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COMMUNICATION FROM THE COMMISSION

The support of electricity from renewable energy sources

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TABLE OF CONTENTS

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(Text with EEA relevance)

1. INTRODUCTION

1.1. Reasons for the report

Increasing the share of renewables in the EU electricity has well recognised benefits mainly in particular:

– Improved security of energy supply.

– Enhanced competitive edge for the EU in the renewable energies technology industries.

– Mitigation of greenhouse gas emissions by the EU power sector.

– Mitigation of regional and local pollutant emissions.

– Improved economic and social prospects especially for rural and isolated regions.

Therefore the European Union aims to have renewable energy sources providing 21% of the electricity by the year 2010 (see Annex 1). This target has been formulated in the Directive 2001/77/EC[1] on the promotion of electricity produced from renewable energy sources in the internal electricity market, which has also set differentiated targets for each Member State. The Directive further stipulates that Member States have to provide better grid access for renewable energy generators, streamline and facilitate authorisation procedures and to establish a system of guarantees of origin.

The dedicated public support for penetration of green electricity in the electricity market is justified because the benefits listed above are not (or only partially) captured by the net added value fetched by operators in the value chain of renewables-based electricity.

Under the Directive, Member States have set up individual RES-E (electricity from renewable energy source) targets. They are free to choose their preferred support mechanism in order to achieve the targets and/or are allowed to continue to do so for a transitional period of at least seven years after a new EU-wide regulatory framework would be adopted. Article 4 of the Directive states that, *not later than 27 October 2005, the Commission shall present a well documented report on experience gained with the application and coexistence of the different mechanisms* used in Member States. *The report shall assess the success, including cost effectiveness, of the support systems* promoting the consumption of electricity from renewable energy sources in conformity with the national indicative targets. This Article also states that

1 Directive 2001/77/EC of 27 September 2001 on the promotion of electricity produced from renewable energies sources in the internal electricity market (OJ L 283, 27.10.2001, p. 33). The date for the implementation of this Directive was October 2003 and for the new Member States, 1 May 2004.

the report may *be accompanied by a proposal for a Community framework with regard to support schemes*, if appropriate.

1.2. Scope

This Communication serves three purposes:

- The report that the Commission is required to make under Article 4 of Directive 2001/77/EC, presenting an inventory and the **experience gained** with the application and coexistence of the different mechanisms used in Member States for supporting electricity from renewable energy sources.

- The report that the Commission is required to make under Article 8 concerning **administrative barriers and grid issues** and the implementation of the **guarantee of origin** on renewable electricity.

- A plan for coordination of the existing systems based on two pillars: **cooperation** between countries and **optimisation of** the national schemes which will likely lead to a convergence of the systems.

2. ASSESSMENT OF EXISTING SUPPORT SYSTEMS

2.1. The existing support systems

There are currently in the EU a range of different support systems operational that can be broadly classified into four groups: feed-in tariffs, green certificates, tendering systems and tax incentives.

- **Feed-in tariffs** exist in most of the Member States. These systems are characterised by a specific price, normally set for a period of around several years, that must be paid by electricity companies, usually distributors, to domestic producers of green electricity. The additional costs of these schemes are paid by suppliers in proportion to their sales volume and are passed through to the power consumers by way of a premium on the kWh end-user price. These schemes have the advantages of investment security, the possibility of fine tuning and the promotion of mid- and long-term technologies. On the other hand, they are difficult to harmonise at EU level, may be challenged under internal market principles and involve a risk of over-funding, if the learning-curve for each RES-E technology is not build in as a form of degression over time. A variant of the feed-in tariff scheme is the fixed-premium mechanism currently implemented in Denmark and partially in Spain. Under this system, the government sets a fixed premium or an environmental bonus, paid above the normal or spot electricity price to RES-E generators.

- Under the **green certificate** system, currently existing in SE, UK, IT, BE and PL, RES-E is sold at conventional power-market prices. In order to finance the additional cost of producing green electricity, and to ensure that the desired green electricity is generated, all consumers (or in some countries producers) are obliged to purchase a certain number of green certificates from RES-E producers according to a fixed percentage, or quota, of their total electricity consumption/production. Penalty payments for non-compliance are transferred either to a renewables research, development and demonstration (RD&D) fund or to the general government budget.

Since producers/consumers wish to buy these certificates as cheaply as possible, a secondary market of certificates develops where RES-E producers compete with one another to sell green certificates. Therefore, green certificates are market-based instruments, which have the theoretical potential, if functioning well, of ensuring best value for investment. These systems could work well in a single European market and have in theory a lower risk of over-funding. However, green certificates may pose a higher risk for investors and long-term, currently high cost technologies are not easily developed under such schemes. These systems present higher administrative costs.

- Pure **tendering** procedures existed in two Member States (IE and FR). However, France has recently changed its system to a feed-in tariff combined with tendering system in some cases and Ireland has just announced a similar move. Under a tendering procedure, the state places a series of tenders for the supply of RES-E, which is then supplied on a contract basis at the price resulting from the tender. The additional costs generated by the purchase of RES-E are passed on to the end-consumer of electricity through a specific levy. While tendering systems theoretically make optimum use of market forces, they have a stop-and-go nature not conductive to stable conditions. This type of scheme also involves the risk that low bids may result in projects not being implemented.

- Systems based only on **tax incentives** are applied in Malta and Finland. In most cases (e.g. Cyprus, UK and the Czech Republic), however, this instrument is used as an additional policy tool.

The above categorisation into four groups is a fairly simple presentation of the situation. There are several systems that have mixed elements, especially in combination with tax incentives. Annex 2 gives an overview of support schemes in EU-25.

2.2. Assessment of the performance

The generation cost of renewable energies varies widely. National, regional, and agricultural resources are rather different in Member States. Any assessment of support schemes should therefore look at each individual sector.

The **current level of support** for RES-E differs significantly among the EU Member States. Annex 3 gives a detailed assessment of the differences between the total money received for renewable energy produced and the generation cost[2], therefore pointing at the cost-efficiency of the different schemes. When delivering, the wider the gap between “generation costs” and “support” the less the cost-efficient the system is. <u>Due to the complexity of the different renewable energies and the differences in national situation, an analysis per sector has been chosen. A parallel lecture of the graphs in Annex 3 can give how cost-effective and efficient such a system is.</u>

In the case of wind power, the green certificate systems show a big gap between generation and support. The reasons for the higher cost may be found in the higher investment risk, with such schemes and probably in the still immature market for green certificates.

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2 The average level for 2003 and 2004 is used. In the feed-in system, the support price level is equal to the value of the tariff. The source for generation costs used in this Communication is Green-X.

Wind is poorly supported in nine of the twenty-five Member States. Where the total money received by producers is lower than generation costs, no movement will be seen in this sector for those countries.

For biomass forestry, half of the Member States do not give enough support to cover generation costs. In the case of biogas, in nearly three quarters of the Member States, support is not sufficient for deployment.

Alongside the cost, the **effectiveness** of the different support systems is also an essential parameter in the assessment.

Effectiveness refers to the ability of a support scheme to deliver green electricity.

In assessing effectiveness, the effects of more recent systems are difficult to judge. In particular, the experience with green certificates is more limited than with feed in tariffs. Moreover, the amount of green electricity delivered needs to be assessed against the realistic potential[3] of the country.

For wind energy, Annex 3 shows that all countries with an effectiveness higher than the EU average use feed-in tariffs. This type of system currently has the best performance for wind energy.

The analyses for biomass sectors are not as clear as in the case of wind. The generation cost of biomass shows big variations[4]. These large variations are caused by: different sources (forest residues, short rotation coppice, straw, animal waste, etc.), different conversion processes of transformation (co-combustion, gasifications, etc.) and different sizes (existing sizes of biomass plants can vary by a factor of 200). Thus much more precise analyses are needed, based on specific feed-stocks and technologies.

Nevertheless, the analysis shows that, for biogas, both feed-in and green certificates produce good results (four countries with feed-in and two countries with green certificates show a higher effectiveness than the European average). In the biomass forestry sector, it cannot be concluded that one system is better than another. The complexity of the sector and the regional variations mean that other factors play a strong role[5]. In general, incentives to forest harvesting should help mobilise more unused forest biomass for all users.

It is also important to compare **profits from an investor perspective** and effectiveness. This exercise is carried out for a limited number of Member States in Annex 4, assuming current prices over a longer period. This gives an indication as to whether the success of a specific policy is primarily based on the high financial incentives, or whether other aspects have had a crucial impact on market diffusion in the countries considered.

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3 The potential should be read as the "realisable additional achievable potential assuming that all existing barriers can be overcome and all driving forces are active". See Annex 3 for more detailed explanation.

4 Wind on-shore cost varies between €40-100/MWh while biomass varies between €25 and €220/MWh.

5 The support level for biomass is linked more to other factors like the policy choice (big or small plants, with or without co-firing…) than to the instrument chosen (feed-in or green certificate).

2.3. Main conclusions as regards performance (see Annexes 3 and 4)

Wind energy

- The green certificate systems present currently a significantly higher support level than the feed-in tariffs. This could be explained by the higher risk premium demanded by investors, the administrative costs as well as a still immature green certificate market. The question is how the price level will develop at the medium and long term.

- The most effective systems for wind energy are currently the feed-in tariff systems in Germany, Spain and Denmark.

- The capital return with green certificates is higher than for feed-in tariffs. This high return (annuity), is calculated by extrapolating from the currently observed certificate prices[6]. The capital return will depend on the future price developments.

- The analyses show that, in a quarter of the Member States, support is too low for any take-off. Another quarter provides enough support but still obtain mediocre results. This can be explained by the existence of grid and administrative barriers.

- Regarding profit, the feed-in systems investigated are effective with a relatively low producer profit. On the other hand, green certificates at present have high profit margins. It should be emphasised that these green certificate systems are rather new instruments. The situation observed might therefore still be characterised by significant transient effects.

Biomass forestry

- Denmark's system with feed-in tariffs and centralised co-generation plants using straw[7] combustion and the Finish hybrid support system (tax relief and investment) clearly show the best performance, in terms of both effectiveness and economic efficiency of support. A long tradition in high-tech biomass use for energy purposes, stable planning conditions and a combination with heat generation can be considered as key reasons for this development.

- Although feed-in tariffs in general show better outcomes, since investor risks where green certificates are concerned seem to hamper the real take-off of the biomass sector, the analysis is more complex in the biomass forestry sector. Factors other than the choice of financial instrument (infrastructural barriers, installation sizes, optimal forest management and the existence of secondary instruments, etc.), considerably influence the effectiveness of systems.

In nearly half of European countries, the support for biomass forestry it insufficient to develop this high-potential sector further. In many regions incentives would be needed, targeted at forest harvesting, to increase the wood-flow from EU forests to all users, thus preventing possible distortions in the market for wood residues.

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6 The big question is how the green certificate price will evolve in the coming years. The analyses shown in this document are based on a constant value for the certificates.

7 Biomass use of straw is included in the analyses of the biomass forestry although by origin it is not a forestry product. Denmark is the main country using this type of biomass.

Biogas[8] sector

Six countries have an effectiveness higher than the EU average, four of them with feed-in tariffs (DK, DE, GR, LU) and two of them with green certificates (UK, IT). As in the biomass forestry sector, these results are influenced by other factors:

- The agro-economic possibilities and the choice of the size of plants. Large plants have a higher effectiveness. Small plants are supposed to be more important for the rural economy, but the cost is higher.

- The existence of a complementary support scheme. The biogas sector is intimately linked to environmental policy for waste treatment. Countries like the UK support biogas with a secondary instrument such as tax relief. Complementary investment aid is also a good catalyst for this technology.

- For agricultural biogas[9], generation costs are higher but so re the environmental benefits. With landfill gas, the cost is lower but the environmental benefit is reduced.

Nearly 70% of the EU countries do not provide give enough support for the development of this technology.

Other renewable energy sources

The small hydropower sector shows large variations in both supports and generation costs. The development of this renewable technology is considerably influenced by the existence of barriers.

Solar photovoltaic energy is currently actively promoted in DE (world leader), NL, ES, LU and AT.

Full analyses of small hydro and solar photovoltaic energy production can be found in Annex 3.

There are other renewable energies producing electricity which are not included in this document. One of them is large hydro which is a well developed source of renewable energy and in general it does not need any support. Geothermal energy, wave and tidal and solar thermal concentrating power are other renewable energies which are not included in this report, as they are only supported in some Member States or not yet applied at industrial level.

3. INTERNAL MARKET AND TRADE ASPECTS

3.1. Introduction

Internal electricity market and support of RES-E are intimately linked together. Renewable energies provide new installations contributing to security of supply and enlarging the energy mix of electricity generators. Conversely, internal market aspects, like free trade,

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8 Biogas includes all the fermentation processes of biomass: biogas with Co-fermentation, sewage and landfill gas

9 Agriculture biogas is the result of the specific treatment of waste from animal and plant production or from specific energy crops. Landfill biogas involves the extraction of methane from dumped wastes.

transparency, unbundling, disclosure, inter-connectors, can accelerate the deployment of RES-E in the internal electricity market. In many cases, support to renewable energy sources is covered by the Community guidelines on state aid for environmental protection[10]. State aid rules can influence the design of the support scheme.

3.2. Unbundling, transparency and dominant players

In an unbundled market[11], an independent Transmission System Operator (TSO) and an independent Distribution System Operator (DSO) are obliged to guarantee fair grid access to all producers and have to develop the network infrastructure according to a long-term strategy, taking account of the integration of renewable energy resources.

Some countries are still characterised by the dominance of one or a few power companies, often vertically integrated. This might entail a monopoly-like situation, which could hamper the development of RES-E.

For the good functioning of **all** RES-E support systems, truly independent TSO and DSOs are an essential factor.

Governments have to improve consumer information on how the cost of a renewable energy support is transferred to the user. According to estimates by the European Commission, renewable support represents between 4% and 5% of electricity tariffs in Spain, UK and Germany and accounts for as much as 15% of the tariff costs in Denmark. The share of non-hydro RES-E in these countries is currently 3.5% for the UK, 9% for DE, 7% for ES and 20% for DK (see Annex 5)

3.3. Intermittency in Production and Balancing power: a need for appropriate regulation to combine internal market and renewable regulation

Wind power – like other renewable sources – is an intermittent source of energy. The following issues are especially important:

- The prediction of wind. In countries like Denmark, United Kingdom and Spain, RES-E generators have to predict their production, just like other electricity producers. The more firm this prediction, the greater the value of intermittent RES-E sources.

- The time of gate closure[12]. The closer gate closure is to the operating hour, the better intermittent RES-E technologies can predict how much electricity they will be able to deliver.

- The charging of the balancing costs. UK, DK and ES[13] have systems for charging for the deviation from the predicted production of electricity, of whatever origin,

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[10] OJ C 37, 3.2.2001, p. 3

[11] Unbundling is described in Directive 2003/54/EC as follows: in order to ensure efficient and non-discriminatory network access, the distribution and transmission systems must be operated by entities which are legally and functionally separated especially from generation and supply activities.

[12] The closing time for power markets for receiving bids from electricity producers.

[13] UK has green certificates as the main support scheme for renewables. DK and Spain have feed-in tariffs.

including wind electricity. A more detailed analysis of balancing costs can be found in Annex 5.

An intelligent design of the support scheme can contribute alleviating the problem of intermittency.

In cases where power production from intermittent sources covers a high share of domestic power consumption, it is important for RES-E producers to be able to react better to power prices on the spot market. The integration of large shares of intermittent RES-E power into the system can therefore be facilitated by a support system that includes a link to the spot power price and therefore a risk-sharing approach. This is the case with a premium system[14], a green certificate system and some feed-in schemes like the one in Spain[15].

3.4. Trade of Power

The impact of the different support schemes on trade is an important aspect of the compatibility of RES support measures with the internal market. A distinction needs to be made between the physical trade in power (electricity) and the green value of the electricity.

The physical trade in RES-E is subject to the same restrictions that apply to conventional electricity[16]. It is in general possible and is currently happening. The deployment of RES-E would probably increase the need for cross-border trade in power and stronger interconnectors.

Article 3(6) of Directive 2003/54/EC establishes a mandatory disclosure system under which consumers have to be informed of the contribution of each energy source to the overall fuel mix. The full implementation of the disclosure would increase the green value of renewable electricity. The disclosure of the origin of electricity would also give added value to a generator portfolio with a higher RES share.

3.5. State aid rules

When talking about competition in the RES market and European economies at large, one should also pay attention to the distorting effects that support might have on the smooth workings of the market. As stated in indent 12 of the pre-amble of Directive 2001/77/EC, the rules of the Treaty, and in particular Articles 87 and 88 thereof, apply to public support. Such support is normally covered by the Community Guidelines on State aid for Environmental Protection and might be economically justified on a number of grounds as the beneficial effects of such measures on the environment outweigh the distorting effects on competition. Since the use of renewable energy sources is a priority in the policy of the Community, the mentioned guidelines are rather generous for such support schemes. On that basis, some 60 State aid schemes supporting renewable energy sources were approved by the Commission during the period 2001 to 2004.

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[14] To recall, a premium system is normally classified as feed-in system although there are differences: a premium is applied to RES-E generators on the top of the spot market price. The final price paid to RES-E fluctuates with the normal electricity spot market.

[15] The feed-in system in Spain includes charges for the deviation in electricity production for RES generators – as for the rest of electricity generators.

