Background information

German Wind Energy Association (BWE)

Minimum price system compared with the quota model – which system is more efficient?

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Headquarters

Herrenteichsstraße 1
D-49 074 Osnabrück
Tel. + 49 (0)541/3 50 60-0
Fax + 49 (0)541/3 50 60-30
bwe-info@wind-energie.de
www.wind-energie.de

Contact

Claudia Grotz
Berlin-Office
Marienstr. 19/20
10117 Berlin

Tel. + 49 (0)30/284 82 109
Fax + 49 (0)30/284 82 107
c.grotz@wind-energie.de

Ralf Bischof
Tel. + 49 (0)30/284 82 106
Fax + 49 (0)30/284 82 107
r.bischof@wind-energie.de

Power generation from renewable energy sources is now being encouraged in all European Union countries. In Europe minimum price systems are currently being applied to a large extent. Some countries, on the other hand, apply a quota model, which is often presented as an allegedly more efficient promotion tool. However, in comparison to quota systems, minimum price systems clearly perform better; they do not only perform better; they are more efficient too. And all the more so when it comes to wind energy.

The minimum price system is characterised by the legally determined minimum price and a general obligation to purchase "green" electricity on the part of the grid operator or utility. In contrast, the key component of a quota system is the government regulation of a quantity or amount of electricity from renewable energies that should be provided, purchased or sold by a specified group of market participants. Allocating green certificates controls compliance to the respective committed quantity. Bidding models also exist: regenerative electricity producers compete in individual bidding rounds to cover a previously determined quantity contingent. The winning bidders then receive a fixed-term purchase guarantee for the electricity they generate.

When comparing the annual growth rate for developing wind energy, countries within Europe and across the globe with fixed compensation for electricity fed into the grid are at the top; Germany and Spain have recorded the highest figures in newly installed capacity in recent years (see illustration 2).

There are fixed-price systems in 16 other EU member states, including France, Austria, Portugal and the Netherlands. However, a system change is brought up in conversation again and again in the current debate both in the individual countries and at the EU level. In the following document, the most important arguments for this are subjected to critical examination. In addition, the minimum price and quota systems will be compared as an example in the main European wind markets at present.

Background information:

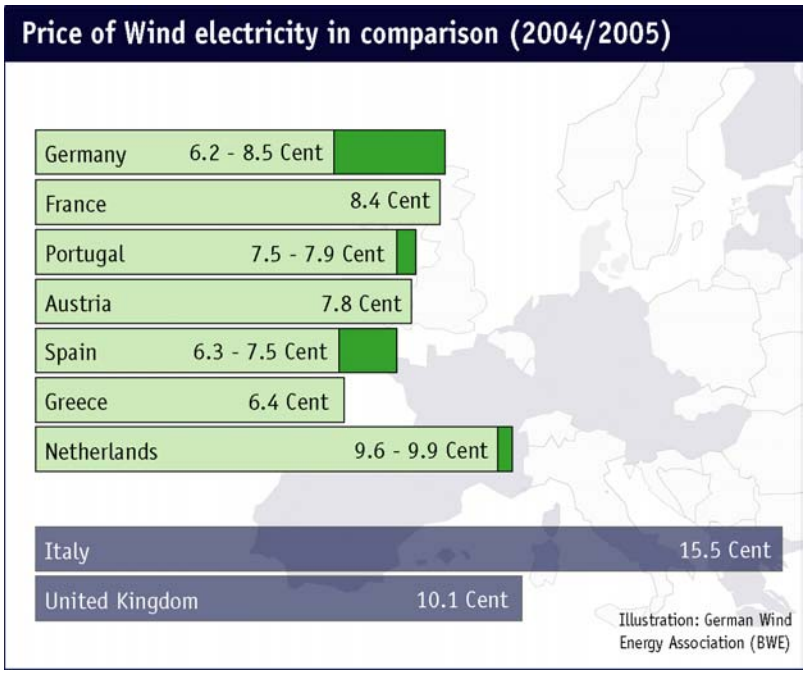
Promoting wind energy through the Renewable Energy Sources Act (EEG)

Claim number 1:

"Quota systems lead to lower prices when compared to minimum price systems".

