



Intelligent Energy  Europe

Workpackage 3

Country report

Germany

Second, updated version

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Berlin, January 2007

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0. Introduction

This report analyses Germany's situation as of the end of 2006 with regard to the national energy policy framework, production of electricity from renewable energy sources (RES-E) and support schemes aimed at promoting an increase in their share.

The transposition of the EU Directives (2003/54/EC and 2003/55/EC) on the development of the single European market for energy into national rulings in 2003 ended a long period of self-regulation. This report also analyses the relationship between RES-E support policies and their interaction with the reform of the German electricity market, especially from the angle of the impact of liberalisation on “greening” the power market.

The report is drawn up among others on the basis of the consultation carried out in autumn 2005 within the framework of the activities of the *German Desk*, established under Work Package 3 of the REALISE-Forum project. In fact, a part of it has been devoted to the expectations and viewpoints of national stakeholders in the field of RES-E (electricity utilities and RES-E producers, manufacturers, institutional actors such as federal and regional ministries as well as municipal administrations, research institutes, energy agencies, consultants and energy services, RES and industry associations, NGOs, consumer and environment protection associations, etc.). The analysis has largely benefited from the input provided by the survey carried out in late summer 2005 and the 70 questionnaires returned till mid-October, as well as in depth interviews especially with stakeholders involved in the country desk. This consultation process culminated in a national hearing held on October 19, 2005 and could count on the participation of 85 representatives from the major actor groups. The hearing focussed on three main issues:

- How can the share of RES be increased till 2010 in the most effective way? Is a harmonised support system a prerequisite for it?
- How can RES support be made compatible with the liberalised internal market?
- The European Perspective: harmonisation or coordination?

The answers to most questions showed some identifiable trend and provided a helpful representation of the positions of major actors and their viewpoints on opportunities and obstacles relating to RES-E, as well as their perceived solutions to overcome the major problems.

In accordance with the aims of the project, special emphasis has been laid in the analysis of the degree of consensus of the various stakeholder groups (actor cohesion) on some major issues, such as the effectiveness of national RES-E, support schemes with regard to a number of key market aspects, the willingness to change these support schemes in the short term, the kinds of change that should be given priority and the reasons underlying such changes.

The arrangement and contents of the various sections of this report follow the general outline and structure of all other reports depicting the countries participating in the REALISE-project. Questionnaires, agenda and minutes of the meetings of the German desk and the programmes of events, including the national hearing can be found on the project's web site (in German language) under “German Desk”, http://www.realise-forum.net/front_content.php?idcat=15

1. State of the Art of the German electricity system

In its green electricity balance, Germany did not manage to reach the European average of 13.8 % in 2003 (BMU 2005). Latest developments confirm a successful path: a 10.2 % share of green electricity in 2005 (BMU 2006a), world leader in terms of installed wind capacity amounting to 19,299 MW at the end of June 2006 (one-third of the global capacity and roughly half of the capacity installed in the EU), and in 2004 for the first time there have been more new photovoltaic installations in Germany than in the former lead market Japan (300 MW in Germany in comparison to 280 MW in Japan) (websites BEE, BWE)

In 2005 the largest fractions of gross electricity consumption in Germany came from hydropower with 3.5 % of net electricity production and 4.3 % from wind energy (BMU 2006). According to BMU, generation from RES increased from 57.5 TWh in 2004 to 62.5 TWh (+ 8.7 %) in 2005. Wind energy generation amounting to 26.5 TWh ranked first, while hydro power from run-of-river and storage water ranked second with 21.5 TWh in 2005 (BMU 2006). In the domestic electricity generation the most striking characteristic is the high share of coal, which accounted for nearly half of the whole production (46.6% % in 2005) (AGEB 2006). In the EU-25, Germany is the second largest coal producer behind Poland and the world's leader for lignite production.

An important political decision was to phase out nuclear power production. In 2001 an agreement was signed between the government and the electricity suppliers fixing the final amount of electricity to be generated from nuclear power. This amount can be distributed freely among the existing nuclear power stations. Altogether, it establishes the term of operation for approximately 32 years. In September 2006, the second largest utility RWE submitted an application to the Federal Ministry of Environment (BMU) requesting approval for transfer of electricity output to the oldest nuclear power plant in operation, Biblis A. In November 2005 in the coalition agreement of the new governing parties Social Democrats (SPD) and Christian Democrats (CDU/CSU) the phasing out of nuclear power was confirmed. While the SPD seems to stick to the nuclear phase out, there is a consensus in the CDU/CSU for longer run times for the existing nuclear power plants.

Germany relies strongly on energy imports to cover its energy demand. In 2005 the share of energy imports amounted to 65.1 % of the primary energy consumption, which was above the already high EU-average of 56.2 % in the same year. Apart from coal, Germany has very little fossil resources and imports account for the largest part of oil (approximately 94 %) and gas (around 81 %) (Eurostat 2006: 1 et sqq.).

Table 1: Net electricity production in Germany (2005)

Energy Carrier	%
Nuclear energy	29
Lignite	26
Hard coal	21
Renewable Energies	11
Natural gas	10
Mineral oils and others	3

Source: (VDEW 2006)

Table 2: Contribution of renewable energy sources to electricity generation (2005)

Source	Contribution in GWh
Hydropower	21,524
Wind	26,500
Photovoltaic energy	1,000
Bioenergy solid	5,400
Bioenergy liquid	430
Biogas	2,500
Sewage gas	864
Landfill	2,200
Geothermal energy	0.2
Biomass share in waste	2,050
Total	62,468

Source: BMU (2006)

Table 3: Energy supply from RES sources (1990 – 2004)- final energy

	Hydropower	Wind power	Biomass electricity	Photovoltaics	Geothermal electricity	Sum total of electricity generation	Share of gross electricity consumption	Biomass heat	Solar thermal energy	Geothermal heat	Sum total, heat generation	Biodiesel	Bio-ethanol	Sum total, fuels	Sum total of final energy supply	Share of final energy consumption
	[GWh]						[%]	[GWh]						[%]	[%]	
1990	17.000	40	1.422	1	0	18.463	3,4	not given	130	not given	not given	not given	0	0	not given	not given
1991	15.900	140	1.450	2	0	17.492	3,2	not given	166	not given	not given	2	0	2	not given	not given
1992	18.600	230	1.545	3	0	20.378	3,8	not given	218	not given	not given	52	0	52	not given	not given
1993	19.000	670	1.570	6	0	21.246	4,0	not given	279	not given	not given	103	0	103	not given	not given
1994	20.200	940	1.870	8	0	23.018	4,3	not given	351	not given	not given	258	0	258	not given	not given
1995	21.600	1.800	2.020	11	0	25.431	4,7	not given	440	1.425	not given	310	0	310	not given	not given
1996	18.800	2.200	2.203	16	0	23.219	4,2	not given	550	1.383	not given	517	0	517	not given	not given
1997	19.000	3.000	2.479	26	0	24.505	4,5	48.546	695	1.335	50.576	827	0	827	75.908	2,9
1998	19.000	4.489	2.800	32	0	26.321	4,7	51.613	857	1.384	53.854	1.033	0	1.033	81.208	3,1
1999	21.300	5.528	3.020	42	0	29.890	5,4	50.951	1.037	1.429	53.417	1.343	0	1.343	84.650	3,3
2000	24.936	9.500	4.129	64	0	38.629	6,7	54.314	1.279	1.433	57.026	2.583	0	2.583	98.238	3,8
2001	23.383	10.456	5.065	116	0	39.020	6,7	55.326	1.626	1.447	58.399	3.617	0	3.617	101.036	3,8
2002	23.824	15.856	5.962	188	0	45.830	7,8	54.626	1.955	1.483	58.064	5.683	0	5.683	109.577	4,3
2003	20.350	18.919	7.982	333	0	47.584	8,0	59.248	2.465	1.532	63.245	8.267	0	8.267	119.096	4,7
2004	21.000	25.000	9.367	459	0,4	55.826	9,3	59.806	2.573	1.558	63.937	10.747	424	11.171	130.934	5,1

Source: BMU (2005b)

2. Actors involved in the national electricity market

The responsibility for renewable energy was moved in 2002 from the *Ministry of Economic Affairs* to the *Ministry of the Environment, Nature Conservation and Nuclear Safety* (BMU), also responsible for climate protection and issues related to the environmental impact of energy production and consumption. Other energy policy issues at national level rest within responsibility of the *Ministry of Economics and Labour* (BMWA). During the election campaign in autumn 2005 there were demands to give the responsibility for renewables back to the BMWA for an energy policy of a piece. After the general election in September, the new conservative/social democratic coalition decided to keep the existing power sharing between BMWA and BMU. The *Ministry of Consumer Protection, Food and Agriculture* (BMVEL) is in charge of programmes related to agricultural production and energy. Research in the field of renewables is supported mainly by BMU and BMVEL through various programmes, as well as by the *Ministry of Education and Research* (BMBF). The *Ministry of Transport, Building and Housing* (BMVBW) is in charge of bio-fuels and is also responsible for planning and building permission of renewable energy plants.

Germany consists of 16 *Länder*. These regional governments are highly influential in certain policy areas, though they do not actively shape federal policies. Thus, the governments of North Rhine-Westphalia, Saarland and Brandenburg often exerted strong pressure on the federal government – in most cases directly on the Chancellor– to protect established coal interests. *Länder* with coastline such as Lower Saxony, Schleswig-Holstein, Mecklenburg-Western Pomerania are in favour of suitable regulations for wind energy, whereas the southern *Länder* Bavaria and Baden-Württemberg have a high share of hydro and insist on favourable regulations for this source. Most of the *Länder* have their own support schemes for renewable energy, however in recent years the size of these programmes has decreased. On the administrative level, the *Länder* are in charge of building codes and for planning provisions.

A new actor on the energy arena is the *German Federal Energy Agency* (*dena*), established in 2000. *Dena* provides specific information on federal support programmes, runs information campaigns, offers consultation and co-operates with similar institutions at the international level in the fields of energy efficiency and renewables.

In 2005, the reform of the energy market led to the establishment of the Regulation Authority for the energy market. It is expected that this independent institution will speed up the attainment of competitive conditions in the various segments of the energy market.

After a series of mergers, four supra-regional utilities are now active on the German electricity market: E.ON, RWE, Vattenfall Europe and EnBW. They own 90 % of the total power plants capacity in Germany. For years, one of the most influential associations has been *VDEW* (*Association of German Utilities*), which also includes distributors. However, in important political questions, the companies usually speak for themselves. As transmission grid operators, utilities are also organised in the *Association of grid operators* (VDN).

VDEW comprises two third of the total electricity supply (around 1,000), regarding the fact that all large companies are members of this association. Many newcomers in the electricity and gas market are represented by the *Federal association of new energy suppliers*

(Bundesverband Neuer Energieanbieter, BNE), working for non-discriminatory grid access and increasing competition.

