation in Austria (2,9 millions).

Belgium

1. National renewable energy targets

Belgium depends for 60 % on nuclear power but has decided in principle to phase out this source of electricity supply. The current Government wants to end subsidies to nuclear power and boost development of renewable energy such as wind.

But, according to a study by the INSTITUT WALLON DE DÉVELOPPEMENT ÉCONOMIQUE ET SOCIAL ET D'AMÉNAGEMENT DU TERRITOIRE ASBL, the share of renewable energy in the energy balance of Belgium is still very small. Its contribution to the final energy consumption in Belgium was about 1% in 1997, one of the smallest in Europe. Since then there has not been a significant growth in terms of renewable energy production.

In this federal country, renewable energy has become a responsbility of the regions. Federal authorities are still responsible for energy supply policies, for the regulation of energy production and energy pricing and taxation.

There is no other confirmed information at the moment as whether there would be a different national target than the indicative target in the RES Directive. According to this, Belgium has a target of 6 % until 2010. The Walloon Region has an official target of 8%, and the Flemish region has the target of 5 % by 2010.

Depending the increase of general electricity consumption in Belgium two scenarios come to the conclusion that between 1,3 % and 2,7 % will be achieved in Belgium realistically by 2010, unless drastic measures are taken to improve access and production for all RES sources. (source: Apere asbl).

The details are as follows:

Source	Installed capacity 1999 (MW)	Production level 1999 (GWh)	Exepceted production level 2010 (GWh)
Large Hydro (>10mW)	42,9	145	1340
Small Hydro (<10mW)	59,6	197	200
Wind offshore	-	-	1500
w. onshore	9,3	13,3	376
Solar	58 kWp	?	?
Biomass	?	440	529
TOTAL	?	795	2739

Source: APERE info

2. Investment support schemes

RES is a regional responsibility, but a new national electricity law grants authority for minimum price definition for RES-based electricity to the federal level. Funds for RES electricity production will be collected from the electricity sector (users may be included) in form of a levy. Existing RES subsidies will be revised/terminated on implementing the new electricity law. But many implementation-related aspects are still unknown. The implementation process is still under way. Not all respective decrees for the application in the respective regions have been published. Initiatives to develop RES in Belgium include: tax incentives, subsidies for RES investments in the private and public sector, support to RTD projects, legislative and regulative measures, information campaigns, direct subsidy to electricity producers, etc.

Regional governments are or have just passed legislation for the liberalisation of electricity transport and distribution, including regulations to facilitate access of green electricity to the grid, as well as support mechanisms for green electricity, notably a green certificates system.

These certificate markets will begin in the near future. Belgium will have four different regulatory systems for this green certificate market with purchase obligations, one on national and three on regional levels.

In Flanders for example, green certificates will be used as documentation and aim to fulfil the renewable energy targets in Flanders of 1.4% in 2002, 3% in 2004 and 5% in 2010. Each electricity supplier must comply. Without green certificates are required for a company to sell green electricity to end users.

3. Guarantees of origin

This is only foreseen within the green certificate scheme and only for RES sources.

4. Administrative procedures and grid access

Belgium has just opened its formerly monopolistic market. There is still no real competition and a strong dominance of the former sole utility. There are different opinions how to interpret the legal conditions. Some see a guaranteed access to the grid ensured by the legislation while others foresee further obstacles. The reality is full of obstacles such as exaggerated costs for grid connection, pretended grid problems and calls for participation in the grid enforcement.

In planning many obstacles occur from public institutions, including the military.

5. Local acceptance

Because there is little RES production installed, one cannot generalise. There seems to be hesitance growing against wind power, but on the other hand, once installations are successfully established, the acceptance increases.

Solar energy has become gradually more popular especially in urban areas.

Denmark

1. National renewable energy targets

The national renewable energy target has been adopted in the form of a political declaration. It is in accordance with the European Directive targets to increase the share of RES-E consumption to 29%.

2. Investment support schemes

According to the Electricity Supply Act, producers of RES-based electricity have a guaranteed right to the sale of their production. RE electricity is defined as produced from wind energy, biogas, biomass, solar energy and wave energy and at hydropower plants under 10 MW.

The compensation in form of guaranteed feed-in tariffs is almost insufficient to attract new investments. Only for biogas until 1. January 2003 and for wind power until 1 January 2002 the tariffs are or have been attractive.

Supporting measures have been implemented to promote the use of RES and to increase energy efficiency. Wind power is included as an element of land use planning. Building law prescribes relatively high isolation standards.

Different options are being investigated regarding additional voluntary green electricity schemes,. Currently there are virtually no such additional schemes.

3. Guarantees of origin

The problem of guarantee of origin has not been considered to date.

4. Administrative procedures and grid access

Except for biogas installations and in designated wind power areas, where planning procedure is fairly rapid, there is no a fast-track planning procedure for renewable electricity producers.

Denmark has taken the necessary measures to ensure that grid system operators guarantee the transmission and distribution of RES-E and RES-E has been granted priority access to the grid.

Denmark has put into place a legal framework setting up objective, transparent and non-discriminatory rules relating to the bearing of costs of technical adaptations required to integrate new RES-E producers into the grid.

5. Local acceptance

An investigation by the Danish Folkecenter in 1996 in Denmark indicated that about 80% of the public has a positive attitude towards wind power production.

Forecasts concerning local acceptance, however, are largely negative because national promotion campaign for renewable energies have been all cancelled since 1 January 2002

Finland

1. National renewable energy targets

Finland adopted a national energy target in form of an "Action Plan for Renewable Energy Sources" in December 1999 covering:

	Increase		Electricity
	1995 -> 2010	TWh/a	
Bioenergy total		6,2	(industry + distr.heating + small scale)
Hydropower	8 %	1,0	
Wind power	100 times	1,1	
Solar energy	40 times	0,05	
Heat pumps	10 times		
Total	50 %	8,35	which is roughly 10 % of the annual consumption and would bring RES-E to a level of 31 % of estimated consumption

The "Action Plan" is only a policy declaration by the Ministry of Trade and Industry.

It is referred to in the national climate strategy and fits into the European Directive Target, if the plan is implemented. So far, bioenergy is progressing but wind power prospects remain doubtful.

2. Investment support schemes

The annual budget for investment support covers all kinds of RES. About 10 % of the budget has been directed towards wind power. In order to reach the target 500 MW for wind power by 2010 Finland should build an average of 60 MW annually, which would mean 50 % of the total budget. The budget (or rather the part directed towards wind power) therefore bears little relationship to the target concerning wind power.

The available percentage of investment support is somewhat unpredictable because it is investigated by authorities case by case, otherwise it is reasonably easy to achieve.

Regarding wind power, the present (from 2002 to 2007) investment support (typically max 40 %) is in practice around 33 %, subject to the ministrys investigation, case by case. There is also a tax reduction of 0,7 eurocent/kWh. These two support instruments equal an income of about 2,05 eurocent/kWh. As the sale price of winpower energy has to compete with the Nordpool spot market price, average 2,3 c/kWh, the total income aspects rise to 4,35 cent/kWh. This is the very minimum needed at a good wind site in Finland. It leaves no margin and does therefore not attract investors to wind power projects.

There exist no feed-in-tariff and no obligations system, only a tax reduction, which equals about 15 % of needed income/kWh for wind power electricity.

A voluntary systems exists, but no monitoring mechanism..

3. Guarantees of origin

There are mechanisms ensuring accurate and reliable guarantee of origin for RES-E managed by indepent bodies. The system of guarantee of origin is only applicable to RES-E and not to other energy resources.

4. Administrative procedures and gird access

There is no fast-track planning procedure for renewable electricity producers.

There is a guarantee of transmission, but transmission tariffs vary depending on grid owner calculations and may cause economic impossibilities. No priority access to the grid is granted to the RES-E, but RES producers are free to connect to grid against all costs involved.

5. Local acceptance

No national polls have been conducted to date, but large area polls show up to 80 % acceptance. (However, the NIMBY phenomenon appears to apply).

For some years there exists a department under the Ministry of Trade and Industry to prepare information and promote energy saving programmes and RES projects. No larger campaigns have been executed yet, only brochures and project guides.

France

1. National renewable energy targets

The target included in the RES-E Directive (upgrading from 15 to 21 % of E-RES) has been divided by technology by the national agency ADEME, which allocated 14 000 MW of wind energy and the rest to biomass, mainly wood. But these figures remain controversial, particularly the share of biomass which seems unrealistic and because they have no legal status.

2. Investment support schemes

A purchase obligation for all renewables up to 12 MW per site legally exists since a law passed in February 2000, but the tariffs were fixed for all technologies only in March 2002. The level is clearly sufficient for wind, more or less for small hydro, but clearly insufficient for other technologies without complementary investment support (direct subsidies).

The total budget available is not related to the total effect. 14 MW in 4 years (4 in mainland plus 10 in overseas Departments) were planned, but there is great uncertainty whether the new government will keep the forecast budget.

The scheme is not yet fully operational and no clear information is available for general public to date. The procedure is expected to be rather complicated.

Call for tenders are considered in the law of 2000, but none has yet been made, since details for application have not yet been decided (there is no actual need for new generation capacity, since exported surplus of power represent more or less 10% of total production)

Regarding the issuing of voluntary green certificates, EDF has been willing since 1998 to experiment with such a scheme in the Dunkerque area of Northern France, but the opposition of the previous Green Minister Dominique Voynet (on the basis that this was contrary to the polluter-payer principle) delayed the project. There has been no information about an eventual new tentative.

3. Guarantees of origin

There is not yet any legal mechanism of guarantee of origin in France.

4. Administrative procedures and grid access

There is no fast-track planning procedure for renewable electricity producers. They are submitted to the common regulation for planning, but there is a consensus among them not to make any exception for renewables that could later weaken their legitimacy.

From a legal point of view, France has taken the necessary measures to ensure that grid system operators guarantee the transmission and distribution of RES-E, but this has still to be fully implemented in practical.

Priority access to the grid is guaranteed, but only if it does not disturb its normal operation. Renewable penetration is limited by the grid (EDF-ARD) to 40 % of the nominal power of

each cell of transformer connection device, without any legal basis (technical recommendation).

Grid transmission tariffs were published in July 2002. Reinforcement costs are clearly charged to the grid operator, but the distinction between these and connection costs charged to the producer are not yet clear for the low and medium voltage grid.

