PROGRESS REPORT

On the implementation of the European renewables directive

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Contents

0. Executive Summary

The Directive on the Promotion of Electricity Produced from Renewable Energy Sources (the Renewables Directive) adopted in October 2001 represents the first concrete action from the European Union in its strategy to meet its obligation to reduce the greenhouse gases emissions under the Kyoto Protocol. This report undertaken by WWF is a first evaluation of the progress made thus far by the Member States. It was compiled on the first anniversary of the Directive's approval and in time for the first deadline with which the EU Member State must apply, namely adopting national measures to implement the Directive goal of pushing forward the use of renewable electricity to represent 22.1 % of the total electricity by 2010.

This report shows that although most EU Member States have adopted national renewables targets, not enough measures have been taken to address the key barriers to the development of renewable electricity. With current policies, the 15 European countries are likely to miss the 22 % target, achieving together only between 15 and 17 percent of the EU's electricity consumption by 2010. This gap is due to lack of progress in the largest European countries, including Italy, UK and France. The report comes to the conclusion that measures that guarantee premium prices for power generators, such as the feed-in systems – which go some way towards compensating for subsidies offered to fossil and nuclear power – prove to be the most successful policy tool to boost renewables. Recently established quota systems have not yet proven the claimed benefits. Barriers related to grid access and administrative procedures are becoming to be the most critical issue for the future development of renewable projects in Europe.

There are five main recommendations that WWF would like to make which should lead to closing the forecasted gap. Firstly, dynamic feed-in systems should be established with tariffs high enough to ensure competitiveness and based on 10–15 year contracts. Secondly, renewables should be given priority access to the grid by the transmission system operator. Thirdly, administrative requirements should be streamlined to enable the prioritisation of renewable energy technologies in the implementation of national energy plans and programmes. Fourthly, planning guidelines should be elaborated to assist national and regional planning authorities to ensure siting of renewables projects and management of potential local impacts. And finally, governments should extend the guarantee of origin to all electricity sources, thereby implementing a full power disclosure system.

These recommendations must be taken up by the EU Member States to ensure a swift and timely implementation of the EU's Renewables Directive and promote the urgent shift away from polluting conventional energy sources.

1. Introduction

In October 2001, the European Council and the European Parliament approved the European Directive on the Promotion of Electricity Produced from Renewable Energy Sources (hereafter the Renewables Directive)[1]. This law provides a European legal framework to ensure that the potential of renewable energy sources (RES) is further exploited. The Directive states "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 to this end.

The Renewables Directive builds upon the 1997 European Commission **White Paper** on renewable energy sources[2] which had set the EU target of consuming 12 % of gross inland energy from renewables by 2010 – with electricity representing 22.1 % of the total. This is essential under the commitments made by the EU to comply with the 1997 **Kyoto Protocol** on the reduction of greenhouse gas emissions. The full implementation of the Directive is expected to can save up to 200 million tonnes of CO_2 (Mt CO_2) emissions or an additional 6 % of 1990 CO_2 emissions.

1) Directive 2001/77/EC of 27 September 2001, OJ 2001 L 283, p. 33.–27.10.2001
2) Energy for the future: renewable sources of energy – White Paper for a Community Strategy and Action Plan, COM (97)599 final (26/11/1997)

Table 1: Timetable for its implementation

27 October 2002	The EU Member States (MSs) are to publish a report setting the national indicative targets for future RES-E consumption for the following ten years and showing what measures are to be taken to meet those targets.
27 October 2003	• Deadline for transposition of the Directive by MSs. • The EU MSs to publish a report which includes an analysis of success in meeting the national targets. • A system concerning the guarantee of origin of RES-E to be put in place at national level. • MSs to publish a report defining action to be taken to reduce regulatory and non-regulatory obstacles for RES
27 October 2004	The Commission to publish the first bi-annual report based on the national reports assessing the extent to which: • the Member States have progressed towards achieving the national targets; • the national indicative targets are compatible with the indicative share of 22.1 % by 2010.
27 October 2005	The Commission to present a „well-documented" report on the experience gained concerning the application and coexistence of the different support schemes in the Member States This report will be accompanied, if necessary, by a proposal for a Community framework for support schemes for RES-E.
31 December 2005	European Commission to publish a report on the implementation of the Directive.
27 October 2010	Member States to achieve their national targets.

2. This report

One year after its adoption, the following report assesses the current status of the implementation of the Renewables Directive by considering national policies and measures approved by the Parliament before October 2002. After this date, however, new policies have been introduced which will have an impact on the development of power generated from renewable sources. The gap analysis does not consider these policies, but their merits or shortcomings are discussed in this report whenever it is relevant.

The gap evaluation is based on information provided by the WWF network and other environmental NGOs, supported by data and analysis produced by renewable industry federations and research centres, such as the ECOFYS consultancy in the Netherlands.

Table 2: Summary of the Renewables Directive

1. *Definition of renewable energy sources (Art. 2):* The Directive sets a common definition of renewable energies to be developed across Europe in order to meet the target of 22.1 % of electricity by 2010.
2. *National targets (Art 3):* In order to reach the overall 22.1 % target, the Directive establishes national targets – defined as reference values in the Annex – for the future domestic consumption of renewable electricity.
3. *Support schemes (Art 4):* Member States can choose one of the different support schemes to promote the production of renewable electricity.
4. *Guarantee of origin (Art 5):* The Directive introduces a system of "guarantee of origin" to make sure that electricity is genuinely produced from a renewable source.
5. *Administrative and planning procedures (Art 6):* A review must be carried out on the existing national regulatory and legislative systems for planning procedures in order to "streamline and expedite" them for renewable projects.
6. *Access to the grid (Art 7):* The transport and distribution system operators have to guarantee access of renewable electricity to the grid, indeed, even priority access. Connection charges, meanwhile, will have to 'reflect the economic costs and benefits associated with the connection' so that costs for small generators are not unfairly prohibitive.