Municipal utilities are similarly influential. Due to public ownership, they have been traditionally receptive to local and regional politics. Under monopoly regulation, revenues from the electricity business often served to cross subsidise public transport. Due to their dual role as public service provider and employer, they have a standing with local communities and parties, as well as trade unions. Their interests in the field of energy, water supply, waste disposal and telecommunications are represented in the *Association of municipal enterprises* (Verband Kommunaler Unternehmen, VKU) with about 1,400 members. An affiliated organisation is the *Working group for economical energy and water supply* (Arbeitsgemeinschaft für sparsame Energie- und Wasserversorgung, ASEW) with more than 200 members, mainly local energy and water suppliers (Stadtwerke).

On the electricity consumer side, the most important actors are the Federation of German Industry (*BDI*) as well as major industrial companies such as *BASF*, *Siemens* or *Aventis* (formerly *Hoechst AG*). Traditionally they have strong ties to the Ministries for Economic Affairs as well as to large electrical utilities at federal and *Länder* level. For the most part, major industries are also self-producers of electricity and thus members of the Association of Industrial Self-Generators (*VIK*), which at the same time has close ties to the ESI. VIK was an early proponent of liberalisation, expecting decreasing energy costs.

The *Federal Renewable Energy Association* (Bundesverband Erneuerbare Energien, BEE) is the umbrella organisation of the major renewable energy associations in Germany. The largest among those is the *German Wind Energy Association* (Bundesverband WindEnergie BWE) with over 17,000 members and additional sections at Federal States level and at regional level. It stands for wind-turbine operators, manufacturers, planners and developers, but also individuals interested in the promotion of wind energy and energy supply from RES. The *German Bio-energy Association* (Bundesverband BioEnergie, BBE) represents businesses and institutions in the bio-energy sector. The most important member is the *Biogas Association* (Fachverband Biogas) with over 1,600 members. Additionally, there are a number of associations active in the solar energy field, representing the interests of manufacturers and traders of solar energy equipment such as the *German Section of the International Solar Energy Society* (Deutsche Gesellschaft für Sonnenenergie, DGS), the *Association of enterprises in the solar industry* (Unternehmensvereinigung Solarwirtschaft, UVS) and the *German Solar Industry Association* (Bundesverband Solarenergie, BSi). The *German Hydropower Association* (Bundesverband deutscher Wasserkraftwerke, BDW) stands for the operators of small hydropower plants and counts on several thousand members. The association *Power Systems* within the German VDMA represents manufacturers from the wind industry, from bio-energies and hydropower.

Less visible, but not unimportant are the large financial and insurance companies as shareholders and/or financiers. Habitually their managers are also on the boards of large utilities. Another traditional actor in the energy policy arena are the trade unions. Energy industry employees are covered by *IG BCE* (miners, chemicals, energy); *ver.di* (formerly *ötv*), for public service employees, e.g. utility employees; and *IG Metall*, uniting machinery and iron and steel industry workers. Their ties to the SPD - with its strong electoral base in the industrial and mining regions of North Rhine-Westphalia and Saarland - and to blue collar workers in general, have historically been very close and still persist. Whilst *IG Metall* and *ver.di* have become more open to a change in energy policy and are critical of nuclear energy

and support renewables (IG Metall groups most of the workers from the wind energy branch, for example), IGBCE by contrast keenly supports the coal industry, coal subsidies and nuclear power.

Greenpeace Germany, *BUND*, *NABU*, *Eurosolar* and several other environment advocacy groups campaigned in support of renewable energy. Their local groups, however, sometimes oppose the installations of new plants, especially wind energy, offshore wind power and large wood plants as well as photovoltaic installations.

3. Major support instruments for RES-E¹

Germany has a long tradition in promoting green electricity with feed-in tariffs. In 2004 the *Renewable Energy Sources Act* (Erneuerbare-Energien-Gesetz – EEG) of 2000 was amended. The EEG of 2000 had replaced the former German *Act on Supplying Electricity from Renewables* (Stromeinspeisungsgesetz, StrEG) of 1991 and its amended version of 1998.

The StrEG obliged the public energy utilities to purchase and remunerate electricity from solar and wind energy, hydro power, biomass, sewage and landfill gas on a yearly fixed basis. The remuneration was coupled to the value of the average revenues of the public utilities for each kWh sold to the end users. The remuneration for wind and solar power amounted to 90 % of this value. For all the other sources of energy the remuneration was set at 80 % for plants with a power output under 500 kW and at 65 % for plants up to 5 MW for the part of power output above 500 kW. Together with the 250 MW wind programme of BMBF, the StrEG helped the wind power sector to reach a market breakthrough. The installed wind power capacity nearly centupled from 48 MW in 1990 to 4,443 MW in 1999. The wind power development was further stimulated by the provision of soft loans by the state owned *Deutsche Ausgleichsbank* (DtA).

For all other RES this financial support was not sufficient to reach market entry. For example, the remuneration for photovoltaic power in 1999 amounted to 16.52 Pf/kWh (~ 8.5 €ct/kWh), whereas the costs of one kWh by photovoltaics were DM 1,50 (~ 76.7 €ct/kWh). This situation could not be changed by the so-called *1000-roofs-photovoltaic-programme* of the Federal and state governments – in force between 1991 and 1995 – although this programme was very successful and reached the installation of more than 2,000 photovoltaic plants with an overall capacity of 4 MWp. However, after its expiration there was no further promotion programme for photovoltaic systems, which - in the view of many experts - led to the migration of the biggest German solar collector manufacturers into countries with better conditions for solar PV development (Hemmelskamp 1999: 80).

The most important German RES promotion measure – in the area of electricity - is without any doubt the *Renewable Energy Sources Act* (Erneuerbare-Energien-Gesetz, EEG). It came into force on April 1, 2000, carrying forward the approach of its predecessor, the StrEG of 1991, in an extended and in many points improved manner. The design of the former StrEG included several points that harmed the development of RES. This made necessary a determined and quick change. The most important structural elements of the EEG can be summarised as follows: Firstly, the remuneration system was uncoupled from the average utility revenue per kWh sold and replaced by fixed, degressive and temporarily limited feed-

¹ This section is based on Bechberger/Reiche 2004.

in tariffs for the whole amount of generated RES electricity. Secondly, a priority purchase obligation for RES power was introduced, to be fulfilled by the nearest grid operator. Thirdly, a German-wide equalisation scheme was adopted for the costs which grid operators incur as a result of the different amounts of RES each region feeds into the power grid, which leads to an evenly distribution of the RES power amounts and extends remuneration to all energy supply companies and ultimately to all end consumers. Fourth, the EEG for the first time also enclosed provisions concerning the financing of grid connection and grid extension.

The first amendment of the EEG was the extension of its ambit: Besides the energy sources already considered in the StrEG, the EEG also included electricity from geothermal energy and pit gas. The power limit for hydro plants and installations using sewage or landfill gas of 5 MW fixed in the StrEG now also concerns installations based on pit gas or solar energy. In contrast, the power limit for biomass² plants was raised from 5 to 20 MW. The most obvious changes in comparison to the StrEG are related to the remuneration scheme. With the coming into force of the EEG, all remuneration rates were raised, although in different scale, depending on the source of energy, capacity or location of the plant. Except for hydro power, where the amortisation of the power plants normally takes several decades, the EEG fixed the purchase guarantee and the feed-in tariffs for 20 years after putting into operation of every new plant.

To stimulate innovations and to ensure a better compatibility with the European law on state aid, the remuneration paid under the EEG also includes a digressive element: From 2002 onwards, new installations of biomass (minus 1 %), wind (minus 1.5 %) and PV (minus 5 %) receive lower tariffs. From 2003 onwards, new installations of these types receive tariffs lowered by a further 1, 1.5 or 5 %, and so on for the following years.

To comply even more with the European law on state aid, the EEG set three further provisions. Firstly, by 30 June, every two years after the entry into force of the law a report shall be submitted on the progress achieved in terms of the market introduction and the cost development of RES power generation installations. Where necessary, this report shall propose adjustments of the remuneration amounts and of their reduction rates, in keeping with technological progress and market developments with regard to new installations. Accordingly, the first progress report was presented in June 2002 and served as a basis for a recent amendment of the EEG.

Secondly, relating to the remuneration for wind power, the different quality of plant sites was also taken into account (“*Referenzertragsmodell*”). The purpose of these new provisions is to avoid payment of compensation rates that are higher than what is required for a cost-effective operation of such installations, and to create an incentive for installing wind energy converters at inland sites.

² As the term biomass was specified neither in the StrEG nor directly in the EEG, the BMU – with the aim of reaching legal and planning security for investors – was authorised through the EEG to lay down which substances shall be considered biomass, what technical processes for generating electricity from biomass fall within the EEG and what environmental standards must be met in the generation of biomass. With the so called Biomass Ordinance (*Biomasseverordnung*) of 21 June 2001, the BMU decided that biomass of vegetable or animal origin (but not animal carcasses), as well as secondary sources of energy like biogas or alcohol (biomethanol or bioethanol) produced from it are registered as such. Besides, biologic waste and waste wood, comprising used wood or industrial waste wood (if not strongly contaminated) are seen as biomass. Excluded are peat, mixed municipal solid wastes, paper, cardboard, pasteboard, sewage sludge, textiles, sewage and landfill gas.

Thirdly, also the remuneration scheme for PV power contains a special provision that is connected with the compliance with the European law on state aid. The guaranteed remuneration shall not apply to PV systems commissioned after 31 December of the year following the year in which PV systems within the scope of the EEG reach a total installed capacity of 350 megawatts. This limit was already raised to 1,000 MW in June 2002 because the 350 MW seemed to be surpassed already in 2003 and the successful PV sector needed further planning security. In the amendment of the EEG in 2004 this capacity limit was revoked completely.

Moreover, for the first time the EEG comprises a clear regulation concerning grid costs. Accordingly, the costs for grid connection have to be paid by the plant operators whereas possible costs for upgrading the grid must be borne by the grid operator. For the settlement of any dispute in relation to grid costs, the Federal Ministry of Economics and Technology (BMWi) also established a clearing centre, with the involvement of the parties concerned.

Finally, the EEG constituted a multi-level and nation-wide equalisation scheme for RES electricity purchases and compensation payments. This provision was designed to remedy a shortcoming in the former StrEG. As a result of this the electricity purchases were far above average in some regions. The equalisation provision in the present Act is aimed at the operators of transmission grids because this is a small group with a limited number of players which will easily be able to handle the transactions associated with the equalisation scheme and which will also be able to monitor each other (Bechberger/Reiche 2004).

