International market for green electricity. Overview on German policy and opinions among German market actors.

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Renewable Electricity in Germany

History of renewable sources of energy in Germany

In particular the Electricity Feed Law (EFL – StrEG)[2], but also preferential planning guidelines, lower interest rates granted by the German Ausgleichsbank for part of the loans, and other support programmes in various German states, have brought Germany into the world-wide number one position in wind energy capacity.[3] In 1998, some 1,000 new wind turbines with an overall electric power of some 800 MW were set up. So the total capacity installed almost reached 3,000 MW (2,875 MW to be precise) at the end of 1998; for comparison, in 1990 wind capacity was at 2 MW in Germany. Already in the first 6 months of 1999, more than 500 additional MW of wind power were installed – a new record (cf. Figure 1). At the end of the year, the total wind capacities are expected to reach 4,000 MW.

However, despite this immense upswing, wind power plants still only accounted for about 1% of electricity generation in Germany in 1998. As 1998 was a rather good hydropower year in addition, the share of renewable sources of energy in electricity consumption equalled about 5,2%.[4] But only somewhat more than 1% was met with non-hydro renewable energy sources, what is quite below EU-15 average. In 1990, before the 'famous' German Electricity Feed Law was introduced the share of renewables was already at 4% (see Table 1 for more details).

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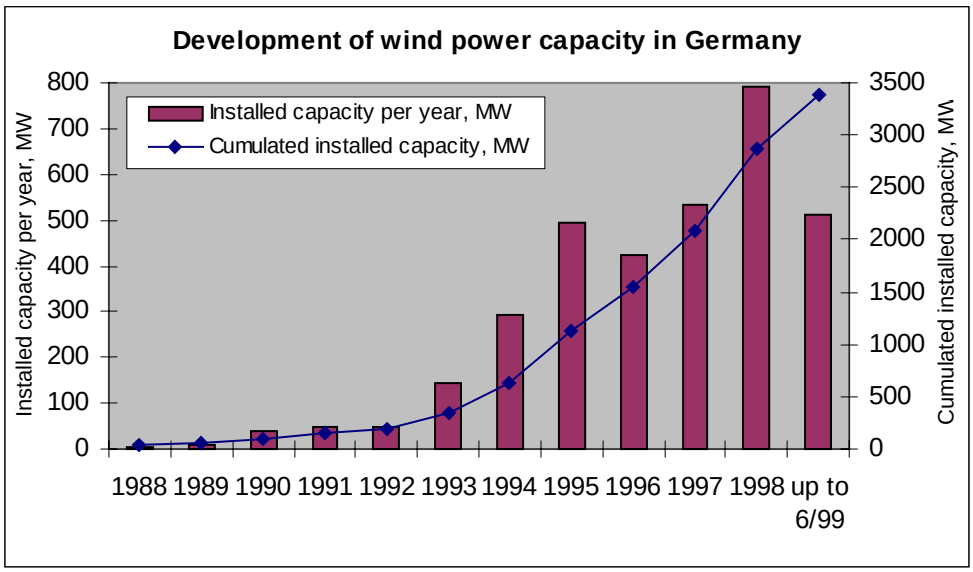
[2] Law on feeding electricity from renewable energy sources into the public grid (Electricity Feed Law (EFL) – Stromeinspeisungsgesetz (StrEG)) of 07/12/1990, Bundesgesetzblatt 1990, I, S. 2633, latest revision through Art. 3 of the Law on New Regulation of the Energy Sector Law of 24/04/1998.

[3] The German policies for advancing electricity generation from renewable sources will be explained in more detail in Section 1.2.

[4] The share of renewable energy in primary energy consumption was at 2.2% in 1998.



Data Sources: BWE (1999), IWR (1999b), Rehfeldt (1999)

Other renewable sources of energy have not had a boom comparable to that of wind energy. The installed capacities of hydropower, sewage and landfill gas have only changed slightly throughout the nineties (cf. Table 2). Yet, the share of electricity produced from biomass has also started to grow. In 1998, the installed capacity was about 410 MW (1992: 230 MW), only 62 MW (1992: 40 MW) of which belonged to public electric utilities. Although the portion of photovoltaic in total electricity production is still below 0.01%, this technology has gained very high growth rates in recent years, among both groups, public utilities and independent power producers. Photovoltaic installations seem to play a special role in Germany. They are equally popular in public, in the electricity industry and in government. There are rumours that the solar industry was successful in convincing the government to fix a feed-in tariff of 99 German Pfennig (about 50 EuroCents) per kWh in the latest draft amendment of the EFL. This policy would be in addition to several investment subsidy and R&D programmes which exist in the solar energy field at state and federal levels.