3. Definition of renewable energies

The Renewables Directive defines renewable energy as all the non-fossil sources, including: biogases, biomass, geothermal, hydro-power, landfill gas, sewage treatment plant gas, solar and wind. It is classified as being produced from renewable energy sources if the electricity is obtained by plants using solely 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, yet electricity produced as a result of the storage system is excluded.

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

However, to date a number of countries still have definitions which are in direct contradiction with the European Directive. This includes **Spain**, where renewable energy plants still count municipal solid waste incineration within the renewable energy target. **Italy** offers the most striking case of non-compliance. There national legislation includes all waste in the definition of renewable energies. Inorganic wastes (e.g. plastics) accounted for about 45 % of the renewable energy certificates issued in 2002. A worrying development is the inclusion of a coal-based fuel in the proposal for the implementation of the European Renewables Directive.

4. National targets

The Annex of the Renewables Directive contains reference values for national indicative targets on electricity produced from renewable energy until 2010. The deadline for the transposition into national law is set for 27 October 2003.

The table below gives an overview of renewable energy policy papers and related targets currently in place at national level. Most of the national objectives adopted so far follow the values indicated in the Directive, with exceptions such as that of Sweden, whose adopted target for the year 2010 (49,5 %) is clearly lower than indicated in the Directive (60 %). To date only Italy and Greece, have not adopted a 2010 national target with regard to renewable energy. Most of these targets do not have a legal status but are part of "soft" legislation and are included in policy papers or national energy plans.

A crucial issue for the near future will be the translation of national targets into specific regional and local goals. In the **UK**, for example, the government has encouraged regional authorities to assess their potential for renewable energy and to nominate specific targets for each technology. In the north-east of England, for instance, a regional study suggested a wind energy target of up to 364 MW by 2010 – more than the British Wind Energy Association had considered in its own regional report. Unfortunately, very few targets have been fixed by regions or municipalities across Europe.

Table 3: Overview of RES policy papers and targets in EU Member States

Country	RES Policy Paper	Targets
Austria	ELWOG II; Ökostromgesetz BGBl. I 149/2002 (Green Electricity Act).	No binding targets, but objectives to reach 78.1 % RES-E. No heat targets.
Belgium	Wallonia: Electricity Act of 12 April 2001 (adopted Sept. 2001) with green certificate system started October 2002. Flanders: Electricity Act 2000 (adopted Sept. 28, 2001) with green certificate system as of July 2002.	Wallonia: 3 % Sept. 2003 up to 7 % Sept. 2007 Flanders: 2 % RES end 2004, 5 % by 2010. Additional new CHP capacity of 1.200 MW in period 1995–2005.
Denmark	Energy action plan „Energy 21"; Act on utilisation of RES and amendments; Large revision of policies ongoing (all RES support stopped after 2003); Act on heat supply No. 382 (1990).	Reduce CO_2 emissions by 21 % in 2008–2012 compared to the 1990 level. 20 % RES-E by 2003 and 29 % RES-E (including waste) by 2010.
Finland	Action plan for renewable energy sources; Finnish National Climate Strategy.	Targets for increase specified for period 1995–2010. Separate targets per technology: bio-energy, small hydro, wind, solar heat, PV, heat pumps.
France	National Plan for Improved Energy Efficiency (PNAEE) No. 2000-108, dated 10 February 2000; DOM-TOM & Corsican RES Program for French overseas departments and territories.	PNAEE designed to meet France's EU target of 21 % RES-E, ADEME target 14000 MW wind power.

Germany	Renewable Energy Act (EEG; March 2000), formulating feed-in tariffs and purchase obligation for TSO (Transmission System Operator).	National target: 12,5 % electricity from RES by 2010; Indicative targets are formulated on specific RES-E.
Greece	Action Plan „Energy 2001“, Economic Development Incentives Law 2601/98; Third Community Support Framework for the period 2000–2006.	Greece adopted its EU indicative RES-E target of 20.1 % in 2010.
Ireland	Green Paper on sustainable energy (1999); “Strategy for intensifying wind energy deployment”.	13.2 % by 2010. Target for 500 MWe additional RES-E capacity by 2005 with annual target of 31 MW between 2000 and 2010. Technology specific targets set in AER rounds.
Italy	Italian White paper for the valorisation of renewable energy sources (August 1999); Decrees of 11/11/99 and 18/03/02 introducing RES-E obligation and certificates system.	Target RES formulated as contribution to greenhouse gas reduction target: 18-20 Mton CO_2 reduction. (855 PJ/yr by 2010) Target Decrees: 2 % electricity from RES by 2002; new proposal foresees 0.3 % increase every year from 2005.
Luxembourg	Grand-Ducal Regulation of 17 July 2001 on financial promotion of RES for at least the next 5 years.	Increase share RES-E from 2.5 % in 1997 to 5 % by 2010); Doubling share of wood in final energy consumption from 0.5 % to 1 % in 2010.
Netherlands	Third Energy White Paper (1996); Action Programme for 1997–2000; Proposal for new electricity regulation of September 2002.	Share of 10 % of renewable energy in 2020 (5 % by 2010). Share of 8.5 % RES-E by 2010.
Portugal	Program E4 (Eficiência Energética e Energias Endógenas, 154/2001 of 19 October 2001); Law 339-C/2001 on tariffs for RES.	RES goal 15 % by 2010; EU indicative target of 39 % RES-E adopted. Specific goals on installed capacity wind, small and large hydro and other RES-E by 2010.
Spain	1999 National Renewable Energy Plan; General Electricity Law 54/1997 and Royal Decree 2818/1998.	Target share RES 12 % by 2010. Target wind capacity 9000 MW by 2010.
Sweden	Swedish Government Energy Bill 2001/02: 143 and updates discussed in Parliament Oct 8, 2002.	Target 10 TWh increase RES-E from 2002 to the year 2010. EU indicative target 60 % RES-E by 2010.
UK	Utilities Act 2000: Social and Environmental Guidance to the Gas and Electricity Markets Authority, June 2002 Energy White Paper 2003.	10 % of electricity demand by RES by 2010, 20 % by 2020.