[16] Currently around 11% of all electricity is the subject of physical cross-border trade in Europe.

3.6. Main conclusion

The compatibility of all different renewable energy support schemes with the development of the internal electricity market is essential in the medium and long term. The construction of a European internal market should be accomplished through adequate regulation taking into account the steps needed for the development of RES-E. The design of the market is essential for the development and take-up of RES-E. Where applicable, the State aid rules must be taken into account at the design of the support schemes.

4. CO-EXISTENCE OR HARMONISATION

Due to widely varying potentials and developments in different Member states regarding renewable energies, a harmonisation seems to be very difficult to achieve in the short term. In addition, short term changes to the system might potentially disrupt certain markets and make it more difficult for Member States meeting their targets. Nevertheless the advantages and disadvantages of harmonisation towards the different current systems have to be analysed and monitored also notably for the medium to longer term development.

4.1. Potential advantages

- A number of studies suggest that the overall cost of complying with the RES-E target share in 2010 could be substantially lower with harmonisation of green certificate or feed-in systems than with the continuation of the present different national policies. However, a better functioning internal electricity market and a higher interconnection and trade capacity are required to enable these cost-efficiencies to take place and market distortions in the form of support for conventional energy sources should be eliminated.

- The integration of renewable energies in the internal market with one basic set of rules could create economies of scale needed for a flourishing and more competitive renewable electricity industry.

- A Europe-wide green certificate scheme is likely to lead to a bigger and thus more liquid certificates market, which would result in more stable green certificate prices compared to smaller (national) markets. However, the administrative costs of such a system would need to be assessed against the administrative costs of the current situation.

- A European wide common feed-in scheme which takes into account the availability of local resources could drive down the costs of all RES technologies in the different Member States as installations are not restricted to certain Member States. Such a feed-in system could either consist of fixed tariffs or “premium” tariffs on top of a base price bound to the average electricity price.

4.2. Potential disadvantages

- A harmonised green certificate scheme can work only if it results in the correct certificate prices and penalties across the EU and thus the most efficient build-up of RES installations in the various countries. Significant fluctuations in the green certificate price can lead to increased investor uncertainty and reduced build-up of RES.

- Considerable information on technologies and costs are needed in order to optimise the tariffs and keep the costs low for a harmonised feed-in tariff system. Hence, if these issues are not managed properly, the system could risk becoming expensive and inflexible.

- Harmonisation through a green certificate scheme with no differentiation by technology would negatively influence dynamic efficiency. Since such a scheme would promote cost-efficiency first, only the currently most competitive technologies would expand. While such an outcome would be beneficial in the short run, investment in other promising technologies might not be sufficiently stimulated through the green certificate scheme. Other policies would thus need to complement such as scheme.

- Member States that become importers of RES-E in a harmonised system may be unwilling to pay the bill if they do not profit from the local beneficial effects (employment and rural development, diversity and thus security of indigenous energy supplies and reduced local pollution) which would be achieved if the renewable energies were produced in their territory.

- On the other hand, even the exporting countries might be unwilling to have more RES capacity than needed for their own targets, as this could create opposition within the population to future RES installations (NIMBY-ism[17]).

5. ADMINISTRATIVE BARRIERS

It is impossible to isolate the discussions of support schemes from the issue of administrative barriers. To meet RES-E penetration targets in a cost-effective way, it is necessary to create a process that will facilitate increased RES-E generation in a timely and simple manner.

This chapter – in accordance with Article 6 of Directive 2001/77/EC – will analyse the different problems and propose some solutions for reducing the administrative burden (see Annex 6 for more information).

5.1. Identified barriers

Barriers that project developers and investors encounter when installing new capacities can be of administrative, grid, social and financial nature. Recently, the Commission launched a public consultation process on how barriers were perceived[18].

The identified administrative barriers can be classified into the following categories:

1. Large number of authorities involved and lack of coordination between them

An important issue that could hinder the greater presence of renewable energy sources is the existence of several layers of competence for the authorisation of generating units. Requirements imposed by the numerous authorities involved (national, regional and municipal) often lead to delays, investment uncertainty, a multiplication of efforts and

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17 NIMBY-ism is the acronym of "Not In My Back Yard".

18 The stakeholder consultation consisted of a web-based questionnaire and follow-up interviews. This process is described in the Impact Assessment accompanying this Communication.

potentially greater demands for incentives by developers in order to offset investment risks or the initial capital intensity of the project.

Where different levels of administrations are involved, Member States should appoint **one-stop authorisation agencies**, responsible for the *co-ordination* of several administrative procedures, such as the Bundesamt für Seeschifffahrt und Hydrographie for off-shore wind in Germany. Standard forms and requirements should also be used by the different authorities.

2. Long lead times needed to obtain necessary permits

For onshore wind projects authorisation procedures may take two to seven years[19], which has in some cases it has led to insinuations of totally 'freezing' the development of the market. The track record of authorisation procedures for offshore wind projects is even more inefficient, as until recently no clear procedures were established for the division of responsibilities among the different government authorities concerned.

Clear guidelines for authorization procedures are highly recommended and obligatory response periods for the authorities involved need to be incorporated in such procedures. The setting of approval rates[20] is an excellent tool for checking the streamlining of authorisations.

3. RES insufficiently taken into account in spatial planning

In many countries and regions, the future development of RES projects is not taken into account in drawing up spatial plans. This means that new spatial plans have to be adopted in order to allow for the implementation of an RES-E project in a specific area. This process can take a very long time. Often obtaining the permits related to spatial planning accounts for the largest part of the overall period needed for the development of a project. This is especially the case for projects in the field of wind and biomass. Authorities should be encouraged to **anticipate the development of future RES projects (pre-planning)** in their region by allocating suitable areas.

Where different levels of authorities are involved, a possible solution could be the **pre-planning** carried out in Denmark and Germany where municipalities are required to assign locations that are available to project developers for a targeted level of renewable electricity generating capacity. In these pre-planned areas, the permit requirements are reduced and implemented faster. In Sweden, these areas are called 'areas of national interest for wind'.

The planning and permitting process also relates to the respect of European environmental legislation, such as the Water Framework Directive, the Habitats and the Birds Directive. The Commission will continue its work -for example the on-going Commission initiative in relation to the link between the Water Framework Directive and Directive on electricity from renewable energies like hydro-power- so as to increase the transparency and clarity on the application of these Directives in relation to renewable energy development.

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19 This period applies in the Netherlands and Scotland.

20 The British Wind Energy Association publishes yearly approval rates: the last year, 2004, had a 80% approval rate.

5.2. Recommendations concerning administrative barriers

As the situation with authorisation procedures differs considerably among the Member States, recommendations for improvement can only be formulated in general way. The Renewables Directive (2001/77/EC) calls for shortening the overall authorisation process. This can be achieved only through the strong commitment and involvement of central governments together with the regional and municipal authorities – but with very clear competences for each level. The Commission recommends the following actions:

- **One-stop authorisation agencies** should be established to take charge of processing authorisation applications and providing assistance to applicants.
- **Clear guidelines** for authorization procedures should be established by Member States with a clear attribution of responsibilities. As the case law of the Court of Justice states, authorization procedures must be based on objective, non-discriminatory criteria which are known in advance to the undertakings concerned, in such a way as to circumscribe the exercise of the national authorities' discretion, so that it is not used arbitrarily[21].
- Member States should establish **pre-planning mechanisms** in which regions and municipalities are required to assign locations for the different renewable energies.
- **Lighter procedures** should be created for small projects.
- Guidance on the relationship with European environmental legislation.

6. GRID ACCESS ISSUES

Access to the grid, at a reasonable and transparent price, is the main objective of Article 7 of Directive 2001/77/EC and is essential for the development of renewable electricity generation. It requires Member States to put in place measures to facilitate access to the grid for renewable electricity.

Grid infrastructure was mainly built when the electricity sector was publicly owned and has been designed to allow large power plants being situated near mines and rivers, or near the main centres of consumption. Renewable electricity generation is normally not situated in the same places as conventional electricity production and has, in general, a different scale of generation. Although some biomass electricity plants can have a capacity of around 200 MW and wind parks are increasing to similar sizes, the normal scale of renewable electricity generation plants is smaller. Renewable electricity generation is often connected to the distribution grid, and prone to grid extensions and reinforcements in addition to grid connection investments. Member States, with a few exceptions, have put in place **legislative provisions** ensuring that grid operators guarantee the transmission and distribution of renewable electricity. Priority access when dispatching at transmission level is, however, in many cases not provided for.

Transparent rules for bearing and sharing the necessary grid investment costs are necessary as many grid barriers result from a lack of such rules. The rules that have been established and

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21 See Court of Justice, judgment 20/2/2001 C-205/99, “Analir”.

the degree of transparency of these rules vary considerably between Member States. A lot still needs to be done on transparency for cost-sharing.

Good practice can be found in a number of countries, such as Denmark, Finland, Germany and the Netherlands. In these countries transparent rules for bearing and sharing the costs of various grid investments have been put in place. These countries have chosen a “shallow” cost approach, under which that grid connection costs are borne by project developers requesting connection or shared with grid operators, while costs related to the necessary grid extensions and reinforcements at distribution or transmission level are covered by the grid operators, and passed on through the grid tariff structure. In Denmark, some connection costs for wind are also borne by the grid operator, reducing the economic burden on wind producers in terms of grid investment costs. Although the Netherlands does not provide priority access, all connection costs are, in general, covered by the grid operators.

RES-E can be confronted with a lack of sufficient grid capacity. This barrier is worsened by the lack of clear enforced rules for bearing and sharing various grid investment costs, as well as by the existence of vertical integration and dominant utilities.

To ensure that RES-E can represent a considerable share of the electricity mix, better planning and overall management of the networks is needed. The Trans-European Energy Networks Programme as well as the Framework Programmes for Research and Technology Development of the European Union has started to support studies on grid adaptation and optimisation for the integration of RES-E projects.

The Commission recommends, firstly, that the principles of cost bearing and sharing should be fully transparent and non-discriminatory. Secondly, the necessary grid infrastructure development should be undertaken to accommodate the further development of renewable electricity generation. Thirdly, the costs associated with grid infrastructure development should be covered by grid operators. Fourthly, the pricing for electricity throughout the electricity network should be fair and transparent, taking into account the benefits of embedded generation.

7. GUARANTEES OF ORIGIN

Member States have to implement a system guaranteeing the origin of electricity produced from renewable energy sources in order to facilitate trade and consumer transparency[22]. They must ensure that a guarantee of origin is issued in response to a request. Currently, the implementation of guarantees of origin varies across Member States, as can be seen in Annex 7.

The new Directive on the internal electricity market[23] was adopted after Directive 2001/77/EC. In accordance with Article 3(6) of Directive 2003/54/EC, Member States are required to implement a scheme for the disclosure of the fuel mix. The Commission regards this provision as an important measure in meeting the objective of consumer transparency, as it covers the whole electricity sector and not only electricity from renewable energy sources. The guarantee of origin could be used as a basis for this information.

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22 Article 5 of Directive 2001/77/EC.

23 Directive 2003/54/EC concerning common rules for the internal market in electricity and repealing Directive 96/92/EC.

Trade in green electricity is going on but has so far not led to transfers of green electricity produced in one country to another to meet targets there. In order to avoid double counting, it is not absolutely necessary to have a uniform guarantee of origin. However, a waterproof system needs to be agreed for the redemption of “used” green certificates. Such a system exists in several Member States and could be further coordinated or even harmonised if necessary for larger volumes of cross border trade.

8. CONCLUSIONS

Time for coordination

While gaining significant experience in the EU with renewable support schemes, competing national schemes could be seen as healthy at least over a transitional period. Competition among schemes should lead to a greater variety of solutions and also to benefits: for example, a green certificate system gains from the existence of a feed-in tariff scheme, as the costs of less efficient technologies fall due to the technological learning process, which in turn leads to lower transfer costs for consumers. Moreover, it is too early to compare the advantages and disadvantages of well-established support mechanisms with systems with a rather short history. Therefore, and considering all the analyses in this Communication, the Commission does not regard it appropriate to present at this stage a harmonised European system.

The Commission considers a **co-ordinated** approach to support schemes for renewable energy sources to be appropriate, based on two pillars: **cooperation** between countries and optimisation of the impact of national schemes.

8.1. Cooperation

Intensified co-ordination between countries in the form of “**cooperation**” could be useful for the development of the different support systems within Europe. The emerging cooperation between the feed-in tariff systems in Germany, Spain and France, or on the Iberian market and the new planned common Swedish-Norwegian green certificate system can set examples for others. Member States with systems with a sufficient degree of similarity could then later be sub-harmonised.

8.2. Optimisation

The Commission proposes a process for **optimisation of national systems** and recalls that the instability or ineffectiveness of systems normally translates into higher costs for consumers. Optimisation concerns economic mechanisms and cost-effectiveness but also calls for the removal of adminstrative and grid barriers.

Member States shall optimise and fine tune their support schemes by:

- **Increasing legislative stability and reducing investment risk**. One of the main concerns with national support schemes is any stop-and-go nature of a system. Any instability in the system creates high investment risks, normally taking the form of higher costs for consumers. Thus, the system needs to be regarded as stable and reliable by the market participants in the long run in order to reduce the perceived risks. Reducing investment risk and increasing liquidity is an important issue, notably in the green certificate market. The design of a support mechanism must minimise unnecessary market risk. Increased liquidity could improve the option of long term contracts and will give a clearer market price.

- **Reducing of administrative barriers,** including the streamlining of administrative procedures. The administrative requirements for access support schemes should be reduced in order to minimise the burden on consumers. Clear guidelines, one-stop authorisation agencies, the establishment of pre-planning mechanisms and lighter procedures are concrete proposals to Member States in addition to the full implementation of the RES-E Directive.

- **Addressing grid issues** and the transparency of connection conditions. Transmission reinforcement needs to be planned and developed in advance with appropriate financing. The Commission recommends, firstly, that the principles of cost bearing and sharing should be fully transparent and non-discriminatory. Secondly, the necessary grid infrastructure development should be undertaken to accommodate the further development of renewable electricity generation. Thirdly, the costs associated with grid infrastructure development should normally be covered by grid operators. Fourthly, the pricing for electricity throughout the electricity network should be fair and transparent, taking into account the benefits of embedded generation.

- **Encouraging technology diversity**. Some support schemes tend to support only the strongest of the renewable technologies in terms of cost competitiveness. For instance, offshore wind energy would usually not be developed if it came under the same financial framework as onshore wind power. Such schemes could therefore be complemented with other support instruments, in order to diversify the technological development. A good overall support policy for renewable electricity should preferably cover different renewable technologies.

- Member States should better use the possibilities of **tax exemptions and reductions** offered to renewable energy sources under the Directive on the taxation on energy products[24].

- **Ensuring compatibility with the internal electricity market.** EU Member States are in the process of liberalising their power markets. This criterion assesses the ease with which a support scheme can be integrated into a liberalised power market, and its effectiveness in functioning together with existing and new policy instruments.

- **Encouraging employment and Local and Regional Benefits.** A substantial part of the public benefits pursued by policies supporting renewables relate to employment and social policies, rural development while other national policy goals should be respected and duly take into account.

- **Twinning** with **actions on energy efficiency and demand management**. The progress of renewable electricity generation is being offset by excessive growth in electricity consumption and must be avoided. Only a combination of RES-E support measures with electricity end-use efficiency measures will bring Europe further in its energy policy goals.

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24 Directive 2003/96/EC for the taxation of energy products and electricity (OJ L 283, 31.10.2003, p. 51).

8.3. Next steps

Major regulatory change at Community level in the short term is not recommended in view of meeting 2010 targets. However, considering the drive towards completion of the internal electricity market and the potential for increased cost-efficiency, the Commission will further analyse the options for and impacts of increased optimisation, coordination and possible harmonisation, conditions in terms of progress in liberalisation and transmission capacity, and learn from the further experience gained with various support schemes in the Member States.

The Commission will closely monitor the state of play in EU renewable energy policy and, not later than December 2007, make a report of the level of Member States systems for promoting renewables electricity in the context of the on-going assessment related to 2020 targets and a policy framework for renewable energy beyond 2010. Based on the results of this evaluation, the Commission may propose a different approach and framework for schemes to support electricity produced from renewable energy sources in the European Union, taking into account the need for adequate transitional time and provisions. In particular, the advantages and disadvantages of further harmonisation will be analysed.

The European Parliament has recently adopted a Resolution on Renewable Energies[25] clarifying the criteria for a possible future harmonised European incentive system.

According to Article 4 of Directive 2001/77/EC, the Commission will continue to assess the success, including cost-effectiveness, of the support systems. The report shall, if necessary, be accompanied by a proposal for a Community framework with regard to support schemes for electricity produced from renewable energy sources. Any proposal for a framework should:

(a) *contribute to the achievement of the national indicative targets;*

(b) *be compatible with the principles of the internal electricity market;*

(c) *take into account the characteristics of different sources of renewable energy, together with the different technologies, and geographical differences;*

(d) *promote the use of renewable energy sources in an effective way, and be simple and, at the same time, as efficient as possible, particularly in terms of cost;*

(e) *include sufficient transitional periods for national support systems of at least seven years and maintain investor confidence.*

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25 EP Resolution, 28 September 2005 (Turmes report on the share of renewable energy sources).