Table 1: Share of renewable sources of energy in electricity consumption in Germany (in %)

	1998	**1997**	**1996**	**1994**	**1992**
Hydro	3.6	3.4	3.4	3.9	3.6
Wind	0.9	0.6	0.4	0.2	0.06
Waste	0.5	0.5	0.5	0.5	0.5
Biomass	0.2	0.2	0.2	0.1	0.07
PV	0.003	0.002	0.001	0.0009	0.0003
Total (in %)	**5.2**	**4.7**	**4.5**	**4.7**	**4.3**
Total (in Mio. kWh)	25,279	21,733	21,090	21,082	18,784

Data Source: VDEW 1999

Today, the installed renewable capacity has arrived at about 8,300 MW in Germany, at about 7,5% of total generation capacity which is ca. 111,000 MW. It should be mentioned that public electric utilities own the big majority of hydro power and waste incineration plants, whereas independent power producers clearly have higher market assets in particular in wind power plants, but also in biomass and PV installations (also cf. Section 1.5). This is very much a result of the regulatory framework for the promotion of renewable sources. Under the

EFL, the established utilities have been excluded from support.

Table 2: Installed renewables capacity (in MW*) owned by electric utilities and independent power producers (IPPs) for Germany

	1998	**1997**	**1996**	**1994**	**1992**
Hydro	4,600	4,600	4,600	4,500	4,500
Wind	2,700	2,000	1,500	630	180
Waste	540	530	550	500	550
Biomass	410	400	360	280	230
PV	50	25	17	11	4,7
Total	**8,300**	**7,500**	**7,000**	**5,900**	**5,500**

* All numbers are rounded to two significant digits

Data Source: VDEW 1999

The Electricity Feed Law has been based on a rather broad consensus in the political arena, but has been heavily criticised by German electricity industry, e.g. as being discriminatory against them and as distorting competition among them. Especially the electric utilities located in the Northern part of Germany have brought several actions against the EFL to Courts, as they were affected disproportionately by the regulation.[5] Under the EFL, the big majority of new renewable generation units has been built in the North. In Schleswig-Holstein for example, the most Northern state of Germany, the share of wind energy in total electricity consumption has risen to around 15% from almost zero in the past 10 years. For your information, Table 3 gives more figures on the regional distribution of wind power and PV plants. The figures reveal that the top three states concerning generation capacities, in both cases contribute more than 50% to the overall capacity in Germany. In the field of wind energy, the regional differences are due to geographical or meteorological differences; in the field of PV, federal state policies and size of population have had the highest influence.

Table 3: Top three German states in regard to generation capacities for wind power and with PV

Wind [1998]			**PV [1996]**		
Federal State	Installed capacity [in MW]	Share in electricity supply [in %]	State	Rated power [in kWp]	Power generation [in MWh]
1. Lower Saxony	820	3	**1. North Rhine Westphalia**	4,450	1,530
2. Schleswig-Holstein	740	13	**2. Bavaria**	2,660	1,070
3. Mecklenburg-Vorpommern	210	5,8	**3. Baden-Württemberg**	2,400	900
Sum	1,770		Sum	9,510	3,500
Total in Germany	2,875		Total in Germany	17,418	6,100

Data Source: ISET (1999)

[5] So far the lawsuits have not been successful, one is still pending at the European Court of Justice.

One of the reasons for Germany's promotion of renewable energy is its national and international CO_2 commitments. Chancellor Schröder just recently repeated the April 1995 declaration of former Chancellor Kohl to reduce national CO_2 emissions relative to 1990 by 25% by the year 2005. Also the 'principle of sustainable development' was added as societal aim to the German constitutional law (Grundgesetz – Art. 20a GG) in 1994 and environmental protection is mentioned in the Energy Industry Act of April 1998 as one of three public goals in energy policy.

It is definitely still a long way before we can pronounce to have attained these environmental ends. With respect to the contribution of renewable energy sources, even domestically there remains a large potential for their increased use. The German Ministry for the Environment estimates that 10,000 MW of wind power could be installed in Germany in less than 10 years from now. That would equal a share of 3,5% of German electricity production, provided stable consumption levels. The potential of hydro power is almost used, or the possible sites would make new plants very expensive and planning permission problems would occur for environmental reasons.

The existing German regulatory regime, policies and targets

The German Ministry for the Environment's indicative target brought up in several programmes is to at least double the share of renewable energies in electricity supply from 5 to 10% by 2010, and to reach a minimum renewables share of 50% in 2050 (cf. e.g. Umwelt Nr. 2/1999, 45). However, this is not a national target agreed upon among different ministries and parties, i.e. it is not the official policy. Germany is one of the few EU member states that has prevented the target set in the EU's White Paper on Renewable Sources of Energy (CEC 1997) to become binding. In contrast to many EU member states, Germany does not even have an official indicative goal for the renewable generation of electricity.