Source: Authors data; ECOFYS 2003

5. Progress towards targets

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 shows very clearly that – without additional measures – there will be a gap in each Member State between the current situation and the 2010 targets set in the European Directive.

Most financial incentives, even those which have been judged to be most effective in increasing renewable energy production, appear to be insufficient on their own. Failure to address fundamental administrative problems, such accessing the grid and obtaining building permits, can jeopardise the achievement of the Directive's objectives. Such persistent handicaps could weigh heavily on the results by the end of the decade.

As shown in table 4, with current policies, the 15 European countries are likely to miss the 22% target, achieving together only between 15 and 17 percent of the EU's electricity consumption by 2010. This will result in increase climate polluting emissions and be a significant failure in the leadership of the European Union in realising its commitments under the Climate Change Convention and its Kyoto Protocol.

Table 4: Scenarios for the uptake of renewably generated electricity

	1999	2010			Evaluation
		EU Targets	Current scenario	Active scenario	
AT	72%	78%	63%	63.00%	☹
BE	1%	6%	1%	3.00%	☹
DE	6%	12,5%	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%	☹
I.E.	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%	57%	57.00%	☹
UK	2%	10%	4%	4.00%	☹
EU	14%	22%	15%	17.00%	☹

Sources:
European Renewable Energy Federation own calculations based on the PRETIR study (2002) by Ecofys, 3E & Fraunhofer Institute. The assumptions used for all Member States are based on the official European statistics [European Energy Outlook, EC 1999] and assume a certain growth in electricity demand until 2010 based on historic and experienced growth rates.

Notes:
Current scenario: scenario based on the implementation of existing policies (policies passed by Parliament in the different Member States before December 2002).
Active scenario: scenario based on the continuation of existing policies until 2010 (no new measures are adopted).

The expected gap is due to lack of progress in the largest European countries, including France, UK, and Italy. The following paragraphs provide a brief reviews of national situations, ranging from the above-mentioned problematic countries, to the less problematic – such as Spain and Germany, and finally the more advanced such as Denmark.

The largest gap in absolute terms occurs in **France**, where the resulting renewable electricity 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, as a consequence of the recently approved favourable feed-in tariffs for wind power.

A purchase obligation exists for all renewables up to 12 MW per site since a law which was passed in February 2000. All tariffs were fixed in March 2002. The level is cleary sufficient for wind, small hydro and is clearly insufficient for other technologies without complementary investment support. 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)**. Despite having Europe's largest wind energy resource, the UK has a very long way to go in achieving its target – it is starting from a very low base level – and in this sense it is not on target to deliver 10 % renewables by 2010. According to the government, consumption of renewable electricity went up from 2.51 % in 1999 to 2.86 in 2001. However this was due largely to imports of renewably produced electricity over the inter-connector with France of mainly hydro. In 2001, the use of renewables seen as a percentage of overall energy consumption was approximately 1 % (including waste incineration).

The rate of renewables development will have to increase massively over the next 7 years in order to achieve this target. However, a key issue will be the increase in energy demand. 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 moved 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 might include coal-based emulsion); the very low target for renewable generation in the new plan; the lack of certainty on the exact targets the industry will be subject to after 2002; 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, is very slim.

In **Spain**, feed-in tariffs have been sufficient to ensure a rapid growth of the wind power sector but other renewables sectors have experienced problems in achieving a sustained growth in installed capacity. In 2001 the percentage was 22,4 % mainly because of the intense rains that permitted a better than average hydro production (18,6 % of the total). According to the Spanish Association of Producers of Renewable Energies (APPA), the target of 2011 for the wind sector (13.000 MWp) is achievable when taking into consideration that there are applications for 52.000 MWp in total of which they estimate that about 30.000 MWp are feasible. The other sectors are lagging behind in the implementation of their targets.

Bioelectricity, which should contribute 24.5 % of the future renewables growth, will be unable to meet its objective for 2011 if trans-sectorial incentives are not approved for the agricultural sector. The PV sector is also expected to have problems in meeting its targets unless technological improvements are found that reduce the costs for production of electricity with solar panels. Additional measures are urgently required to control fast growing electricity demand, which rose by 50 % in last decade and is expected to grow by an additional 30 % in the next 10 years. In September 2003, the Government has adopted an expansionist energy plan based primarily on the construction on Combined Cycle Natural Gas plants.

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 11–12 % of the expected 12,5 % of renewable electricity. In the last year, Germany also raised its available budget to support solar energy, enabling them to increase their earlier maximum level of capacity of 350 MWp.

Denmark seems to be on course to meet its target of 29 % renewable electricity by 2010. According to the Danish industry in 2001, 200MW of new wind capacity was commissioned. Although down on the previous year's record, this is still an impressive achievement for a small country, which has supplied 16 % of its power from wind by the end of 2001. Meanwhile, the country remains in a market limbo with its transition from a feed-in system to a new quota system, which is expected to be up and running in 2003.

6. Support mechanisms

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 requested by Article 4 of the Directive. According to the Directive, such schemes 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 renewable energy, technological and geographic characteristics,
- be simple and cost-effective, and
- be sufficiently long to establish investor confidence.