Quota system advocates argue with examples of increased competition among producers and reduced prices for electricity from renewable energies. However, the empirical findings suggest otherwise. The following illustration, entitled 'Prices for Wind Electricity', shows prices for electricity produced from new wind turbines in various EU countries.

Illustration 1:



Explanations to the individual tariffs:

Germany: Payment for new turbines in 2005 amounts to 8.53 cents/kWh. After several years, payment decreases depending on site quality to the current 5.39 cents/kWh. In very good sites, this will be the case after five years.

Spain: Wind-electricity producers can choose between two tariffs: a fixed (6.3-7.0 cents/kWh according to capacity) or variable feed-in tariff. The variable tariff consists chiefly of a fixed-price component of between 2.75 and 2.9 cents and the average market price for electricity. The variable rate lies between 6.9 and 7.5 cents/kWh.

Italy: The feed-in tariff in Italy consists of the green certificate trading price (9.7 cents/kWh in 2004) plus the regular electricity price (an average of 5.8 cents between April and September 2004 – www.mercatoelettrico.org). This gives an overall rate of 15.5 cents/kWh.

Great Britain: The wind electricity rate consists of the green certificate trading price, tax exemption credits for renewable energy (Law on Climate Protection/Climate Change Levy – about 0.50 cents/kWh) and the market price for electricity. This gives an overall rate of roughly 10.1 cents/kWh (see www.nfpa.co.uk).

France: 8.36 cents for the first 5 years (from 2004); thereafter the price drops depending on the number of full load hours (0-2000 = 8.38 cents, 2000-2600 = 5.95 cents, 2600-3600 = 3.05 cents, as per official regulations from 2001), overall compensation period 5 years. This includes adjustments for inflation.

Portugal: Rates of between 7.5 and 7.9 cents over a fifteen-year period.

Austria: A tariff of 7.8 cents was paid across the board in 2004. However, 2005 should see a legal commitment to a minimum price.

Netherlands: The price for wind electricity consists of many components: a fixed government surcharge (MEP) plus tax exemption, plus surcharge gives an overall tariff of 9.6-9.9 cents. The fixed surcharge (MEP) is only granted, however, for 10 years or 18,000 full load hours. From July 2006, the rate will be 9.4-9.7 cents/kWh (degression) up to 20,000 full load hours.

Greece: 6.4 cents/kWh in 2004.

Currently, the prices paid for wind electricity in countries using the quota system are 15.5 cents/kWh in Italy and 10.1 cents/kWh in Great Britain. These prices are not lower but, in fact, far higher than the minimum prices paid in the other countries.

Fundamentally, there are two reasons for this:

- The unstable and fluctuating green certificate and electricity prices due to developments in the market and meteorological factors lead to high risk surcharges with investors and banks. Consequently, considerably higher post-interest equity returns and shorter capital return periods will be sought.
- The green certificate price is determined by the marginal costs of the most expensive technology or the least favourable site which have to be used to comply with the quota.

A new study by the Cambridge–MIT Institute specifically explores price trends within the German minimum price system and the British quota model. The authors of the study draw the same conclusions; even taking into account the total running time of a given turbine and in spite of the better average wind conditions in the British Isles, costs for wind electricity in Germany are lower than those in Great Britain. The higher market risk for British wind investments does not lead to lower, but higher, prices (Butler, Neuhoff 2004).