Nevertheless, the German federal government as well as the state and community governments have put in place a number of measures for promoting renewable energies (for a detailed overview refer to Forum für Zukunftsenergien 1999). Responsibility for the promotion of renewable energies indeed rests with a number of different parties at the national and regional level. Yet, the Federal Ministry of Economic Affairs has the principal competence in energy policy and is responsible for the EFL – the primary stimulation instrument for renewably generated electricity on the national level. The EFL has supported about 1.5% of all renewable electricity generation in Germany

The Electricity Feed Law for renewable sources of energy was introduced in December 1990 and came into effect on 1 January 1991. Its second and latest revised version came into force on April 29, 1998 when the German electricity market was opened to all customers. The law regulates the purchasing of electricity generated in the territory of the Federal Republic of Germany from specified renewable sources (hydropower, wind and solar energy, sewage and landfill gas as well as biomass). Excluded from the EFL are installations using sources other than wind or solar energy that have an installed capacity of more than 5 MW.

The EFL obliges the grid companies to buy the electricity and pay fixed feed-in tariffs to the eligible electricity producers. For hydropower, sewage and landfill gas plants up to 5 MW the tariff is set at minimum 65%, for biomass as well as hydro, sewage and landfill gas installations under 500 kW at minimum 80%, and for wind and solar power at minimum 90% of the average utility electricity rates for consumers. The tariffs are fixed by the regulatory authority for a one-year period based on the value of the average utility revenue per kWh sold. This value is drawn from an official statistic and has to be the value for the last calendar year but one. Table 4 shows the feed-in tariffs subdivided into the three technology categories and consecutive years. The categories and percentages for sell-back rates have slightly changed from EFL amendment to EFL amendment.

Table 4: Feed-in tariffs (in Pf/kWh and EuroCents/kWh*) for electricity from renewable energy sources paid each year under the German EFL

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Wind / Solar	16,61	16,53	16,57	16,93	17,28	17,21	17,15	16,79	16,52	16,10
	8,49	8,45	8,47	8,66	8,84	8,80	8,77	8,59	8,45	8,23
Biomass / Hydro, sewage and landfill gas (< 499 kW)	13,84	13,78	13,81	14,11	15,36	15,30	15,25	14,92	14,69	14,31
	7,08	7,05	7,06	7,21	7,85	7,82	7,80	7,63	7,51	7,32
Hydro, sewage and landfill gas (500 - 4999 kW)	11,99	11,94	11,97	12,23	12,48	12,43	12,39	12,12	11,93	11,63
	6,13	6,10	6,12	6,25	6,38	6,36	6,33	6,20	6,10	5,95

* Values are given in terms of the respective year.
The exchange rate of 1,95583 DM/EURO is used throughout.
Source: IWR (1999a)

Installations in which the Federal Republic of Germany, a federal state, a public electric utility or their subsidiaries hold shares of more than 25% are not qualified for the output subsidies under the EFL. Moreover, the EFL does neither provide for a time limitation nor for a gradual degression of the payments to eligible generators.

In the EFL amendment of 1998, some important changes were made, mainly driven by the financial burden issue. §4 StrEG introduces a cap of five percent. If the amount of electricity which has to be supported under the EFL surpasses five percent of the total kWhs delivered by an electric utility in one calendar year, the higher level network company is required to reimburse the costs of supporting additional renewable generation until it also reaches the five percent ceiling in its grid area. This basically means that for a share of RES-E above five percent a utility has no (purchase) obligation any more. Since usually at least two network levels are affected, the regulation has also been called the double-threshold-rule.

It follows a brief of crucial parameters in the current EFL:

- The feed-in tariffs are not financed from public budgets, but from revenues of utilities or grid companies. This on the one hand means that the support under the EFL is not a state aid, but a para-fiscal measure. But it has also led to competitive distortions between electric utilities.
- The guaranteed premium rates only apply to the non-utility sector, i.e. utilities are in general not eligible.
- The double 5% ceiling rule is equal to an absolute upper limit for renewables exploitation in Germany.
- The feed-in tariffs are based on the average utility revenues from electricity sales to consumers. With presently sharply falling electricity prices, the feed-in payments will shortly be lowered as well.
- The EFL guarantees different levels of output premium rates depending on the source of renewable energy, thus, it (indirectly) includes technology bands.

In October 1999, the supra-regional utility PreussenElektra announced that they expect to exceed the 5% ceiling in their grid area this year. According to the EFL, then the PreussenElektra Grid company will not be obliged to support electricity generated from additional renewable energy plants from beginning of next year on. To avoid a halt of the dynamic development especially in the wind energy sector, the government has been working on another amendment of the EFL for some time now. Since October, however, the follow-up version of

the existing EFL amendment has been intensively discussed, not at all in public, but behind closed doors between politicians, the renewables industry and their associations, and other NGOs. The government is planning to pass and enact the next EFL revision early next year, as the 5% threshold rule and falling electricity market prices for conventionally generated electricity urge them.