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.

Member States have adopted a number of financial mechanisms to provide support for market development of the renewable generation. These include along with the traditional investment support schemes a number of production incentives, such as feed-in systems and renewables obligations. To date, the majority of European Member States have applied feed-in tariffs for renewable energy production, as shown in table 5.

Table 5: Choice of RES support schemes per Member State

Country	Major support instrument	Selection of additional instruments
Austria	TSO purchase obligation for RES-E with mandatory obligation to suppliers; fixed feed-in tariffs.	Rebates and feed-in tariffs for biomass (electricity and heat), solar thermal, PV, wind and biogas.
Belgium	Feed-in tariffs (Brussels), renewables obligation and tradable green certificates (Walloon & Flemish region).	Rebates, investment-based tax exemptions.
Denmark	Feed-in tariffs for RES-E.	Tax relief for RES-E e.g. from CO_2 tax, income tax. Compensation schemes; Solar heat obligation in new buildings.
Finland	Tax relief, voluntary green pricing.	Rebates.
France	Feed in tariff & purchase obligation (for wind energy, small hydro, PV, biomass and biogas, and electricity from CHP and wastes incineration).	Fiscal measures for PV, wind, solar thermal, wood burning heating devices (stoves, closed heaters or boilers), heat pumps.
Germany	Feed-in tariffs for RES-E.	Soft loans, local rebates, green tariffs. Solar roofs programme.
Greece	Feed-in tariffs for RES-E.	Subsidies and tax deduction.
Ireland	Tendering (AER programme) with purchase obligation and feed-in tariff.	CO_2 tax, tax relief.
Italy	Renewables Obligation.	Tax relief.
Luxembourg	Feed-in tariffs.	Compensation schemes.
The Netherlands	Feed-in system and purchase obligation proposed, combined with tax exemption and certificate system (Jan. 2003).	Feed-in tariffs, fiscal measures.
Portugal	Feed-in tariffs.	Rebate, compensation schemes.
Spain	Feed-in tariffs.	Compensation schemes, third party financing.
Sweden	Renewables Obligation and certificate system as of Jan. 2003. Quota on new RES-E production from 6% in 2003 to 15% in 2010.	Feed-in tariffs for small generators, tax exemptions (largely to be phased out).
UK	Purchase obligation: 10% by 2010 and will continue (and increase) until 2027, tradable green certificates.	Pollution tax relief, green tariffs.

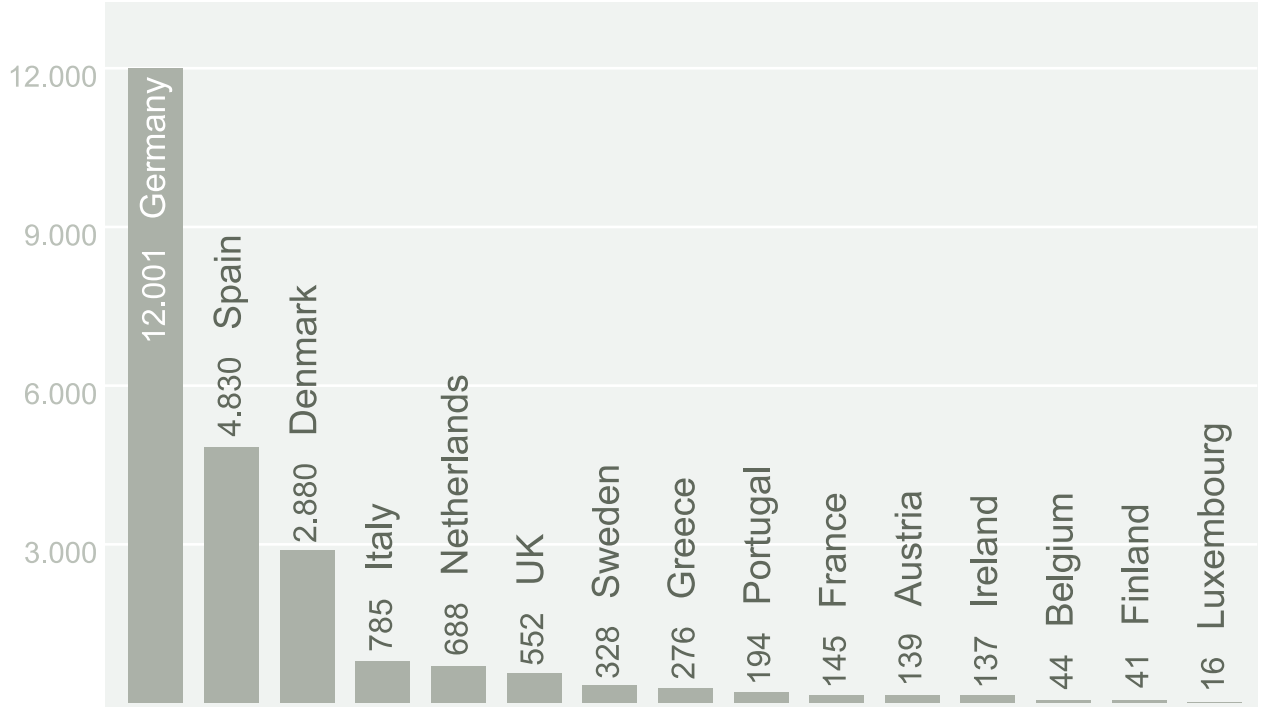
Source: Authors info based on ECOFYS 2003

6.1 Investment support schemes

Capital incentives are being used to pay for the extra development costs linked to the deployment of renewables technologies. By accelerating increases in capacity and manufacturing, investment support can bring technologies to an improved level of market competitiveness more quickly. In general, these incentives apply to small-scale technologies such as PV which cannot directly compete with more developed markets under current conditions, or to technologies which have high market entry costs.