In 2004, an amended version of the EEG came into force. Compared with the former EEG, the new version includes improvements concerning the tariffs for biomass, biogas, geothermal as well as photovoltaic energy (The increased rates for solar power compensate the expiry of the 100,000 roofs programme). On the other hand, small hydropower and onshore wind energy tariffs were lowered. The government increased the annual digression in the fees for new installations to strengthen the incentives for technical innovations and cost cutting, e.g. 2 % for wind energy, 1.5 % for bio energy and 5 % for photovoltaic energy starting from 2005.

Table 4: Feed-in tariffs for RES-E (2006).

Source	Capacity	Tariff / kWh	Duration (years)	Comments
Hydro-power	Until 5 MW	9.67 cEuro up to 500 kW 6.65 cEuro over 500 kW to 5 MW	30	Limitations for sites starting from 2008
	Up to 150 MW	7.51 cEuro (to 500 kW) 6.51 cEuro (500 kW to 10 MW) 5.98 cEuro (10 MW to 20 MW) 4.46 cEuro (20 MW to 50 MW) 3.62 cEuro (50 MW to 150 MW)	15	Only when renewed plants and only compensation of additional capacity
Sewage gas, pit gas, landfill gas	Unlimited	7.44 cEuro (to 500 kW) 6.45 cEuro (500 kW to 5 MW) 6.45 cEuro (pit gas from 5 MW)	20	Sewage – and landfill gas: capacity over 5 MW will be remunerated according to market price
	Unlimited	9.44 cEuro (to 500 kW) 8.45 cEuro (500 kW to 5 MW) 8.45 cEuro (pit gas from 5 MW)	20	Implementation of specific innovative technologies
Biomass**	Up to 20 MW	11.16 cEuro (up to 150 kW) 9.60 cEuro (150 to 500 kW) 8.64 cEuro (500 kW to 5 MW) 8.15 cEuro (5 MW to 20 MW)	20	
	Up to 20 MW	3.78 cEuro (up to 20 MW)	20	Use of waste wood of categories A II and A IV from 01.07.2006
	Up to 20 MW	17.50 cEuro (up to 150 kW) 15.90 cEuro (150 to 500 kW) 12.90 cEuro (500 kW to 5 MW)	20	Plants from agricultural, silvi and, horticultural operations, or manure according to (EC) No 1774/ 2002, vinasse etc. (<i>nachwachsende Rohstoffe</i>)
	Up to 20 MW	17.16 cEuro (up to 150 kW) 15.60 cEuro (150 to 500 kW) 11.14 cEuro (500 kW to 5 MW) 8.15 cEuro (5 MW to 20 MW)	20	Burning wood in the sense of sentence 1
	Up to 20 MW	13.16 cEuro (up to 150 kW) 11.60 cEuro (150 to 500 kW) 10.64 cEuro (500 kW to 5 MW) 10.15 cEuro (5 MW to 20 MW)	20	Combined heat and power plants
	Up to 20 MW	15.16 cEuro (up to 150 kW) 13.60 cEuro (150 to 500 kW) 12.64 cEuro (500 kW to 5 MW) 12.15 cEuro (5 MW to 20 MW)	20	Electricity from CHP plants when innovative technologies are implemented
Geothermal energy	Unlimited	15,00 cEuro (up to 5 MW) 14,00 cEuro (5 MW to 10 MW) 8,95 cEuro (10 MW to 20 MW) 7.16 cEuro (over 20 MW)	20	

Wind-energy Onshore		8.36 cEuro (initial tariff) 5.28 cEuro (basic tariff)	20	Depending on reference revenue ⁱ , the initial higher tariff is granted for 5-20 years; no compensation for plants with reference revenue of less than 60 %*. Additional incentive (prolonged initial higher tariff) for re-powering of plants.
Wind-energy Offshore		9.10 cEuro (initial tariff) 6.19 cEuro basic tariff	20	Initial higher tariff granted when put into operation by 2010. Depending on site, 12 - 20 years. Additional prolongation for deeper waters and growing distance from coast.
Photovoltaic energy	Roofs/ facades / noise protection walls	51.80 cEuro (up to 30 kW) 49.28 cEuro (30 to 100 kW) 48.74 cEuro (from 100 kW)	20	
	Plants integrated in buildings	56.80 cEuro (up to 150 kW) 54.28 cEuro (150 to 500 kW) 53.74 cEuro (500 kW to 5 MW)	20	
	Others	40.60 cEuro	20	Specific criteria concerning site are to be fulfilled.

* To be determined in advance

** Tariffs for RES-E from biomass are subject to additional bonuses on top of the basic tariff, see e.g. the so called “nachwachsende Rohstoffe” in the third section (up to additional 6 ct/kWh). Various bonuses can also be combined. In 2004, a small plant up to 150 kW, using innovative technology, with combined heat-power and firing specific sources (nachwachsende Rohstoffe) could get a total tariff of 21.50 ct/kWh.

Source: Bechberger/Reiche 2006: 11 et sqq.

4. The national position in the EU debate on the Directive 2001/77/EC

The Directive 2001/77/EC was implemented through the amendment of the EEG in 2004. The indicative target for Germany of 12.5 % was taken up into the law. Furthermore, the EEG includes a target of 20 % by the year 2020. In addition, the German government adopted a wind energy target of 25 % for the year 2025 (15 % offshore, 10 onshore). Finally, the German sustainability strategy formulated the target that renewable energies will account for half of total energy consumption by 2050.

In its 2005 report on achievement of the indicative target for electricity consumption from renewable energy sources by 2010 the Federal Government anticipates that “...the EU’s indicative target for Germany will be met by 2010, whereby the EEG will act as the principal mechanism for this purpose” (BMU 2005a). Table 5 shows the rapid growth of green electricity in the last years. Many predictions assume that the indicative target will be reached even earlier than 2010. According to a press information of VDEW from September 2006, in 2005 the share of renewables in the electricity market already reached 11 %.

Table 5: Share of renewable energies in the German electricity consumption (1997-2004)

	1998	1999	2000	2001	2002	2003	2004	2005	2010*
Gross electricity consumption [TWh]	556.7	557.3	578.1	582.8	584.0	595.8	600.0	611.0	
RES share of gross electricity consumption (%)	4.7	5.4	6.7	6.7	7.8	8.0	9.3	10.2	12.5 (Indicative target)

Source: BMU (2006)

5. State of completion of liberalisation efforts in the electricity market

The Energy Supply Industry Act (*Energiewirtschaftsgesetz*) adopted in December 1935 laid down the framework for a low-priced and secure electricity supply and defined state control of the sector for more than 60 years (Mez/Lauber 2004). There have been numerous failed attempts at reforming the German energy sector, among which a proposal of the Green party for the so called re-municipalisation of electricity supply (Hennicke et al. 1985). In the 90's, the conservative Federal government tried to introduce more competition in the energy sector and to increase public control. However, reform proposals failed to find the necessary consensus. The transposition of the EU Directives (2003/54/EC and 2003/55/EC) on the development of the single European market into national rulings in 2003 ended a long period of self-regulation. In this section, we analyse the degree of implementation of the internal electricity markets from the viewpoint of the impact of the opening of the market in terms of greening of the power market.

5.1 Late Developments

A new law (*Gesetz zur Neuregelung des Energiewirtschaftsrechts*) was passed in 1998, amending the major energy rulings (*Energiewirtschaftsgesetz* of 1935, the Act against Restraints of Competition and the Electricity Feed-in Law). The enactment of the law represented the end of demarcation agreements, full opening of the grid for all suppliers and free choice of supplier for all customer groups.

The EU Directive for the power market established a deadline for the full opening of the market for the 1 July 2004 for business customers and the 1 July 2007 for households. Differently from other countries, the government decided to open the German electricity market to competition in a single step. However, the new Energy Industry Law was not accompanied by detailed rules regarding grid access, transmission charges, and other important issues. An initial strong price competition led to an erosion of profit margins and a wave of mergers and acquisitions took place. Large utilities started also diversifying horizontally and took over gas companies. A number of new players entered the market, but most of them withdrew a few years later. Within short period, the major large players decreased from eight to four, namely RWE, E.on, Vattenfall Europe and EnBW. A small number of green electricity retailers and producers remained nonetheless on the market. On the customer side, switching rates have remained low. Only 3.7 % of residential customers changed suppliers between 1998 and 2001 (Öko-Institut 2003).

The EU directive called for the establishment of a national regulatory agency and for unbundling. These provisions represented major legal and somehow “cultural” changes for Germany. In fact the country represented an exception in Europe. Peculiarities were:

- the lack of a regulatory authority with ex ante powers,
- the adoption of so called negotiated rather than regulated third party access,
- the absence of an independent transmission system operator (TSO).

On June 17, 2005 the German Parliament passed a number of amendments to the Energy Industry Act (EnWG). Additionally, the Federal Government prepared guidelines on electricity and gas grid access and tariff calculation methods in draft ordinances. On 13 July 2005, the new energy law entered into force. The Law allows non discriminatory network access and changes the previous legal framework for grid operators. In fact, Articles 10 and 15 of Directive 2003/54/EC required stringent unbundling requirements: Amongst other key issues, the law defines the duties of the future regulator for the German power and gas sector. The decision to set up a new regulatory authority for the electricity and gas sector has been accompanied by long discussions whether a regulatory body was necessary at all. Grid operators had acted so far on the basis of a voluntary code with rules for access to their networks (Associations‘ Agreement on Electricity II with Amendment, Grid Code and Distribution Code). These have been ineffective, since firms wishing to use parts of the network have complained that tariffs are often complicated and too high (VIK, VKU 2005). A further controversy concerned the issue whether the authority should be part of the Federal Cartel Office or be an independent body³. These tasks were eventually attributed in July 2005 to the Regulatory Authority for Telecommunications and Postal Service, renamed into Federal Network Agency, as an independent higher federal authority under the guidance of the Federal Ministry of Economics. The Authority has the power to supervise and rule on grid access fees before they are put in place by network operators. The regulator will also have the power to initiate administrative proceedings against grid operators abusing dominant market position or infringing any Energy Law provision.

The evaluation of the situation in the electricity and gas sectors relating to market opening presented in the 4th Benchmarking report of January 2005, placed Germany in a middle position, as some progress has been made. One of the crucial aspects of the New Energy Act has been the specification of rules on legal, operational (management and information) and accounting unbundling, according to the provisions of the EU Directive⁴.

Although not explicitly required by the EU Directive, some European countries such as the UK and Italy have introduced stricter unbundling requirements between generation and retail to prevent the possibility for cross subsidisation (Di Nucci, 2004). The German Law improves unbundling rules, but implements only minimal European requirements (VIK 2005). In fact, it does not foresee separate accounting for power generation and marketing activities. Differently from elsewhere in Europe, the new Law does not envisage the creation of a national independent Transmission System Operator. The law only suggests that network

³ The Federal Cartel Office deals with competition restraints issues. Whilst regional cartel authorities are responsible for cases which effect only one Federal State; mergers can be scrutinised only by the Federal Cartel Office. The basis of its activities is the Act against Restraints of Competition and the European law on competition.