Declared goals of the third revision are to quickly re-establish a reliable framework for investors, to get rid of regional distortions in competition caused by the financing mechanism, and on the whole, to make the EFL more market-conform, i.e. to react at least partly to criticism. The details of the next amendment should become available in early November 1999. The Minister for Economic Affairs Müller and the Green Party seem to have similar ideas (as e.g. no further cap; no more link of premiums with market prices, but fixed tariffs on a high level; incorporation geothermal power; higher support for biomass; equal sharing of costs between all consumers), there is only disagreement in few points (as e.g. time limit of support; exact level of subsidies for solar and wind). Neither of the two governing parties wants to take account of developments at EU level, in neighbouring EU Member states or in the German utility sector. Both, the SPD and the Green Party, ignore discussions on alternative support schemes for electricity generation based on renewables. They seem to almost completely rely on information from the prevailing renewables industry and their stakeholders.

From the broad range of federal and state policies and programmes promoting or affecting renewable electricity development, only those regulations are referred to here in addition to the EFL that have been put in place by the new federal government since its inauguration. They comprise:

- the Directive for the promotion of PV installations (300 MW) by a 100,000-roofs solar electricity-programme of 1 January 1999
- the Law for the introduction of an Ecological Tax Reform of 1 April 1999
- the Directive for the promotion of measures for renewable energy sources (200-million-DM market incentive programme) of 1 September 1999

The 100,000-roofs solar electricity programme aims at promoting the establishment of 100,000 photovoltaic installations with a maximum power production of 3 kW, i.e. a total production of 300 MW, between 1999 and 2004. The programme offers a special zero-interest loan with a repayment period of 10 years and up to 2 starting years without credit repayment. Private persons, small and medium-sized companies can apply.

The eco-tax reform should relieve pressure from the production factor employment and in return increase cost pressure on energy consumption. In the first phase of the tax reform, the mineral oil tax was increased (gasoline is taxed an additional 6 German Pfennig per litre, heating oil an additional 4 Pf/l, natural gas an additional 0.32 Pf/l) and an electricity tax of 2 Pf/kWh was introduced. A key uncertainty in the eco-tax reform is whether renewably-generated electricity will be exempt from the electricity levy from 2001 on, the third stage of the reform. Currently, renewably generated electricity is taxed like conventionally generated power. The public budget for the market incentive programme, however, is recycled of the revenue from the taxation of renewable energies. The support volume was set at DM 200 million per year until 2002. Priority funding shall go to solar thermal installations, installations for the recovery of energy from biogas / biomass, small hydroelectric power stations, individual wind farms and geothermal power plants. The average funding rate is estimated to be 20%.

Key concerns now dominating the renewables industry in Germany are the pending EU Directive on grid access of renewable energy sources, the future and the revision of the EFL, grid access rules and tariffs for RES-E in Germany, and the details of the second and third phase of the eco-tax reform.

Status of electricity market liberalisation in Germany

In the course of the last year, the German electricity market has become one of the most competitive in Europe. The EU internal electricity market directive 96/92/EC has not only been implemented in national legislation in time, but often the national liberalisation efforts have gone beyond the liberalisation targets required by the directive.

On the 29th of April, 1998, the new '**Energiewirtschaftsgesetz' – EnWG** (New Regulation of the Energy Industry Law) came into effect. The main elements from a European perspective are:

- the *full market opening* in one, not in three steps;
  The traditionally closed supply areas ceased to exist. There was no step-by-step liberalisation, as visualised in the EU Directive 96/92/EC concerning common rules for the internal market in electricity. The electricity market was officially opened to all customers at once. §6 EnWG obliges the operators of the electric grid to allow the transmission to all customers. It establishes a universal access to the grid rule, since all reasons for the refusal of full access are listed and the burden of proof is imposed on the network owner.
- the model of *negotiated,* not regulated *TPA;*
  In contrast to other member states, Germany does not have a regulatory authority. No grid access rules and tariffs were worked out in the new Energy Law. This was left to the industry itself. Only in case of failure of the industry-led grid access scheme, the government is planning to take the initiative. (For more details see information below)
- the transition period for *municipal utilities* until 2002
  The municipal electric utilities are given the permission to make use of the Single Buyer option in their supply areas for a transition period until 2002 (or even 2005). A respective paragraph was included in the new Law.
- separation of accounting, but no legal *unbundling* required; no changes in *network ownership* or operation;
  The electricity industry has been vertically and/ or horizontally integrated up to now. Utilities still control the transmission and distribution grids in their 'former' supply areas what gives quite some market power to them.

In the first year of electricity market opening, **grid access rules** have turned out to be the major obstacle for competition to really start. The scheme worked out gave the established electric utilities some more time to get prepared.