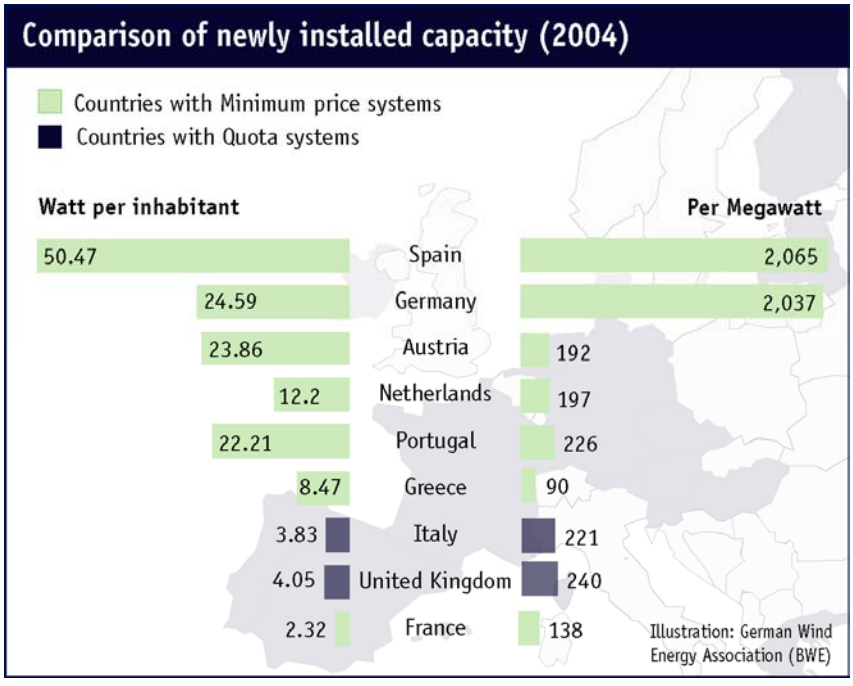
Claim number 2:

"Quota systems lead to the achievement of precise objectives and provide security in terms of the share of renewable energies in the electricity market"

The quota system intends for a specified quantity of electricity from renewable energies to be generated at a specified point in time. However, in reality, this is not achieved. In 2002 a quota system with a green certificate trading model (Renewable Obligation Certificates) was introduced in Great Britain. Energy Supply Companies (ESCOs) are expected either to produce green electricity, purchase certificates or they can buy themselves out of their obligation, currently for a price of about 4.5 cents/kWh. By 2010, a power consumption rate of 10.4% from renewable energies is to be catered for, rising to 15.4% by 2015. In 2004 the quota was set at 4.3%, but it fell well short, achieving only 1.7%. The larger the number of companies that purchase themselves out of their obligation, the more the certificate trading prices increase; the money from the so-called buy out funds is distributed to the owners of ROCs.

The average ROC price in Great Britain is currently 4.61p/kWh, which corresponds to approximately 6.9 cents/kWh. Yet even in spite of this additional incentive, a real share of only seven to eight percent is anticipated in industrial circles by 2010.

Illustration 2:



The reason for this is straightforward; neither investors nor bankers have an interest in reaching the target quota, let alone surpassing it. The consequence would be a crash in the green certificate price[1][1] due to excess supply and,

[1] See, for example, "Renewable Obligation Certificate Prices to crash by 2007". PR Newswire Europe Ltd. 02.02.2004. Going on statements made by Platts, UK, there is prior warning that investments in

therefore, a massive drop in revenue. Developments in Spain and Germany have been in exactly the opposite direction. In 2004, more than 70% of newly-installed wind energy capacity in Europe occurred in these two countries, each new installation having a capacity of above 2000 megawatts (see illustration: A Comparison of Newly-Installed Capacity). Even more interesting is new capacity per capita; countries using a minimum price system are streets ahead of those using a quota model.

Claim number 3:

"Quota systems prevent windfall gains"

As far as the minimum price system is concerned, possible windfall gains can be avoided by designing the respective system accordingly. The German Renewable Energy Sources Act is designed to prevent windfall gains. Firstly, it contains a differentiation according to varying site quality, in addition to declining payment rates. There was originally a yearly rate degression of 1.5% for new wind turbines, which rose to 2% from 2004. Furthermore, this is a nominal degression. As the Renewable Energy Sources Act does not provide for adjustments for inflation, there is a further real-term price degression of between 1.5 and 2% annually which, incidentally, also applies to all old turbines. The Renewable Energy Sources Act also stipulates regular revision of the payment and degression rates (every four years). For example, in August 2004, payment rates for wind electricity were also reduced on a one-off basis alongside the increased degression. The payment rate is also temporary.