⁴ The high degree of vertical integration in the German energy sector has contributed to the large number of grid access disputes since energy sector liberalisation in 1999 (see http://europa.eu.int/comm/energy/electricity/benchmarking/doc/4/com_2004_0863_en.pdf).

operators should cooperate with the aim of acquiring balancing power in joint auctions. According to the German Association of Industrial Energy Users and Self-Generators (VIK 2005), the effects of the new regulatory framework are not yet foreseeable. Much depends on how the regulatory authorities on the federal and state level make use of their new instruments. Depending on the details of incentive regulation, VIK expects grid charges to remain constant and even to decrease in the medium term. However, the organisation laments that effects on the wholesale electricity price are not likely to materialise, even if grid charges decrease (they count for 20-30 % of industrial users' total price).

It is expected that the new rules will reduce conflict of interest, cross subsidies, discrimination by network operators. However, given the level of vertical integration of the grid operators, the market is far from being competitive. According to VIK it will take time for new players to build confidence in and enter the market. A more vigilant competition policy is needed so that proposed horizontal and vertical mergers are carefully scrutinised. Measures and mechanisms to decrease the degree of concentration and increase the number of market participants on the supply side need to be developed on the national as well as on the EU-level (VIK 2005).

The law preserved existing rules on priority to renewables and created a legal framework for feeding in biogas to the natural gas supply grid. However, the law envisaged a watering down of requirements on power source labelling for consumers.

5.2 Greening of the power market/ Degree of penetration of RES-E

The “voluntary” market for green power has represented for long time a controversial issue. One of the reasons is that such programmes do not necessarily lead to new RES plant capacity since electricity may be also marketed from existing plants, mostly large hydropower works. German utilities started offering green pricing programmes to their customers already in the mid-1990s. The revenues from the surcharge were supplemented by the utility and used for installing new renewable energy capacity, mostly photovoltaic. The utility could pass the burden on to electricity customers. However, after the initial phases of E.on Aquapower and RWE's green-pricing programmes, the large utilities have returned to less aggressive marketing strategies (NREL 2002, Wüstenhagen/Bilharz 2004). Following the reform, in 1998 also a number of independent suppliers entered the market. However, whereas large industrial customers negotiated lower rates or switched to competitive suppliers early on, even today, relatively few customers have switched to alternative suppliers. Whilst generally for providers and green marketers, the prime objective to participate in the market was product differentiation in a liberalised market environment, for incumbent utilities, the aim was to complement the product range, supply a perceived small niche of green consumers, increase loyalty among light green customers and get an environmentally responsible image to other stakeholders (Wüstenhagen/Bilharz 2004).

According to CLEAN-E it has been estimated that by the end of 2005 approx. 600.000 customers have been supplied with one of the more than 130 green electricity products offered on the electricity market. This amounts to an annual market volume of approx. 2 TWh which corresponds to a market share of about 1.5% of the domestic sector. More than 50% of this market volume is held by two hydropower products, Eon Aquapower and NaturEnergie Silber. Both products are fed by hydropower plants which have been mostly put in operation long before the German electricity market was liberalised (CLEAN-E 2006: 49).

Non-residential customers and green (public) procurements are an important factor for green electricity. Although households remain price sensitive, the dimension of their purchases makes them an attractive market segment. The German Ministry for the Environment (BMU) set a standard on green procurement. BMU defined criteria for RES-E, required an "additionality" standard and tried to create an incentive for green power tariffs. Between 2004-2006, the department planned to purchase almost 40 million kilowatt-hours of green power, about 80 % supplied by new installations.

At time in the German market there are a number of concurring green power labels, each of which adopting its own criteria for auditing and verification. The most important are: EnergieVision e.V/Ok-power (promoted by WWF, Nordrhein-Westfalia Consumers' organisation and Öko-Institut e.V); Grüner Stromlabel e.V.(promoted by the environmental protection groups), TÜV labels and a number of local ones.

The ok-power label - the first accredited label to the Eugene Standard - marketed in 2004 more than 1 bn kWh green power⁵. The "Grüner Strom" Label, developed by a consortium of leading environment groups and Eurosolar, certifies 100 % renewable electricity and does not endorse products of utilities involved in nuclear power generation. The label of the Technische Überwachungs-Vereine (TÜV), a technical supervision Association, is attributed on the basis of ad hoc criteria, among which a regular supervision of the plants and audits. A share of a maximum of 50% CHP can be included in the electricity mix⁶.

5.3 Development of the voluntary market for green power/RECS

The development of the voluntary demand of green power in Europe and the implementation of certificate systems are strictly related. RECS (Renewable Energy Certification System) was established in 2000 to trial green certificates trading. The system is based on voluntary participation and is supported by almost all major electricity players in Europe. A RECS certificate verifies the production of electricity from renewable sources and provides a methodology for trading. RECS strives for a strong, transparent and liquid market for renewable energy in Europe and an international harmonised certificates system⁷. These systems should facilitate the national and international markets and avoid double counting and double selling of green energy. In 15 European countries independent issuing bodies issue, register and redeem green certificates in accordance with the principles laid down in a "basic commitment and national domain protocol". The German members of RECS include E.on Sales & Trading, Electrabel Deutschland AG, Energiedienst AG, EWE-Naturwatt, HEW (Hamburgische Electricitäts-Werke AG now part of Vattenfall), RWE-Trading GmbH; Statkraft Markets GmbH, TÜV Industrie Service (TÜV SÜD Gruppe), TÜV NORD Umweltschutz GmbH & Co. KG, RWE Trading, Environmental Trading and Reliant Energy Trading & Marketing GmbH (NUON). The institution acting as German Issuing Body is Öko-Institut. The volume of the voluntary market in Germany is estimated approximately 2 TWh per year (RECS Report 2005).

⁵ See: <http://www.eugenestandard.org/index.cfm?inc=cat&id=6>; Verbraucherzentrale NRW: "ok-Power": Gütesiegel für Grünen Strom Wegweiser im Dickicht des Strommarktes", <http://www.verbraucherzentrale-nrw.de/UNIQ113283640429515/link195183A.html> ; <http://www.gruenerstromlabel.de/index.html>

⁶ The regulations for labelling were replaced in February 2005 by new directives, the so called VdTÜV-Basisrichtlinie Ökostromprodukte Energie- und Gebäudetechnik 1304 02.2005; see <http://www.tuev-nord.de/downloads/oekostrom.pdf>

⁷ Detailed information about the RECS system can be found online at www.recs.org

5.4 Certification and Guarantee of origin (GO)⁸

The green power market is not regulated. In Germany a system for the Guarantee of Origin (GO) is implemented in line with article 5 of the RES-directive.

Germany participates in European schemes to standardise Guarantees of Origin (GO). For example the EnergieVision group holding the label OK-Power participates in the initiative “Eugene” (European Green Electric Network), providing a label that can be used in conjunction with GOs. The Eugene Standard provides a standardised benchmark. EUGENE sustains the AIB/RECS approach for standardised GO. It aims at defining level of additionality to consumers, proven by reliable green power labels across Europe.

The EEG states that the guarantee of origin should be issued on request by certified EMAS auditors. §18 of the Renewable Energy Source Act (prohibition of multiple sales) states that RES-E may not be sold or otherwise transferred more than once and that plants benefiting from a feed-in tariff scheme cannot give a guarantee of origin. In a sense, the GO is redeemed “automatically” when feed-in remuneration occurs. The RECS Report 2005 (pp. 31 and 60-63) criticises that the regulation in place is not so unambiguous on this issue. It also reproaches that this proviso is not followed by the request of a common database where an Issuing Body has to document the issuing of a guarantee of origin. Thus double Issuing and double selling cannot be excluded if there is not data base to prove that no other guarantee of origin for the same kWh has been issued so far. RECS Germany offered to implement a standardised system for the GO. The Ministry of Environment however denied the need of a common database.

6. Role of green power in national energy policy

Renewables have become an important economic factor. According to BEE, the magnitude of employment in the RES sector has reached around 170,000 whilst the total turnover for German renewable energy industries in 2005 is estimated to be approximately 15 billion €⁹. In 2004 the role of green power in energy policy has become more significant following the pressure to adopt measures to combat climate change. Renewables helped to save an equivalent of 70 m tonnes of CO₂ (BMU 2005a).

The success of the German case has shown that support for renewable energy cuts across traditional political fields. A critical mass of interest groups is in favour of renewables. Opinion polls and market research have shown that 70-90 % of consumers have a positive attitude towards renewables and 20-35 % are willing to pay additionally for renewable energy (BPA 2003).

Opposition comes to some extent from some members of the conservative party (CDU/CSU) and especially of the liberal (FDP) party. However, their hostility can be considered to be soft. They opposed the amendment of the EEG, but their criticism concerned technical details. Some of the major utilities have started to become directly involved in the renewables market. Strong opposition still comes from the coal lobby including the Trade Union of Miners and the Chemical Industry (IG BCE).

⁸ Most information is based on the latest RECS report:

<http://www.recs.org/doctree/RECS%20International/05%20Evaluation%20Report.pdf>

⁹ See press release of 11.11.2005, “BEE begrüßt Bekenntnis der designierten Bundesregierung zu Erneuerbaren Energien“, online at <http://www.bee-ev.de/presse.php?pr=782>

6.1 Goal attainment

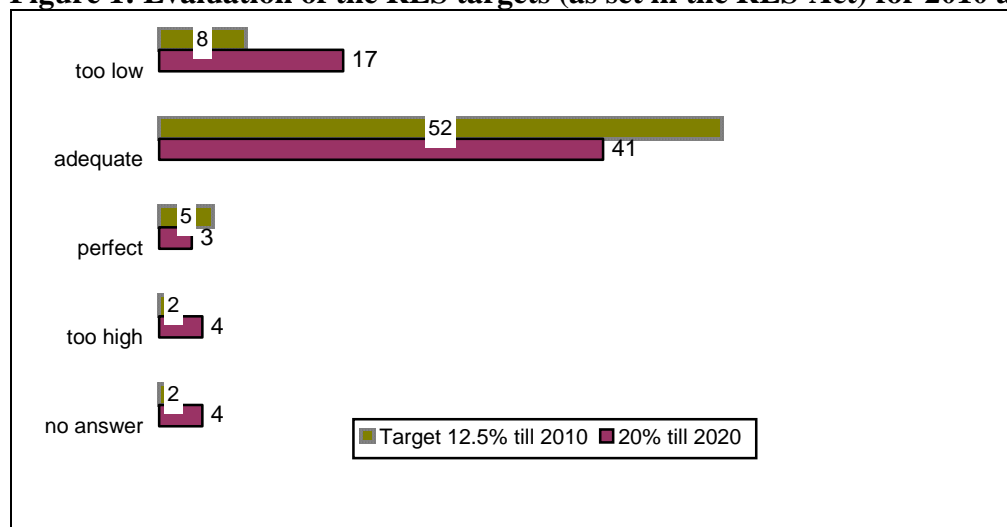
The EEG of 2000 stated the need for a “substantial increase” in the percentage of RES-E “in order at least to double the share of renewable energy sources in total energy consumption by the year 2010” (BMU 2000). The EEG made explicit reference to corresponding EU objectives. The sustainable development report of April 2002 (BMU, 2002) included a longer-term target to increase the contribution of renewables to 50% by 2050. The EEG Amendment of 2004 reiterated the need to attain these goals. Support for the draft law came mainly from members of the governing Green Party and the Social Democrats, while conservatives mostly did not oppose the target of doubling the share of renewables but disagreed on technical details. By a share of RES-E of around 10%, the achievement of the goal set for 2010 is guaranteed.