Under the pressure to find a consensus between each other and to prevent regulation by the government, as foreseen in the bill, the electricity industry and their big industry customers agreed on a 'Verbändevereinbarung (VVD)' (Voluntary Agreement of Associations). It fixed the criteria for how to determine the grid access rules and charges literally in the last minute. The VVD between the 'Bundesverband der Deutschen Industrie e.V. (BDI)' (Association of German Industry), the 'Verband der Industriellen Energie- und Kraftwirtschaft (VIK)' (Association of the Industrial Energy and Power Sector) and the 'Vereinigung Deutscher Elektrizitätswerke (VDEW)' (Association of German Electric Utilities) was ultimately signed end of May 1998 to be in force until 30 September, 1999. Although technically the agreement is not strictly binding for the members of the associations, but a recommendation only, it has provided the baseline for the calculation of transmission as well as distribution charges.

The first Association Agreement of May 1998 has been heavily criticised from all sides because of its lack of transparency and practicability, high charges and the distance dependency of the tariffs. It has been a major obstacle for (fair) competition.

The second Verbändevereinbarung is under way and almost agreed on. Under the pressure of the Federal (Cartel) Office for Fair Trading and other actors in the market, grid access rules and tariff structures have been simplified a lot. Transaction / negotiations costs will decrease a lot. Additional associations representing smaller companies have been sitting on the negotia-

tion table as well this time. The most controversial question between the different parties is how to standardise load profiles and charges for typical households. Nevertheless, the second Verbändevereinbarung seems to guarantee the necessary level playing field.

The changing electricity sector landscape

The German electricity industry has been tremendously restructuring since market opening, most of the developments that we have seen in the sector were predicted or expected – they are a logical outcome of the new commercial pressure. Yet, it is the speed which is surprising to most experts !

At the beginning of liberalisation, there were about 1,000 electricity utilities in Germany, of which about 500 have generation assets of their own. On the national level, there are the eight companies shown in Table 5.[6] The eight supra-regional utility companies dominate the market. They are interconnected through capital links and are joint members of the Association 'Deutsche Verbundgesellschaft e.V.'. In addition, there were about 80 regional utilities and approximately 900 local, mostly horizontally integrated utilities in mid-1998.

With a share of more than 80% in public supply, the eight large interconnected utilities have been the main producers of electricity in Germany. A share of about 80% in the high voltage grid guarantees them a crucial position in electricity transmission as well. Further influence has been secured through a immense number of participations in regional and municipal utility companies. With the exception of PreussenElektra AG and Bayernwerk AG the big utilities were also directly supplying industrial and standard rate customers. HEW, for instance, used to mainly sell electricity to households and small businesses. Over-capacities is also a problem in the Germany power market.

Table 5: The largest electric utilities in Germany and their electricity sold in 1997 & 1998
[in billion kWh]

	1997	**1998**
1. RWE Energie AG, Essen	132	138
2. PreussenElektra AG, Hanover	105	106
3. Bayernwerk AG, Munic	63	73
4. Energie Baden-Württemberg AG (EnBW), Karlsruhe	49	51
5. Vereinigte Energiewerke AG (VEAG), Berlin	47	47
6. Vereinigte Elektrizitätswerke Westfalen AG (VEW), Dortmund	33	35
7. Hamburgische Electricitäts-Werke AG (HEW), Hamburg	14	17
(8. Neckarwerke Stuttgart AG (NWS), Stuttgart	14	14)
9. Berliner Kraft- und Licht AG (Bewag), Berlin	13	13
Total	470	494

Source: http://www.vdew.de/ak_wo_1.htm

One of the first steps of active electricity companies was the preparation of a comprehensive restructuring with the aim of separating strategic and operational functions, bundling of competence and independently operating business units of different value-adding components. Organisational restructuring was usually directed at both, improving client orientation and

[6] Energie Baden-Württemberg AG (EnBW) recently emerged from Badenwerk AG and the Energieversorgung Schwaben AG (EVS).

massive cost reductions. Cost management is next to client orientation the key strategy for the energy utilities in order to be successful in the liberalised market. Therefore, employees have rather looked at all the organisational changes with fear, as restructuring implies unemployment or early retirement for many. The industry's workforce has already been reduced by 25% in the nineties. Rationalisation has also led to the shut-down of several generation facilities.

Then, there has been a great deal of strategic alliance, take-over and merger activity in the sector, including foreign firms. Electricity purchasing pools, strategic alliances, and asset sales are particularly popular among municipal utilities. Regional utilities have been merging quite a lot. The supra-regional utilities have increased their shares in or taken over regional and municipal utilities, and have now started to merge with each other. It was predicted that 3 supra-regional utilities and about 200 regional suppliers would survive in the medium-run; we could also end up with four blocs for the time being:

- VEBA/ VIAG, i.e. PreussenElektra and Bayernwerk (No. 2 and 3 in Table 5), and
- RWE Energie/ VEW (No. 1 and 6) are planning to merge.
- VEAG, the supra-regional company in the area of Eastern Germany, is completely owned by a consortium of the large utilities listed in Table 5 anyhow.
- A 25.1% share of EnBW is to be sold to EdF and
- a 25.1% share of HEW was sold to Vattenfall.