Annex 1 – Current share of electricity from renewable energy sources

Renewable energies promise to bring about strategic improvements in the security of supply, reducing the long-term price volatility to which the EU is subject as a price-taker for fossil fuels, and could offer an enhanced competitive edge for the EU's renewable technology industry. Renewable energies reduce air pollution and greenhouse gas emissions. They could also help improve economic and social prospects in the rural and isolated regions of industrialised countries and provide a better means of meeting basic energy needs in developing countries. The cumulative effect of all these benefits makes a robust case for supporting renewables. The EU aims at having renewable sources provide for 21% of the electricity consumed in its 25 member states by 2010. Romania and Bulgaria have set up a target by 2010, maintaining the objective for the enlarged Union at 21%[26]. This target is formulated in the EU Renewables Directive 2001/77/EC, which sets individual national targets to this end. The electricity produced by renewable energy sources (RES-E) in the EU-25 countries accounted for 394 TWh in 2003, corresponding to a share of 14% in electricity generation (see Figure 1). The recent very dry years and the considerable growth of electricity consumption affect the percentage of RES-E in consumption as a whole. One percentage point of the objective on renewable electricity has been missed in the last three years due to the important draughts occurring in Europe. Electricity consumption is growing at 2% per year.

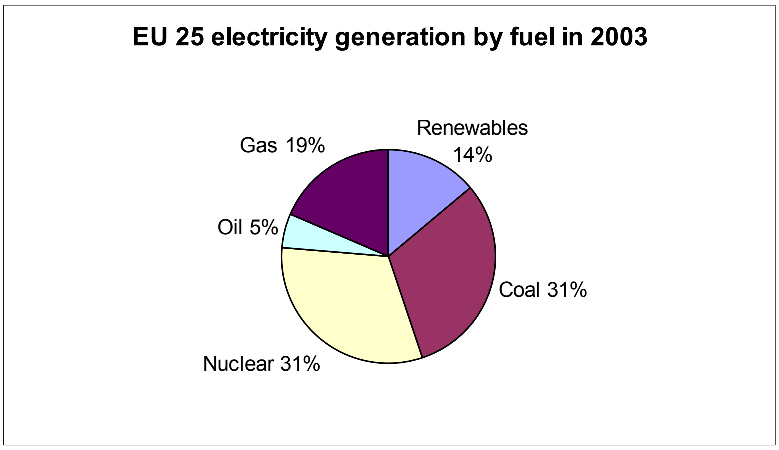

Figure 1:
EU25 electricity generation by fuel in 2003.

To avoid the interference due to the variability of rain conditions in recent years, Figure 2 shows all renewable energies apart from hydropower. In recent years, the growth in renewable electricity has been faster with the non-hydro sources. Figure 2 shows the impressive evolution of wind (three countries were mainly responsible for the growth of this sector up to 2003) and the other sectors such as biomass, geothermal and photovoltaic solar energy.

26 Romania has set up a target for passing from 28% to 33% by 2010 and Bulgaria from 6% to 11% by 2010.

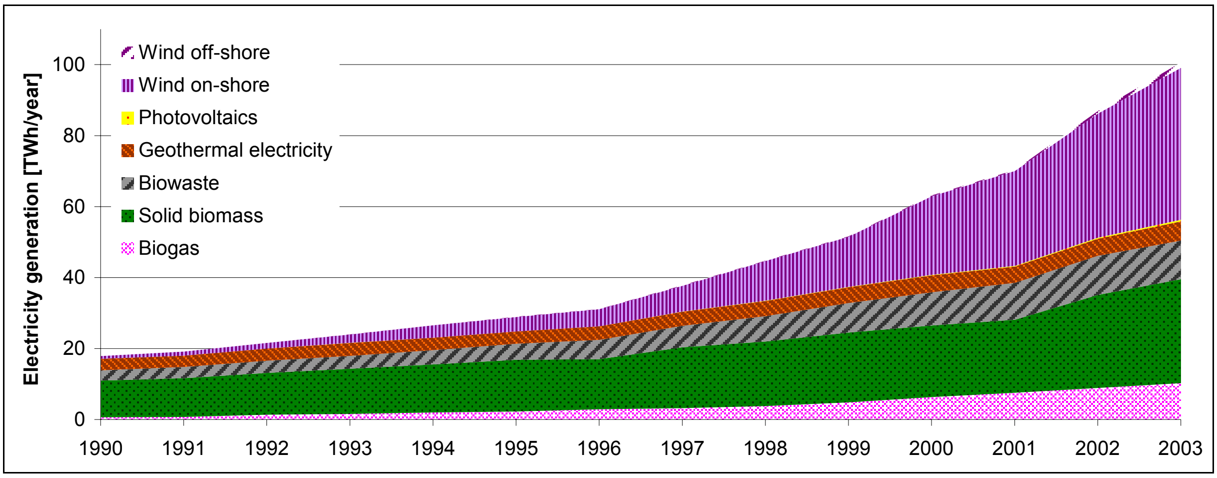

Figure 2:
Historical development of electricity generation from 'new' RES-E in the European Union (EU-25) from 1990 to 2003.

Hydropower remains the dominant source, but new renewable sources such as biomass or wind are starting to play a role. Especially in the EU-15 countries, wind energy is the most important of the new renewable sources in recent portfolios with a yearly growth of 35% in the last ten years while biomass is prominently represented in some of the new Member States.

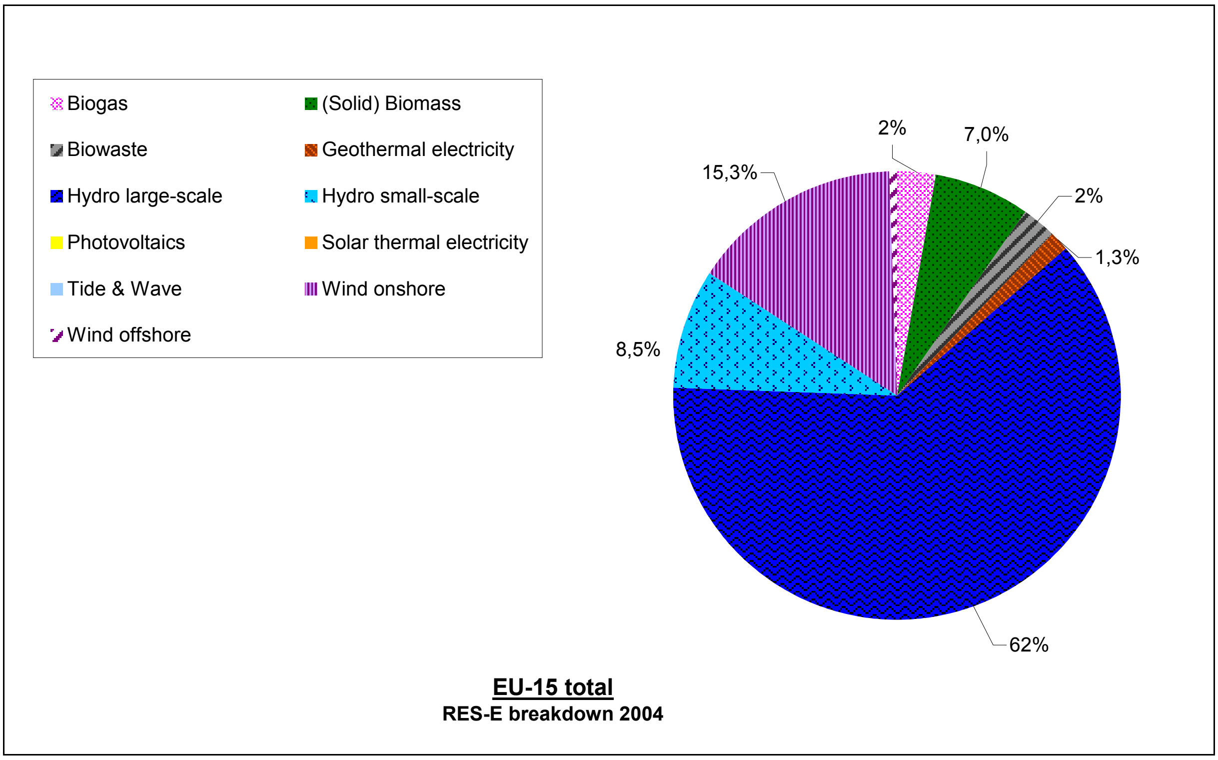

Figure 3:
RES-E as a share of the total achieved potential in 2004 for the EU-15.

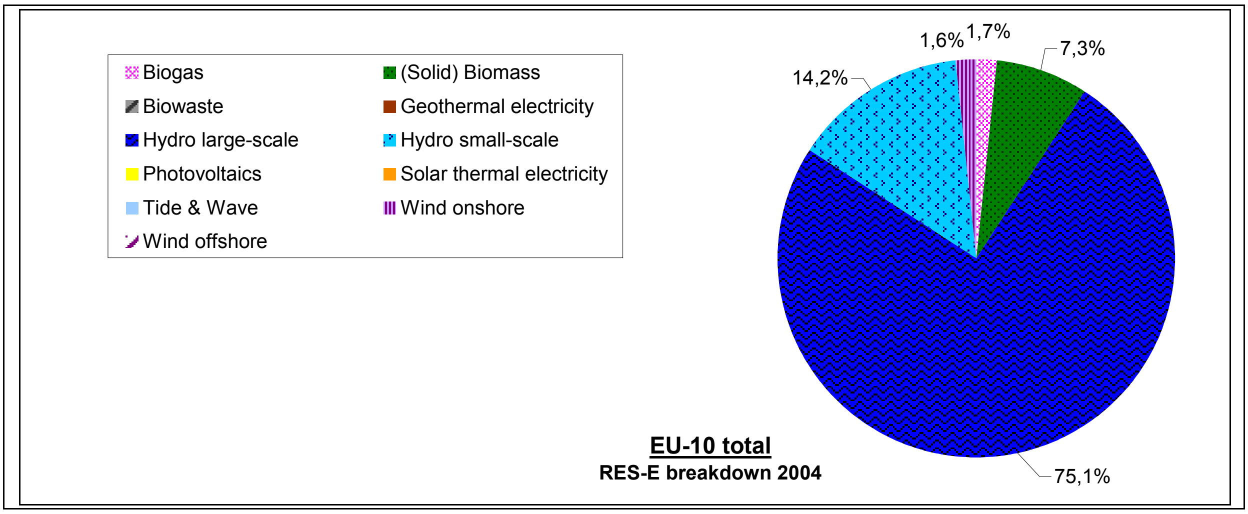

Figure 4:
Breakdown of RES-E in 2004 for the EU-10.

Annex 2 – Inventory of current support systems

Table 1: Overview of the main policies for renewable electricity in EU-15

Country	Main electricity support schemes	Comments
Austria	Feed-in tariffs (now terminated) combined with regional investment incentives.	Feed-in tariffs have been guaranteed for 13 years. The instrument was only effective for new installations with permission until December 2004. The active period of the system has not been extended nor has the instrument been replaced by an alternative one.
Belgium	Quota obligation system / TGC[27] combined with minimum prices for electricity from RES.	The Federal government has set minimum prices for electricity from RES. Flanders and Wallonia have introduced a quota obligation system (based on TGCs) with the obligation on electricity suppliers. In Brussels no support scheme has been implemented yet. Wind offshore is supported at federal level.
Denmark	Premium feed-in tariffs (environmental adder) and tender schemes for wind offshore.	Settlement prices are valid for 10 years. The tariff level is generally rather low compared to the previously high feed-in tariffs.
Finland	Energy tax exemption combined with investment incentives.	Tax refund and investment incentives of up to 40% for wind, and up to 30% for electricity generation from other RES.
France	Feed-in tariffs.	For power plants < 12 MW feed-in tariffs are guaranteed for 15 years or 20 years (hydro and PV). For power plants > 12 MW a tendering scheme is in place.
Germany	Feed-in tariffs.	Feed-in tariffs are guaranteed for 20 years (Renewable Energy Act). Furthermore soft loans and tax incentives are available.
Greece	Feed-in tariffs combined with investment incentives.	Feed-in tariffs are guaranteed for 10 years. Investment incentives up to 40%.
Ireland	Tendering scheme. It has been announced that the tendering scheme will be replaced by a feed-in tariff scheme.	Tendering schemes with technology bands and price caps. Also tax incentives for investment in electricity from RES.
Italy	Quota obligation system / TGC. Anew feed-in tariff system for photovoltaic valid since 5th August 2005.	Obligation (based on TGCs) on electricity suppliers. Certificates are only issued for new RES-E capacity during the first eight years of operation.
Luxembourg	Feed-in tariffs.	Feed-in tariffs guaranteed for 10 years (for PV for 20 years). Investment incentives also available.
Netherlands	Feed-in tariffs.	Feed-in tariffs guaranteed for 10 years. Fiscal incentives for investment in RES are available. The energy tax exemption on electricity from RES ended on 1 January 2005.
Portugal	Feed-in tariffs combined with investment incentives.	Investment incentives up to 40%.
Spain	Feed-in tariffs.	Electricity producers can choose between a fixed feed-in tariff or a premium on top of the conventional electricity price, both are available over the entire lifetime of a RES power plant. Soft loans, tax incentives and regional investment incentives are available.
Sweden	Quota obligation system / TGC.	Obligation (based on TGCs) on electricity consumers. For wind energy, investment incentives and a small environmental bonus are available.
UK	Quota obligation system / TGC.	Obligation (based on TGCs) on electricity suppliers. Electricity companies which do not comply with the obligation have to pay a buy-out penalty. A tax exemption for electricity generated from RES is available (Levy Exemption Certificates which give exemption from the Climate Change Levy).

[27] TGC = tradable green certificates.

Table 2: Overview of the main policies for renewable electricity in EU-10

Country	Main electricity support schemes	Comments
Cyprus	Grant scheme for the promotion of RES (since February 2004) financed through an electricity consumption tax of 0.22 E/kWh (since Aug. 2003).	Promotion scheme is fixed only for a 3-year period.
Czech Republic	Feed-in tariffs (since 2002), supported by investment grants Revision and improvement of the tariffs in February 2005.	Relatively high feed-in tariffs with 15-year guaranteed support. Producer can choose between a fixed feed-in tariff or a premium tariff (green bonus). For biomass cogeneration, only the green bonus applies..
Estonia	Feed-in tariff system with purchase obligation.	Feed-in tariffs paid for up to 7 years for biomass and hydro and up to 12 years for wind and other technologies. All support schemes are scheduled to end in 2015. Together with relatively low feed-in tariffs this makes renewable investments very difficult.
Hungary	Feed-in tariff (since January 2003) combined with purchase obligation and tenders for grants.	Medium tariffs (6 to 6.8 ct/kWh) but no differentiation among technologies. Actions to support RES are not coordinated, and political support varies. All this results in high investment risks and low penetration.
Latvia	Quota obligation system (since 2002) combined with feed-in tariffs.	Frequent policy changes and the short duration of guaranteed feed-in tariffs result in high investment uncertainty. The high feed-in tariff scheme for wind and small hydropower plants (less than 2 MW) was phased out in January 2003.
Lithuania	Relatively high feed-in tariffs combined with a purchase obligation. In addition good conditions for grid connections and investment programmes.	Closure of the Ignalina nuclear plant will strongly affect electricity prices and thus the competitive position of renewables as well as renewable support. Investment programmes limited to companies registered in Lithuania.
Malta	Low VAT rate for solar.	Very little attention to RES-E so far.
Poland	Green power purchase obligation with targets specified until 2010. In addition renewables are exempted from the (small) excise tax.	No penalties defined and lack of target enforcement.
Slovak Republic	Programme supporting RES and energy efficiency, including feed-in tariffs and tax incentives.	Very little support for renewables. The main support programme runs from 2000, but there is no certainty as to the time frame or tariffs. The low support, lack of funding and lack of longer-term certainty make investors very reluctant.
Slovenia	Feed-in system combined with long-term guaranteed contracts, CO_2 taxation and public funds for environmental investments.	None.

Bulgaria	Combination of feed-in tariffs, tax incentives and purchase obligation.	Relatively low levels of incentive make penetration of renewables especially difficult as the current commodity prices for electricity are still relatively low. A green certificate system to support renewable electricity developments has been proposed. Bulgaria recently agreed upon an indicative target for renewable electricity, which is expected to provide a good incentive for further promotion of renewable support schemes.
Romania	Subsidy fund (since 2000), feed-in tariffs.	Normal feed-in tariff modest, but high tariff for autonomous small wind systems (up to 110-130 €/MWh). Romania recently agreed upon an indicative target for renewable electricity, which is expected to provide a good incentive for further promotion of renewable support schemes.

Annex 3 – Costs of current support systems and effectiveness

The generation cost for renewable energies shows a wide variation (see Figure 1). Any assessment of support schemes should therefore be carried out for each sector.