Grid operators don't provide any new RES-E producer wishing to be connected with a comprehensive and detailed estimate of the costs associated with the grid connection. RES-E producers are not allowed to issue a call for tender for the connection work.

Reinforcement costs are supposed to be included in the general budget of the grid operator to a certain extent. Connection costs are borne by the producer, but should be shared by an eventual future newcomer who could benefit from the line.

France has not ensured that the charging of transmission and distribution fees does not discriminate against RES-E, in particular RES-E produced in peripheral regions, such as island regions and regions of low population density.

It has not put into place a legal framework to ensure that fees charged for the transmission and distribution of electricity from RES plants reflect realisable cost benefits resulting from the plant's connection to the network, nor required grid system operators to ensure such a requirement.

A report with all the measures taken to facilitate access to the grid system of electricity produced from renewable energy sources has not been published yet.

5. Local acceptance

The situation is ambivalent and sometimes difficult. There are permanent problems for small hydro with environmentalists. Wind energy is subject to more and more opposition campaigns.

For small hydro, strict regulations at the national level on water use and environmental protection of rivers apply. For wind, few experimental planning process at local or district scale are in design phase, but they have no legal base and could not be mandatory in the current state of regulation.

It exist a campaign only for thermal solar (“Plan Soleil” by ADEME). A first campaign in 2000 with TV spots was not successful at all. A second one based on local newspapers and radio was to be launched in October 2002.

Germany

1. National renewable energy targets

It is the explicit target of the EEG (Erneuerbare Energien Gesetz; Renewable Energies Act) at least to double the share of RES-E by the year 2010. According to the "Strategy of the German Government on the use of off-shore wind energy" 25 % of the electricity in 2030 will come from wind energy: 15 % from offshore and 10 % from onshore installations.
The EEG is a national law. The strategy is a political declaration.
The EEG was approved before the European Directive. However, the EEG follows the directive's target at least to double the share of RES-E by 2010.

2. Investment support schemes

The main investment support scheme for the promotion of RES is the EEG itself. In cases in which RES installations, due to the calculated guaranteed fix prices, depend on additional funds, the (non)availability of such funds leads to a restriction of the extension of RES installations.

Since the EEG came into force in April 2002, RES experienced a remarkable growth. The target of doubling the share of RES until 2010 will be achieved even earlier if the support mechanisms of the EEG are continued. However, in some technologies a more detailed distinction regarding the guaranteed fix prices remain desirable.
The EEG has been very successful and made Germany the leading wind power market world-wide. 10.000 MW are currently installed producing 3,5 % of the country's electricity. 11,500 MW are expected to be installed by the end of the year 2002.
The EEG and the former feed-in law have proven to be very efficient. The feed-in tariffs were decreased between 1991 and 2002 – calculating with an average inflation of 1,5 % - by 55 %. According to the EEG there will be an additional reduction of 1,5 % every year (plus inflation) for new installations. The EEG, in addition, provides a differentiated feed-in tariff system according to the quality of a site. Thus over-support for the best sites may be avoided and it is possible to use "second best" sites at reasonable costs.
The period for the special tariff for offshore installations (according to the EEG available only for turbines installed until 2006) will not be sufficient and should be prolonged.
On contrary, the compensation for biogas is not sufficient to attract new investment for the moment. The compensation for small decentralised agricultural Biogas plants is not enough. Especially for the use of energy crops in Biogas sites there will be a need for around 8 ct more (!) for biogas sites smaller than 200 kW inst. El. Capacity. The German biogas association therefore proposed to split the feed--in tariffs between biogas sites using just agricultural product like manure and energy crops (Maise, grass, clover), which need those 18 ct per kWh and those sites who use bio wastes. The latter in many cases get gate? fees if they use those wastes. So the costs of producing energy which are not covered by the compensation will be covered by the gate fees.
Almost no demand for green certificates has been noticed up now. Slowly a discussion has begun on the biogas sector, since they are saving methane emissions from manure storage in addition to their energy production CO2 effect.

In Germany every customer can chose his electricity supplier. There are several suppliers specialised in RES-E, but with a relatively low market share.

Electricity from “green suppliers” is generally more expensive than conventional electricity. Due to the very successful feed-in system many people do not think that it is necessary or makes sense to buy RES-E. Therefore, of course, the produced RES-E amount is much bigger than the direct demand by consumers. Besides, in general every consumer pays per kWh for the RES-E remuneration.

3. Guarantees of origin

There are several labels for RES-E with different criteria defining green electricity for German electricity consumers.
The strictest label (Grüner Strom Label) has been set up and is controlled by several environmental associations. There is also one quite weak label (regarding its criteria) from TÜV.
The labelling organisations have set up criteria defining what is recognised as renewable energy. There are also differentiations between “gold” (100 % RES-E) and “silver” (up to 50 % CHP) labels.

4. Administrative procedures and grid access

It usually takes 2-3 years for the planning procedure. The procedure depends on the municipality and on the “Bundesland”. There are examples of state governments and local administrations trying to hinder wind energy projects.

In general, the EEG guarantees priority access to the grid. Unfortunately grid operators still use different possibilities to block or delay access. The operators of renewable energy installations have to pay for the connection to the grid whilst the grid operators have to pay for the grid reinforcement. Theoretically and according to the law, the RES-E producer can choose a company for the connection work. In reality, the grid operators make it very difficult to choose an independent company. A report about the experiences with the EEG (“EEG-Erfahrungsbericht”) was published this summer by the federal government tackling the existing problems (feed-in tariffs, grid access, and remuneration).

5. Local acceptance

The general acceptance of wind energy is very significant: 90 % of the German population approves of wind energy and wants to extend its utilisation. However, there are some local problems. The experience in Germany shows that the more the local population is involved directly, the more likely is local acceptance.
According to federal law, an environmental impact assessment is necessary to obtain building permission. The local environmental administration is responsible for the procedure.
Unfortunately and in spite of several initiatives, there has not been a – without doubt necessary – RES campaign yet.

Greece

1. National renewable energy targets

There has been no formal adoption of any national RES target, nor of any technology-specific target.
There is not even a formal political declaration by the Government that it adopts Greece's RES target set by the Directive (20.1% of electricity to be produced from RES by 2010). This is left to be assumed by default (i.e. the Government has not formally rejected or protested the Directive's target for Greece).

2. Investment support schemes

Despite the lack of national renewable energy targets, the current investment scheme is sufficient to attract new investment. Currently it stands at 30-50% cash subsidy on the RES investment budget (depending on the RES technology; e.g. for wind parks it is 30%).
Under the Third Community Support Framework (CSF III; 2000-2006), there are financial resources currently available to support (subsidies) about 600-800 MW of RES investments in the 2000-2006 period. This should be compared with the about 2500 new MW of RES capacity needed to be installed in Greece until 2010, in order to achieve the national target set by the RES Directive (20.1% of RES electricity).
The procedure is well known, but it is still lengthy and complex, as far as the evaluation of submitted RES investment proposals is concerned.

The current feed-in tariff stands at 6.1 Eurocents/kWh. It is regularly adjusted for changes in the consumer electricity prices and it is guaranteed through a 10-year PPA.
Supportive regulation is to be found in the new Building Code regulation.

3. Guarantees of origin

A system of guarantee of origin currently doesn't exist.

4. Administrative procedures and grid access

The administrative procedures are slow.
RES electricity has, by Law 2773/99, priority access to (and guaranteed use of) the grid, but this is purely theoretical. For example, in the country's windy areas (Thrace, Euboea, Cyclades Islands, Lakonia), complete saturation of the grid precludes, currently and for the next 5-6 years, the connection of any new RES installation to the grid.
The full cost of grid reinforcement and extension is borne partly by the RES producers and partly by CSF III grants.
In principle grid operators provide any new RES-E producer wishing to be connected with a comprehensive and detailed estimate of the costs associated with the grid connection. Theoretically RES-E producers are also allowed to issue a call for tender for the connection work, but in practice it is the Public Power Corporation (PPC) that always constructs the grid connection.
RES electricity is not charged with transmission and distribution fees.
The licensing of RES installations follows the normal procedures and rules applicable to all industrial projects (!). Project siting is selected by the RES investor, based chiefly on IRR considerations.

5. Local acceptance

Local acceptance of RES installations is ambivalent. There is still strong local reaction against the installation of new wind parks in the two windiest areas of Greece, namely Euboea and Lakonia, where most of the already operating wind parks are concentrated (~ 200 MW). On the other hand, there is sufficient local acceptance of new wind park installations in other windy areas of Greece, such as Thrace, Crete and other Aegean islands, but the wind capacity currently installed and operating there is small (with the exception of Crete, where about 80 MW of wind parks are already in operation). The installation of new small hydros is met, in most cases, with strong local resistance.

The licensing of RES installations follows the normal procedures and rules applicable to all industrial projects (!). Project siting is selected by the RES investor, based chiefly on IRR considerations.

Measures to increase the popularity of RES are limited. A modest promotion campaign (1 year, 150,000 €), employing a multitude of tools (brochures, newspaper ads, books, etc.), was undertaken, for the first time, last year and was financed entirely by the Greek Association of RES Electricity Producers. The campaign focused on southern Euboea, where strong local reaction existed at the time against the installation of new wind parks. Campaign results have been modest.

Ireland

Ireland

1. National renewable energy targets

In 1995 Ireland set a target of increasing installed renewable electricity generation capacity from 235 MW to 290 MW. When this target was achieved under the first Alternative Energy Requirement Program (AER-I), three following AER rounds were held which increased the target to an additional 190 MW, reaching 480 MW in total end of 1999. At the same time, a longer-term target was set of 31 MW annual increases in renewable capacity in the period 2000-2010.

The national publication *"Green Paper on Sustainable Energy"* (1999) set a target to add additional 500 Megawatts of new green generating plants to the electricity network by 2005. This programme was launched after the commencement of EU common rules establishing the internal electricity market. The support programme as notified and approved by the competition authorities of the EC relies on competitive tendering, compliance with EU procurement rules and wind technology as the predominant technology. The Directive and the national target are considered by the Irish government as complimentary and mutually reinforcing measures. It was decided therefore to conclude the existant national programme before commencing a public consultation programme on future detailed targets and support measures under the Directive. All the administrative steps necessary to complete the current AER programme will be commenced before end 2002. This will be followed almost immediately by the public consultation process which will also address the wider obligations arising under Directive 2001/77/EC.