By reducing the high up-front costs of renewable energy projects, capital based incentives remain a key element for the deployment of renewable energies. However, by basing the support on offsetting the high costs of project capital, there is a risk of providing incentives mainly for the installation of renewables plants instead of for the actual renewable electricity production. Therefore, capital support schemes should be time-limited and gradually substituted with production incentives once these are approaching market competitiveness. For instance, in **Germany** the 100,000 roof solar power programme will end this year and will to be replaced by higher feed-in prices for some photovoltaics installations.

Table 6: Installed wind energy capacity in EU countries (MW, 2002)



6.2 Production incentives

Production incentives are based on actual power production, providing an incentive to maximise capital use and reduce the costs of energy production. In doing so, they reduce the costs of producing renewable electricity to consumers in contrast to capital incentives. The systems adopted by countries include feed-in tariffs, quota systems (also known as renewable obligations), and tendering schemes.

Feed-in systems that guarantee premium prices for power generators – which go some way towards compensating for subsidies offered to fossil and nuclear power – prove to be the most successful policy tool to boost renewables, as shown by the fast growing share of wind power recorded in Germany, Denmark and Spain (see table 6).

Feed in systems

Feed-in systems 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. Usually the feed-in tariff differs between various technologies, depending on the different production costs. The amount of renewable generation is determined by the payment but there is no explicit quota. When carefully developed, major advantages of a feed-in system 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 low administrative costs.

Nevertheless, feed-in systems have been recently criticised as they would not encourage competition between generations and therefore do not force reductions in unit electricity price. Experience shows, however, that they put pressure on manufactures to produce ever more cost-effective technologies, such as wind turbines. Fixed price schemes facilitate a homogenous planning of renewable energy projects, and thus result in the large-scale dissemination of renewable energy in a beneficial and acceptable way for society.

WWF believes that the effectiveness of feed-in systems depends of the following success factors:

- **Fair payment.** An effective support scheme should reduce the financial risk of independent power producers by guaranteeing them with secure revenues. Where the premium has been set at a low level, the feed-in system has not been successful to promote the development of any given specific energy technology. For instance, given the slow development of the biomass sector, in **Germany** and more recently in **Spain**, incentive rates for bioelectricity have been significantly increased to attract the necessary investments. Nevertheless, evidence suggests that for the sector to develop additional support for the production of biomass feedstocks, such as energy crops, is urgently needed. In **France**, the extension of the feed-in tariff to bioelectricity based on anaerobic digestion is needed to enhance growth in biomass electricity.

- **Long term stability.** Experience shows that tariffs must be long-term guaranteed by a highly credible source or signed by a contract. For example, in **Germany** and **France**, tariffs are made available for a period between fourteen and twenty years per plant, with the exception of hydropower facilities, which require a longer harmonisation period. In **Spain**, on the contrary, long term security is not guaranteed because feed-in tariffs are revised every year in December for the following year. WWF believes that a ten to fifteen-year time horizon is crucial to creating a friendly investors climate.

- **Technology innovation.** In order to account for technology development and the expected cost reductions with market growth, feed-in tariffs should decrease over time, as experience is gained in line with the expected learning curve. For instance, under the **German** renewable electricity law, buy-back rates for successive 15-year contract decrease from year to year, with annual reductions of 1 per cent for biomass, 1.5 per cent for wind, and 5 per cent for photovoltaic power. In **France**, projects will receive 8.38 €/cents per kWh for the first five years after which the payment varies depending on the turbine productivity.

- **Balanced development.** Public policies should promote a homogenous distribution of renewable energy plants. This is key to reducing local acceptance problems, this is often due to the concentration of renewables production on the best location, which are often in areas of high natural or recreational value. Therefore, feed-in systems must differentiate incentives according to the available resources. For example, in the **French** case for wind feed-in tariff, governmental authorities defined a standard rate of return for projects and calculated the tariff to make projects in high and low resources equally profitable. Similarly, the earlier **German** feed-in scheme has been amended to introduce different compensation rates depending on the profitability of the sites.

Quota systems

Under the quota system, governments can set a quota to source a given percentage of renewable electricity. The requirement to meet this target can be imposed on a variety of market actors, such as producers, suppliers or consumers. At the end of the given year, the market actor must demonstrate its compliance with the obligation, by submitting the required number of certificates, often issued as units representing 1 MWh of renewable power, to the authorities. The certificates represent the market value of the renewable quality of electricity and therefore function as an incentive per kWh of produced electricity. This mechanism is currently applied in the **UK**, **Italy**, **Belgium** and is expected to start in spring 2003 in **Sweden**.

Theoretically, the main advantage of quota systems and green certificates is that they drive the most cost-effective deployment of renewable technologies. However, the existing experience suggests a number of shortcomings that could undermine the fast and significant deployment of renewable technologies. The most important disadvantage experienced to date is the likely volatility in the price of green certificates. To reduce the latter, balancing systems like financial instruments are necessary. A second shortcoming is that this system puts small renewables generators at a disadvantage because of the high transaction costs for managing those hedging instruments.