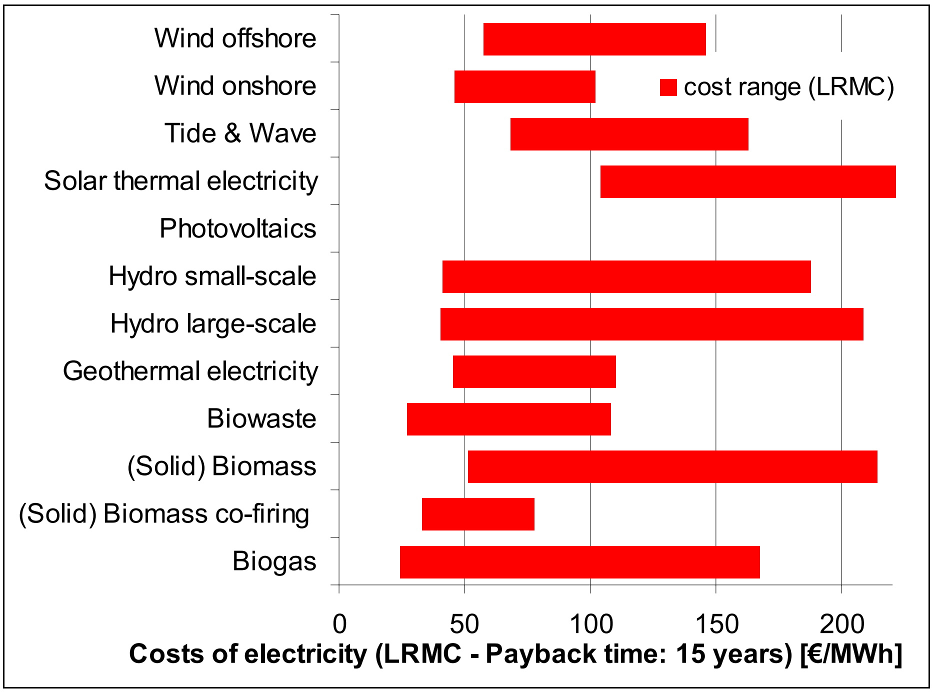

Figure 1:
Cost of electricity generation –Long-run marginal costs (LRMC). Sources: FORRES report.

The **current level of support** for RES-E differs significantly among the different EU Member States. This is due to the different country-specific cost-resource conditions and the considerable differences in the support instruments applied in these countries. In order to compare the prices paid for the different RES-E generation options with the costs in each Member State, both quantities are analysed and shown simultaneously for wind onshore, agricultural biogas, biomass forestry, small-scale hydropower and solar photovoltaic.

Before comparing costs and support levels among the countries, we have to make sure we are dealing with comparable quantities. In particular, the support level in each country needs to be normalised according to the duration of support in each country, e.g. the duration of green certificates in Italy is only eight years compared to 20 years for guaranteed feed-in tariffs in Germany. The support level under each instrument has therefore been normalised to a common duration of 15 years. The conversion between the country-specific duration and the harmonised support duration of 15 years is performed assuming a 6.6% interest rate.

Only minimum to average generation costs are shown because the readability of the graphs would suffer if the upper cost range for the different RES-E were shown as well.

Effectiveness[28] can be defined in simple terms as the outcome in renewable electricity compared to what's remains of the 2020 potential. This means that a country with an 8%

[28] The source of the indicators for Annexes 3 and 4 is the work carried out under the OPTRES contract of the European Commission, Contract EIE-2003-073.

yearly average effectiveness indicator over a six-year period has been delivering 8% of the 2020 potential every year over that period – as is the case for Germany in Figure 5 (wind). Over the complete six-year period, therefore, 48% of Germany's 2020 potential has been deployed.

In more complex terms, effectiveness is defined as the ratio of the change in the electricity generation potential over a given period of time to the additional realisable mid-term potential by 2020 for a specific technology, where the exact definition of effectiveness reads as follows:

$$E_n^i = \frac{G_n^i - G_{n-1}^i}{ADD - POT_{n-1}^i}$$

E_n^i Effectiveness Indicator for RES technology i for the year n

G_n^i Electricity generation potential by RES technology i in year n

$ADD - POT_n^i$ Additional generation potential of RES technology i in year n until 2020

This definition of effectiveness is a measure of the available potentials of a specific country for individual technologies. This appears to be the correct approach since Member State targets as determined in the RES-E directive are based mainly on the realisable generation potential of each country.

The yearly effectiveness of a Member State policy is the ratio of the change of the electricity generation potential in that year compared to the remaining additional realisable mid-term potential until 2020 for a specific technology.

Figure 2 below shows the concept of the yearly effectiveness indicator:

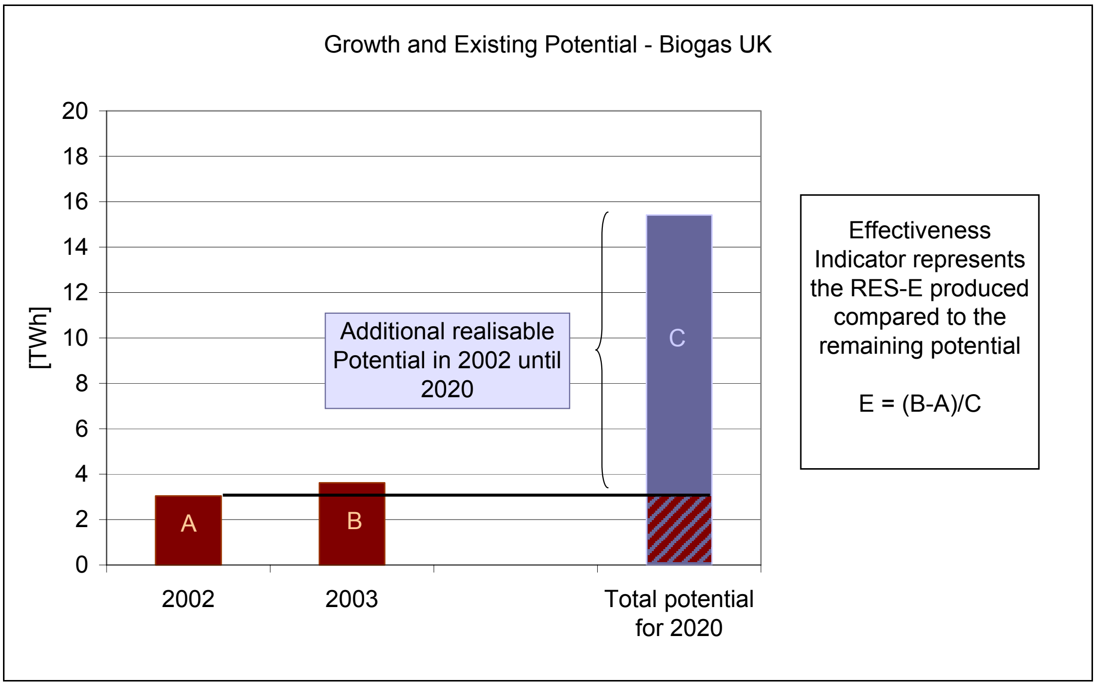

Figure 2: 2003 effectiveness indicator – example biogas in UK

The indicators included in this Communication are calculated in an average period of six or seven years[29]. In figure 2, we show the annual effectiveness indicator for the particular example of biogas in UK for the years 1998 until 2003 as well as the average during the period. The interpretation of this indicator can be pursued as follows: if a country has an average effectiveness indicator of 3% - as indicated by the dot line in figure 3 - it means that it has already mobilised a 17% of its additional potential until 2020[30] in a linear manner.

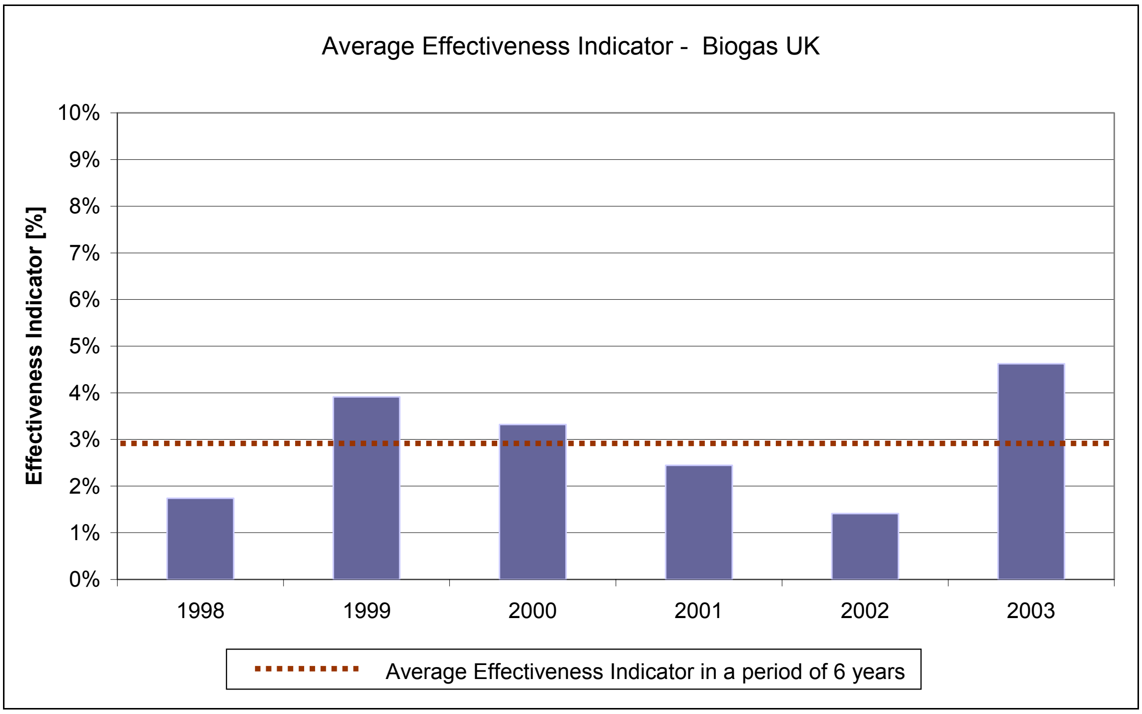

Figure 3: Average effectiveness indicator for the period 1998-2003 –Example biogas in UK

In the following section, effectiveness indicators are shown for the sectors wind onshore and solar photovoltaic for the period 1998-2004, and solid biomass, biogas and small hydro for the period 1998-2003. It must be clarified that in the subsequent section for the period 1997-2003, over which the effectiveness indicator is analysed, a mixed policy is considered in Belgium, France, Italy, the Netherlands, Sweden and the UK.

Wind energy

Figure 4 and figure 6 show the generation cost of wind energy and the level of the supported prices in each country. Support schemes for wind vary considerably throughout Europe with values ranging from €30/MWh in Slovakia to €110 per MWh in the UK. These differences – as seen in Figures 4 and 6 – are not justified by the differences in generation costs. Generation costs are shown in a range based – in the case of wind – on the different bands of wind potential.

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29 The period of seven years applies to the case of wind energy and PV.

30 As the remaining potential decreases every year that more renewable electricity is generated, the complete figure is 17% instead of 18% (3% x 6 years).

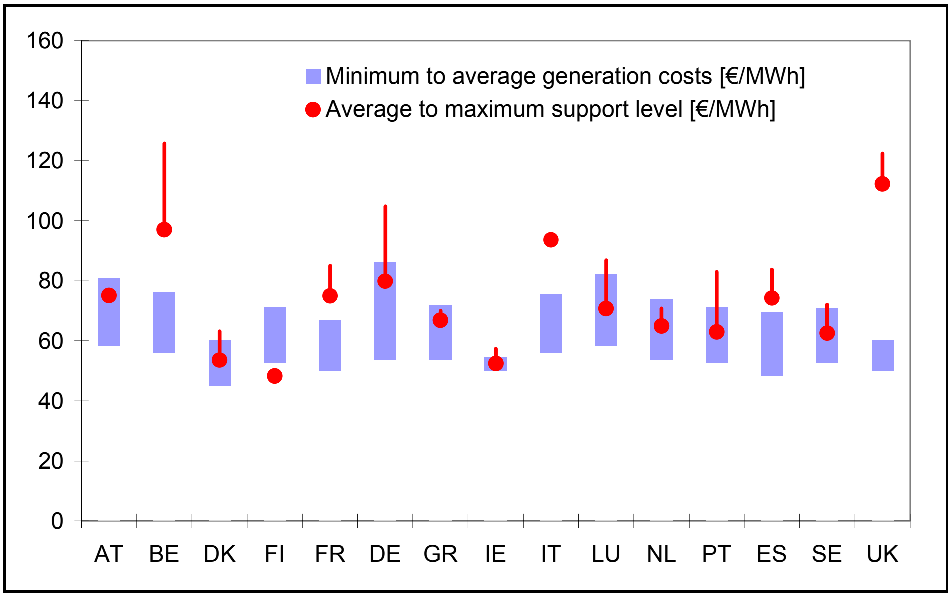

Figure 4:
Price ranges (average to maximum support) for direct support of wind onshore in EU-15 Member States (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs). Support schemes are normalised to 15 years.

How effective are these support schemes? The definition of effectiveness has been taken as the electricity delivered in GWh compared to the potential of the country for each technology.

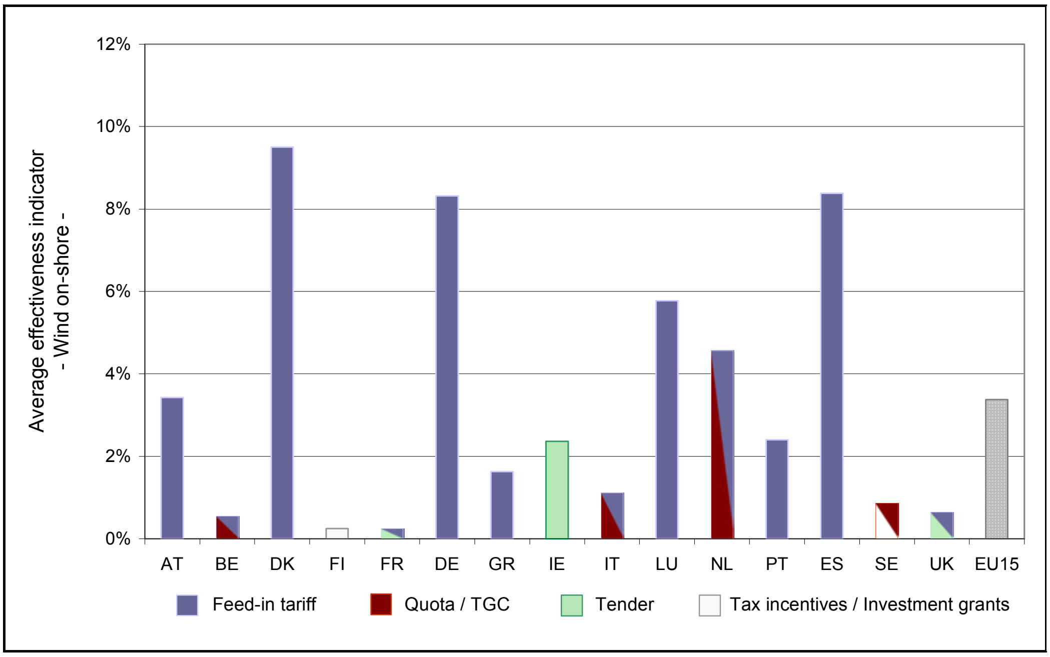

Figure 5:
Effectiveness indicator for wind onshore electricity in the period 1998-2004. The relevant policy schemes during this period are shown in different colour codes.

The three countries that are most effective in delivering wind energy are Denmark, Germany and Spain as can be seen in Figure 5.

Germany applies a stepped tariff with different values depending on wind resources. France uses the same system. This stepped support scheme – although controversial as it does not use only the best potentials – is justified at national level in order to extend potential resources in the country and avoid concentration in one region and hence NIMBY effect. The values used in Figure 4 consider the maximum tariff for Germany[31].

It is commonly stated that the high level of feed-in tariffs is the main driver for investment in wind energy especially in Spain and Germany. As can be seen, the level of support is rather well adjusted to generation cost. A long-term stable policy environment seems to be the key to success in developing RES markets, especially in the first stage.

The three quota systems in Belgium, Italy and the UK, currently have a higher support level than the feed-in tariff systems. The reason for this higher support level, as reflected in currently observed green certificate prices, can be found in the higher risk premium requested by investors, the administrative costs and the still immature green certificate market. The question is how the price level will develop in the medium and long term.

Figure 4 shows the three countries with the lowest support: FI, DK and IE. The situations in these countries are very different. DK has a very mature market with the highest rate per capita of wind installations in the world and current support is concentrated in re-powering[32], while IE has the best wind potential in Europe but only 200 MW installed capacity, and Finland has chosen a policy of biomass promotion and provides too little support to initiate stable growth in wind.

For the EU-10, the comparison of costs and prices for wind onshore as shown in Figure 6 leads to the conclusion that the supported price level is clearly insufficient in Slovakia, Latvia, Estonia and Slovenia, as the level is below marginal generation costs.

The level seems to be sufficient in at least Cyprus and Czech Republic. For countries like Hungary and Lithuania, support is just enough to stimulate investment[33].

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[31] Germany wind onshore: tariff €87/MWh (maximum tariff). Duration of support is 20 years. Interest rate: 4.8% (considering the soft loans granted by the German federal government). Wind conditions: 1 750 full load hours (country-specific average).

[32] The DK system is now concentrating on re-powering (replacement of old turbines by more efficient ones) and offshore which is not included in this text.

[33] For Poland no figures are shown since a green certificate price cannot yet be given.