Yet under the quota system, the certificate price is determined by the marginal costs of the most expensive technology or the least favourable site which have to be used to comply with the quota. To start with, the expansion of wind capacity will concentrate on the best onshore sites. If 'plan B' sites and even more expensive offshore technology need to be used in the foreseeable future in order to achieve the ambitious expansion targets, the green certificate price will be determined by the costs required for cost-effective operation at these locations.[2] As no payment rate differentiation is foreseen in the quota model, this automatically leads to massive windfall gains where better sites, more cost-effective technology and, in particular, written off old turbines are concerned. This can be summarised as: with comparable wind conditions, a specified quantity of electricity can be generated more cheaply using a differentiated minimum price system than by applying a quota model with a standardised price at any given time.

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renewable energy could grind to a halt should the green certificate price collapse due to the target quota being reached.

[2] cf. Butler/Neuhoff, 2004. Page 11 et seqq.

Another negative effect of the quota system is also plain to see: the high revenue risk favours well-established energy providers over private, medium-sized or agricultural investors in renewable energies. Thanks to their equity, providers are not dependent on banks to help finance the projects, whose assistance, due to the insecure revenue situation, would only be procurable at a very high price.

There are far more opportunities to conclude internal long-term, advantageous electricity supply contracts with the companies' own wind parks. These opportunities are not offered to independent providers. The resulting decrease in range of players leads to oligopolistic and, therefore, price-increasing effects.

It can generally be stated that minimum price systems have largely contributed to developing national industries by creating long-term secured political frameworks. This leads to increased competition, accelerated technological development and job creation. Up until now, quota systems and similar bidding models have scarcely contributed to the development of local industry. Whereas leading wind turbine manufacturers and suppliers have output in Germany, Denmark and Spain, countries using a quota system, such as Great Britain, Italy and Sweden, have no production industry to speak of.

Claim number 4:

"A Europe-wide harmonised support scheme prevents this becoming an uneven playing field in a liberalised European energy market and leads to the best-suited sites being used."

Renewable energies made up a 14.8% share of European electricity consumption in 2003.[3] Without large hydropower, the 'new' renewable energies have a share of under 5%. The lion's share of the market is dominated by electricity generated from conventional energy sources (gas, coal, nuclear energy). The sector is far removed from real competitive structures. The same conclusion has been reached not just by studies on the European energy market, but by the European Commission too. In 2004, the then EU Energy Commissioner, Loyola de Palacio, singled out the ongoing monopoly structures and an increasing concentration within the market.[4] At present, two thirds of the former EU-15's market is controlled by three large Energy Supply Companies.[5] The main players in the European electricity market see their position threatened by liberalisation and new market participants. Therefore the right strategy would appear to be to promote competition with very special

[3] EurObserv'ER, 2004 European Barometer of Renewables.

[4] "Much work still has to be done to deal with the dominant and even monopolistic positions of the incumbent operators and investments will be needed to guarantee the interoperability of grids and networks, interconnection and an adequate level of capabilities and infrastructure." Loyola de Palacio, 13.10.2004, quote from Kjaer/Schäfer 2004, p. 2.

[5] DGTREN Draft Working Paper Third benchmarking report on the implementation of the internal electricity and gas market, Commission of the European Communities, Brussels, 1.3.2004.

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emphasis on a thus far not dominant yet constantly growing sector: the renewable energy market.

In recent years, the prices for electricity generated from renewable energy sources have come down considerably[6] and will decrease further in the future thanks to new technological innovations. Gradually, renewable energies will adjust to the competition in liberalised markets. However, a precondition for this is that real, effective, fair competition should be possible in the conventional market sector. As long as this is not provided for, it is still premature to realistically call for competition in the renewable energy market.[7]

A further argument is the plea to exploit the best sites within Europe by introducing a quota model. Going by the green certificate trading logic, future growth could only occur in locations with the best wind conditions (such as the British and French coasts). However, one of the presuppositions for this type of distributed utilization of resources is for electricity produced far from the centres of consumption to be able to be transported to those centres. Such comprehensive expansion of the European grid is not to be seen in any proposals. Implementation periods of ten years or more are anticipated just for short new power-lines for the German power grid. Furthermore, there is no equal tax treatment for electricity generated from renewable energy sources. Yet without harmonising energy taxes for the production and consumption of electricity generated from renewable energy sources, misallocations and windfall gains are bound to occur.