WWF believes that countries should carefully consider the difficulties and effects of implementing a quota system. Given that the effectiveness of this tool is not yet proven on the ground, the following success factors are key:

- **Stringent targets.** To attract private sector investment and reduce regulatory uncertainty, it is crucial that governments design the obligation in such a way as to guarantee a growing market size (e.g. an ambitious medium term target) and a clear schedule of implementation (yearly targets). For instance, in the **UK** and **Belgium** targets have been designed to create a shortage of certificates especially during the first years. In the former country, the renewable obligation has been set

Box 1: The Belgium Quota System

In Belgium, utilities and supply companies have to be able to demonstrate that a given quote of the electricity they supply comes from renewable energy. Green certificates, issued for one MWh of renewable power, are used for the verification. In the Flemish region, the quota has been set at 2 % by 2002 increasing to 5 % by 2010, while in Wallonia is 3 % by 2003 up to 8 % by 2010. The quota can be automatically increased depending on the path of domestic renewable deployment. At the end of the year, suppliers which are not able to provide enough green certificates to meet the quota, may pay a financial penalty equal to 75 € per MWh in 2002, increasing to 125 € per MWh in 2004. The market will decide on the price of green certificates. Nevertheless, it is expected to vary between the price guaranteed by the transport grid operator (50 € per MWh in Flanders and 65 € in Walloon), and the penalty price. This arrangement reduces the volatility of certificate values, which can discourage small independent producers to enter the market.

at 3 % in 2003, increasing to 10 % in 2010 (and 20 % in 2020). In the **Belgian** region of Flanders, the 2 % quota for year 2003 is expected to drive a 20 times increase in renewable power generation.
In **Italy**, on the contrary, the low renewable quota of 2 % for 2003 is unlikely to provide the renewable industry with the long-term security needed to kick start a large-scale development of renewable electricity. In addition, the market is suffering from the lack of certainty on the exact targets the industry will be subject to after 2002. A proposal for a yearly increase of 0.35 %, which will not be enough to achieve the national target of 25 % (equal to 75 TWh by 2010), is still waiting for parliamentary approval at the time of writing of this report.

- **Penalties level.** Along with the target levels and the scarcity of available certificates, the price of green certificates depends on the credibility of the obligation. For the obligation system to work well, the penalty for not purchasing a certificate must be higher than the investment needed to meet the quota. In the **UK** for instance, the buy out price is set at approximately 48 € per Mega watt-hour, and will be adjusted annually in line with the retail price index. Money raised from companies "buying out" in this way are re-distributed to companies that have met the obligation, in proportion to a number of certificates they presented in that year. This is expected to act as a further market stimulation mechanism.
  Similarly, under the quota system of **Belgium** (Flanders), if a supplier cannot satisfy its obligation to fulfil the green electricity quotas it must pay a fee of 75 MWh in 2002, increasing to 125 € by 2004. On the contrary, in **Italy** the penalty for not adhering to the 2 % renewable power quota is not yet defined. The above-mentioned Marzano decree may introduce a sanction equal to 1.5 the price of the certificates.

- **Ensure stability.** Independent power producers, which have played a major role in developing renewable energies, must be guaranteed a stable revenue for their investments. When renewable quotes are to be met at a certain date and the certificates are not transferable to the next period, the price of green certificates is likely to be highly volatile. This can cause serious barriers for potential independent investors. For instance, in **Italy**, the uncertainty that characterises the future price of green certificates – which is currently set by the Grid operator and it has changed three times since 2001 – risks jeopardising investor security and freezing project developments.
  To reduce the unstability of revenues, governments must set a fixed price floor and a penalty and allow some degree of banking and borrowing, as in the case of **Belgium** (see box 1). However, the validity of banking should be restricted to a period of at most five years, a period long enough to address fluctuations due to variation of renewable energy generation (e.g. wind and power supply), and small enough to prevent speculation on green certificate prices. In addition to banking and borrowing, governments should introduce a future market for green certificates to decrease the fluctuations in certificate prices.

- **Technology banding.** As obligation systems generally benefit mostly those technologies that are closest to market competitiveness, they are not likely to result in the development of those renewable energies which are not competitive enough to find their niche on the market set by the obligation. In the **UK**, for instance, 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 energy crops/biomass, PV, and offshore wind. Therefore, they identified additional support for these technologies.

To ensure a diversified renewables portfolio, WWF recommends governments to either break-down the obligation into fractions to come from specific technologies such as biomass, solar etc. or provide additional subsidies for these technologies.

Box 2: The UK Quota System

In April 2002, the United Kingdom introduced a new Renewable Obligation that requires electricity companies to supply an increasing proportion of their supply from renewables. Specifically, 5% of UK electricity needs should be met from renewables by the end of 2003 and 10% by 2010. Renewable Obligation Certificates (ROCs) will be awarded for renewable electricity produced within the UK. A 'Buy-out' price is set for non-compliance 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.

Another policy implemented in the UK energy market is the Climate Change Levy (CCL). The CCL is a tax on energy use by business and public sector, aiming to increase energy efficiency by these sectors. Additionally, 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.

Tendering schemes

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. Normally there are separate tenders for different technology bands. Theoretically, the advantage of a tendering system is the competition between potential investors in the new RES and subsequent price reductions. However, past experience in the UK, France and Ireland shows that the system has had several problems including: high bidding costs, relative to the size of the contracts, a large number of projects that are not implemented, and many problems of local acceptance due to the high concentration of wind developments.

In France and the UK, the system has failed to deliver a significant increase in renewables power production. In the first country, set against a target of achieving 500 MW by 2005, only 82 MW were actually operating in 2002, while 86 MW were cancelled, and 193 were in the pipeline to be installed. In the UK, although the country ranks first for wind energy potential, wind power capacity amounted to just below 340 MW at the end of 1999. Finally, in Ireland, most of the bidding processes organised under the Alternative Energy Requirement Programme (AER) regularly failed to gain planning permission. In addition, 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.

In the above analysis, this report identifies crucial success factors for developing effective production incentives for ensuring the competitiveness of renewables against conventional power sources. The achievement of the Renewables Directive targets requires nevertheless more than a well-balanced support framework. It depends on yet other circumstances, such as access to the grid and administrative procedures.