As far as long terms targets are concerned, the original early draft of the BMU had included a 50 % target for renewables by 2050. However, because of the opposition from the Ministry of Economic Affairs, the government finally adopted a draft including targets of “at least 12.5 %” for 2010 and “at least 20 %” for 2020. The goal for primary energy from renewables was set by 4.2 % by 2010. This has been considered a realistic goal. Some important research institutes however suggested that additional instruments may be necessary to meet the primary energy target (DLR 2000).

Germany's new government aims at preserving the current commitment to renewable energy and confirmed its intention to leave existing legislation unchanged until at least 2008. The so called coalition agreement between the Social Democrat (SPD), the conservative Christian Democrats (CDU) and the Christian Social Union (CSU) confirmed that Germany will stick to its target of a RES share of the country's electricity demand of at least 20 % by 2020. The original plans of the CDU of limiting the promotion of renewables has been ruled out.

The survey carried out within the activities of the German desk of REALISE-Forum with 70 selected energy actors showed that these targets are deemed as realistic. All stakeholders assumed that Germany should reach the RES-E goal set by the EU Directive 2001/77/EC without problems well before 2010. Around 25 % of the respondents considered the long term target too low.

Figure 1: Evaluation of the RES targets (as set in the RES-Act) for 2010 and 2020



6.2 Renewables in the public debate

It has been often acknowledged that the role of public opinion in policy formation is perceived as more important by renewable energy supporters than by opponents of these policies. Over the years there has been a pattern showing a shift from organised public pressure and protest to organised interest representation through growing lobbying. With regard to the role of public opinion in the policy process, in the case of the StrEG and EEG, there are striking differences in the responses on the political and public opinion side. In the first case, at the beginning, a group of policy makers and especially a number of expert parliamentarians took the lead, supported by a well organised flanking public pressure. Over the years, by growing economic importance of the RES, the renewables sector has started using the same instruments as the industry and started forming lobbies and pressure groups. This switch can be epitomised by a demonstration for RES in Berlin “Deutschland ist erneuerbar” with more than 5,000 participants short before the amendment of the RES-Act in November 2003 where all organisation of the sector showed their grown influence and the core-coalition for renewables was extended with new alliances as for example the confederation of SMEs and the service Union Ver.di.

6.3 Changing attitudes towards RES and climate change policy¹⁰

A large representative survey carried out six times between 1984 and 2003 provides a picture of shifting public perception of energy sources in Germany (BPA 2003). The percentage of Germans who expect wind energy to make an important contribution to the energy supply in the next 20-30 years has consistently increased since the late 1980s¹¹. Nuclear energy, by contrast, has lost popularity continuously. A recent survey (forsa 2005) shows that a large majority holds the promotion of RES the best approach to sustainable energy policy. 62 % are for an increased support of RES; only 4 % plead for reduced or ceased support. With respect to preferred energy sources, the majority opts for solar energy; coal ranks last: solar energy 85 %, wind energy 71 %, water power 68 %, geothermal heat 63 %, biomass 56 %, natural gas 53 %, oil 27 %, nuclear power 24 %, coal 22 % (multiple answers were allowed)¹². Worth mentioning is also that 63 % favour nuclear power phase-out. However, significant differences are revealed when looking at the party affiliation of interviewees: Green Party 88 %, PDS 77 %, SPD 66 %, FDP 53 %, CDU/CSU 53 % for nuclear phase-out (Emnid 2004). A representative survey of the Allensbach Institute, published in February 2005, largely confirms these results. Moreover, this survey shows that 77 % prefer those energy sources which are climate-friendly. 50 % want an energy policy which strengthens independence from foreign energy supply. However, 60 % expect energy policy to keep energy prices low; 34 % favour higher energy price for environmentally detrimental energy sources; but only a minority of 28 % would be willing to pay higher energy prices for the sake of expanding renewable energy.

Renewable energy facilities meet with much less opposition from local groups than fossil or nuclear power plants. However, in recent years criticism increased, especially of large wind power parks (in particular offshore parks) and large land-covering solar energy plants. While

¹⁰ This section is almost entirely taken from Weidner/Mez (2005).

¹¹ N = 2059. Respondents were asked to name up to three energy sources. Survey carried out by Institut für Demoskopie Allensbach in September/October 2003, on behalf of the German Federal Ministry of the Environment, summary published by the Federal Public Relations Office (BPA 2003).

¹² The question was: „Which kind of energy source should be the future basis of energy supply in Germany in the next 20 to 30 years?“

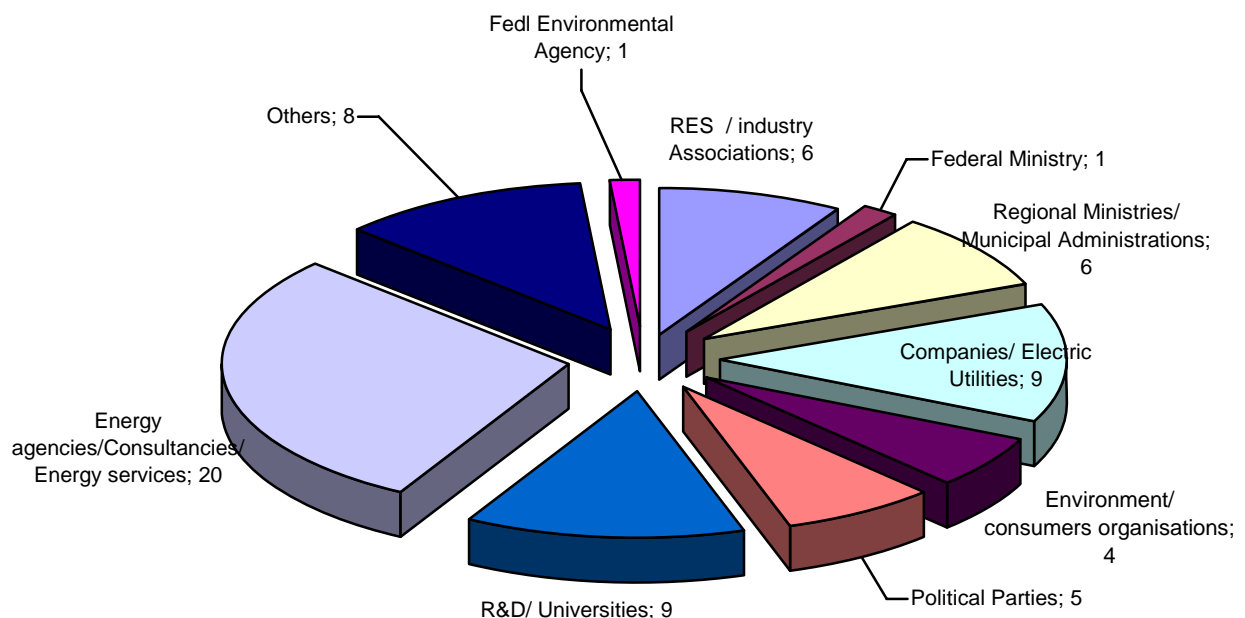
national environmental organizations clearly support all forms of renewable energy, their local-level branches sometimes ally with NGOs opposing renewable energy facilities. Altogether, despite some very aggressive conflicts between proponents and opponents of RES, there is strong acceptance and support of RES. A 2004 survey on wind power (forsa 2004) revealed that 66 % favour an expansion of wind energy. Also 66 % opt for continued promotion and subvention of wind power under the Renewable Energy Act. A 2005 survey on “Wind power plants and tourism” (SOKO-Institut 2005) showed that only 24 % would consider wind power plants in German resort areas a nuisance, but 75 % would be annoyed by nuclear and coal power plants, 64 % by high chimneys; 58 % by high-rising buildings, 55 % by motorways and 41 % by high-voltage transmission lines¹³.

7. Stakeholder positions on features and performance of different support schemes (evaluation of the survey and consultation)

This section is based on the results of the survey and interviews with representatives of the major stakeholders in Germany. It only describes the core results of the consultation, further details on the survey results can be found on the project’s web page under the heading “German desk”¹⁴.

The German country desk developed a questionnaire on current RES-support systems, liberalisation and perceived need for a coordinated EU-approach and sent it out to 400 RES market and institutional actors. Around 17,5 % responded to the survey. Figure 1 provides an overview of the response of the survey and shows which actor groups took part.

Figure 2: Response to the survey (subdivided according to stakeholder)

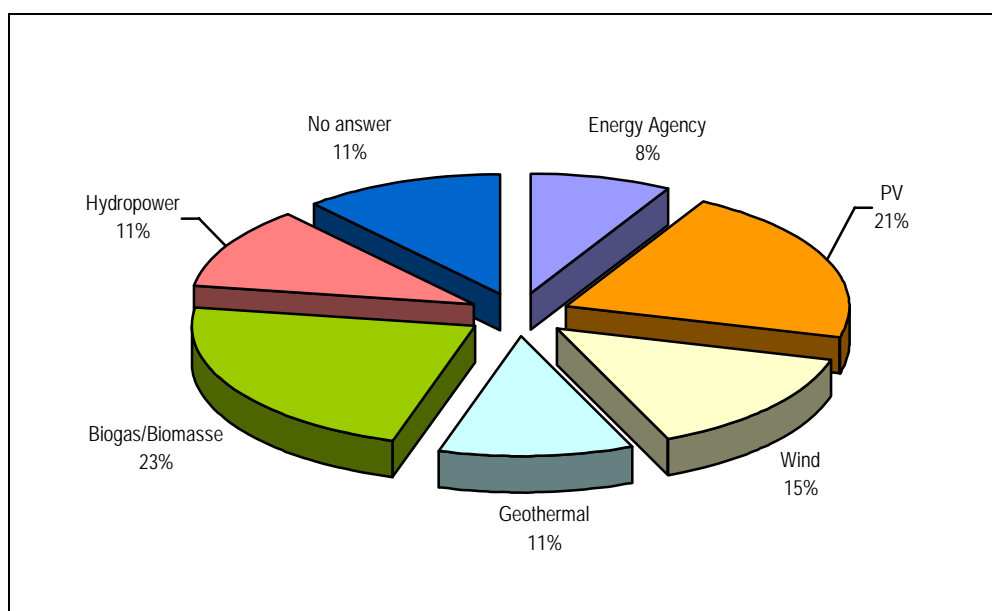


¹³ For a discussion of conflicts over RES, see NABU 2004, “Naturschutz kontra Erneuerbare Energien”, Bonn: NABU. For general information on RES, see www.energieportal24.de

¹⁴ See http://www.realise-forum.net/front_content.php?idcat=35.