The cartel office is preferring a solution with 3 to 4 blocs. They want to urge the supra-regional utilities to get rid of their capital links (e.g., PreussenElektra has a share in HEW, Bayernwerk has a share in VEW), and to sell VEAG to a foreign competitor.

In some categories, electricity prices have been falling up to 30% in the last 18 months. For a long time, there was only price cuts and competition for industrial and bundle customers. But this last summer, supply companies opened competition in the residential sector, nation-wide, and not only on paper. Marketing efforts of some utilities have been immense, yet, switching rates are still rather low, what is partly due to the pending Agreement on grid access rules and tariffs (Verbändevereinbarung). Price offers also in the residential sector are astonishing !

Of course, the competitive market has also brought new business opportunities, branches and companies or market players especially in the field of power trading and energy services.

Green pricing boom in Germany

At the end of 1996, about ten companies were involved in marketing green power in Germany. By July 1999, the Association of German Electricity Utilities (VDEW) counted close to 50. A few months later the total is certain to be higher, as month after month new green energy products and services are launched into the headlines.

Since the official opening of the electricity market to competition in April 1998, every type of power utility – large, medium-sized and municipal – has tried to improve its image by fostering renewable energy options through voluntary extra payments from its customers. Green electricity has in fact been one of the first products to be marketed in the newly liberalised market. As one representative of a German utility explains: "Any business which wants to be successful in selling electricity to its customers has to offer 'green' electricity products. The lack of such an offer is an unacceptable risk (in terms of losing customers) compared to the small expenditure required." Many municipal utilities regard the supply of environmentally friendly services as an important pillar in their competitive survival. The ASEW – an umbrella organisation of about 200 municipal utilities – has even created the trademark “energreen”, under which its member companies can pool and sell their green power offers.

The number of companies operating a green electricity product may sound promising. Green

pricing has not, however, turned into a success story so far. The known participation rates - customers signing up in relation to a company's total customers - are mostly below 0.1 %. By far the highest participation rate at the moment is 0.6 %. Expressed as a share of overall electricity generation, the average percentage is even lower; consumers often choose to cover only a fraction of their total power consumption with 'green' kilowatt hours.

Against this, the business is still in an early stage of development, and only a few of the green power programmes have been on the market for more than two years. Moreover, marketing activity has often been small once the trademark has first been introduced. The (added) environmental benefit of several of the products has also been questioned, with a lack of information and transparency for potential consumers. Maybe even more importantly, the rules on access to the grid and transmission and distribution charges which have been applied since the formal opening of the German market have so far hindered true competition. Yet, the new 'association agreement' on these matters, which has been negotiated in these days and is expected to come into force from next year, should make residential customer switching and nationwide marketing of green power much easier. A final conclusion on the performance of the voluntary market for green electricity cannot therefore yet be drawn.

The majority of companies have been selling green power for an extra charge of about eight pfennigs per kilowatt hour. But the range is huge - from 1 pf/kWh up to as high as 2 DM/kWh for offers based on photovoltaics (PV). Brands which have recently entered the market are usually based on a mix of energy sources, including wind, biomass, hydro and, nearly always, a certain percentage of PV. The latter plays a particularly strong role in the 'voluntary' German market.

The VDEW estimates that about 27,000 German households are taking advantage of green offers. On the other hand, non-residential demand has been very low. An exception is the programme from the (up to now) largest German utility, RWE, which has about 30 commercial and industrial customers in addition to 15,000 households. Other companies report more and more inquiries from businesses.

Many green power products include commitments to new renewable energy generation. In terms of new capacity, RWE and Bayernwerk, another major player in Germany, have been among the best. Bayernwerk supports 19 solar and 12 biogas installations under its green power programme; RWE has built 26 PV, three wind power and two hydropower plants.

Besides the 'old' electricity utilities, about 15 newcomers with various backgrounds have entered the green power market, several of them from the start of liberalisation. These are companies with an exclusive focus on green energy, some of them with generation capacities of their own, others only trading and marketing green electricity. Yet, their business has not been developing well. The number of customers is far behind the expectations. Lichtblick, an ecopower supplier in Hamburg, has only earned 350 customers in almost 1,5 years. Naturstrom AG located in Düsseldorf managed to get 1,200 consumers under contract so far, but had expected to get 12,000 by the end of the year.