7. Grid connections

Given its characteristics, renewables are faced with grid access issues which are different or absent for conventional generation. Firstly, independent renewables operators are often not given **access to the grid**, at a reasonable price. Secondly, renewable energy projects may be located in rural or remote areas where the grid connections are limited or unavailable. Rectifying this situation requires grid **extension and strengthening**, which is often very costly and could make the proposed project uneconomic if all the developers were to bear all the associated costs.

WWF believes that fair access to the grid for renewables projects is becoming the most critical issue to ensure the rapid uptake of renewables. In **Spain**, for instance, the poor grid infrastructure in some regions of the country, and the resulting need to built new power lines to connect up wind farms, has been a major technical problem. This problem is now partly addressed by agreements to share the cost of strengthening between project developer. However, smaller developers are still encountering substantial difficulties in reaching an agreement with a grid operator. Utilities are likely to abuse their dominant position to try to evade or delay access to their networks by wind plants operated by independent power producers. Furthermore renewable energy producers are frequently forced to assume the costs of any technical adaptations.

In **France**, the grid transmission costs published in July 2002 clearly charge the reinforcement costs to the grid operator. Nevertheless, the difference between reinforcement and connection costs are charged to the producer, and yet it is not clear what the difference will be for low and medium voltage grids. Furthermore, 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). In **Germany**, in principle the renewable energy law (EEG) clearly charges costs related to the grid connection to the renewable producer, and those due to the grid extension to grid owners. However, delays in the development of renewable energies are due to legal cases between producers and grid owners' concerning the legal definition of grid connection and extension

In the **UK** and **Finland** there is no clear framework for managing the technical and regulatory adaptations required for integrating renewable energy into the grid. In Austria, grid operators do not concede priority access to renewable energy. In **Belgium**, independent power producers face exaggerated costs for grid connection, fabricated grid problems and calls for participation in grid enforcement. In **Greece**, although legal requirements exist to give renewables priority access and guarantees the use of the grid, the complete saturation of the grid in some of the country's windy areas (Thrace, Euboea, Cyclades Islands, Lakonia) precludes, currently and for the next 5–6 years, the connection of any new RES installation to the grid.

WWF recommends that utilities are obliged to allow straight forward access to the grid from renewables and provide transparent and economically fair charging systems for grid access. This has been done in **Denmark**, where measures have been taken to ensure that grid system operators guarantee the transmission and distribution of renewable electricity, which 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 bearing the costs of the technical adaptations required for integrating new renewables producers onto the grid.

In some countries, grid access charging tariffs are still penalising renewable energy for being intermittent in nature, while favouring generators which are able to provide continuous and consistent generation output. In the **UK**, for instance, the New Electricity Trading Arrangements, created in 1997 to replace rules under the Pool (NETA) are being re-examined to decrease barriers to renewable energy penetration. The original terms of NETA penalised wind trading on the spot market because producers have to guarantee their ability to produce the traded energy 3.5 hours in advance.

However, forecasting tools are not yet accurate enough to precisely predict production far in advance, exposing wind generators to penalties for undelivered energy. In practice this means even lower revenues from the energy production for RES-E as their production is unpredictable. According to the British Wind Energy Association, given the modest level of wind in the UK, intermittancy is not an issue and penalties are counter-productive to the achievement of the 10% goal.

8. Administrative procedures

Another crucial issue is the burdensome administrative procedures required for the approval of new generation capacity from renewable energies. In several countries, the realisation of renewable projects depends on several different permits and approvals (i.e. electricity-generation license, installation license, operation license, pre-siting permit, approval of environmental terms and conditions, and approval of intervention on public land). This complicated network of permit procedures results in an additional disincentive to project developers. It is clear that without considerable change in this area, any rapid increase of new capacities will be hindered. WWF recommends that countries streamline project planning and permission procedures and set up a "one stop shop", especially for small projects.

In **France**, a new national law approved at the end of 2002 imposes several new restrictions regarding the way in which wind energy projects are planned and developed. The most important one is that no development reaching a total of 12 MW capacity – therefore being eligible for feed-in tariffs – must be sited closer than 1.5 km to any other wind turbine owned by the same promoter. A second restriction is that all applications involving turbines over 25 meters in total height must be argued out at a public hearing. Thirdly, any project over 2.3 MW in capacity must be the subject of a full impact study. These measures may delay significantly the deployment of wind energy in France.

In **Italy**, new renewable energy projects suffer from implementation difficulties as local authorities delay procedures in processing applications. This penalises renewable energy operators, which do not have the financial capacity to cope with the delays necessary to obtain permits. The situation has become worse with the adoption of the governmental decree, the Decreto sblocca centrali, which has implemented fast-track permit procedures for all power facilities over 300 MW, excluding de facto all renewable energy technologies.

Secondly, renewable energy can be successfully deployed only if there is active support and public acceptance for renewable energy at the level, at which they are brought forward for approval. As in most cases, the responsibility for granting the respective permission lays at the local and regional level, a strong commitment from regional and local governments is crucial. WWF believes that 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 potential local impacts.

Development of such guidelines is a key priority for **Italy**, where a draft guidance document developed by the Ministry of the Environment is still waiting for cabinet approval; while in **Ireland**, there is a need to revise and update the five-year old planning guidelines for wind park developments, which are rather problematic for some schemes particularly in rural areas.

Positive examples include the **Netherlands** and **Spain**. In the former country, the July 2001 government agreement – called "Blow" – requires municipalities and provinces to assign locations for new wind parks by the end of 2005. In these areas, the provinces have the right to by-pass municipalities in proof of default. In **Spain**, several Regions have explicitly integrated the development of renewable energies in their energy and environmental plans. The Aragon region, for example, facilitates wind energy development through "Strategic Wind Plans", which facilitate wind energy development by offering streamlined rules for projects including more than two wind generation parks.