The wind capacity in 2001 was 125 MWe. About 4% of all electricity is sourced from large hydro facilities operated by the ESB (Energy Supply Board) on an ordinary business case. It is estimated the annual output of projects already built under the AER programme contributes between 1% & 2% to gross consumption. It is expected the 500 MW of plants to be built in the period 2000-2005 will contribute between 4%-6% depending on overall growth levels in gross electricity consumption in the period. In the low case, it is expected green electricity will contribute 9% to gross consumption by 2005 and taking the higher figure, total consumption could rise towards 12% by 2005. It is concluded that both scenarios are proportionate to the attainment of a minimum contribution by green electricity of 13.2% of gross electricity consumption by 2010.

Since 1999 two pieces of legislation were enacted which impact directly on the green electricity market. The Electricity Regulation Act 1999 was primarily concerned with establishing an independent regulator (now the Commission for Energy Regulation or CER). The Act also provided for the accelerated full liberalisation of the green electricity market (generation and supply). Players are now free to source and supply green electricity to any customer in the Irish market.

The Sustainable Energy Act 2002 established Sustainable Energy Ireland (SEI) as a statutory body. Since its establishment in May 2002, in the field of renewable energy alone, SEI has:

- launched a RD&D programme;
- contracted for the development of a digitised wind resource which will also incorporate terrain data, information on the electricity grid and information on planning and heritage;

- contracted professional pollsters to identify pubic attitudes to and perceptions of renewable energy developments, and
- commenced a high profile publicity campaign on energy issues.

In addition SEI funds a Renewable Energy Information Office which offers detailed professional advice to planners and developers in particular and more general advice to the wider public.

According to the official report of the Department of Communications, Marine and Natural Resources on a proposed national programme to increase the gross consumption of "green electricity"- published in October 2002, the planned approach is to intervene in the electricity generating market to the extent necessary to ensure green electricity contributes a minimum 13.2% to gross electricity consumption by 2010. The specific indicative target, the quantity of additional capacity required to deliver that target, the particular technologies employed and the detailed market interventions will be settled after a public consultation process is commenced in the first quarter of 2003. This public consultation process will also consider the other obligations under Directive 20001/77/EC.

2. Investment support schemes

The total costs of the additional 500 MWe of renewable electricity are estimated at IR £ 40 million (euro 50.8 million). Furthermore, £ 37 million (euro 47 million) is allocated in the national development plan for infrastructure investment in the electricity grid to accommodate for renewable and CHP projects. The Government's National Development Plan in total committed £126 million (euro 160 million) to promote moves towards sustainable energy use. Next to the £37 million (euro 47 million) already mentioned, this includes £29 million (euro 36.8 million) for the Irish Energy Centre, £40 million (euro 50.8 million) for research and development, and £20 million (euro 25.4 million) for energy-efficient homes and buildings. Based on an additional 500 MWe renewable production capacity, the total contribution of renewables in Ireland in the year 2005 would be:

- 937 MW installed renewable energy capacity, being 16.61% of total installed capacity in Ireland
- 3,487 GWh renewable electricity generation, being 12.39% of total electricity generated
- 586 kTOE of renewable energy production, being 3.75% of total primary energy requirements.

Ireland's national renewable energy strategy is guided by the Alternative Energy Requirement Programme (AER) initiated in 1994. Under the AER competitions are held where electricity generators utilising wind, hydro, biomass/waste or CHP technologies can apply for a license to build, own, operate and supply electricity to ESB from newly installed high efficiency generating facilities. Successful competitors are offered an ESB Power Purchase Agreement of up to 15 years (Department. of Public Enterprise, 2001) The costs of the AER are covered by a PSO levy on all consumers. Details on the AER are included in section 6 (bidding scheme).

Tax relief is permitted under Section 62 of the Finance Act, 1998 for corporate equity investments in certain renewable energy projects namely hydro power, solar power, wind power and biomass. The relief takes the form of a deduction for tax purposes from a company's profits for an investment in new ordinary shares in a qualifying company. The

relief is capped at 50% of all capital expenditure (excluding land), net of grants, on a single project up to £7.5 million. Investment by any one company or group of companies in more than one qualifying energy project is capped at £10 million per annum. The Department of Public Enterprise certifies qualifying renewable energy projects and thereafter the Revenue Commissioners administer the tax relief.

The scheme provides higher certainty on investments and so far reasonably successful. The corporate tax rate is being step-wise decreased from 36% to 12.5% in 2004. This decreases the tax relief incentives for renewables.

As far as information could be obtained, no strict regulations are set on the use of renewable energy in building regulations. Sustainable Energy Ireland (formerly the Irish Energy Centre) has set up programs to reduce energy consumption in state buildings and public service buildings. A comprehensive Building Energy Management System is being set up.

Bidding

The key policy instrument Alternative Energy Requirement Programme (AER) is the regularly organised bidding procedure for installation of new electricity generation capacity. So far, five AER rounds have been organised, the targets of which are listed in the table below.

Table: Targets Alternative Energy Requirement Programme (AER)

Category	**AER-I**	**AER-II**	**AER-III**	**AER-IV**	**AER-V**
Biomass/waste	15	30	07	00	10
CHP	20	00	00	35	00
Hydro	10	00	03	00	05
Wave	00	00	05	00	00
Wind	30	00	90	00	240
Total	**75**	**30**	**105**	**35**	**255**

The AER is well-known in Ireland. The total amount of renewable production capacity offered usually exceeds the target set. The results from the AER-I and III rounds regarding renewable energy projects are included below. AER-II – which was specified for waste and biomass only - did not proceed due to difficulties with planning permission. AER-IV concentrated only on CHP.

One of the main flaws of the AER was that approved projects failed to gain planning permission, thus did not go ahead. As a result, one of the prerequisite for AER V was that all applicant schemes should already have gained planning consent. The AER so far has only been directed near-commercial applications. Higher-cost options such as solar, wave and tidal energy are not directly stimulated.

Table : Results Alternative Energy Requirement Programme

Category	**Target capacity MW**	**Offers MW**	**Result MW**	**Price range (IRp/kWh)**
AER-I				
10 windfarms	30	73	45.8	4.28 - 4.41
10 small-scale hydro	10	4	2.3	4.41
6 landfill gas/waste	15	12	11.8	4.41
AER-I for existing				
Wind	Existing	Existing	6.51	4.2 - 4.4
Hydro	Existing	Existing	8.44	3.6 - 4.2
AER-III				
8 large windfarms	65	102	84	2.43 - 3.07
8 small windfarms	25	37	37	3.03 - 2.52
10 small-scale hydro	3	4	3	3.82 - 4.29
3 landfill gas/waste	7	17	3	3.63

In February 2002, the Irish government announced that under the AER V round a total of 363MW renewable capacity was awarded. Almost all applications of in total 367 MW were granted, which largely exceeds the planned 255MW. The capacities awarded include 318MW of large wind power, 35MW of small wind power, 8MW of biomass, and 0.9MW of hydropower.

Successful tenderers under the AER contracts used to granted a 15-year purchase power contract with ESB. In September 2000 the CER held a green Virtual Independent Power Provider (VIPP) auction of 40 GWh of green electricity in 1 GWh tranches. Successful bidders were again ESB Independent Energy and EPower. Both companies received the right to supply green electricity.

Voluntary green electricity schemes

The company Airtricity (formerly named Eirtricity) sells green electricity to commercial customers on a voluntary basis. Since their start early 2000 Airtricity has recruited 15,000 customers largely from the SME sector. Most of Airtricity's power supply stems from wind power production. The main driver for consumers to switch from ESB to Airtricity is the tariff discount. In July 2002 Airtricity started supplying in Northern Ireland as well, being the first independent electricity supplier in the region.

3. Guarantees of origin

The Electricity Regulation Act, 1999 provides for the establishment of the Commission for Electricity Regulation. The Act enables the issuing of supply licences for supply to all final customers of electricity produced from renewable, sustainable or alternative sources of energy. In effect, this permits renewable energy producers to source customers (both domestic and commercial) to purchase the electricity generated. Certain regulatory and technical issues need to be resolved in order to facilitate this activity. These include connection arrangements and the trading mechanism.

4. Administrative procedures and grid access

A Working Group on Grid Connection Issues was set up by the Minister in 1995 to develop an acceptable methodology for the determination of charges for the connection of renewable energy electricity generating units to the grid and to determine a procedure for such connection. The Group prepared a progress report in 1997, informed the development of grid connection policy for the AER III competition and is currently preparing a final report.

A problem for the development of renewable energy projects is that the electricity network is not designed to take electricity from remote locations but rather to dispatch electricity from large thermal power plants via the transmission and distribution network to the points of consumption. In addition, ESB's rural distribution network (10 kV particularly) is characterised by small conductor sizes and long line lengths. Both of these features present a challenge to ESB in connecting renewable energy to the grid. ESB are currently implementing an extensive upgrading of the rural networks and this will enhance the strength of the network and, as a result, will help to accommodate connection of additional renewable energy generating plant. In addition the deadline feature of the AER process has led to a bottleneck effect in the area of grid connection.
A key challenge for the future will be to redress these constraints.

The provisions set out in the Electricity Regulation Act, 1999 enabling generators of electricity from renewable sources to sell green electricity directly to customers will be brought into effect. In carrying out functions under the Act it can be expected that the Commission will take account of the needs of the renewable energy sector, in particular, in relation to:

- connections to the grid;
- operational arrangements and pricing terms for transmission of electricity over the national grid; and
- the mechanism for trading of electricity between generators in a competitive environment, in order to redress the imbalances between supply and demand.

5. Local acceptance

While projects undergo technical and financial appraisal in the competitive AER selection process, they are effectively screened for "public" acceptability through the planning process which is, of course, completely independent of the AER process. The planning consent procedure for a wind farm can take up to 14 months. Wind turbines are a relatively new feature on the Irish landscape. Furthermore, proposed sites for wind farms are often in remote upland areas where generally the wind speeds are higher. This has, in some cases, led to conflict between competing land use interests, particularly where developers have not gauged public reaction in advance of applying for planning permission.