In this regard, there is also the risk that the quota systems will contribute to renewable energy having trouble being accepted due to its concentration at a limited number of sites within Europe. Social and political support for renewable energy could also possibly wane in countries with fewer good resources. Expansion over a wide area, on the other hand, brings with it acceptance and equal distribution of the advantages arising from decentralised energy use with regional added value.

[6] Prices for German wind electricity have, for example, fallen by 60% since 1990

[7] For an analysis of the basic conditions within the European energy market in terms of the current state of competition, see, for example, Kjaer/Schäfer 2004.

Summary

Minimum price systems are successful and efficient

- They guarantee effective expansion.
- They lead to lower prices than do quota systems.
- They avoid windfall gains.
- They give small and medium-sized businesses the same opportunities.

Quota systems are ineffective and expensive

- Expansion falls far short of its targets.
- Prices for wind electricity are considerably higher than in countries with a minimum price system.
- They cause sizeable windfall gains.
- Small and medium-sized businesses are structurally disadvantaged.
- Up until now no large independent industrial sector has emerged in these countries for the manufacture of renewable energies.
- They jeopardise acceptance of renewable energy.

The minimum price system has enhanced the development of renewable energies most successfully. These systems are flexible in design and changes in technology and the market can be taken into consideration. Small and medium-sized businesses are not disadvantaged. These companies compete among themselves and therefore are interested in improving their efficiency. Furthermore, making legal adjustments can increase efficiency. The transaction costs are low and the financing mechanisms are easily implemented.

In contrast quota systems involve huge insecurities for producers of regenerative electricity; for the most part, small and medium-sized companies cannot bear the high investment risk because of the long-term framework conditions. Up until now such models to promote renewable energies have been implemented in various designs and in a host of countries. One noticeable fact is that up until now no large independent industrial sector has emerged in these countries for the manufacture of renewable energies and to ensure their professional application. However, in the long term this is indispensable if further development of technology and tapping the full cost reduction potential by increasing efficiency and performance are to be achieved. The costs for wind power in the countries using a quota system are currently higher than those in countries that use the minimum price system.

Moreover, considerable transaction costs for organising, implementing and monitoring need to be taken into consideration where quota models are concerned.[8]

It is fundamental that when applying the minimum price system, this must also be supported by creating additional positive framework conditions. Among other things, this pertains to additional grid capacity expansion, adjustments in building laws and encouraging acceptance through broad participation models and controlled land usage.[9]

Under these circumstances minimum price systems can achieve their ideal effect: a rapid development of renewable energies that is profitable for both the medium and long term and creates jobs at the local level. As a result, renewable energies make a continually increasing contribution to the local energy supply and are a central pillar for protecting the global climate.

Sources:

- Lucy Butler and Karsten Neuhoff (2004): "Comparison of Feed in Tariff, Quota and Auction Mechanisms to Support Wind Power Development." Cambridge Working Papers in Economics CWPE 0503.
- European Renewable Energy Federation (EREF) (2005): Reflections on a possible unified EU financial support scheme for renewable energy systems (RES): a comparison of minimum price and quota systems and an analysis of market conditions. Brussels.
- Janet L. Sawin (2004): "National Policy Instruments: Policy Lessons for the Advancement and Diffusion of Renewable Energy Technologies around the World." Thematic Background Paper 3, January 2004, prepared for the International Conference on Renewable Energies, Bonn, Germany, June 2004.
- Christian Kjaer and Oliver Schäfer (2004): The Myth of Effective Competition in European Power Markets. EREC-Paper. Brussels 2004.

The studies referred to are available online at www.wind-energie.de

[8] This concerns the design of the model as well as its implementation in allocating and regulating green certificates, monitoring compliance and, if necessary, implementing disciplinary mechanisms.

[9] Currently, accompanying regulations are lacking in, for example, France.