Given ongoing concerns about the credibility and environmental value of some green power products, customer information and environmental certification plays an important role in Germany. There are several initiatives to certify energy as green, although with differing objectives and clients. The Grüne-Strom-Label, for example, excludes companies which also operate nuclear power plants. The label of the German TÜV (Technical Monitoring Institute) certifies electricity from renewable energy whether or not it has received support under the Electricity Feed Law, whereas the scheme proposed by the Öko-Institut makes a distinction between old and new plants. Moreover, the German Environmental Protection Agency (UBA) is working on a proposal for including green electricity in its Blue Angel label. It is unclear which of the green labels will gain most acceptance in the end.

It will clearly take time for the green market to mature. However, it must be emphasised that a voluntary green power market cannot replace a regulatory framework which takes account of the environmental costs caused by existing energy systems and for which all polluters have to pay.

Electric utilities and renewables in Germany

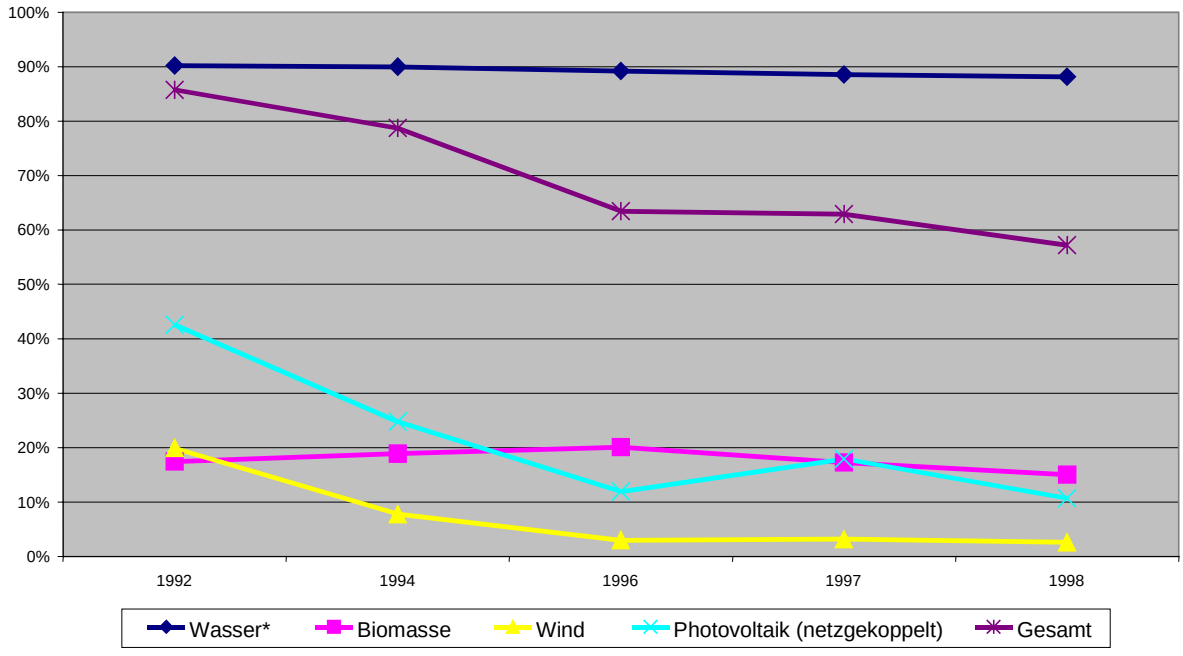
This section briefly summarises the attitude and business strategies of the supra-regional utilities in the past. More details on the current policy can be found in the German Baseline Survey report for the REALM project.

Utilities did not show a pro-active approach towards renewable energies in the past, not seldom they even followed an anti-renewables policy, in particular after the Electricity Feed-in Law had been launched – which has discriminated against the established utilities. With the beginning of liberalisation and the European debate on harmonisation of renewable energy policies last year, several of the utilities became more active, but it was mostly still a wait-and-see strategy.

The Association of German Electricity Utilities (VDEW) reports that the industry spent about DM 2,300 million for renewable energy sources in 1998 – DM 200 million more than in 1997. DM 1,100 million of which were invested in planning, building, maintenance, and operation of commercial plants, mainly hydro power plants; DM 100 million flow into research, development, and the construction of demonstration schemes. For electricity generated and fed into the grid by independent power producers under the terms of the EFL and under reimbursement programmes covering costs, the industry claims to have paid about DM 1,100 million (1997: 800). For comparison, the revenue from total sales to consumers and to electric utilities came to DM 122,500 million in 1997.

Figure 2:

Installed renewables capacity owned by electric utilities in % of total installed renewables capacities in Germany



The VDEW also informs that ca. 70% of the renewably generated electricity in Germany was produced by the public utility sector last year. They do not disclose that their share has decreased continuously during the nineties and that the high share is mainly due to their large

hydro power plants. Figure 2 demonstrates that investments of public electric utilities in non-hydro renewables capacities, in particular in wind power, have been very low throughout the nineties. This can definitely be interpreted as a result of the regulatory framework and policies for promoting renewables, but not only. There was for instance also scepticism by technicians and engineers used to large-scale nuclear and fossil-based technologies. Moreover, renewables are in general not competitive under normal market conditions. Their yield of return was regarded too low by all utilities. Some do not see a high renewables potential in Germany, in particular because they clearly favour PV and solar thermal plants.