Following the announcement of the first Alternative Energy Requirement (AER) competition in 1995 the then Department of the Environment, in consultation with the then Department of Transport, Energy and Communications, prepared Guidelines for Planning Authorities on Wind Farm Development. These guidelines were intended to facilitate planning authorities in dealing with such planning applications and in making appropriate provision in development plans for possible future proposals. Their effectiveness will be reviewed by the Renewable Energy Strategy Group 1.

Italy

1. National Renewable Energy targets

Italy in 1999 developed a plan called "Libro Bianco" on ways to meet the requirements of the Kyoto Protocol. This plan was officially acknowledged in a resolution of the Interministerial Economic Planning Committee (CIPE) which listed the potentials of individual renewable sources to be exploited within 2010-2012.

Data are listed in the following scheme.

RES		*White Book (1999)*	*Recent data*
Generic	status (share[1])	16%	
	national indicative targets[2]	22%	
	support schemes		
Wind	status	119 MWe	(year 2001): 700 MWe [3]
	national indicative targets	2.500 MWe	
	support schemes		
solar PV	status	16 MWe	
	national indicative targets	300 MWe	
	support schemes		
Geothermal	status	559 MWe	(year 2000): 627 MWe [4]
	national indicative targets	800 MWe	
	support schemes		
Biomass and biogas	status	192 MWe	(year 2000): 685 MWe [4]
	national indicative targets	2.300 MWe	
	support schemes		
small hydropower (< 10 MW)	status	2.187 MWe	(year 2000): 2.368 Mwe [4]
	national indicative targets	3.000 MWe	
	support schemes		

[1] referred to production in 1997
[2] forecast for 2008-2012
[3] Source: "ISES Italia" - Italian section of INTERNATIONAL SOLAR ENERGY SOCIETY
[4] Source: GRTN - Italian Transmission Grid Manager

The CIPE document is undergoing an updating and there is an expectation of more prudent estimate of potentials.

In any case, these targets will not be binding but will only be considered as such.

Regarding compliance with the Directive 2001/77/EC, Italy has indicated a target of 22 % from RES on an expected total national power demand of 364 TWh.

In 2000, renewable electricity accounted for 18% of the total power consumption (51.3 TWh), 1% down compared to 19% in 1999 (51.9 TWh). However, between 1995-2000, production of renewable electrical energy increased by an overall 10%. Hydropower remained constant, while geothermal increased from 3435 to 4705 GWh, wind power from 9.9 to 563, PV power from 4 to 6.3 and biomass (mainly municipal solid waste) increased from 387 to 1906.

To meet the European directive 2010 target, it will be necessary to increase production of renewable energies by about 30 TW, equal to 6000-8000 MW.

Italy is preparing a report about the measures taken or planned, at the national level, to achieve the national indicative targets for the next 10 years, taking account of compatibility with national commitments for the Kyoto Protocol on Climate Change.

2.Investment support scheme

Since early 2002 the previous feed-in support system (called CIP 6/92) is not valid and a market system based on a standard green portfolio of 2% (energy from new plants built after march 1999) has been effective. A system of Green Certificates will represent the support scheme and the initial negotiation of titles should start early 2003. In addition to that, a 75% grant support system has been issued to promote PV, along with a net metering arrangement with the grid. Major PV plants will also benefit from Green Certificates whose smallest issue covers 51.000 kW in the year (the minimum production required to obtain one Green Certificate for all renewable sources). Green Certificates are issued for 8 years and have the same value regardless of the source. A cap price is set by the certificates placed on the market by the Grid Manager to balance a possible gap between supply and demand. Their value is fixed yearly and is based on a complicated evaluation of the average incentive acknowledged to those plants still benefiting from the feed-in system. For 2002 the value was fixed at 8,42 €cent/kWh.

As a result, the system should be adequate to guarantee a strong incentive to hydro and wind but is seen as insufficient to develop biomass.

In addition, a 75% grant support system has been issued to promote PV which will also enjoy a net metering arrangement with the grid. Major PV plants will be entitled to benefit from Green Certificates whose smallest issue covers 51.000 kW in the year (this is the minimum production's value necessary to obtain one Green Certificates for all renewable sources). As a result the system should be adequate to guarantee a strong incentive to hydro and wind but is seen as insufficient to develop biomass.

In principle, regions might issue tenders to secure grants to specific sources but financing of this instrument is still to be defined.

Standard portfolio should be increased, starting from 2005, by 0,3 % every year, but this proposal has not been yet approved in a law.

In Italy there is the obligation for producers and importers of energy to feed, during the year 2002, a quota of energy from renewable sources equal to 2% of the energy produced or imported in the year 2001 from conventional sources. This obligation defines the Green Certificates Demand.

The Grid Manager has fixed the price per kWh of Green Certificates for the year 2002: 8,42 €cent/kWh.

Some penalties are provided for non-compliance, but this proposal has not yet been approved in a law.

Renewable energies are not specifically mentioned in the regulations (e.g. building regulations) at national level, but the Laws 9 and 10 in 1991 have promoted activities for energy saving and energy efficiency.

Sometimes local or regional regulations represent support instrument for micro or mini RES plants and for energy saving in domestic uses.

Even if considered as possible under existing laws, no voluntary green energy market has really developed yet. The relatively high price of energy in Italy, in respect to other European countries, does not leave much room for a Green Pricing System. But discussion is in progress on the subject, and Italian utilities joined RECS with interest.

After a test phase lasting two years, RECS - the initiative of European companies (15 European countries) to create a voluntary market for green energy - has become a success.

In 2001 Italy had promoted a new trademark for green electricity ("Bollino 100% Energia Verde") for producers, consumers, and traders. The instrument is the RECS.

3. Guarantee of origin

In Italy there is no obligation to declare the origin of energy. In 2001 the first Green Energy Label was issued and promoted by private associations and the first experiments with labelling have begun. A private independent institution is in charge of certification.

4. Administrative procedures and grid access

There is no fast-track planning procedure for RES.

The grid operator is obliged to accept electricity from RES at a market price. RES energy benefits from priority despatching. After the expiration of the feed-in mechanism, which stimulated RES connection to the grid, no specific rule has been issued on the subject. Grid operators, and for LT and MT connections, local distributors normally issue, on demand, an estimate of cost for grid connection. The producer is entitled to perform the works on his own with its contractors subject to compliance with technical specifications. Transport cost is equal for all producers. A grid benefit is acknowledged to LT – MT connected plants, which instead of paying the system cost are paid a minimal avoided transport fee. No report to facilitate access to the grid has been issued, to the best of knowledge. Two way metering (net metering) is only allowed for plant capacity lower than 20 kW (domestic use) and, at the moment only for PV sources.

According to the Directive 2001/77/EC, Member States shall evaluate the existing legislative and regulatory framework with regard to authorisation procedures, and draw up possible guidelines for a fast-track planning procedure. Member States shall publish a report on the subject not later than 27 October 2003. The Italian report is not ready.

5. Local acceptance

While there is a widespread declared interest for renewable energy, a general ignorance about renewable facts characterises public opinion. RES is widely identified with small PV. Generally speaking, there is limited acceptance from local communities of the establishment of new RES plants.

Luxembourg

Luxembourg seems to be the worst case of non-commitment.
For example the following figures are symptomatic:

Wind power installed in Luxembourg (in MW)
EurObserv'ER 2002

	2000	2001	Capacity installed in 2001 in %	Growth
Luxembourg	10	10	0	0%

Small Hydro (< 10MW) installed in Luxembourg (in MW)

	1999	2000
Luxembourg	39	39

EurObserv'ER 2002

Only in September last year (2001) the government published a programme for renewable energies. According to this the following support can be requested:

Wind energy:
Investment costs: 75, - € /kw installed capacity, minimum capacity 500 kW, maximum contribution 150000 €, from 2003 decreased annually by 10 %

Premium for the electricity production:
0,025 €/kWh for installations between 1 and 3.000 kW for 10 years

Hydro:
Premium:
0,025 €/kWh for installations between 1 and 3000 kW for 10 years

Biomass and Biogas:
Investment costs:
25 % for a central heating system in real estate (pellets, gas,), (maximum amount: 3000 €)
30 % for systems in connection with heating system (max. amount: 38000 €)
50 % and beyond if installation has a regional character (max. amount: 75000 €)
25 % for biogas installation (max. amount: 38000 €)
50 %, if installation has regional character (max. amount: 150000,-- €)

Netherlands

1. National renewable energy targets

In December 1995 the Ministry of Economic affairs published its Third White Paper on Energy Policy, which focused on the liberalisation of the energy market and sets goals with respect to renewable energy. The government aimed at a reduction of the CO_2 emissions of 3% in the year 2000 compared to 1990. After the year 2000 the cabinet aims at stabilising CO_2 emissions. Increasing the energy efficiency by 33% and a share of 10% of renewable energy in 2020 (from currently still about 1%) should attain this.
Table 1 specified all targets included in the Third White Paper.

Table 1 Energy related policy targets in the Netherlands

Issue	Target
Renewable energy	5% renewable energy consumption in 2010
	10% renewable energy consumption in 2020 (approx. 17% renewable electricity consumption in 2020)
Renewable electricity	3% renewable electricity in 2000
Energy efficiency	33% improvement in period 1995-2020
Greenhouse gas emissions	6% emission reduction in period 1990-2010 (Kyoto target)

Source: Ministry of Economic Affairs, 1996

In accordance with these officially specified targets, the intermediate indicative target for renewable electricity for the year 2010 was set at 8.5%. However, as a result on the EU discussions regarding the specification of the EU renewables electricity Directive, this target was increased to 9%.

The Third White Paper also included an indication of possible contributions per renewable source in PJ, as is shown in Table 2.

Table 2 Expected contribution of renewables in the Netherlands

Renewable energy source	Contribution in 2000 (PJ)	Contribution in 2007 (PJ)
Wind	16	33
Photovoltaics	1	2
Solar thermal	2	5
Geothermal	-	-
Heat and cold storage/acquifers	2	8
Heat pumps	7	50
Hydro	1	3
Biomass and Waste	54	85
Total	83	186

Source: Dutch Ministry of Economic Affairs, Third Energy Bill

2. Investment support schemes

The following measures are (were) in place:

- Regulatory Energy Tax (REB)
- Free Depreciation on Environmental Investments (VAMIL)
- Tax deduction for investments in renewable energy (EIA)

- Green Funds
- Investment subsidy for non-profit organisations (EINP)
- Decision on subsidy programmes for energy (BSE programme)
- Implementation of energy subsidy regulation (EPR)
- CO_2 reduction plan

Since the elections of May 2002 high uncertainty characterise the situation for investments in renewable energy. The already resigned new government was planning (and already changed) many of these measures. What is going to happen for next year is highly uncertain at time of writing:

- The important EIA/VAMIL/EINP tax measures has been stopped since September 2002.
- It was planned to stop the advantages for green funds
- The tax exemption for green energy consumption was planned to be halved
- The EPR was planned to be changed
- A new feed-in system would come in place of the old tax exemption on green electricity consumption.