The figure shows that the largest participating actors group was the one comprising energy agencies, consultants and energy services (29 %), followed by companies and utilities (13 %), research institutes and universities (13 %) and RES and industry associations (8.7 %). Institutional actors were also well represented and comprised federal and regional ministries as well as municipal administrations (11.5 %). The breakdown of the responding 28 companies and services according to the RES branches (multiple answers were allowed) shows that all RES sources were well represented. The majority of respondents were active in the biomass/biogas sector.

Figure 3: Breakdown of the responding 28 companies and services according to RES branches



The results were presented at the public hearing held in the framework of the REALISE Forum activities of the German Desk on October 19, 2005 in Berlin. The consultation has been organised in 3 thematic blocks, focussing on following questions:

- How can the share of RES be increased till 2010 in the most effective way? Is a harmonised support system a prerequisite for it?
- How can RES support be made compatible with the liberalised internal market?
- The European Perspective: harmonisation or coordination?

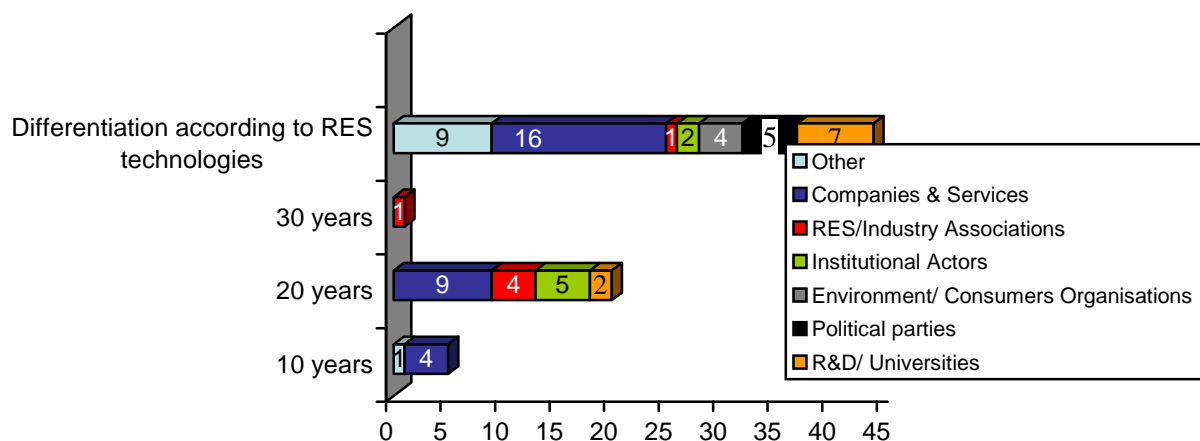
Around 85 representatives of federal and regional ministries, environmental advocacy groups, electric utilities, RES federations, RES producers, energy service companies (ESCO`s), energy agencies, research institutes, etc. attended the event. Some of them illustrated their position and gave a statement. The answers to most questions in the questionnaire showed some identifiable trend. Despite the expected discrepancy of opinion in case of vested interests, there was a consistency of views between the main stakeholder groups. “The feed-in

tariff system has been very successful in developing green electricity in Germany”. However, a large majority of respondents meant that there are deficits in the support system.

BMU (Environmental Ministry) emphasised that the success of renewable power is undisputed. This is mainly due to the renewable energy law (EEG). The tariff system has given green power investors a security for a period of 20 years, and its system based on digressive rates is attracting players to invest as soon as possible in order to benefit as long as possible from the guaranteed remuneration. The result of the EEG is that by the first half of 2005, green power has a share of approximately 11 % in the domestic total power production, with wind power as the dominating source, followed by hydro and biomass power. Regarding the discussion whether green electricity and the present FIT-system increases power prices, it was stated that the EEG is only contributing with 3 % to the total amount of end user prices, based on an anticipated price of EUR 0.18/kWh. On the contrary, production, transportation and marketing of power are accounting for 60 %. The electric utilities claimed that this argumentation neglects other cost components affecting end user prices. RES-E demands a balancing market and also investments into the grid.

The response about the evaluation of the most appropriate length of support period confirmed the opinion of the German Desk that it is difficult to give broad-spectrum answers and that it is necessary to differentiate according to the different technologies. Various respondents regarded a 20 years support for wind power as excessive. On the contrary, hydropower and PV were assumed to necessitate longer support time.

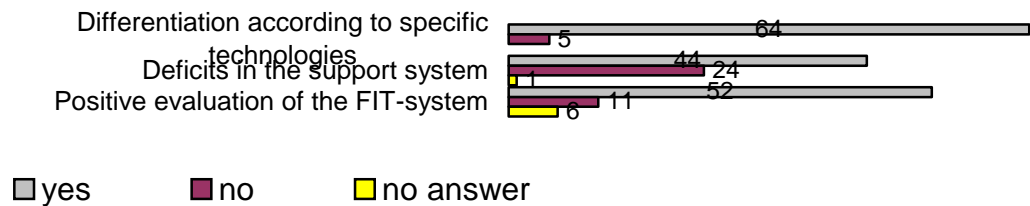
Figure 4: Assessment of the duration of support (broken down according to interest group)



The general appraisal of the German support system is mainly positive. Approximately 75 % of the answers were in favour of this scheme. It was alleged to have made possible a market breakthrough of RES and to gain global market shares. Approximately 65 % of the interviewed however also emphasised, that deficits and contradictions exist that should be analysed and eventually removed. The technological differentiation envisaged in the RES Energy Act was endorsed by an overwhelming majority (90 %). The FIT system was rated

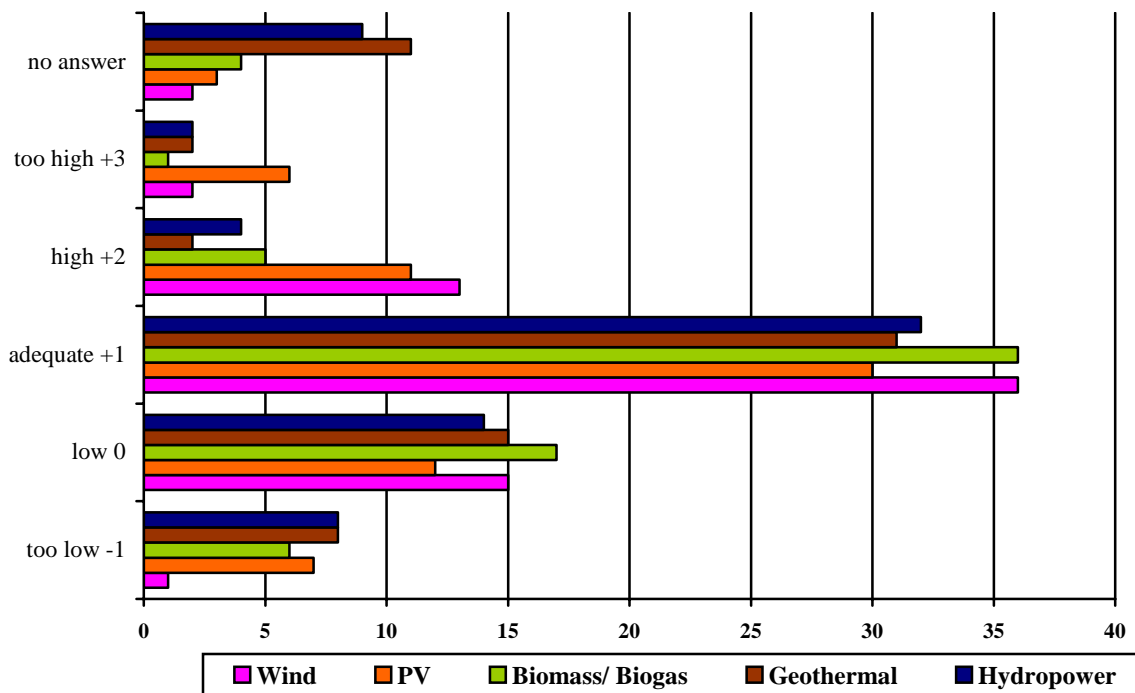
higher than quotas/certificates systems as regards new RES-E capacity deployment, risk to investors, understanding by financing institutions, fair deal with different sources. On the contrary, its cost to the whole electrical system at large was considered higher. Quotas/certificates systems were believed by a number of stakeholders more compatible with the liberalised electricity market than the FIT mechanism.

Figure 5: Support system: General evaluation of the RES-Act



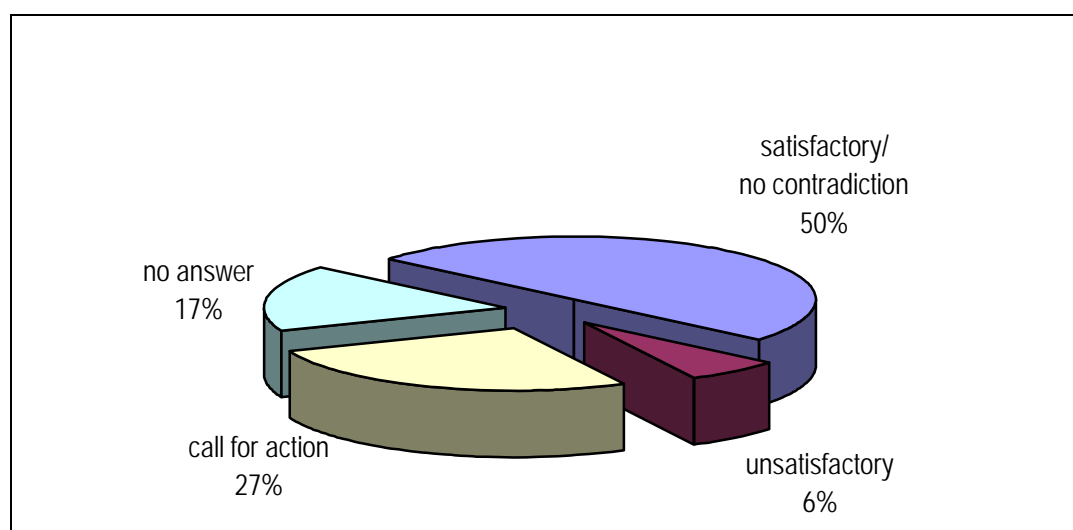
The answers to the question concerning the level of remuneration in the RES Act (EEG) for the individual RES technologies stressed the adequacy of the present level of support. The present remuneration rates were believed to be appropriate by a large majority. Around 11 % of the respondents found the support for PV excessive. By contrast the support for biomass and biogas was considered by approximately 24 % of the respondents as low.