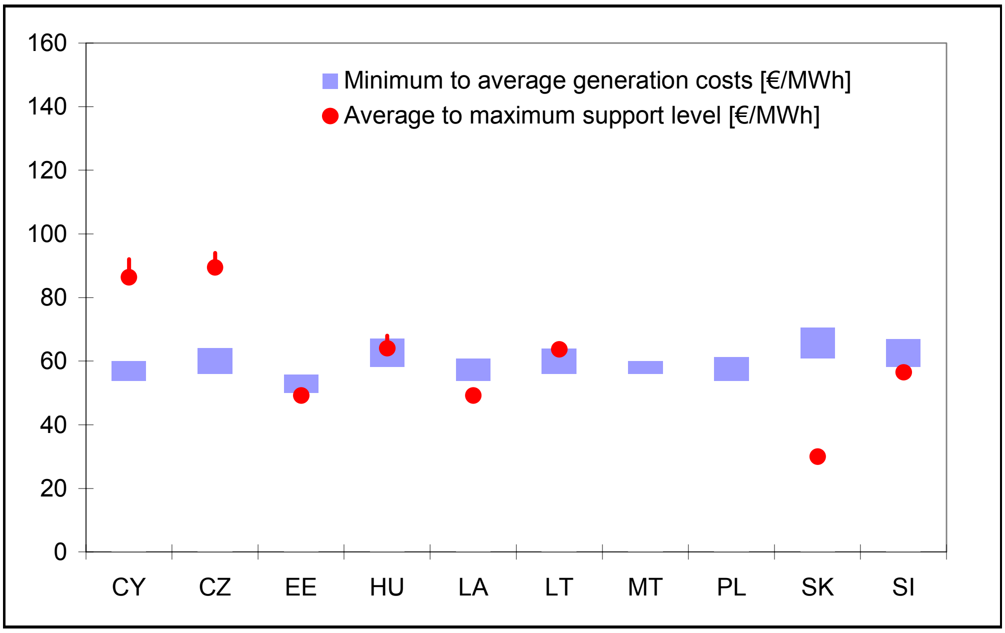

Figure 6:
Price ranges (average to maximum support) for supported wind onshore in EU-10 Member States (average tariffs are indicative) compared to the long term marginal generation costs (minimum to average costs).

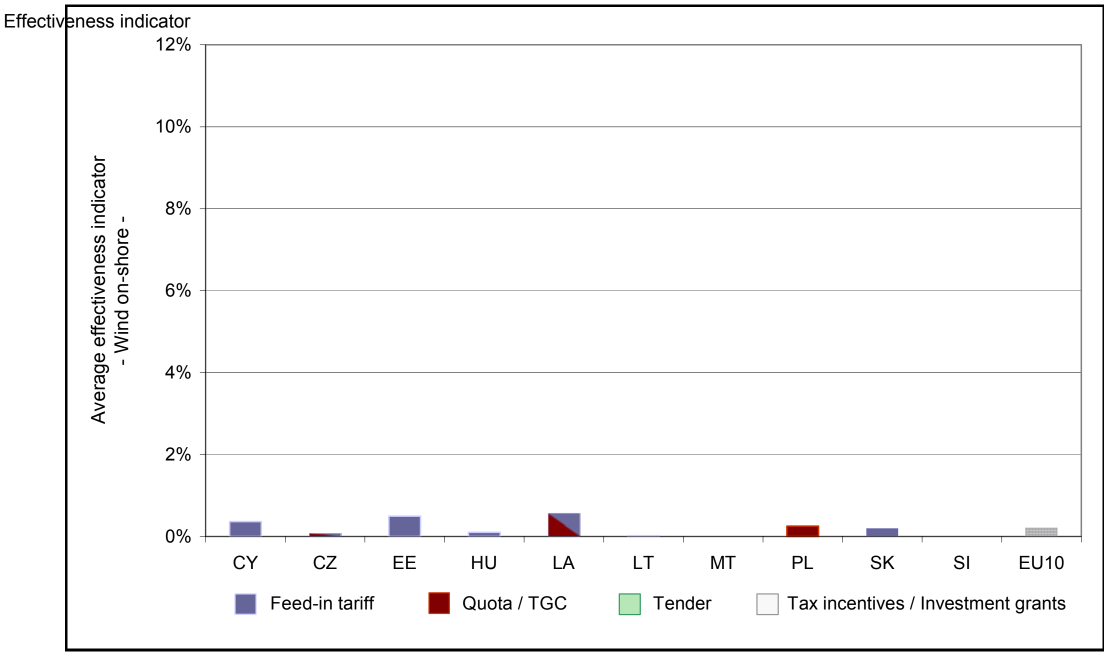

Figure 7:
Effectiveness indicator for wind onshore electricity in the period 1998-2004. The relevant policy schemes during this period are shown in different colour codes.

Biogas[34]

Comparing apples and pears sometimes seems easier than analysing the biomass sector – as the latter is like comparing cows and trees. Biomass is a very complex sector as it covers wastes, products and residues from very different sources: agriculture, forests, cities, animals, etc. Analysis of the support schemes becomes even more complex when 25 countries are considered.

This report is intended to give an overview of two main biomass sectors in Europe: biogas and forest residues.

The different support levels are shown for agricultural biogas electricity generation in Figure 8 for EU-15 and Figure 10 for EU-10. The effectiveness indicators are depicted in Figures 9 and 11.

Among the EU-15 level, the level of promotion in France and Sweden appears to be insufficient when compared to long-run marginal generation costs. Finland clearly does not specifically promote this technology. For Greece, Ireland, and Portugal, the support level is at the lower end of the cost range. In Austria, the tariffs[35] are relatively high with policy aiming to support small-scale agricultural applications (average range of 70-100 kW) as compared to large centralised plants. Germany also promotes small-scale installations with a high effectiveness (Figure 9). UK has a rather high support (TGC + CCL exemption)[36], resulting in a high effectiveness. Denmark has a medium support with a fairly high effectiveness. The Danish support scheme prioritises large central power plants. The Swedish and Finnish tax rebates have been unable to trigger relevant investment in biogas plants. Similarly, the Irish tender rounds seem to have ignored biogas as an option for increasing RES-E generation capacity. It should be noted here that the high growth in Italy and the UK has been based mainly on the expansion of landfill gas capacity, whereas in Austria, Denmark, and Germany agricultural biogas has had a significant share in the observed growth.

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34 Biogas includes all biomass fermentation processes: biogas with co-fermentation, sewage and landfill gas.

35 Paid for new installations until December 2004. The system has now stopped.

36 The total level of support in the UK is about: €110/MWh = €68/MWh certificate price + €6.9/MWh CCL + €36/MWh market price. Before 2002, the UK had different tender rounds for biogas applications.

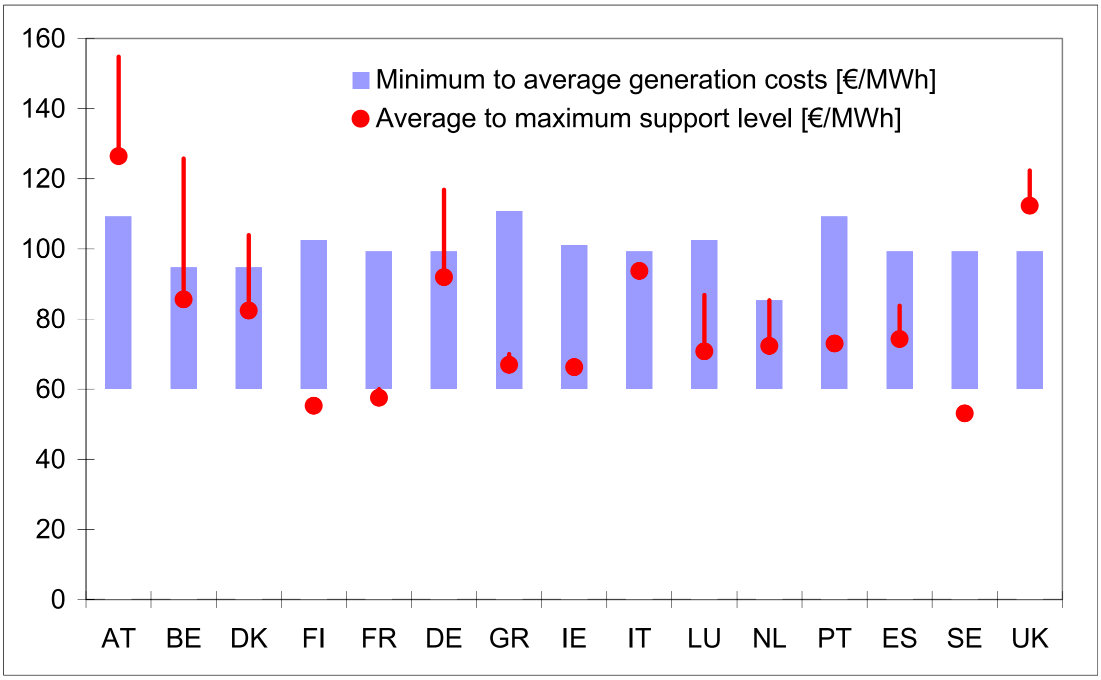


Figure 8:
Price ranges (average to maximum support) for direct support of <u>agricultural biogas</u> in EU-15 member states (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

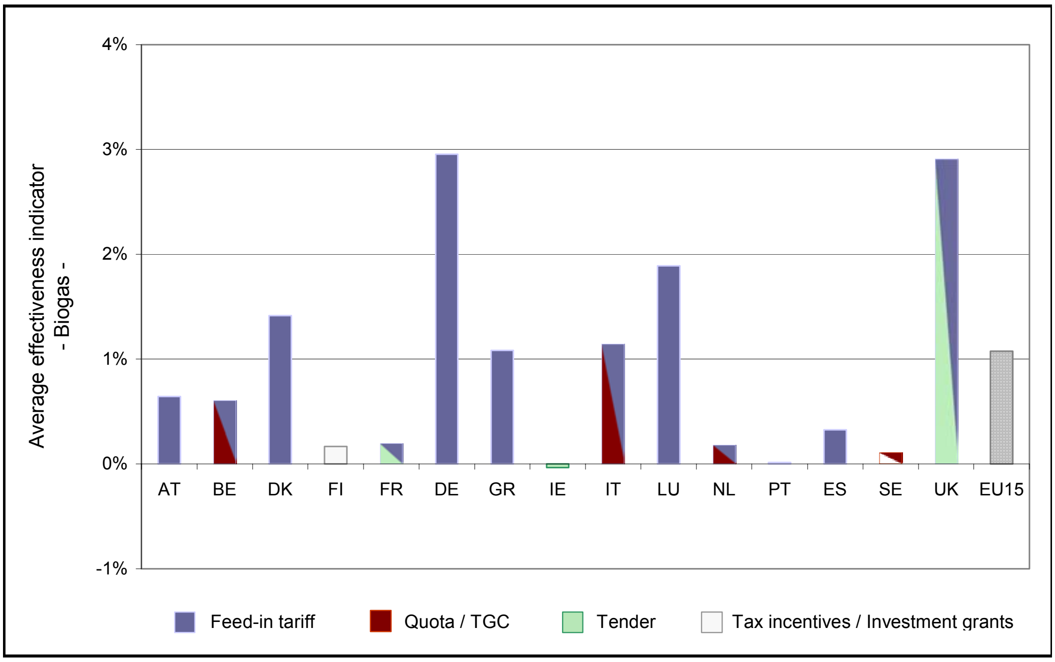


Figure 9:
Effectiveness indicator for <u>biogas electricity</u> in the period 1998-2003. The relevant policy schemes during this period are shown in different colour codes.

The effectiveness of the biogas support level is influenced by the following factors, rather than the choice of support scheme:

- The choice of small or large plants: large plants yield a higher effectiveness. Small plants are supposed to be more important for the rural economy, but the cost is higher.

- The existence of a complementary support scheme. The biogas sector is intimately linked to environmental policy for waste treatment. Countries like the UK support biogas with a secondary instrument such as tax relief (CCL exemption)[37]. A complementary investment aid is a good catalyst for this technology.

- If a country supports agricultural biogas, generation costs are higher but so are environmental benefits. For supporting landfill gas, the cost is 'cheaper' but the environmental benefit is reduced.

- The existence of district heating networks has proved to be an important aspect in the successful development of the biogas sector, e.g. Denmark.

The EU-15 figures lead to the conclusion that, when the feed-in tariffs are set correctly, the support scheme is able to start market development. The green certificate systems seem to need a secondary instrument (based on environmental benefits) for a real market effect.

The picture for the new Member States looks rather different from the EU-15. For most EU-10 countries, the supported price is low compared to the long-run marginal generation costs. Except in the Czech Republic and Slovenia, financial support is insufficient to trigger significant investment into biogas technology. Effectiveness is nearly zero due to the lack of sufficient support.

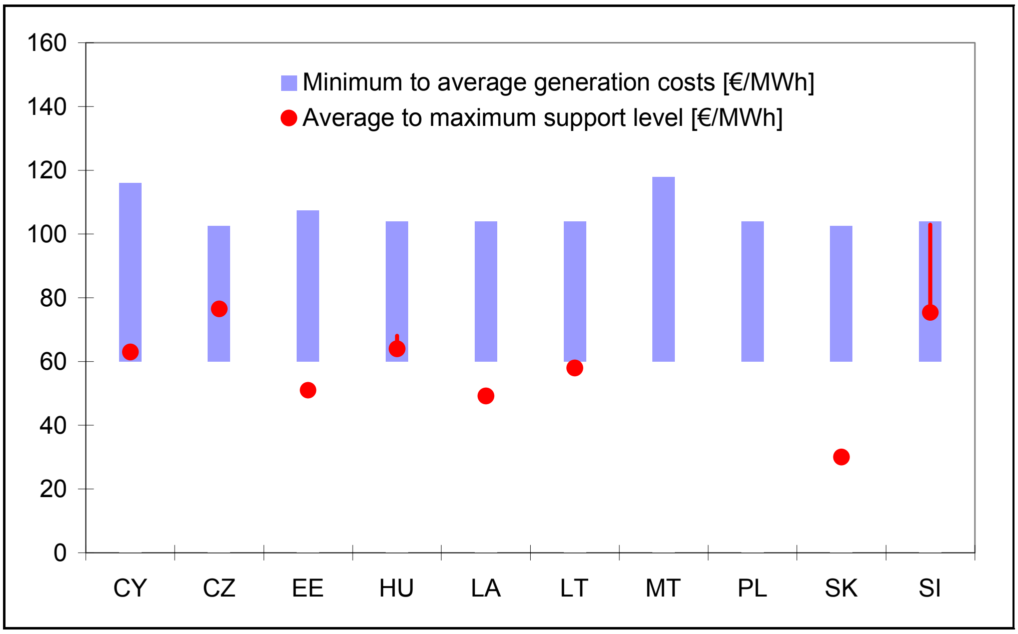


Figure 10:
Price ranges (average to maximum support) for supported agricultural biogas in EU-10 member states

37 The total level of support in the UK is about: €110/MWh = €68/MWh certificate price + €6.9/MWh CCL + €36/MWh market price. Before 2002, the UK had different tender rounds for biogas applications.

(average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

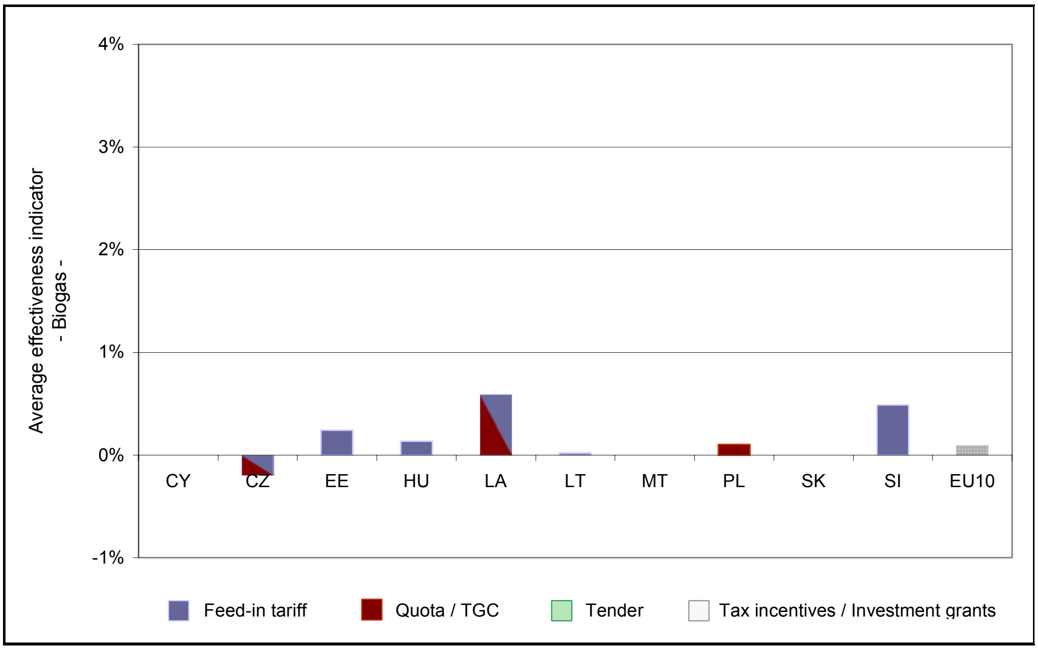


Figure 11:
Effectiveness indicator for biogas electricity in the period 1998-2003. The relevant policy schemes during this period are shown in different colour codes.

Biomass/forestry residues

Before any analysis is carried out, the complexity of this sector should be recalled as it includes small combined heat and power systems, the big pulp and paper industry, the co-firing of wood residues, etc.

Figures 12 and 13 show the differences between support schemes around EU-15 and also the variation in generation costs[38]. The level of Member States support in the EU-10 is generally relatively lower than in the EU-15.