With the policies set till the new cabinet it was expected that the Netherlands could reach its target specified in the EU renewable directive. However the just resigned new government had planned to cut the budget for renewable energy with 500 million. The table below shows what the expenditures would have been with continued policy.

Table: Expected costs business-as-usual, billions of Euros.

Regulation	**2002**	**2003**	**2006**
Energy premium regulation	0.10	0.10	0.10
REB 36i (tax exemption)	0.15	0.20-0.30	0.40
REB 36o etc. (diversion or 'Doorsluis', incl. Incinerators)	0.11	0.20	0.25
EIA	0.20	0.20	0.20
VAMIL	0.06	0.06	0.06
MIA	0.060	0.06	0.06
DOA	0.025	0.025	0.025
Total	**ca. 0.70**	**0.85 – 0.89**	**ca. 1.10**

For the old/current policies the procedures of getting support were sufficiently known to the target group and simple enough. The government has taken sufficient measures so that somebody wants to know about the programs it can easily be sorted out.

Feed-in-tariffs

Introduction of a new MEP feed-in premium

- The introduction of a new feed-in premium is expected as from 1-4-2003. The actual date of introduction is currently uncertain due to the resignation of the new cabinet. The system is called MEP: Milieuvriendelijke Elektriciteitproductie, Environmentally Friendly Power Production and will be introduced for green power, climate neutral fossil energy carriers (e.g. hydrogen with CO_2-sequestration) and combined heat and power (CHP). Only installations that directly feed into the Dutch grid are eligible for MEP premium.
- Tariffs will be diversified and be based on the profitability of the type of source. Tariffs are to be determined by Ministerial Regulation at the end of 2002. Tariffs for CHP will depend on the so-called CO_2-index, the degree to which they reduce CO_2-emissions.

There will be probably 3 levels of tariffs with the highest level set at 6 eurocents/kWh and the lowest at o eurocents/kWh.

- The tariffs will be guaranteed: for ten years for new generating plants, and for ten years subtracted with their age for older installations (from 1996 and later).
- The MEP will be financed by a general levy (Euro 34 per connection per year) on the transportation tariffs. This will raise a MEP fund of approx. 250 MEuro per year.
- MEP will be part of the Electricity Law 1998.
- Consumers will be compensated for the levy by a surplus ecotax reduction (36j).
- The MEP will be administered by Tennet, the Dutch national Transmission System Operator.
- Certificates will be used for both the reduced ecotax and the MEP regulation.

- The new feed-in has the advantage that it secures income for at least ten years. Only when the tariffs are finally set it will become clear what the effects will be.

Obligations systems

1.3 million Households have switched voluntary to green electricity. Although the tax exemption will be halved, most suppliers have stated that they will not increase their green electricity prices for the next year. This is expected to result in more people switching to green electricity, enlarging the demand for green electricity that is already bigger then the national green production.
Tax exemptions are vulnerable for changes and therefor bring high risk to determine investments on these measures. The recent planning in change in the policy can be seen as proof of that.
In the Netherlands there is no obligation, which mean that there are no penalty prices for non-compliance. The tax exemption determines partly the certificate price

Supportive regulations

The EPR subsidy specially aims at energy savings and renewable energy of which several can be used in the build environment.

Bidding

Bidding systems are not used in Dutch renewable energy policy. For the CO_2-reduction plan a bidding scheme is used, important is the expected ratio Euro per ton reduced CO_2. The scope of this bidding is much bigger then only renewable energy

3. Guarantees of origin

- The green certificate system administered by a full daughter of Tennet, the independent Dutch TSO does serve as reliable guarantee of origin.
- See above
- The Netherlands will try to implement the EU requirement for the guarantee of origin by October 2003. The administration will for sure be done by Tennet, which is probably going to use the green certificate system for the guarantee of origin.

4. Administrative procedures and grid access

There is no especially fast track planning procedure for renewable energy. But there are agreements especially for wind with regional governments.
Already in 1991 a government agreement was made between the national government and seven regional governments on the placement problems for wind energy. In this, the seven wind-rich provinces agreed to reserve area to set up a part of the targeted 1000 MW. However, in the year 2001 it proved that only one of the provinces was able to meet its target. In July 2001 a new government agreement was signed called "Blow". This time all provinces signed and agreed to a specific target. To increase the potential success, next to the Ministry of Economic Affairs also other Ministries involved (Environment, Agriculture, Defence and Transport) signed the agreement. Moreover, the municipalities are directly involved this time through the co-signing of the Vereniging van Nederlandse Gemeenten (co-operation of Dutch municipalities). All parties have now agreed to the target of 1500 MW wind energy in 2010, apart from the planned nearshore wind park. According to the agreement, municipalities and provinces should have assigned locations for new wind parks before the end of 2005. In this, the provinces have the right to by-pass municipalities in proof of default.

The access to the grid is for all kinds of production the same, there are no special regulations for RES-E. Grid access is not a the biggest bottleneck for the introduction of RES-E in the Netherlands, unless speaking of large-scale (offshore) wind farms placed far from the national transport grid. In that case the connection is a considerable cost of the implementation.

There are no special rules for RES-E producers. The regulations are further more objective, transparent and non-discriminatory.

In the Netherlands a new producer pays per meter cable to the network. In case the network needs to be enhanced to deal with this extra capacity demand the producer is also billed for this enhancement. A producer pays once to be connected to the network and furthermore for a yearly fee for the capacity.

5. Local acceptance

Certainly windpower does suffer from local protest against so-called horizon pollution. Many potential wind parks have faced problems with getting permits due to strict regulation to prevent visual and sound pollution. One of the reasons why regional governments didn't reach their target. Large national protest came up with the planning of a huge windfarm placed on the dike through the waddensea, a protected natural area.

For (large) projects an environmental impact assessment (MER= Milieu Effect rapportage) need to be made. Depending on the scale they should apply to the appointed authority. The ministry of Housing, Spatial Planning and the Environment is the responsible ministry for the developing the procedures

The Dutch government has started since the opening of the green electricity market for households July 2002 a TV campaign to promote the switch to green electricity. The duration of this campaign is unknown.

Portugal

In November 2001, Portugal signed an agreement with Spain on the integration of their electricity markets by January 2003. Current developments show that this date will most likely not be met, but market developments go along the way of full market integration. This will inevitably mean that support policies for renewable energy will also have to be attuned. Currently this is not the case. The report describes the current situation in Portugal.

1. National renewable energy targets

The Portuguese government has adopted the present European Union strategy for renewable energy and is committed to contribute to the 12% target by 2010.
The EU renewables electricity Directive (2001/77/EC) states that at least 39% of the electricity in Portugal in 2010 should be generated from renewable sources (green electricity). Portuguese policy makers have adopted this target as the national target. Underlying assumptions for this indicative target are that:

- it will be possible to continue the national electricity plan building new hydro capacity larger than 10 MW
- other renewable capacity, only possible with financial state aid, will increase at an annual rate eight times higher than has occurred recently.

These assumptions imply that new capacity for producing electricity from renewable sources, excluding large hydro, will increase at a rate twice as high as the rate of increase of gross national electricity consumption.

The target for renewable energy supply aims at a share of 15% of total energy consumption by the year 2010.

According to the official government Program E4 (officially called the Energy Efficiency and Endogenous Energy Program; RCM nº 154/2001) the outlook for the installed capacity for electricity production in 2010 is 15.000 MW, the indicative target is that 50% of the installed capacity consist of techniques based on fossil fuel combustion and the other 50% consisted of techniques based on use of renewable sources.

Table : Installed capacity for Electricity production, outlook 2010

	Installed capacity 2001 (MW)	**Installed capacity 2010 (MW)**	**Foreseen Investments (M€ 2001)**
Renewable Energy			
Mini hydro	215	500	420
Wind	80	3,000	3,100
Biomass	10	100	160
Biogas	1	50	100
Photovoltaics	1	50	300
Wave and Tidal	0	50	80
Municipal Solid Waste	66	130	n.d.
Large Hydro	4,210	5,000	800
Sub total	**4,583**	8,800	4,960
Combustible fossil fuels			
Natural gas	1,240	2,800	640

	Installed capacity 2001 (MW)	Installed capacity 2010 (MW)	Foreseen Investments (M€ 2001)
Coal	1,870	1,870	0
Fuel oil	1,614	1,500	0
Cogeneration	1,200	1,700	400
Gasoil	334	0	0
Sub total	6,258	7,870	1,04
Redes Electricas			**3,000**
Total	**10,840**	**16,750**	**9,000**

Source: Programa E4, Ministry of Economic Affairs

The key legislatory documents for the promotion of renewable energy in Portugal consist of:

- Dec.-Law nº 339-C/2001: Characterising RES-E, set technical requirements and define tariffs for produced energy.
- Dec.-Law nº 312/2001: introducing new rules relating to the connection to the grid of RES-E producing facilities and to administrative licensing procedures

The decrees are further elaborated in section 4.

2. Investment support schemes

The main instrument to promote renewable energy in Portugal is an investment-related support program. For the period 2000 to 2006 the operational Programme for Economic Activities (POE) is the financial instrument of the Ministry of Economy to support projects in the energy sector under the third Community Support Framework (QCA III). POE is funded by the European Commission (structural Funds ERDF + ESF), national public resources and private investors.

Within the POE Program, subsidies for renewable energy projects are regulated in measure 2.5 Use of energy potential and streamline consumption. Order no 198 of 13 March 2001 establishes and regulates this support measure for the use of energy potential and streamline consumption(MAPE). Investment aid for renewables includes financial support for a maximum of 40% of eligible costs, consisting of lost funding for a maximum of € 300.000 with a balance of 12 years lending.

For the current policies the procedures of getting support were sufficiently known to the target group and simple enough. This is illustrated by the large amount of wind power projects offered for support: the total amount of renewable production offered largely exceeds the available grid capacity.