Thus, in the past, the supra-regional utilities have basically restricted themselves to examining electricity from renewable sources in R&D, demonstration and pilot projects. None of the German utilities had ambitious targets for the inclusion of renewable electricity in its generation mix. The perception of the opportunities and risks presented by renewable energy seems to have been pretty similar, and consequently renewables did not play a part in the business strategies, but have not been ruled out for the future. There were differences in the renewables programmes of the utilities surveyed, yet, these differences are considered to be of minor importance. They are pointed out in more depth in the German Baseline Survey.

Finally, it should be also clear that decisions to promote or ignore renewable electricity, either in generation or marketing, are driven as much by internal conditions (business philosophy, prior experience) as by an analysis of the external business environment.

Utility perspectives on the current regulatory regime

First of all, there is no single, unified industry view.

As the public power companies have been excluded from the EFL since the very beginning and as they have always demonstrated their refusal, they will never accept this type of support mechanism currently in place in Germany.

However, the overall view on renewable energies has definitely become more positive in the past 2-3 years, opportunities linked to them are more and more recognised. The top German utilities are not planning to leave market shares to their European competitors or even to newcomers, if the EU shows determined Kyoto as well as renewable energy policies implementing the respective regulatory frameworks and policies. A determined and clear EU framework and policy is almost a prerequisite, however. None of the utilities has demonstrated leadership so far or revealed a pro-active approach. They are only waiting in the wings. Some are more positive or less negative than others.

On the VDEW level initiative was taken for determining the industry preferred support scheme. (Minimum)[7] 3 large utilities had developed their preferred support schemes and tried to convince their competitors in the VDEW meetings to agree:

- Voluntary agreement model of RWE Energie AG: voluntary, industry-led approach only; based on marketing of green power; European perspective and market in the centre
- 'Handelsplatzmodell' of PreussenElektra: government quota; green certificates, but no separation of physical and financial trade to avoid regional imbalances and discrimination. The outline of this scheme has been distributed to the REALM team.
- Regenerativ-Pfennig-Modell of Bayernwerk AG: tender based system with grid charge (a la NFFO)

Yet, agreement turned out to be hard and was not necessary anymore when the EC Directive

[7] For example, HEW and EnBW meanwhile also have intensive internal discussion on the design of a support scheme following the EFL. Simplified, an obligation on consumers combined with green certificate trading might turn out as their favourites.

was postponed. The 8 big utilities do not talk with one voice any longer. In the past, it was much easier. Now the VDEW (Association of German Electric Utilities) will be completely restructured while the personnel will be halved. The organisation seems to very much lose its influence. They, in this case representing the opinion of all of their members, have required a competition-based, market-conform and efficient support scheme for REN-E. The sector also seems to have consensus on some general objectives: they want to have market shares in the renewables business and they want to improve their public image. Very recently, the President of VDEW said: "If such a support policy was finally realised, the share of renewable energies could increase from currently 5 to 8 and 10 percent in 2005 and 2010, in the assessment of the electric utilities. But with the newly implemented instruments of the current government, no decisive increases can be expected."

A Renewable Portfolio Standard (RPS) with Green Certificate Trading has not many official supporters yet. It still seems to be too complicated a system, especially with all the other new issues the utilities have to face in the liberalising markets. Yet, it is more and more discussed and some of the large utilities that do not have 'their' scheme yet seem to favour it.

Recommended changes to the current regulatory regime

Some general policy design and implementation issues important for all renewables promotion policies have been discussed in the final paper of Working Group 3 (Kühn et al. 1999).

In the course of the REALM project and an internal ZEW project, ZEW has organised 2 workshops with national experts from academia and industry in the field of renewable energy policies. How to design a RPS with green certificates trading for the large-scale market penetration of renewable electricity in Germany was assessed and discussed in detail. Based on these discussions, I believe that a legally binding quota on consumers or final suppliers combined with green certificate trading will be possible in Germany in the medium run, technically and politically, when the government is allowed to implement a (generous) transition period for stranded investment reasons. For another two to three years, however, Germany will completely stick to the old, but somewhat improved fixed feed-in tariff system.

Ultimately, a policy of binding national targets, obligations and tradable certificates seems to be preferable for reasons discussed elsewhere in the project plus the following ones:

- Europeans should start gaining experience with the instruments of tradable permits and flexible mechanisms to a much larger extent,
- big players cannot be excluded, and under the recommended system we have a level playing field,
- it is an attractive system also for other business sectors.

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