38 The support for combined heat and power (CHP) is not included in this figure.

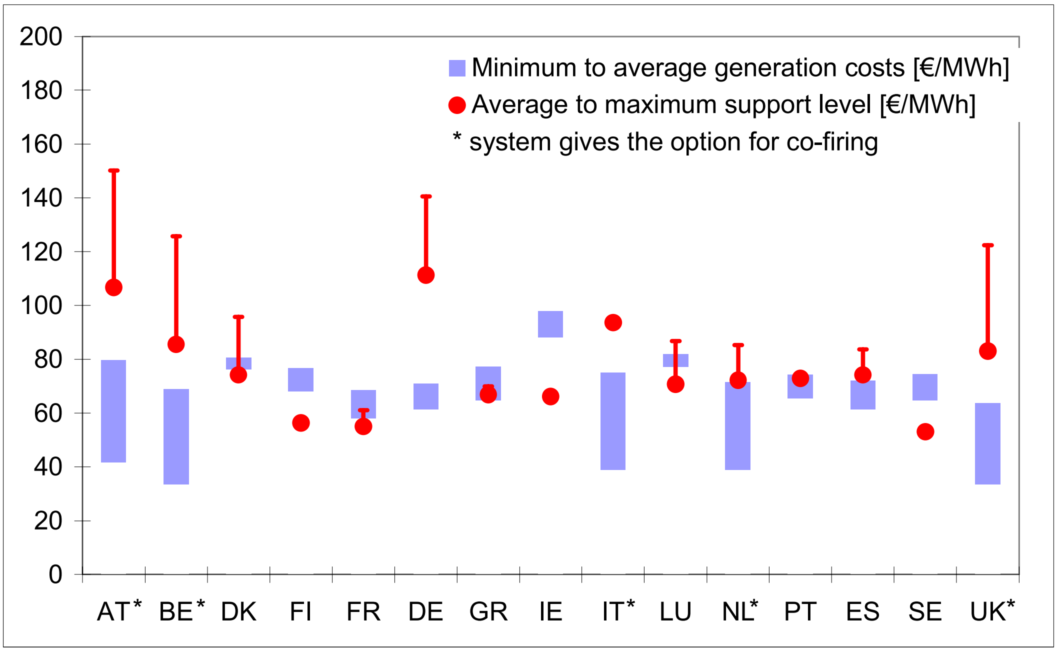


Figure 12:
Price ranges (average to maximum support) for supported <u>biomass electricity</u> production from <u>forestry residues</u> in EU-15 member states (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

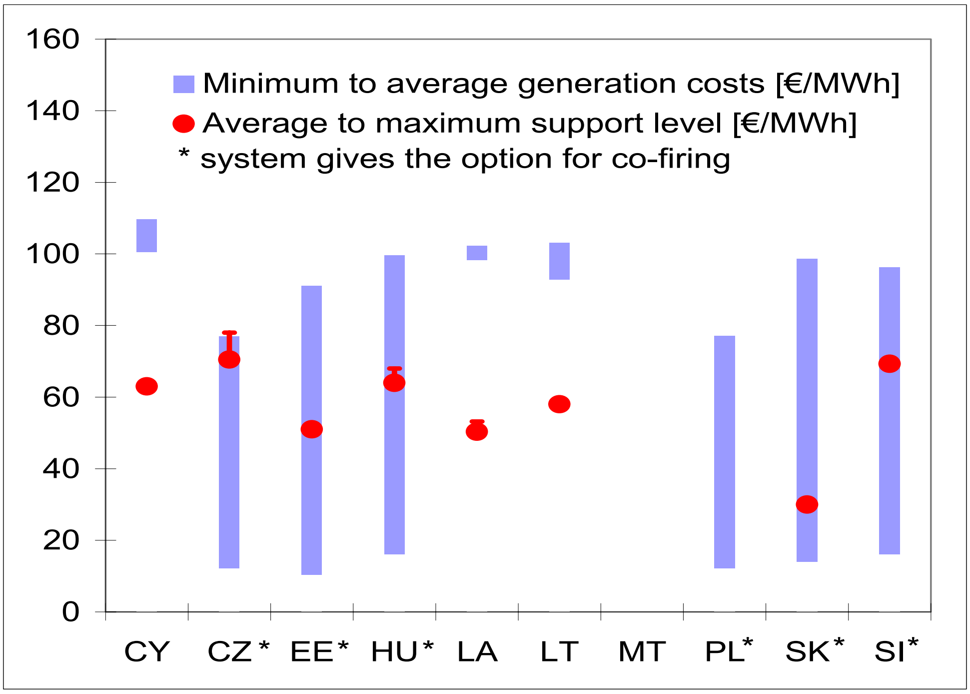


Figure 13:
Price ranges (average to maximum support) for supported <u>biomass electricity</u> production from <u>forestry residues</u> in EU-10 Member States (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

** = countries with co-firing.*

Figures 14 and 15 show the effectiveness of RES support for electricity produced from **solid biomass**. The first conclusion is that at EU-15 level, only a small part of the available potential was exploited on an annual basis during the period 1998-2003. The effectiveness indicator for solid biomass electricity is significantly lower compared with wind exploitation[39]. This confirms the conclusion of the Communication of May 2004[40] that the development of biomass electricity is lagging behind expectations at EU level.

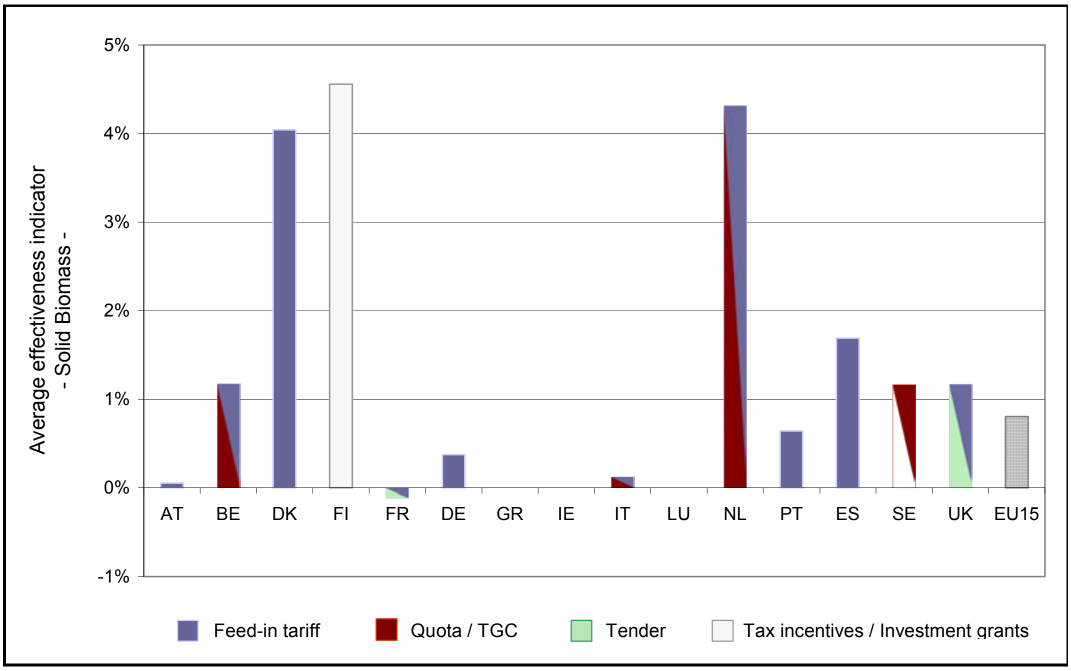
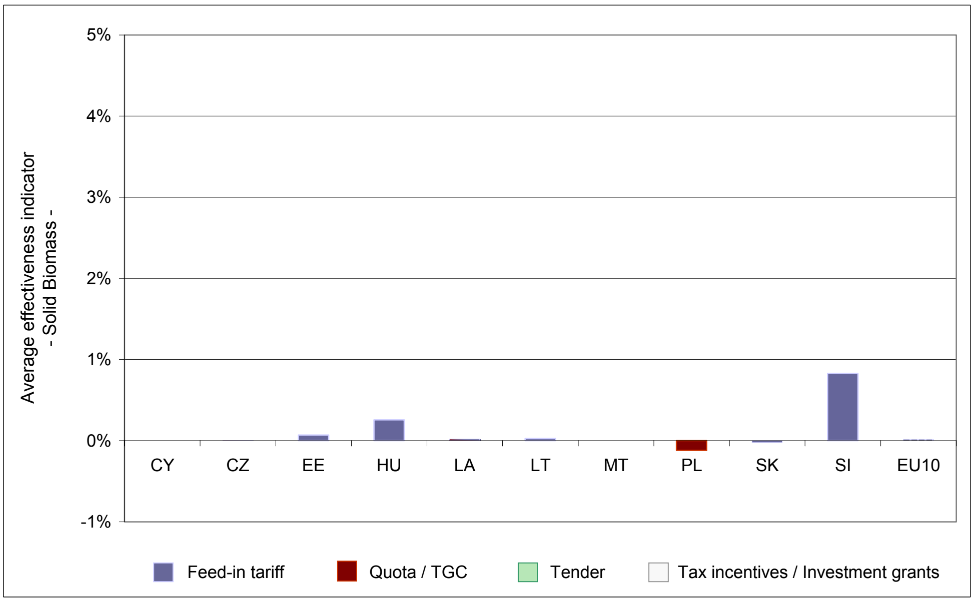


Figure 14:
Effectiveness indicator for <u>biomass electricity</u> in the period 1998-2003. The relevant policy schemes during this period are shown in different colour codes.



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39 Countries with a high effectiveness in wind energy have an indicator between 6-8%. For biomass, the top figures are around 4%.

40 Communication on the share of renewable energy in the EU - COM(2004) 366.

Figure 15:
Effectiveness indicator for biomass electricity in the period 1998-2003. The relevant policy schemes during this period are shown in different colour codes.

It must be clarified that, for Denmark, Figure 14 covers not only forest residues but also straw, which represents half of their solid biomass market. The figure for the Netherlands also includes the co-firing of palm oil, which in 2003 represented 3% of the total solid biomass market.

Denmark saw strong growth in biomass until 2001 with large centralised CHP plants, initiated by the relatively high feed-in tariffs and a stable policy framework.

In the Netherlands, a partial tax exemption was introduced in July 2003 for a feed-in tariff system. Additional support was given by investment grants. Co-firing is the main technology in NL. It is highly likely that the Netherlands will already reach their 9% target for 2010 by 2006.

In Finland, the tax refund for forestry chips has been the main driver of market growth in recent years. An additional 25% investment incentive is available for CHP plants based on wood fuels. The key element in the success of this mix of tax relief and investment incentives is the important traditional wood and paper industry.

In 2002, Sweden switched from investment grants to a TGC system and tax refunds.

Austria and Germany have chosen a policy of medium- and small-scale biomass installations, which has higher costs but is driven not only by energy policy but also by environment and rural development considerations.

The new German support system shows a larger gap between support and generation costs. This new level was adopted in August 2004. Effectiveness in the biomass forestry sector needs still to be demonstrated in this country.

The main barriers to the development of this RES-E source are both economic and infrastructural. Denmark, Finland and NL show the best effectiveness and a smaller gap between support and generation costs. Denmark and the Netherlands have implemented feed-in tariffs and Finland has tax relief as the main support scheme. The common characteristic in these three countries is that centralised power stations using solid biomass attract the largest share of RES-E investment.

Nevertheless, biomass features a large band of options, uses and costs. The promotion of large biomass installations should not ignore promising technology options with a significant potential for technology learning.

To conclude on this sector:

- In UK, BE, IT and to some extent SE, the level of support is just enough. Nevertheless, it looks like that the biomass sector is not yet able to cope with the risk of green certificate schemes.

- Denmark, Finland and NL show the best effectiveness and the smallest gap between support and generation costs. Denmark and the Netherlands have implemented feed-in tariffs and Finland has tax relief and 25% investment support. Centralised power stations using solid biomass attract the largest share of RES-E investment.

- In France, Greece, Ireland, Luxembourg, Portugal and Spain, the feed-in tariff support is not enough to bring about a real take-off in the biomass sector.

- Secondary instruments especially small investment-plant support and tax relief are good catalysts for kicking off biomass. They also have the advantage of less interference with the wood market.

- CHP support is very good for the biomass development, adding higher energy efficiency.

- It is not a matter of demand: good management of agriculture and forest residues is an important factor for good biomass exploitation.

Hydropower

As our third example, we provide the same analysis for **small-scale hydropower**. In this case, country-specific costs show very large differences. The technology is also especially relevant for some of the new member states. Again, it can be seen that existing feed-in tariffs are quite well adjusted to the costs of generation, with the Austrian and the Portuguese tariffs at the lower end of the cost spectrum. The Finnish tax measure is again unable to cover the costs needed to stimulate investment in new generation capacity. Very good financial conditions for small hydropower exist in France and in Slovenia. For Cyprus, the support level might be higher than shown in the figure, since additional investment grants are not considered.

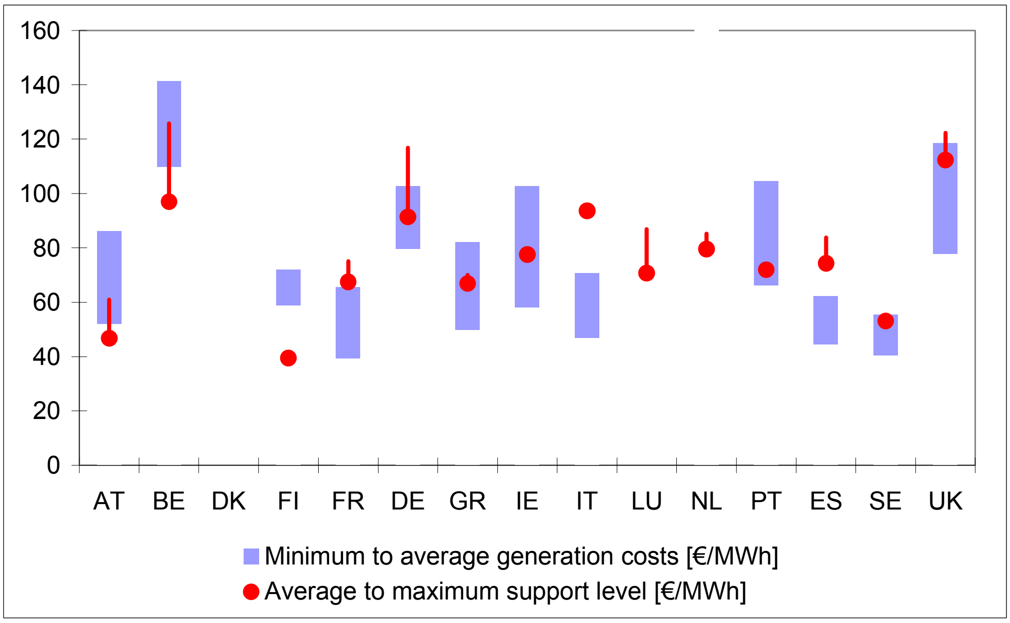

Figure 16:
Price ranges (average to maximum support) for direct support of small-scale hydro in EU-15 Member States (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

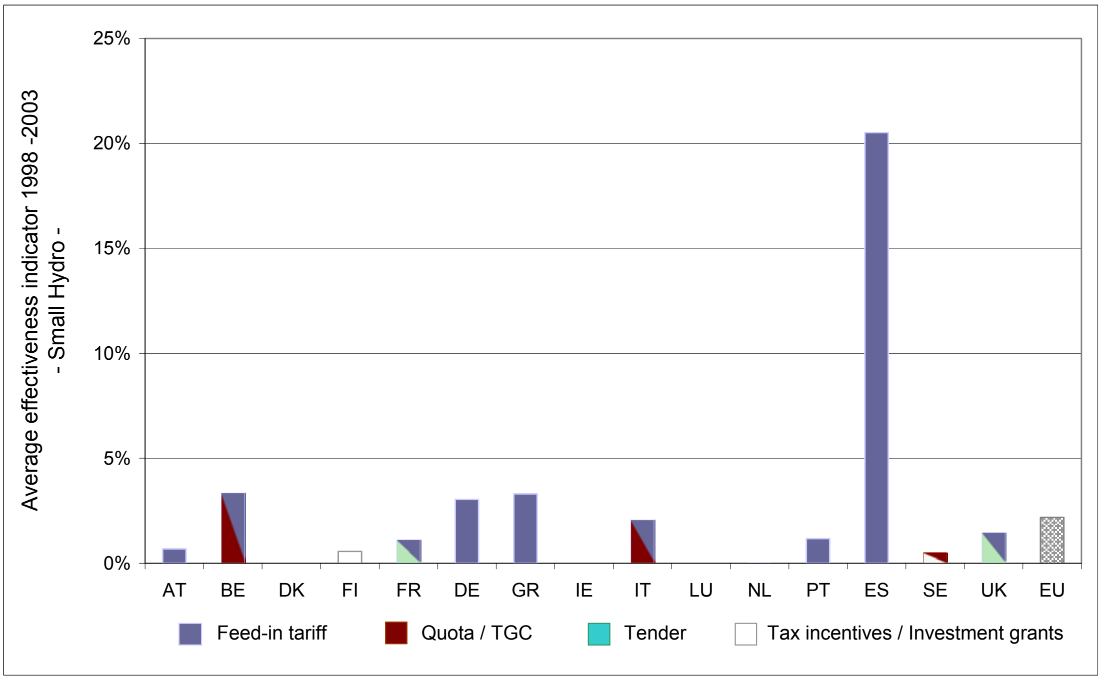

Figure 17:
Effectiveness indicator for <u>small hydro</u> electricity in the period 1998-2003. The relevant policy schemes during this period are shown in different colour codes.