Feed-in-tariffs

Besides investment subsidies, the legal framework for feed-in tariffs for electricity produced from renewables is an important incentive.

The Decree-Law no 189/88 of 27 May 19988 was the first law which guaranteed the access to the grid for independent power producers using renewable energy sources and co-generation. In 1995, as part of the new legal framework of the National Electricity System and after the

publication of an autonomous legislation regulating co-generation, Decree-Law no. 189/88 was adjusted to the new framework and Decree-Law no. 313/95 of 24.11.95 was approved.

Nevertheless, in the late years, the energy sector, in general, and the electricity sector, in particular, have faced two important modifications: the development of a single internal energy market and the increasing pressure of global environmental challenges. The first one, is responsible for the adoption of EU Directives aiming to liberalize the energy sector operation. The second one, obliges to reinforce the integration of energy and environmental policies aiming to fulfil international commitments on the reduction of greenhouse gas emissions. Therefore, the existing legal framework was revised by Decree-Law no. 168/99 of 18.05.99.

Decree-Law no. 168/99 introduces a full change to the feed-in tariffs applicable to the sale of electricity from renewables, establishing the principles to account environmental benefits of power generation from renewable energy sources and creating an opportunity to implement green tariffs. Additionally, Decree-Law no. 168/99 re-organizes the permission process for RES power plants - describes the general arrangements, lays down the principles and establishes the rights and duties of all parts involved. Last but not least, Decree-Law no. 168/99 modifies the mechanisms to define the interconnection points of power plants, in order to assure an increased transparency to the procedures and equity between promoters.

Under the conditions of the resultant legal diploma, power producers have the guarantee that the electricity produced will be bought by the public grid during the license period.

The feed-in tariff is calculated as the sum of three parts related to:

- The avoided costs for the Public Power System due to the starting-up and operation of the power plant, including: *(i)* the avoided investment cost on new power plants and *(ii)* the transport, operation and maintenance, including fuel costs.

- The environmental benefits from the use of endogenous energy resources.

Feed-in tariffs are determined by this new Decree-Law, which presents an updated method to calculate the tariffs and the formula valid for each time period. The environmental part of the tariff is based on the unit valuation of the avoided CO_2 emissions of a reference plant: 370 g (CO_2) /kWh and 75 €/ton. The average prices that are estimated for 2002 are listed in the table below.

Photovoltaics	< 5kW	410
	> 5kW	224
Wave		225
Small Hydro		72
Wind	beyond 2600 hours	43
	from 2400 to 2600 hours	51
	from 2200 to 2400 hours	60
	from 2000 to 2200 hours	70
	first 2000 hours	83

Table: Average prices for renewable electricity in Portugal (EUR/MWh), Source; Portuguese Transmission System Operator REN

The current feed-in tariffs in Portugal are relatively high. Wind projects submitted for license largely exceed wind capacity goal, as well as estimated grid capacity for connection of wind power generation (limit due to grid safety and topology).

	Licence requests	Power (MW)
Wind	319	6807
Small	53	144
Others	6	72

Source: Portuguese Directorate for Energy

Obligations systems

Portugal has not made a decision on the issue of implementing a certificate system (to be defined till October 27th, 2003). The Transmission System Operator (REN) is conducting work in this field, and has particularly good conditions to be recognised as a Certificates Issuing Body (IB) in Portugal. The Renewable Energy Certificate System (RECS) appears to be a very appropriate platform for Certificates issuing and trading. Membership of other Portuguese entities is desirable in order to achieve full participation in RECS.

Voluntary green electricity schemes

It seems that there is limited or no voluntary demand for renewables in Portugal.
Portuguese TSO has to monitor all renewable energy fed into the grid.

3. Guarantees of origin

The Portuguese TSO, has to count all the energy fed into the public grid. Therefore, it is responsible for monitoring all the generation, including renewables, and its destination (distributors and some large consumers). An official system for Guarantee of origin is not in place yet.
The TSO company REN is officially separated from the national supply company. In practice strong connections still exist as EDP holds 30% of the stocks of REN,
S.A.

An official system for Guarantee of origin is not in place yet.

4. Administrative procedures and grid access

- Portuguese law includes specific administrative licensing procedures for the promotion of renewable electricity production. .

The Special Regime Production (PRE) includes a purchase obligation for the TSO, provided that there is enough grid capacity. With current capacity restrictions, in practise not all electricity offered can be accepted.

5. Local acceptance

Portugal has not yet opened its electricity market for smaller consumers; thus renewable energy is no incentive for these consumers to switch supplier.

Spain

1. Support scheme: feed-in tariffs

Spain has chosen a feed-in system as the main support mechanism for RES-E. The Electricity Act 54/1997 enshrined two different electricity production systems: the *Ordinary System* and the *Special System*. Whereas under the former, the regulatory basis was the free generation market or electricity pool where demand and supply bids for electricity are matched and prices are set in consequence, in the latter all generating plants below 50 MW belonging to three clearly separated areas –cogeneration, RES-E and waste– are given a special treatment justified by their contribution to "the environmental protection, energy efficiency improvement and the reduction in consumption".

According to article 30 of that Act RES-E producers are entitled to incorporate all their output power into the grid system and to receive as payment the general generation hourly pool price plus a premium or incentive fixed by the Central Government for all Spain. The total amount paid to RES-E generators must be between 80% and 90% of the average electricity price estimated each year by the Government. That average is calculated by dividing the total electricity supply revenues estimated from the whole electricity supply billing (excluding VAT and other taxes) by the total estimated power supplied[1]. The Act allows solar plants to surpass such a range. Regarding hydro, this rule only applies to small plants (10 MW or below).

The authorisation of any of these special plants is left in the hands of the Regional Autonomous Governments (Article 28), according to the federal political system in place in Spain since the 1978 Constitution.

This Special System was developed in depth by the Royal Decree 2818/1998, which entered into force on January 1st 1999. This legal disposition contains a preamble that states: "the established incentive for RES facilities has no time limit placed on it because their environmental benefits must be internalised and RES special characteristics –higher costs– prevent them from competing in a free market".

This Royal Decree 2818 fixed the RES-E premium amounts for the 1999. As foreseen in the 18th article of this Decree, the premiums have been adjusted annually by the central Government since then "in line with the variation in the average electricity sale price[2], which shall be applied to the sum total of the market price plus the premium". The table below shows the evolution of premiums since 1999.

[1] The Spanish Central Government estimated that electricity revenues for the year 2002 would total 13,457 M€ with a total supplied power of 197,425 kWh and that therefore the average electricity price would be of 6.82 €c/kWh.
[2] The average electricity sale price is defined as the forecast income from billing for electricity supply divided by the forecast electricity supplied. See footnote 1 for year 2002 estimate.

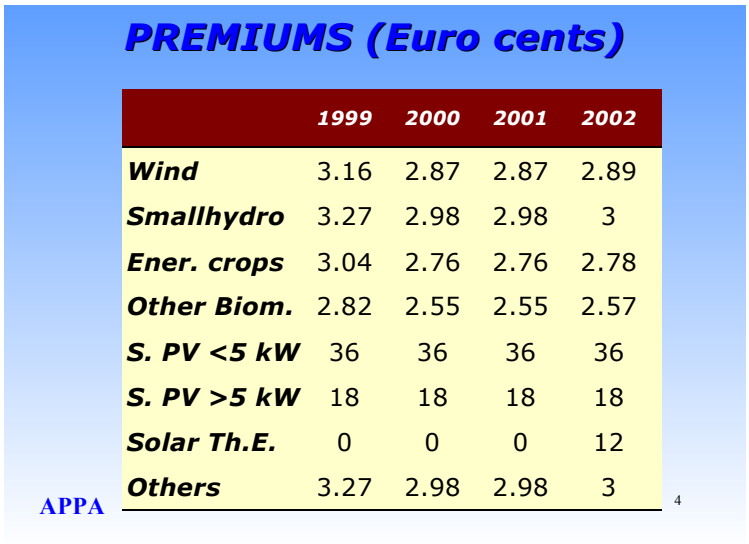

Table 1: Evolution of RES-E premiums by technology

Although the premiums are paid directly by the distributors that are fed with the electricity from the renewable generator, they are entitled to pass such amounts to the National Energy Commission (CNE). Premiums are legally regarded as a *diversification and security of supply* cost of the electricity system and therefore are paid at the end by all electricity consumers like the other costs of the system.[3]

In order to offer RES-E generators a way to know fully in advance their revenues per kWh regardless of hourly market price changes, the same *Royal Decree 2818* has given some RES-E producers the right to opt for a fixed price instead of the "market price + premium" basic option. That fixed price is also adjusted annually by the Government according to the variation in the average electricity sale price.

The table below compares both options in 2002 assuming last year's average market price (3.8 €c/kWh). The basic option is better in terms of revenues although the difference between both options is small. Most RES-E producers follow the basic "market + premium" option. Legally, they are only entitled to change from one option to the other once every year.

[3] Although almost all RES-E generators have chosen this feed-in scheme, according to the Spanish legislation they may follow two other alternative schemes: to make offers directly to the electricity market or to sign physical bilateral contracts with distributors, suppliers and qualified consumers. In both cases they are also entitled to receive the same premiums as in the feed-in scheme. Any RES-E generator which choses to make offers to the electricity market would be also entitled to receive 0.9 €c /kWh as a capacity payment.

RES PRICES 2002 (Euro cents)

	Fixed Prices	Market Price + Premium
Wind	6.2	3.8+2.8
Smallhydro	6.3	3.8+3
Energy crops	6.1	3.8+2.7
Other Biom.	5.9	3.8+2.5
S. PV <5 kW	39	3.8+36
S.PV >5 kW	21	3.8+18
Others	6.3	3.8+3

Table 2: Comparison between fixed prices and premium payments.

According to the 32nd article of this Royal Decree "every four years the premiums set in this Royal Decree shall be revised by taking into account the evolution of the price of electric power, the participation of these facilities in the coverage of demand and their impact on the technical management of the system". Hence, later this year –after the end of the first four-year period– the Central Government will carry out the first revision of such premiums. It is expected that the Government will keep the current amounts of premiums for wind and small hydro whereas the premium for biomass should be increased to ensure the required profitability of plants and investments.