Figure 6: Assessment of the remuneration in the RES Act for the individual RES technologies



The consulted stakeholders saw no obvious contradiction between a liberalised European market and the support scheme in use. Around 37 % of the respondent stated that a fair competition in the internal market is not yet available. According to the RES Associations (EREF, BWE, and BEE), there is no level playing field so far in the electricity sector. Renewable energies need support schemes in order to counter the bias in favour of fossil and nuclear energy. As far as the degree of market conformity of the present support system is concerned, especially the RES Associations remarked that market distortions associated with the traditional energy sector are still high and need to be removed before a new support scheme based on tradable certificates can be introduced in an open electricity market.

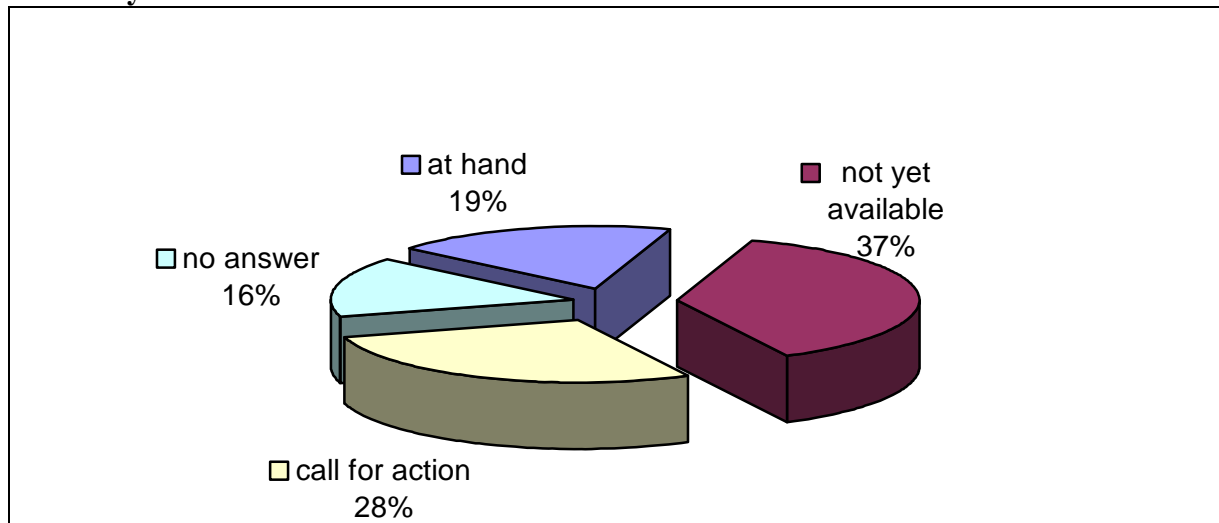
Figure 7: Conformity of the German support system with the liberalised, internal electricity market (%)



On the whole, the evaluation of the possibilities for a fair competition in the internal electricity market shows that the majority of respondents see large deficits and a need for corrective action. Some organisations and actors from the conventional power sector and research institutes called for more competition in the European market for renewable electricity. RES organisations (BWE, BEE) adhered the position purported by their European umbrella organisation EREC and EREF considering effective competition in the conventional power market as a precondition for creating an undistorted and well-functioning market for RES-E. The European Renewable Energies Federation and the Worldwatch Institute recently reported on a comparative study of systems which found that feed-in models are not only generating the most new construction but also competitive prices (EREF 2005).

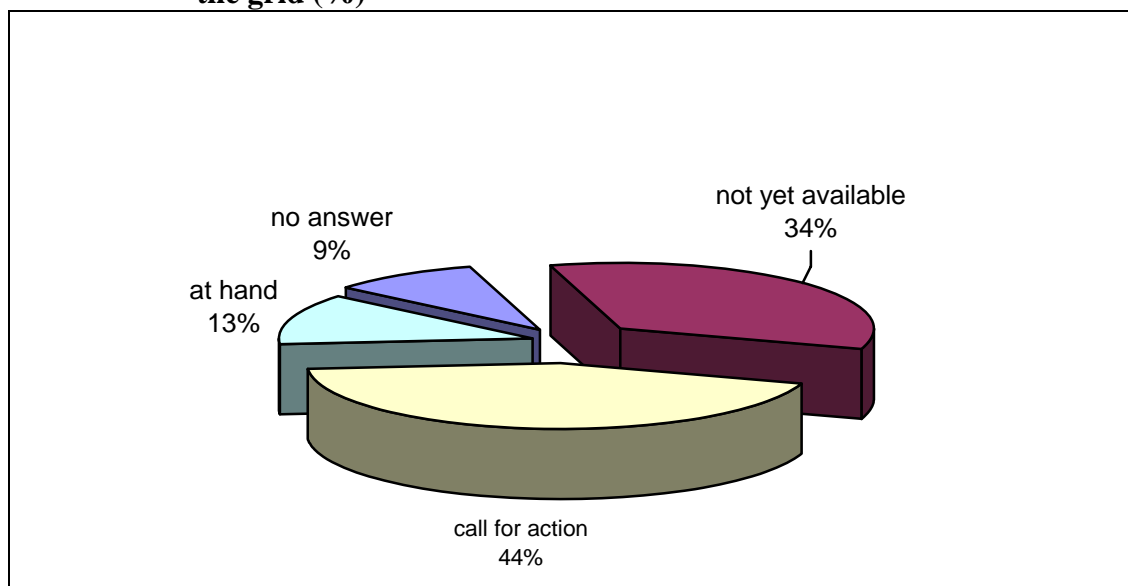
It was remarked that unless the current distortions in the internal electricity market are overcome, there can be no effective internal RES-E market. There has been a general call for action especially in unbundling the major utilities. The high levels of market concentration in the power sector, and the distortions to competition need to be compensated for by fair and transparent rules for third party access, taking into account the different technologies. This is also the position of the EC. Moreover, investments need to be carried out in order to guarantee grids enforcement, interconnection and an adequate level of capabilities and infrastructure.

Figure 8: Assessment of the possibilities for a fair competition in the internal electricity market



Only a small minority of respondents claimed that a non discriminatory access to the grid is at hand (13 %). By contrast, 44 % called for corrective action and control from the newly established Network Agency (Bundesnetzagentur). The Survey response concerning the grid also pointed to the recent study on aspects of grid integration of onshore and offshore wind power in Germany for 2015, coordinated by the German Energy Agency (Dena). It was noticed that grid operators are unwilling to take up intelligent management of the grid systems and grid enforcement. Some respondent even lamented alleged denials for priority grid access for RES-E set by law.

Figure 9: Evaluation of the existing possibilities for a not discriminating access to the grid (%)



8. Willingness to change support scheme. Stakeholders' viewpoint

The German case has shown that support for renewable energy cuts across traditional political fields. The degree of perceived need to support the present support scheme or the willingness to modify it has been changing over the last few years. This statement can be exemplified by the different positions of different stakeholders over time. On the energy policy level, the discourse has been characterised by very animated discussions between the utilities and their head organisation VDEW in the spring 2005 and the renewables industry. The former had been purporting a need for a change in the support schemes and advocated the introduction of green certificates after 2012. In a symposium on October 27 2005, VDEW underlined its support for the development of renewable energies, and stressed that RES "...are an element of the German electricity industry's energy mix". The Association presented a new study purporting the need to change the renewable energy funding law (EEG) in favour of a certificate-quota system"¹⁵. VDEW however still argues that the subsidisation of green energy is one of the reasons for high energy prices¹⁶.

A wide group headed by the associations of the RES sector stressed on return the significance of the feed-in system. The national election in September 2005 placed RES issues higher on the political agenda. This somehow rendered the possibility for a balanced discussion among stakeholders representing different positions more difficult. The trend from all-party consensus to a more polarised policy approach accentuated during the election campaign. And energy policy and the role of renewables have been part of the political manifestos of all parties.

8.1 The "Integration Model" of the electric utilities

The VDEW first communicated the need for a new support scheme at a conference on June 8, 2005. It was argued that the German EEG had to be replaced by a more efficient support system in a step by step approach. Despite the apparent success of the German support scheme, a change was alleged to be necessary because the extra costs for the consumer would increase rapidly in the coming years (VDEW, 2005a). At the end of October 2005, the system favoured by the VDEW was presented to the public.

The so-called *Integration Model* (Integrationsmodell) aimed at integrating the already mature renewable energies market into the conventional power sector can be described as a timely limited premium support scheme which will eventually be turned into a European-wide quota scheme with tradable certificates. The two-step approach was intended to give the producers security of investment since a radical shift from a national feed-in scheme to a European-wide quota model would be difficult to implement on the political level (VDEW, 2005c).

In a first step, the VDEW planned to replace the national feed-in scheme by a national premium tariff, the so-called integration period. From 2007 onwards, the RES-E producers have the possibility to freely shift from the fixed-tariff to a premium tariff. Like in other premium tariff schemes, the total remuneration would consist of the electricity market price and an additional premium. A shift back to the feed-in tariff would not be possible and the granted priority to renewable energy sources would be abolished. Each technology will still

¹⁵ See Bleuel /Hillebrand (2005) and the press release of 27.10.2005 "Ausbau erneuerbarer Energien effizient voranbringen" (<http://www.strom.de/wysstr/stromwys.nsf/WYSFrameset1?Readform&JScript=1&>).

¹⁶ See press release "Ökostrom-Förderung steigt auf drei Milliarden Euro" from October 30, 2005 (<http://www.strom.de/wysstr/stromwys.nsf/WYSFrameset1?Readform&JScript=1&>

be remunerated differently but the size and location of the installation should no longer be considered. In addition, the premium tariff should decrease rapidly over time to foster market innovation. A certificate system should already be introduced to comply with the guarantee of origin system (VDEW, 2005c).

From 2013 onwards, a European-wide quota scheme with tradable certificates should be implemented. After having gained experience with the conventional power market during the integration period, producers could now be challenged with European-wide competition. The VDEW argues that consequently costs could be reduced further and more innovative products established. The single European quota should take the overall potential into consideration. Moreover, a long-term target has to be set. To minimize wind-fall profits the different quotas could be established for different kinds of technologies. Certificate banking should be allowed while borrowing should be forbidden. Furthermore, penalties for non-compliance with the quota obligation should be introduced. Immature technologies, which would not be part of the European quota system, could still be supported on a national level (VDEW, 2005c).