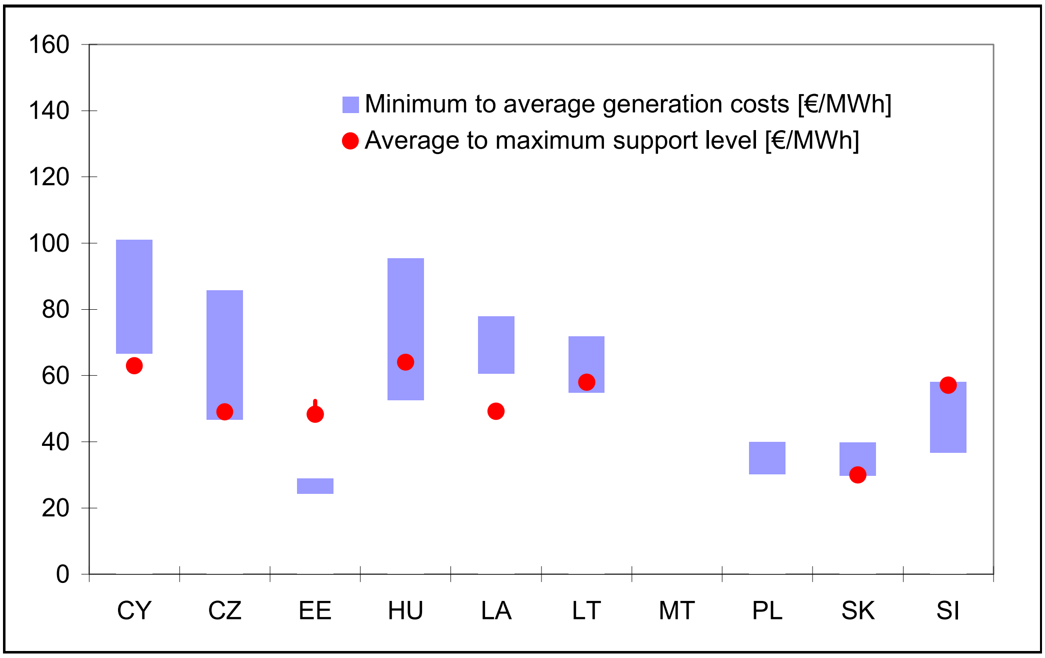

Figure 18:
Price ranges (average to maximum support) for direct support of <u>small-scale hydro</u> in EU-10 Member States (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

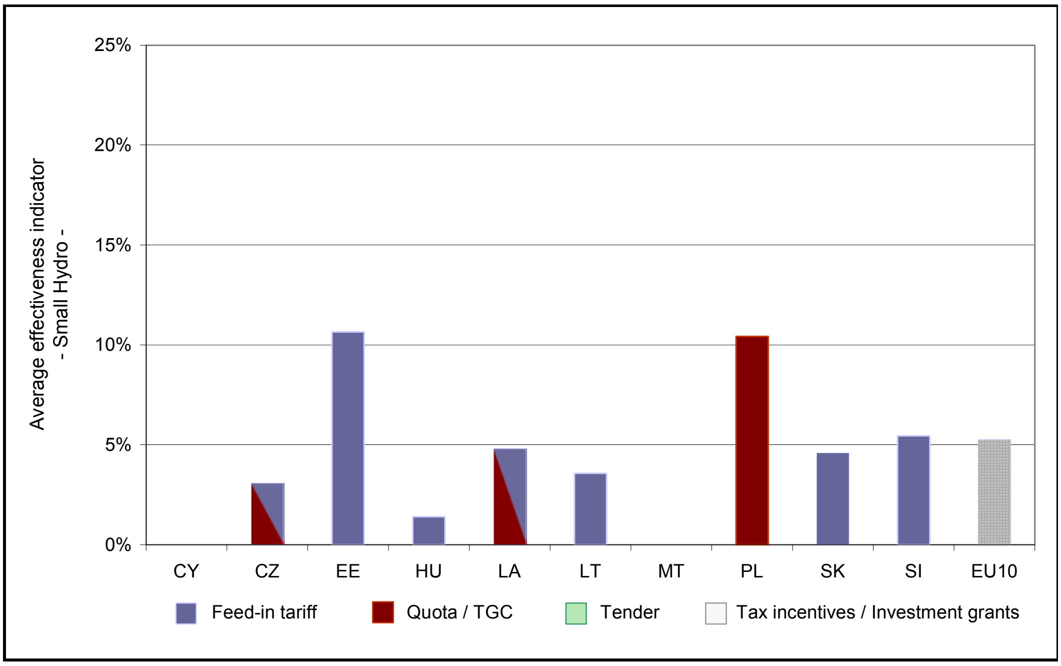

Figure 19:
Effectiveness indicator for small hydro electricity in the period 1998-2003. The relevant policy schemes during this period are shown in different colour codes.

Photovoltaic solar energy

As can be seen from Figure 21, photovoltaic electricity generation showed the strongest growth in Germany[41] followed by the Netherlands and Austria over the period considered. The support system in these three countries consists of fixed feed-in tariffs supplemented by additional mechanisms such as the soft loans in Germany. As expected, quota obligations and tax measures provide little incentive for investment in PV technology, since these schemes generally promote only the cheapest available technology. The PV support scheme in DE, NL, ES and AT is implemented as part of a long-term policy for the market development of this technology.

[41] DE has just become the world leader, overtaking Japan.

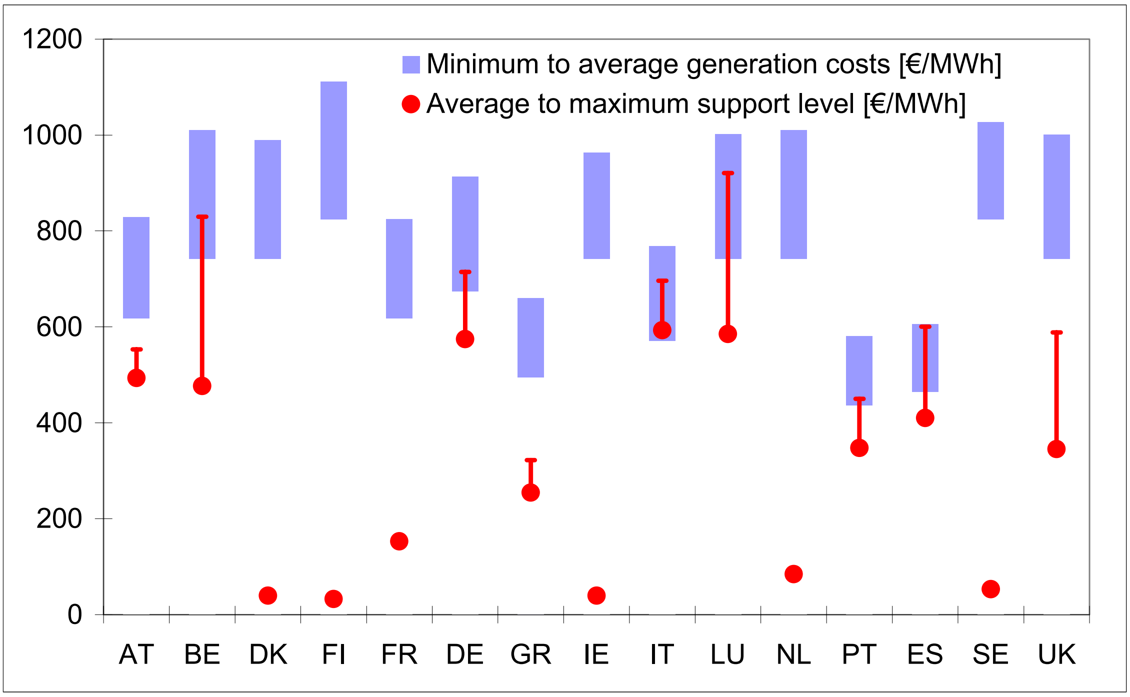

Figure 20:
Price ranges (average to maximum support) for direct support of <u>photovoltaic electricity</u> in EU-15 Member States (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

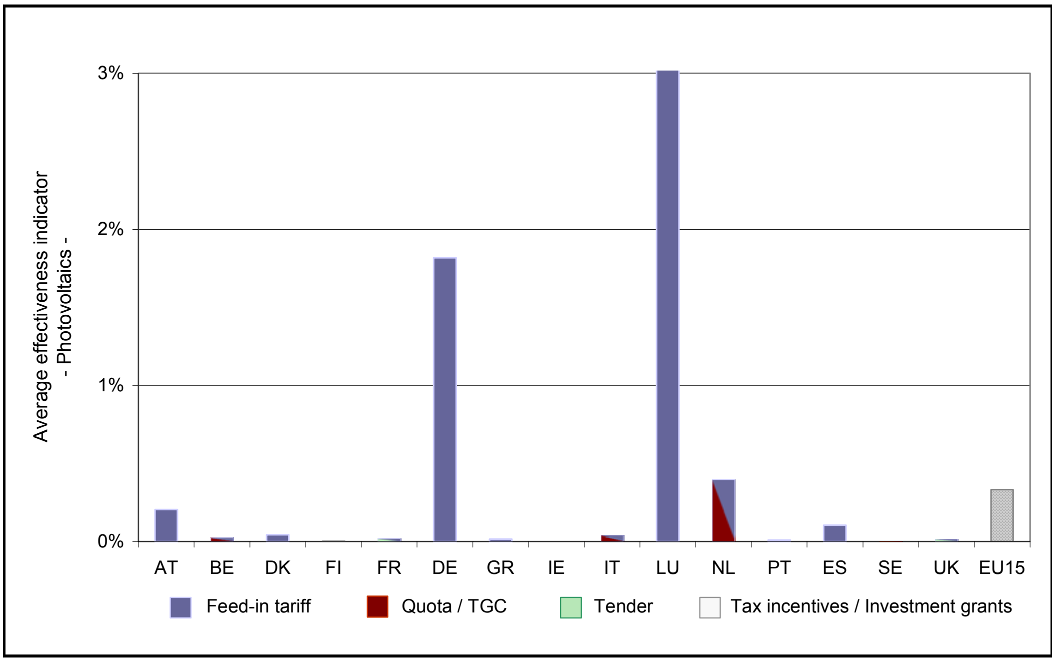

Figure 21:
Effectiveness indicator for <u>photovoltaic electricity</u> in the period 1998-2004. The relevant policy schemes during this period are shown in different colour codes.

Annex 4 – Methodology for the investor's perspective

We define the effectiveness of a member state policy in the following as the ratio of the change in electricity generation potential during a given period of time to the additional realisable mid-term potential by 2020 for a specific technology, where the exact definition of effectiveness reads as follows:

$$E_n^i = \frac{G_n^i - G_{n-1}^i}{ADD - POT_{n-1}^i}$$

E_n^i Effectiveness Indicator for RES technology i for the year n

G_n^i Electricity generation potential by RES technology i in year n

$ADD - POT_n^i$ Additional generation potential of RES technology i in year n until 2020

Annuity

One possible approach for calculating actual support over the entire lifetime from an investor's perspective is to determine **the average expected annuity of the renewable investment.** The annuity calculates the specific discounted average return on every produced kWh by taking into account income and expenditure throughout the entire lifetime of a technology.

$$A = \frac{i}{(1-(1+i)^{-n})} * \sum_{t=1}^{n} \frac{Income_t - Expenditure_t}{(1+i)^t}$$

A= annuity; i=interest rate; t=year; n=technical lifetime

The average expected annuity of wind energy investment for Germany, Spain, France, Austria, Belgium, Italy, Sweden, the UK and Ireland is calculated based on the expected support level during the period of promotion. The level of support in the German system is annually adjusted according to the degression implemented in the German EEG. For the four countries using quota obligation systems, the certificate prices of the year 2004 are extrapolated for the entire active period of support.[42] Furthermore, an interest rate of 6.6% is assumed[43] and country-specific prices of wind technology are used, taking the average market prices of wind turbines in those countries in 2004. Therefore, the expected annuity considers country-specific wind resources, the duration the support is given as well as additional promotion instruments, such as soft loans and investment incentives. An important limitation of this approach is that an estimate of the future evolution of certificate prices in quota systems is needed. Such an estimate typically does not exist. We therefore assume that TGC prices will remain constant at 2004 levels.

42 This assumption might be questionable because certificate prices might reduce as the certificate markets in those countries mature. However, only very little knowledge exists about the temporal development of prices in these markets.

43 For Germany only, an interest rate of 4% was used based on the soft loans granted.

In this section, a comparison of profits from an investor perspective and effectiveness has been made for a limited number of Member States and assumping current prices over a longer period.

Therefore, the effectiveness indicator as defined in Annex 3 is shown against the expected annuity of investment in wind and biomass energy for each country. In this way one can correlate the effectiveness of a policy with the average expected annuity of investment. This gives an indication as to whether the success of a specific policy is primarily based on the high financial incentives, or whether other aspects have a crucial impact on market diffusion in the considered countries.

Wind energy

This analysis has been carried out only for a selection of countries in order to show the principal differences between the different policy schemes. The reference year for both the effectiveness indicators and the expected annuity is 2003. This analysis covers the country-specific costs of generation and the duration of payments. Furthermore, country-specific wind yields are used to calculate the income generated during the lifetime of plants.

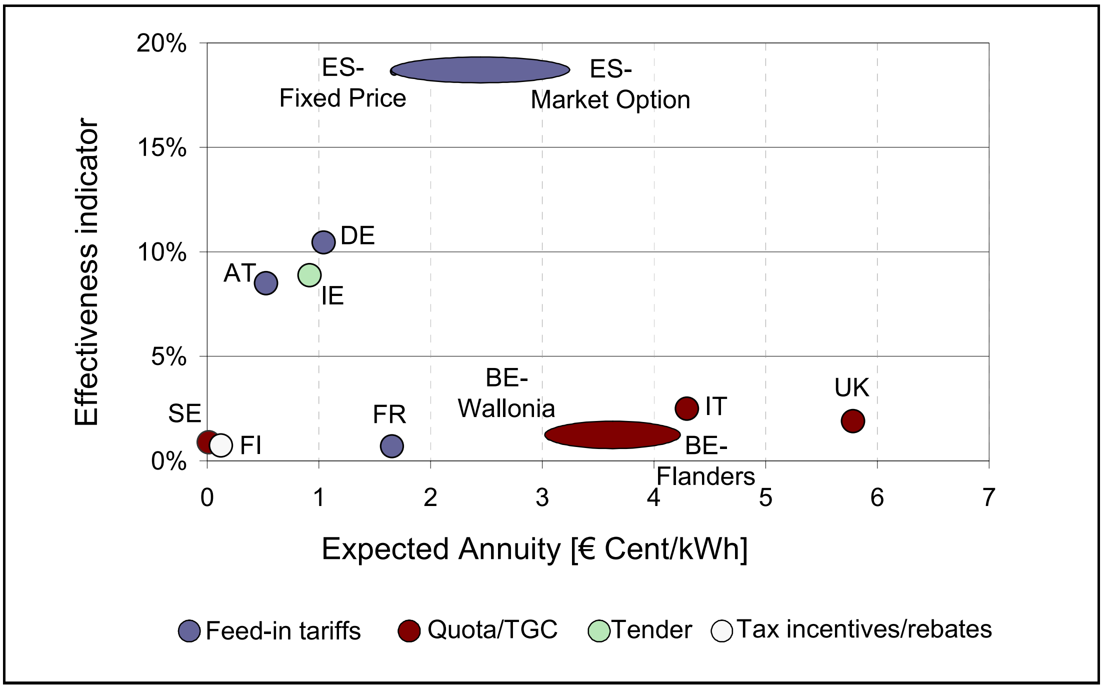

Figure 1: Historically observed efficiency of support: effectiveness indicator in relation to the expected annuity. WIND.

Forestry Biomass

The same analysis has been carried out for electricity generation from biomass. However, the biomass sector is influenced by other factors, such as secondary instruments[44], the combination of heat and electricity generation or an optimal forest management.

The final result of this exercise, carried out for the year 2003[45], is shown in Figure 2.