The existence of both the "market price + premium" scheme and the annual adjustment of premiums and fixed prices according to the variations in the average electricity sale price stress the market oriented approach of the Spanish support system. This way all reductions in costs brought about by conventional producers in the electricity market are passed onto RES-E producers' revenues. Thus, APPA regards the Spanish support scheme as a good example of how to combine market forces and incentives for clean energies without complex mechanisms or bureaucracy. Moreover, this well-known framework is able to deliver quite good results at an affordable cost: RES-E generators within the Special Regime received last year premiums under this scheme that totalled 335 M€, which represents only 2.4% of the total electricity supply revenues.

The current Spanish support system has demonstrated its efficiency in delivering good results in those RES-E technologies with the appropriate amount of premiums such as wind energy but it has not been capable of overcoming alone other barriers as explained in the following chapter. Financial institutions have confidence in the stability of this framework and its ability to combine market forces and incentives for clean energies without complex mechanisms or bureaucracy. The framework needs only to be improved to deliver better results and be complemented by new policies aimed at removing pending administrative and market barriers.

For the time being, Spanish independent investors and developers are pleased with the feed-in economic scheme and are therefore reluctant to be involved in the experiments already in place in some other countries with alternative schemes such as the tradable green certificates or voluntary approaches such as green electricity offers. Actually, in Spain there is no green

electricity offer in the market so far although this situation may change with the complete liberalisation of the household electricity market from January 1st 2003.

2. National renewable energy targets

The Electricity Act 54/1997, currently in force, abandoned the old notion of electricity supply as a public service and opened the door to a new electricity legal framework aimed at making the guarantee of supply to all consumers compatible with the principles of objectivity and transparency within a liberalised market. This Act brought into force in Spain the provisions of the European Directive 96/92/EC.

In its 16th Transitory Provision, the Electricity Act enshrines the 12% RES EU goal by 2010 as a legal one in Spain and envisages that a RES Plan should be drawn up to fulfil such a goal. This provision states that "In order for RES to satisfy at least 12% of Spain's total energy demand by the year 2010, a plan shall be drawn up to promote renewable energies and whose objectives shall be taken into account in the setting of premiums".

Table 3: Spanish RES-E goal by 2011

The Central Government adopted in 1999 the *National RES Development Plan 2000-2010* aimed at reaching that 12% goal by 2010. As far as RES-E are concerned the Plan fixed as a target that renewables will satisfy 29.4% of all electricity demand by 2010, the same target that was later fixed in the Directive.

The *National RES Development Plan 2000-2010* adopted technology-specific targets to fulfil the 29.4% goal. These technology-specific targets were updated last September in the *Spanish Electricity and gas Infrastructures Plan 2002-2011* which increased the expected demand of electricity by 2011 that had been considered within the 1999 *National RES Development Plan*. Both documents have the legal status of *Plans* adopted by the Spanish Cabinet and sent later to the Parliament. Whereas the first one was sent to the Parliament only for information purposes, its recent update has been debated and eventually approved last 2nd October by the Economy Commission of the House of Representatives. However, there has not been any

formal transposition or reference to the Directive in any of these Plans or in any other legal document.[4]

All these goals and their current degree of fulfilment are shown in the tables below. Note that actually the updated targets are foreseen by the year 2011 instead of the original 2010 reference.

	Goals 2011 (MW)	Situation 2001 (MW)
Wind	13000	3337
Big Hydro	16571	16399
Small Hydro	2380	1607
Biomass	3098	164
Biogas	78	45
Solar TE	200	0
Solar PV	144	16
MSW	262	94

Table 4: technology specific targets of RES-E by 2011

Although RES-E share has risen from 17.1% in 2000 to 22.4%[5] in 2001, the fulfilment of the 2011 goal (29.4%) will be impossible under current trends. Actually, last year's share was primarily reached due to the extraordinary higher than average hydro electricity production which alone accounted for 18.5% of the RES-E share. The 50% increase in the electricity demand over the last decade and the 30% rise expected for the next ten years add even more difficulties in achieving the RES-E goal.

Wind energy is the only RES-E technology that seems to be on the right track to achieve the 2011 goals. The stable legal framework, the right level of the wind premiums and the regional development plans put in place by many Regional Authorities have been able to foster a swift wind development with more than 800 new MW installed last year. However, to add around 1,000 new MW every year to reach the 13,000 MW goal will be only possible if the current support system is kept in place and the electricity sector barriers to all renewables, including wind, are removed.

[4] The *National RES Development Plan* or the *Spanish Electricity and Gas Infrastructures Plan 2002-2011* might be regarded as "the report setting national indicative targets for future consumption of RES" that member States should adopt and publish not later than 27 October 2002, as alluded by article 3.2 of the Directive 2001/77/EC. Nonetheless, there has been formal mention of such link within such Plans.

[5] The Energy Statistics from the Government regards as renewable the electricity from the incineration of Municipal Solid Waste (MSW) although according with the Directive 2001/77/EC only the biodegradable fraction of such waste could be considered as a renewable source.

Moreover, it seems essential to streamline administrative procedures regarding authorisation, since at present bureaucracy often makes a nightmare of this process. There should be also some kind of harmonisation among Autonomous Regional Communities since each of them currently follows its own singular procedure.

The growth rate of other RES-E technologies is too slow to envisage the fulfilment of the capacity goals by 2011. Small hydro, for instance, only added 64 new MW to the installed power in Spain over the last two years. As the Spanish Renewable Energy Agency (IDAE) states in one of its last regular reports "the pace at which new small hydro plants are currently being installed is insufficient to achieve the 2010 goals (2380 MW)". This situation clearly points out that a good support system in terms of economic revenues is not enough to overcome the administrative and environmental barriers that prevent small hydro from developing all its untapped potential.

The situation is even worse as far as biomass is concerned. Although biomass is one of the cornerstones of the RES Development Plan, only 19.5 MW have been installed over the last two years. Biomass is currently at a complete standstill due to the lack of profitability of projects as a result of the current premium level. To reverse this situation APPA has asked the Government to increase biomass premiums around 1.8 €c/kWh in order to foster new investments, guarantee their profitability and deliver the ambitious planned power by 2011 (3,098 MW). Biomass development would also require a more integrated policy, which takes into account the environmental and agricultural benefits of this RES-E. The increased goals adopted by the new Plan only stress the urgency of the additional measures required.

Solar PV –with only 3.5 MW installed last year– also needs urgent measures to reach its modest goal by 2011 (164 MW). Among them, the current premiums should be increased enough to get a payback period of 10 years and a guarantee for 20 years.

Moreover, RES-E development has been only possible in those Spanish regions where a wide political and social consensus has been achieved between the Autonomous Government and the local councils. Last but no least, social and economic local agreements have helped to prevent conflicts with local organisations and residents. Information campaigns and careful environmental impact assessments have helped in many cases to overcome landscape concerns of local population and lack of energy awareness.

3. Guarantee of origin of RES-E

There is no guarantee of origin for electricity sources in place in Spain. The Government expects to set up such a scheme with the transposition of the RES-E Directive.

4. Administrative procedures and grid access

Administrative procedures regarding authorisation of RES-E plants are full of lengthy bureaucracy that makes often this process to be a nightmare for developers. It seems essential to streamline such administrative process and introduce some kind of harmonisation among Regional Communities different procedures.

RES-E developers have to cope with weak grid infrastructure in some parts of the country –a problem that is being solved partly by agreements to share the cost of grid strengthening between groups of wind developers– and the connection with the distributors' grid. Independent developers usually face substantial difficulties in reaching an agreement with the

grid operators, commonly big utilities, which in many cases have been abusing their dominant position to try to avoid or delay access to their networks by independent RES-E operators. The present legal regime regarding grid connection is completely outdated –it was passed in 1985– and unsuitable for RES-E plants. A new legal framework is in the pipeline in order to guarantee a more transparent and objective procedure.

Sweden

1. National renewable energy targets

Sweden has adopted a national renewable energy target, which envisages a 10 TWh increase of the annual RES-E output between 2003 and 2010. This new target was adopted by the Swedish Parliament in June 2002. It does not fulfil the target 60% of the Swedish electricity consumption 2010. It indicates 51%-52%. To meet the target an increase of the annual RES-E output ought to be 20 TWh.

2. Investment support schemes

From the middle of 2003 on an obligation system will be implemented as support scheme. Since Sweden will experience a new system and a new market, at present it is unpredictable if there will be enough demand.

For electricity from biomass prices are expected to be sufficient to attract new projects. For wind power and small hydro they will be too low to attract investment. For owners who have a high dept burden there could be problems.

Penalty maximum 2, 2 eurocent/kWh is designated, but it will be too low and will create a low maximum price level.

Besides the obligation system, there are other voluntary systems in addition to the mandated system planned.

Whether there will be enough demand given the price, cannot be forecast. The voluntary green electricity scheme is to be monitored by the Swedish National Energy Administration.

3. Guarantees of origin

Mechanisms to ensure accurate and reliable guarantee of origin are under development for RES-E. They are managed by Swedish National Energy Administration, a National Authority.

4. Administrative procedures and grid access

There is no fast-track planning procedure for renewable electricity producers. On the contrary the procedure is slow.

Regarding the grid access issue, there are measures taken to ensure that grid system operators guarantee the transmission and distribution of RES-E for plants < 1, 5 MW. To some extent it works in practice. However, Sweden has not given RES-E priority to the grid.

There are rules set up regarding the distribution of cost for grid connection between grid owners and RES-E owners of plants < 1, 5 MW, but these rules are not followed in practice. There are differences between the grid owners.

Some grid owners provide accurate and detailed information about cost associated with the grid connection, others do not. RES-E owners are allowed to issue a call for tender for the connection work.

A transparent system relating cost sharing of system installations – such as grid connections and reinforcements – between all producers benefiting from them has not been implemented so far. There is no regulation about non-discriminative fees for transmission and distribution for RES-E either.

But there is a legal framework to ensure that fees charged for the transmission and distribution of electricity from RES plants reflect reliable cost benefits resulting from the plant connection to the network, but it is not followed in practice. The legal procedure for process is extremely slow.

There are no actions taken in order to analyse obstacles in order to facilitate access to the grid system for RES-E producers.

5. Local acceptance

Local polls have shown 70% support for wind power. How new projects are received by neighbours are very much dependent on the presentation and possibilities for participation in the planning procedure. In some cases there is a high acceptance in others a high resistance. Unfortunately some local authorities are reluctant to support RES. Some are even negative.