In the **UK**, an analysis of planning decisions on wind projects submitted between June 1999 and January 2002 shows a 67 % approval rate, but only for those projects which were finally determined by local councils. Although this is a good trend, the process still has a long way to go before wind power meets the goal of 7000 MW, which the industry estimates to be needed to meet the UK 10 % target. To address this issue, the government encourages the regions to assess their potential for renewable energy and to nominate specific targets for each technology. This could reverse the planning debate, putting the onus on local authorities to nominate a list of sites where wind farms could be built, and then allowing developers to take their pick.

Finally, in several countries, Defence Authorities are becoming a major obstacle to new wind developments, claiming that wind turbines could disrupt radar operations. For instance, the **British** Ministry of Defence have objected to 25 % of wind proposals, while action from **Belgian** military authorities have resulted in more than 700 MW of wind capacity being put on hold. Clearly, better co-operation is needed between public authorities to prevent this type of delays.

9. Guarantee of origin

The Renewable Directive requires countries to implement proof origin systems to track renewable energy sources. Only a very limited number of countries seem on track to implement their guarantee of origin schemes, such as the **UK**, **Belgium** and the **Netherlands**.

Given the current process of energy liberalisation, WWF recommends that such disclosure requirement should be applied to all sources of energy. There is no reason why certification should be limited only to renewables. Certificates of origin and the cost of providing them, should be a requirement for all power sources. Otherwise, this system could even become an extra burden for renewable generators.

A comprehensive and harmonised disclosure system, indicating the sources used to generate electricity and the associated environmental impact (eg CO_2 emissions and nuclear waste), 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. According to a survey conducted by the Environmental Change Institute, Oxford, 80 % of European consumers want to know about the source and environmental impacts of the electricity they buy. This survey shows also that consumers want the information displayed on bills.

Disclosure of electricity has now become a major point in the proposed European Directive on further energy market liberalisation. Initially proposed by the European Commission, the requirement for an European harmonised system for power disclosure was strengthed by the European Parliament first reading vote in March 2002. According to this vote, suppliers should detail in their bills the sources of electricity and the associated environmental impacts, including $C0_2$ emissions, nuclear waste, particulate and nitrogen oxides. In November 2003, the EU Energy Council watered down this provision, requiring general environmental information to be available only on a web site information Second reading is expected by June 2003.

WWF recommends countries to extend the proof of origin for renewables to all energy sources, thereby level the playing field between different power technologies and provide consumers with the environmental information they need to make informed choices in a liberalisation market.

10. Recommendations

Given the expected gap in achieving the community target of 22 % of electricity from renewables energy sources by 2010, the top policy priority at EU and national level should be to set a favourable environment for renewable energy investments. These following recommendations must be taken up by the EU Member States to ensure a swift and timely implementation of the EU's Renewables Directive, and promote the urgent shift away from polluting conventional energy sources:

- Implement dynamic feed-in systems. Guarantee premium prices are easy to establish, to implement and effective in accelerating the penetration of renewable electricity. However, to be successful, tariffs must be high enough to ensure competitiveness, be based on 10–15 year contracts, reduce overtime to account for technological development, and be differentiated depending on project locations.

- Provide priority access to the grid. Utilities should be obliged to allow straight forward access to the grid from renewables and provide transparent and economically fair charging systems for grid access.

- Streamline administrative requirements. Member States should streamline project planning and permission procedures and set up "one stop shop", especially for small projects. Renewable energy should be prioritised in national and regional energy plans.

- Develop planning guidelines. Member states should urgently develop national and regional planning guidelines to assist permitting authorities to ensure both the optimal siting of renewables projects and the best management of potential local impacts.

- Guarantee disclosure of all power sources. Countries should extend the proof of origin to apply to all electricity sources, thereby reducing the costs to renewable operators and advancing the requirement currently discussed under the Energy Liberalisation Directive.

11. Conclusions

On the first anniversary of the Renewables Directive adoption, this report provides European and national policy makers with a first assessment of the implementation of the European renewable energy directive and of the main problems currently experienced across the larger European Union Member States in the promotion of renewably generated electricity.

This report shows that although most EU Member States have adopted national renewables targets, not enough measures have been taken to address the key barriers to the development of renewable electricity. With current policies, the 15 European countries are likely to miss the 22 % target, achieving together only between 15 and 17 percent of the EU's electricity consumption by 2010. This gap is due to lack of progress in the largest European countries, including Italy, UK and France.

Among production incentives, dynamic and stable feed-in tariffs prove to be the preferred instrument to successfully trigger a significant development of renewably generated electricity. While it is too early to assess the effectiveness of quota systems, initial experience indicates that countries should carefully consider the implications and the difficulties related to their implementation, including their high administrative costs.

Along with financial support schemes, 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.

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This publication was co-ordinated by Giulio Volpi (WWF International).
The text has been written by Ellen Townsend and Giulio Volpi of WWF on the basis of national reports and information provided by Marina Faetanini, Claudia Kunz, Heikki Willstedt, Sami Wilkman, Daniel Archard, Andrea Masullo, Sible Schöne and Pat Finnegan.
The authors wish to thank Stephan Singer and Thomas Cross for their comments.
Layout by Michal Stránský.

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WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which human live in harmony with nature, by:

- conserving the world's biological diversity
- ensuring that the use of renewable natural resources is sustainable
- promoting the reduction of pollution and wasteful consumption

WWF European Policy Office

Avenue de Tervuren, 36 Box 12
1040 Brussels
Belgium

tel.: +32 2 743 8800
fax: +32 2 743 8819