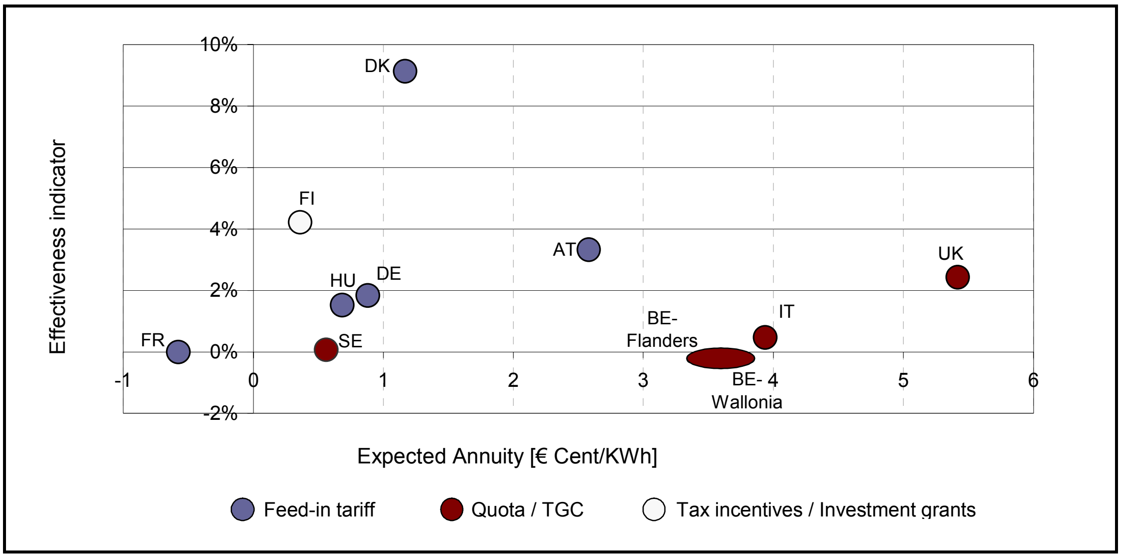

Figure 2: Historically observed efficiency of support: effectiveness indicator in relation to the expected annuity. BIOMASS
The economic data regarding investment costs and operation and maintenance costs are based on biomass electricity generation using CHP[46] technologies. The sale of heat as a by-product is therefore also taken into account for the economic assessment.

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44 Some Member States 'reinforce' the main instrument (normally feed-in tariff or green certificate) by tax relief or investment support. These instruments are good ways of catalysing the kick-off of biomass. They also have the advantage of less interference with the wood market.

45 Again, as in the case of wind, the reference year for both effectiveness indicators and the expected annuity is 2003.

46 CHP = Combined Heat and Power generation.

Annex 5 – Intermittency in production and balancing power: need for an appropriate combination of internal market and renewables regulation

As previously stated in Chapter 3.3, balancing costs will of course depend on the volume of intermittent power that has to be balanced, which again depends on the prediction of renewable production, gate closure etc. Moreover, the cost will also depend on the availability of balancing power, which will in turn depend on the generating system (energy mix) and interconnectors to other countries. As said before, an appropriate forecast of wind generation so as to minimise deviations will optimise system costs and regulation services. Under certain conditions, RES-E integration can match with local and regional demand peaks (e.g., solar energy with respect to peaking and grid-destabilizing air-condition demand in Mediterranean countries during daytime.

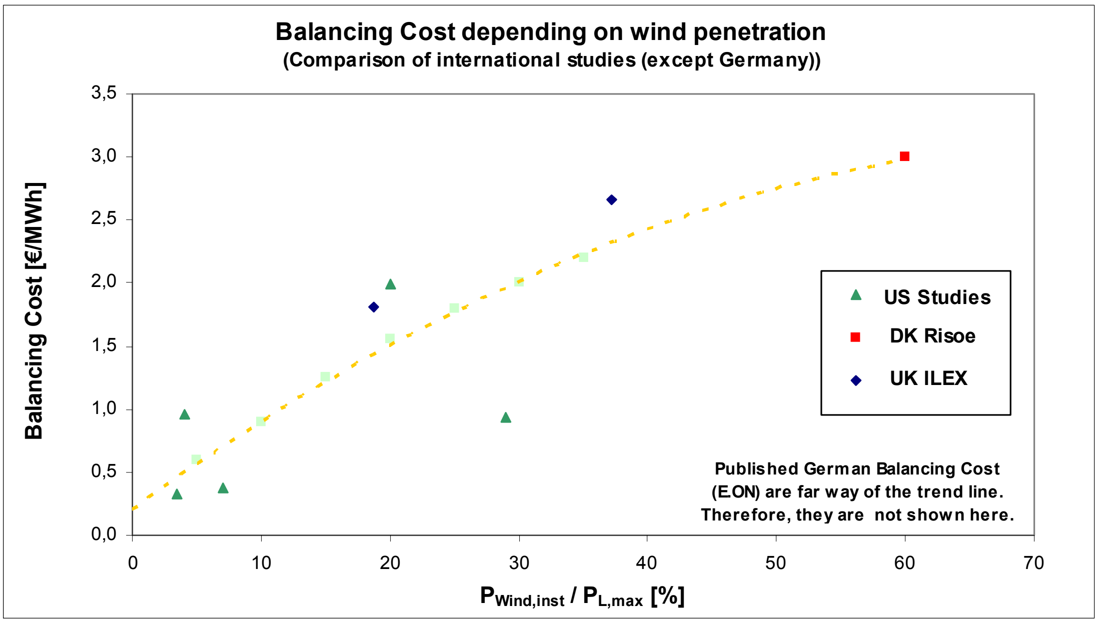

Figure 1:
Comparison of international studies on additional balancing cost due to large-scale intermittent wind integration.

It should be stressed that most existing power markets are designed to cater to the needs of conventional thermal and hydropower, and therefore only to a very limited degree take into account the needs of new renewables. At EU level, therefore, the need for rules and other measures to integrate intermittent RES-E technologies should be considered.

The influence of wind power on cross-border bottlenecks between Germany and its neighbours has created some disturbances in the Netherlands and Poland. Arrangements for power plant scheduling, the possible rigidity of the structure of electricity market, reserve capacity for cross-border transmission and congestion management seem to be crucial points requiring further analysis.

If developed in a more intensive manner, demand flexibility can also handle some of the fluctuations in power production from intermittent sources. At the same time, this flexible demand which could ensure a better balance between supply and demand, may offer advantages not only for integrating RES-E capacity, but also for the general operation of a liberalised power market.

How is the cost of support systems reflected in the electricity tariff? The consumer's point of view.

The transparency of consumers of the different support systems depends almost entirely on the design of the system, especially the flexibility of the market. The majority of countries in the EU do not give the explicit cost of renewable energies in electricity bills.

The transfer of the cost of renewable electricity depends on national regulation aspects and the tariff structure.

The structure of the electricity market and the design aspects are very different in Europe, so the following graph should be considered an estimate of the inclusion of RES support in electricity prices. The cost of the renewable support systems as reflected in the tariff is between 4% and 5% for Germany, Spain and UK and around 15% for Denmark. The share of renewable electricity in Denmark is currently higher than 20%.

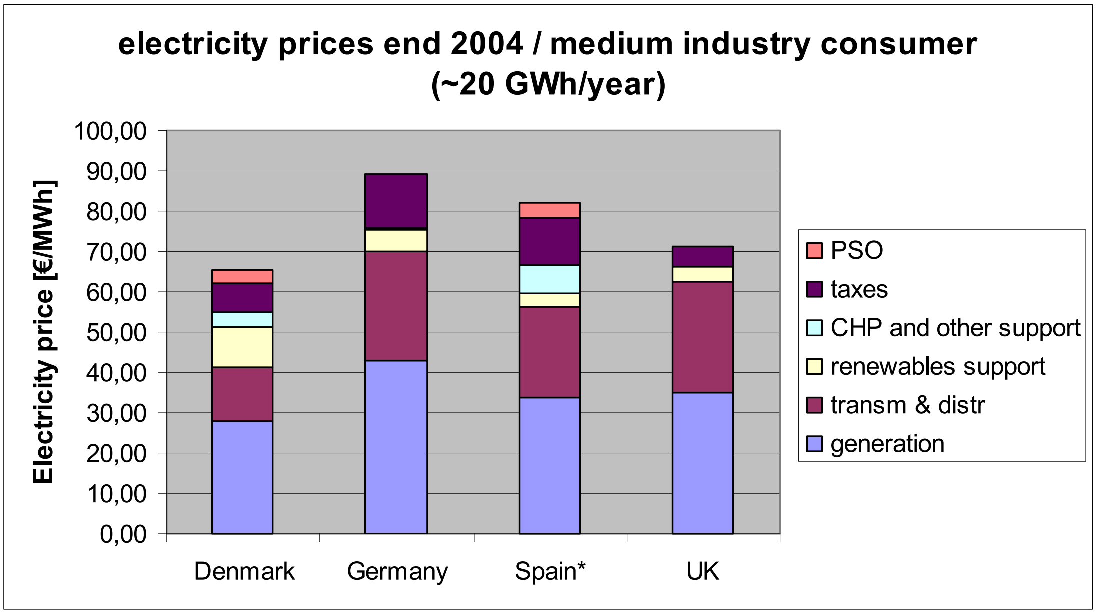

Figure 2: Approximate breakdown of electricity prices. European Commission, own estimation[47]. * No tax is considered for Spain.

47 The structure of the electricity tariff varies between countries in Europe. The figures included in this table are based on data from Member States and further elaborated by Commission services in order to compare different countries.

Annex 6 – Administrative barriers

Many Member States recognise the problem that renewable energies come in many cases under different codes and legislations. This multiple regulation leads to extra work for both applicants and the authorities concerned.

Complex legislation concerning renewable projects:

- Spatial planning laws involve competent authorities at different hierarchical levels (e.g. central, provincial and local government); civil construction works law and building codes involve local government as the competent authority.
- Environmental laws justify a favourable environmental impact assessment for granting environmental permits.
- Noise disturbance laws (in the case of wind) are intended to limit noise 'pollution'. Competent authorities are typically at local and/or provincial level.
- Nature diversity laws aim at protecting indigenous plants and animals, notably birds. The competent authority is typically central government.
- Laws for the management of water and road infrastructure seek to protect and promote the efficient use of public infrastructure. The competent authority is central government. (More problematic in the case of small hydropower plants).
- Electricity laws governing the transmission, distribution and supply of electricity.

Pre-planning: the experience in Denmark and Germany

In the 90s, more systematic planning procedures were initially developed at national level in Denmark, with directives for local planners. In addition, an executive order from the Minister of Environment and Energy ordered municipalities to find suitable sites for wind turbines through the country. This **"pre-planning"** with public hearings in advance of any actual applications for turbine sites was a considerable help in gaining public acceptance of subsequent sites for wind turbines.

Around 1997, another set of planning regulations were developed for offshore wind farms, with a central, national authority, the Danish Energy Agency, designated to hear all interested parties, public and private. This **"one-stop shop**" method has facilitated the planning process considerably, and is being widely studied around the globe.

In Germany, under the principle of proportionality, small projects may be authorized by the local authorities. Large projects are subject to authorization by a national body under the Federal Emission Control Act (BImSchG).

Under the national building code (Federal Building Code, BauGB), wind power installations are privileged and therefore generally permitted outside residential areas. However, the *Länder* (Federal states) can designate specific areas in which wind energy use is restricted.

Success rates and average approval timing – a good evaluation method

The British Wind Energy Association publishes overall planning approval rates. From the outset, the approval rate in the UK as a whole has been around 80%. The statistics also include figures for different parts of the UK: Scotland has had an approval rate of over 90% compared with less than 20% in Wales. The time taken to decide on wind farm applications is also publicly available: this is currently around 13 months for local decisions and over 2 years for national or federal decisions.

Estimation of administrative barriers to renewable energy deployment in the EU, excluding grid barriers

AT	BE	CY	CZ	DK	EE	FI	FR	DE	GR	HU	IE	IT	LV	LT	LU	MT	NL	PL	PT	SK	SI	ES	SE	UK
😐	😐	-	☹	☺	-	☺	☹	☺	☹	☹	☺	☹	☹	☹	-	-	😐	😐	☹	-	☹	😐	☺	☺

Member States have to report again – new Member States for the first time – on the existing administrative barriers by October 2005.

Annex 7 – Guarantees of origin

Article 5 of Directive 2011/77/EC requires Member States to implement a guarantee of origin system (hereafter GO system) by 27 October 2003 for EU-15. For the 10 new Member States, the deadline for implementing such a system was, in accordance with the Treaty of Accession of 2003, 1 May 2004. The main objectives of such a system are to facilitate trade in electricity from renewable energy sources and to increase consumer transparency by distinguishing between electricity from renewable and non-renewable energy sources. This Annex contains an overview of the different stages reached with of GO systems in Europe.

The main stages in the implementation of a GO system are:

- implementing legislation,
- appointing an issuing body,
- setting up an accurate and reliable operational system for issuing guarantee of origins.

In accordance with Article 5 of the Directive, a guarantee of origin is issued on request. It is not an obligation for renewable electricity sources.

Based on national reports and supplementary information, the situation in September 2005 was as follows:

	Legislation	Issuing body	Ready to GO
EU-15			
Austria	Passed	DSO	Operational
Belgium	Passed	Regulator	Operational
Denmark	Passed	TSO	Operational
Finland	Passed	TSO	Operational
France	In process	TSO	In process
Germany	Passed	Auditors	Operational
Greece	In process	TSO	In process
Ireland	Passed	Regulator	In process
Italy	Passed	TSO	Operational
Luxembourg	Passed	Regulator	In process
Netherlands	Passed	TSO	Operational
Portugal	In process	TSO	In process
Spain	In process	Regulator	In process
Sweden	Passed	TSO	Operational
UK	Passed	Regulator	Operational

EU-10			
Cyprus	In process	Not appointed	In process
Czech Republic	Passed	Government organisation	In process
Estonia	Passed	Not appointed	Not started
Hungary	In process	Not appointed	Not started
Latvia	Not started	Not appointed	Not started
Lithuania	In process	TSO	In process
Malta	Passed	Regulator	In process
Poland	Passed	Regulator	In process
Slovenia	Passed	Regulator	In process
Slovakia	In process	Regulator	In process

In total only 9 of the 25 Member States have fully transposed this article into national legislation and put in place an operational system for issuing guarantees of origin. At present, none of the new Member States has an operational system issuing guarantees of origin.

Most of the EU-15 have passed legislation concerning a system of guarantees of origins, the exceptions being France, Greece and Portugal. However, these countries are in the process of adopting legislation. Of the new Member States, only the Czech Republic, Estonia, Malta, Poland and Slovakia have passed legislation regarding a system of guarantees of origin. The remaining new Member States, with the exception of Latvia, are in the process of preparing or have proposed legislation.

Altogether 21 countries have designated an issuing body. The majority of countries have appointed either a transmission system operator (TSO) (9 countries) or a regulator (8 countries) as the issuing body. The exceptions are Austria, Germany and Czech Republic, which have opted for a distribution system operator (DSO), a group of auditors and a governmental organisation, respectively. The tasks assigned to the issuing body also vary from country to country. In some countries, issuing bodies maintain a national register of guarantees of origin, while in others they are also responsible for accrediting the power generating plants. However, the task of plant accreditation and verification of eligibility is more often assigned to an institution other than the issuing body. All 9 countries with an operational system in place, with the exception of Germany, have established a national registry for keeping track of ownership of guarantees of origin and to facilitate redemption, if required. Only 3 countries, Austria, Belgium and the Netherlands have introduced redemption. Registry and redemption requirements help reduce the problems of multiple counting.

Other design features, also regarding applications for guarantees of origin, vary greatly from country to country. All countries with a fully operational system in place, with the exception of Italy and Germany, allow for the transferability of guarantees of origin. Italy requires transferability to be linked with the physical electricity, whereas Germany does not allow the transfer of guarantees of origin issued to production eligible for the German feed-in system. A few countries have introduced earmarking of guarantees of origin. In addition to Germany, Austria, Denmark and the Netherlands require that the guarantee of origin is earmarked for support received or for tax benefits.

Under Article 5 of the directive, the Commission has to consider the desirability of proposing common rules for guarantees of origin. At present, the Commission does not see the need for proposing common rules. There are several reasons for this. Firstly, regarding the objective of facilitating trade, a necessary clarification was made in COM(2004) 366 on the role of the guarantee of origin and under what conditions a Member State can consider that imported renewable electricity can contribute to the achievement of the RES-E targets:

The Commission has decided to apply the following principle in assessing the extent to which national targets are met:

> *A Member State can only include a contribution from imports from another Member State if the exporting state has accepted explicitly, and stated on a guarantee of origin, that it will not use the specified amount of renewable electricity to meet its own target and has thereby also accepted that this electricity can be counted towards the importing Member State's target.*

This agreement should be included in a mutually recognised guarantee of origin. Currently, it seems there are no transfers of guarantees of origin between Member States in order to achieve targets.

Secondly, Directive 2003/54/EC[48] was adopted after Directive 2001/77/EC. Under Article 3(6) of Directive 2003/54/EC, Member States are required to implement a scheme for the disclosure of the fuel mix and selected environmental indicators on electricity sold to final consumers. The Commission regards this provision as an important measure in meeting the objective of consumer transparency as it covers the whole electricity sector, not only electricity from renewable energy sources. Several countries with legislation on the disclosure of generation details have already indicated that they will use the guarantee of origin to track information on renewable electricity generation. The guarantee of origin can therefore facilitate the implementation of electricity disclosure. The further development of disclosure would clearly increase consumer transparency.

Thirdly, a few countries have opted for a mandatory renewable energy quota obligation as the main support mechanism for renewable electricity. The quota obligation is administered by a system of tradable renewable energy certificates and there can be significant similarities between the guarantee of origin and tradable green certificates.

Nevertheless, the majority of Member States have chosen feed-in tariffs as the main instrument for promoting renewable electricity. Although there may be similar tasks required for the feed-in tariff system as for the issuance of a guarantee of origin, such as accreditation and verification procedures for renewable electricity production, the issuance of a guarantee of origin is not strictly necessary to facilitate feed-in tariff system.

The Commission considers that for the moment, the further development of disclosure would clearly increase consumer transparency.

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48 Directive 2003/54/EC concerning common rules for the internal market in electricity and repealing Directive 96/92/EC.