So far there are no national guidelines for project siting.

Some little measures have been taken to flank to promote RES-E production. There is a campaign to reduce the use of electricity for heating by changing the system into biomass heating systems.

United Kingdom

Renewable energy policy in the UK largely focuses on electricity production. In February 2000, the Government published its initial conclusions on its new policy for renewable energy in the UK. The key elements of this policy are:

- Introduction of a new Renewables Obligation, to succeed the Non-Fossil Fuel Obligation (NFFO)
- Exemption of renewable electricity and heat from the Climate Change Levy
- An expanded support programme for renewable energy
- A regional strategic approach to planning and regional targets for renewable energy.

The Government proposed an initial 10 year strategy, in collaboration with industry, to help meet its aims. Specifically, it is proposing that 5% of UK electricity needs should be met from renewables by the end of 2003 and 10% by 2010. The 2010 target equals the indicative target specified in the EU renewables Directive and results in a generating capacity of approx. 8300 MW (including large hydro and waste incineration).

2. Investment support schemes

The key component of the UK policy for renewable energy is the Renewables Obligation, implemented in April 2002. The Renewables Obligation requires electricity companies to supply an increasing proportion of their supply from renewables. The targets equal the ones specified above. The Obligation lasts until 2027. Renewable Obligation Certificates (ROCs) will be awarded for renewable electricity produced within the UK. A 'buy-out' price is set for non-compliance, initially set at £30/MWh (approx. 48 euro/MWh), and will be adjusted annually in line with the retail price index. Money raised from companies 'buying out' in this way will be redistributed to companies that have met their Obligation, in proportion to the number of ROCs they presented in that year. This will act as a further market stimulation.
Although the current installed capacity is relatively low in perspective of the targets/obligation for this year (causing high certificate prices) the obligation in 2012 is at the same level as the target.

Feed-in-tariffs

The UK has no feed-in system. Support is organised through the renewables obligation and the exemption on the climate change levy as explained above.

Obligations systems

Under the Utilities Act 2000 all licensed electricity Suppliers in the UK will be obliged by law to purchase a proportion of their previous year's consumption from renewable source in accordance. Scottish companies supplying within E&W fall under the Renewable Obligation, English and Northern Ireland companies supplying in Scotland will be subject to the Renewables (Scotland) Obligation (RSO). Northern Ireland has the option to join the Obligation (subject to decision of the NI assembly), although Northern Ireland business consumers will be subject to Climate Change Levy.

Electricity suppliers str expected to source 3% of their total electricity sales from renewable sources in the period 2002 - 2003. This share will steadily increase until 2011/2012, after which the level will be set at 10.4% until 2026/2027.

Table: Expected increase in the Renewables Obligation

Period	Estimated sales by licensed suppliers in the UK (TWh)	Total obligation (UK) (TWh)	Total obligation as % of sales (UK)
2001/2002	310.9		
2002/2003	313.6	9.4	3.0
2003/2004	316.2	13.5	4.3
2004/2005	318.7	15.6	4.9
2005/2006	320.6	17.7	5.5
2006/2007	312.4	21.5	6.7
2007/2008	322.2	25.4	7.9
2008/2009	323.0	29.4	9.1
2009/2010	323.8	31.5	9.7
2010/2011	324.3	33.6	10.4
2011/2012 to2026/2027			10.4

Source: DTI

Supportive regulations

The second key policy instrument implemented in the UK energy market is the Climate Change Levy (CCL). The CCL was introduced in March 2001 and came into effect in April 2001. The CCL is a tax on energy use by business and public sectors, aiming to increase energy efficiency by these sectors. The CCL is expected to save at least 5 million tonnes of greenhouse gas emissions a year by 2010. To avoid distortion of competition, all revenue raised will be paid back, primarily through a 0.3% cut in employers' National Insurance Contributions and £150 million (239 million euro) of additional government support for energy efficiency measures and energy-saving technologies.

Taxation level on different fuels under the CCL is:

- Liquid petroleum gas (LPG): 0.07 p/kWh
- Gas, coal, lignite and coke: 0.15 p/kWh
- Electricity: 0.47 p/kWh

Renewable energy generators who meet certain tax conditions for exemption to the CCL will be issued with Levy Exemption Certificates (LECs) for their generation. The LECs will be linked to the physical supply of renewable electricity, and can be used by business consumers to claim exemption from the CCL. Presentation of a LEC as evidence of renewable electricity purchase is mandatory.

As the Renewables Obligation and the exemption granted to renewables on the Climate Change Levy do not include any preference according to specific renewable energy technologies, the likely result will be that additional penetration of renewables concerns only the lower-cost renewables. The Government has recognised that a significant proportion of the 10% target will need to be achieved through longer term technologies, such as PV, offshore wind and energy crops/biomass. Therefore they defined additional support for these technologies.

In most cases the same units of electricity will be eligible to both obtain a LEC and a ROC. However, it has been offered that energy from waste units will not be eligible to count towards the Renewables Obligation, while it qualifies for LEC.

Eligibility for ROCs and LECs

Source	ROCs	LECs
Landfill gas	Y	Y
Sewage gas	Y	Y
Energy from waste	Y*	Y*
Hydro > 20MW	N*	N*
Hydro <20MW	Y	Y
On-shore wind	Y	Y
Off-shore wind	Y	Y
Agricultural and forestry residues	Y	Y
Energy crops	Y	Y
Wave power	Y	Y
Photovoltaics	Y	Y

*These technologies are eligible under certain conditions (see below).

Conditions to eligibility:

- Energy from waste: only the non-fossil derived element of mixed waste is eligible. Energy from incinerating waste is excluded.
- Co-firing biomass: Eligible until 31 March 2011 for up to 25 % of a supplier's obligation. From 1 April 2006, 75 % of biomass fuels at least must come from energy crops.
- Hydro: large scale hydro is eligible up to 20 MW. This is mainly due to most large scale hydro plants are now coming to the point when they need refurbishment. Allowing 20 MW plants into the scheme ensures that such refurbishment will be provided for. Plants of a capacity greater than 20 MW will be included if they are commissioned after the obligation comes into force.

Electricity contracted under the NFFO arrangements are eligible for ROCs and LECs to the extent that the source they use are eligible.

Additional funding opportunities for renewable energy in general include:

- £ 55.5m (approx. 88.5m euro) over the next three years for DTI's new and renewable energy research and development programmes. This programme covers most renewable energy technologies. Funding is located through twice yearly calls for proposals.
- £ 100m (160m euro) of new funding for renewable energy announced by the Prime Minister in a speech to WWF on March 6, 2001. He asked the Performance and Innovation Unit (PIU) to determine how the money will be spent. On November 5 the PIU's report recommended:
  - £25 million extra for capital grants for offshore wind.
  - £20 million for solar and other technologies that can be utilised directly on homes and businesses. Of this, £10 million will go to increased support for innovative PV installations and £10 million to support solar, biomass heat and other renewable community projects.
  - £15.5 million to help farmers and foresters establish energy crops in the UK.
  - £5 million for demonstration and testing of wave and tidal technologies.
  - £10 million for fundamental research on the next generation of renewable technologies, and for associated technologies such as energy storage.

- £18 million for development and demonstration of advanced energy crop technologies for clean and efficient production of heat and electricity, for example gasification based CHP.
- £4 million for advanced metering and control technologies so that electricity grids can best harvest PV and other small-scale technologies.
- £2.5 million for to provide information and support to planners and local decision-makers, and land use planning purposes generally

Bidding

The former key support scheme in the UK was the Non-fossil fuel obligation (NFFO), which was in place until 1999. The NFFO contracts are still honoured, so generators are still paid their (premium) bid price per kWh. Under the previous arrangements, the Non-Fossil Purchasing Agency (NFPA) reimbursed the difference between the premium price and the pool selling price to the regional electricity companies. This mark-up was paid for by electricity consumers through the so-called Fossil Fuel Levy on electricity. NFFO contracts are still honoured under the new arrangements.

Voluntary green electricity schemes

It is possible to choose for 100% green electricity supply instead of only the obligation as a household. But through the high demand for the obligation the price for this is relatively high so that not many households make the switch.

De CCL-exemption encourages companies to choose for a green supply as well. This tax advantage is low in comparison to the high demand for the obligation, which makes it unattractive to switch to green.

3. Guarantees of origin

Currently there are two ways of getting your renewable electricity certified.
1. Via Ofgem with the ROC's system as explained above. Ofgem is the English regulator and administrating the ROC certificates.
2. Campbell Carr Ltd is the issuing body in the UK for RECS certificates, also a reliable way of certifying renewable energy. these certificates could be used for the voluntary market

Electricty can only be certified by one of these two bodies. Since the obligation target is relatively high to the production of renewables almost al green electricity is certified by the ROCs system. ROC certificates do have a much higher value then RECS certificates.

Ofgem is the regulator of the electricity market
RECS certification is so organised that independence is guaranteed.
- *Do they apply to other energy sources?*

Not yet, but might be used in the future

4. Administrative procedures and grid access

There is no special regulation for connecting RES-E to the grid. When a new production site wants to be connected they have to pay in case the grid have to be enhanced. Since renewable energy is most of the time placed at rural areas this is often the case for example windfarms. Unfair in this regulation is that if a second site is placed next to this site and the grid doesn't have to be enhanced the costs are much lower.

Except the renewable obligation there is no special regulation for priority for RES-E grid access. The new electricity trading arrangement (NETA) is causing some problems in the income for the electricity (energy) part of RES-E sites. Since the introduction the wholesale prices per MWh are low. Furthermore for the NETA 3 hours in advance the exact demand and production must be known. If any imbalance exists high penalty prices have to be paid. In practice this mean for RES-E even lower revenues from the energy production because their production is so unpredictable

5. Local acceptance

Many people are in favour for renewable energy, unfortunately these positive attitude changes immediately when a windfarm is placed near their area. Remarkable is that surveys in areas around windfarms shows that people living close the such a farm are very in favour
There are guidelines and the scale of the project determines the authority to apply to.
Currently there is no media campaign from the government. The government is asking for reactions to a new policy program to stimulate renewable energy and is promoting a new fund of 10 million pound for small-scale renewable energy that will be available from the beginning of 2003