The proposed system was thought to trigger a discussion about the best support scheme for renewable energies in the German power sector and, several months before the national elections, in the political arena (VDEW, 2005b). With respect to the renewable energy industry, the reactions to the *Integration Model* were almost unanimously negative, if not hostile (Schwarz, 2005; BEE, 2005). Even the BMU criticised the VDEW proposal because it would hinder the growth of the renewable energy sector. The Ministry did not see any need to change the support scheme (BMU, 2005b). After the national election in autumn 2005, it became clear that the new Government wanted to continue promoting renewable energies through the established feed-in support scheme. In 2006, no further attempt was made by the VDEW to promote the *Quota Model*.

Nevertheless, it can be observed that the efforts of the utilities to favour of a quota-based support scheme has been shifted to the European level. The largest German utility, E.On, has initiated a research project carried out by the *Energiewirtschaftliches Institut* (EWI), analysing the advantages of a European-wide quota system in contrast to national feed-in tariffs (EWI, 2006).

8.2 The role of RES in the parties' election programmes

Both coalition parties emphasised the successful energy policy carried out during the last two legislation periods.

Under the heading “A modern energy policy nationally and globally”, the **SPD** manifesto focused on an innovative strategy based on a broad choice of types of energy and the efficient and climate-friendly use of energy resources as a means to react to the challenges posed by climate change. With this strategy the SPD wanted to decrease dependence on oil and progressively reduce energy costs. The course of the red-green coalition was emphasised as a win-win strategy also for renewables. The Social Democrats pledged to continue the successful climate protection policies of the past years.

The **Green Party** claimed a new path “Away with oil and nuclear energy” and declared its aim to politically endorse the economical and energy efficient use of resources. In the long run, it is strived to transform the industrial production of goods and fuels into one that is based on renewables. The target was to reduce greenhouse gas emissions by 40 % by 2020, by 80 % by 2050. The party manifesto built on the success achieved with the Renewable Energies Act. By 2020, the strived target is ‘4 x 25’. This means a quarter of electricity, a

quarter of heat, a quarter of fuel and a quarter of today's chemically produced goods being generated or produced from RES. The greens also intended to introduce a law supporting RES heat generation and connect offshore wind farms to grids. They also envisaged to double the use of co-generation by 2010, focusing on decentralised solutions and the use of renewable energies. Coal subsidies have to be reduced and phased out by 2012. Mining, subsidisation of hard coal mining in Saarland is to be terminated by 2010 at the latest. Emissions trading guarantees that climate protection takes place where it can be most cost-efficiently implemented; the total amount of emissions permitted must be continuously reduced and exceptions decreased.

The **Liberal party (FDP)** appealed for a continued liberalisation and more competition within the so-called network industries and for an open market policy, including the unbundling of the energy sector. The party proposed to stop the subsidisation of hard coal and an amendment of the Federal Mining Act. They appealed to take decisions about the life-span of nuclear power plants not on ideological factors, but rather on requirements of safety, climate protection and business economics. The use of RES must be further promoted as it concerns technologies for the future of sustainable energy supply. The FDP sees a chance for RES especially in the technical advancement of storage technology. The RES Act is to be substituted by a market economy system for promotion of renewables based on certificates and quotas. The share of RES on the heat market should be increased. By combining measures which promote the use of RES in the building sector and those which improve energy efficiency through modern instruments of climate policy, such as emissions certificates, it is guaranteed that investments will prevent as much CO₂ as possible.

The Left wing **PDS** gives priority to renewable resources and requests the immediate phase-out of nuclear energy. The use of solar energy must be developed more decisively through major international cooperation projects. Energy must be handled economically and efficiently. The party considers a decentralised energy supply to be of critical importance. It wants to unbundle the energy monopoly and place it under democratic control and fight against the privatisation of public services, against the EU liberalisation policy and support a democratic EU framework law for services of general interest.”

The **CDU** manifesto “Energy: sustainable and competitive” moves from the high price of energy in Germany as a result of ideological energy policies. The phasing out of nuclear energy is claimed to have devastating effects both environmentally and technologically. The shortage of electricity supply that it will cause in Germany can only be compensated for by additional fossil fuel power plants and more noxious CO₂ emissions. The German nuclear industry has a great export potential which cannot be jeopardised. Economical and efficient use of energy is part of the CDU strategy. They claim a wide-ranging mix of energies made up of fossil and RES sources. The party believes in renewable energies, however, a reduction in their partially exorbitant subsidisation is necessary. CDUs goal is still to have renewable energies make up at least 12.5 % of the German electricity use. But they want to focus on their economical and efficient use. Original critical passages about RES disappeared from the manifesto, as renewables are an important economic factor in two traditionally CDU/CSU Länder, in Baden Württemberg and Bavaria. In the initial phase of the campaign, the chancellor candidate Merkel criticised the current "feed in" subsidies as too costly and voiced support for a quota system.

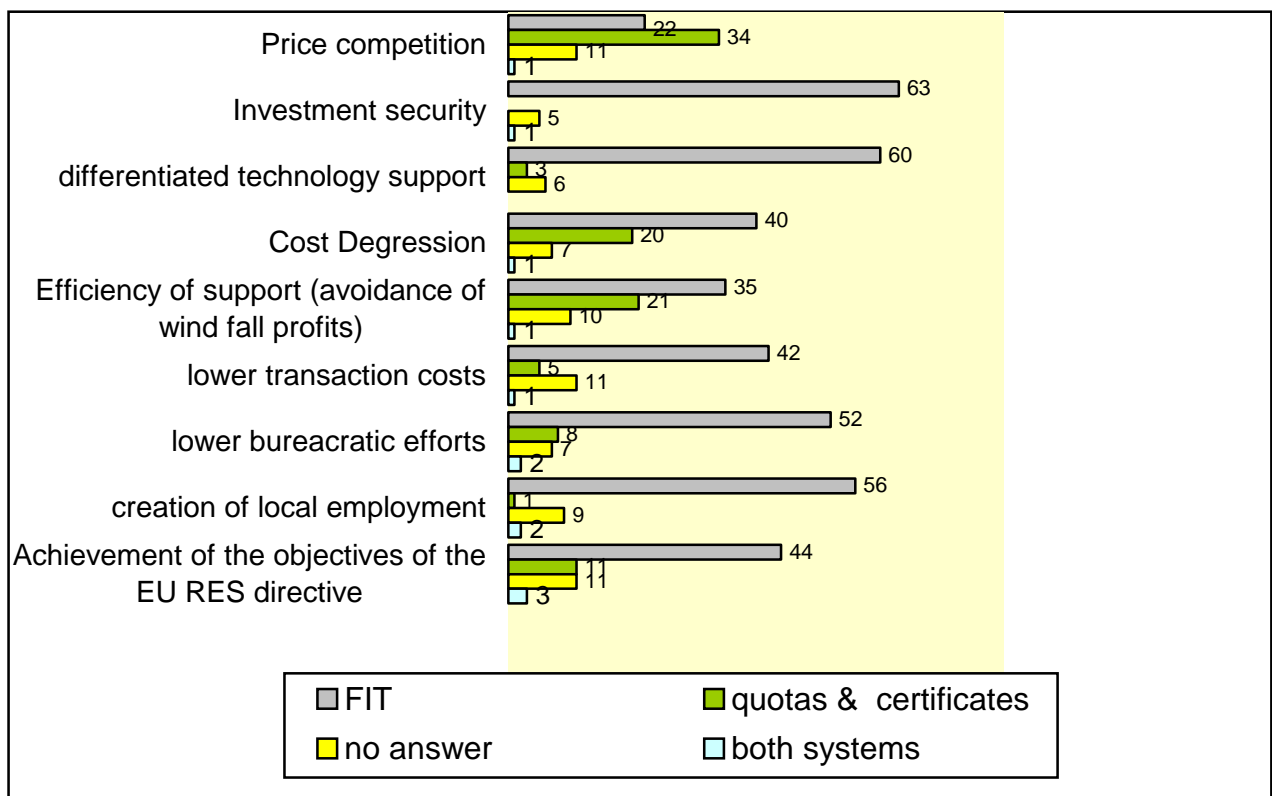
8.2 Stakeholders perspective: results of the survey

A small fraction of respondents to the survey and participants of the hearing advocated a change to a novel system based on quota and certificates. The main grounds justifying a change in the current support system were economic reasons (need to minimise the electricity price to end-users) and a perceived low compatibility of the German system with requirements of a liberalised EU internal market for electricity.

The majority of respondents to the survey ranked FIT systems better than alternative ones based on quotas and certificates with respect to all categories, except price competition. The pre-eminence of the FIT system is also explained with the geographical spread of this instrument: 19 out of 25 Member States have opted for feed-in tariffs, amongst which the most successful countries by growth rate of wind power (Germany, Spain, and Denmark). The quotas and certificates opponent front was very wide and, although most of them recognised that is inappropriate to generalise the performance of quota systems before they have reached maturity, their position ranges from sceptical till very critical.

Quotas and certificates schemes have been advocated particularly by conservative parties, especially the liberals, and the confederation of the electric utilities (VDEW). It was argued that the introduction of volume based trading system of green certificates, with target quotas for all distribution companies and a penalty for not meeting these targets could provide a more efficient system. They also asserted that this instrument encourages increased competition and helps reducing prices. VDEW warned that maintaining the current system would add €10 bn to the national electricity bill by 2020.

Figure 10: Evaluation of the competitiveness of the FIT-model vs. quotas and certificates



By contrast, DIW, one of Germany's leading economic institutes, has backed the country's feed-in renewable energy support system as the most effective means of enhancing renewables and also as cheaper than a quota-based system. It is claimed that even with emissions trading, the system will ensure that renewables account for 12.5 % of electricity consumption by 2010. DIW claimed that between 2000 and 2004, households would have paid €1.7 bn more for electricity if a quota-based system had been used (Diekmann/Kemfert (2005)).

During the hearing it was argued by a key note speaker and by the RECS representative that certificates by themselves achieve nothing. They only work because there are policies (like RES obligations) that create a market pull. Quotas, however, can also work with feed-in tariffs. It was warned that FIT systems without any certification system could lead to a lack of consumer confidence in green power if there is a risk that green power is double counted.

The Wind Energy Association BWE, BBE and the newly established campaign “Germany has infinite energy” argued that quota systems do not necessarily cut the prices consumers have to pay. Quota-type schemes are supposed to promote the least-cost projects, thus restricting them geographically to the areas with the best resources. They stressed that once the best locations are taken, the quota system tends to encourage windfall gains: the marginal price will always go to the least favourable location required to satisfy the renewable electricity demand. Up to now, FIT-systems have been especially advantageous to local SMEs. The representative of Greenpeace argued that despite the implementation of a number of models no countries with quota systems have yet developed a large, independent industrial sector to manufacture renewable equipment.

9. Actors position. (Un)willingness to change: The programme of the new “grand” coalition.

The degree of the national cohesion on the present scheme, at least at political level, is epitomised by the position of the new government towards renewables. After the election, Germany's conservatives no longer consider extending the lifespan of the country's 17 nuclear power stations as a pre-requisite for a power-sharing with the Social Democrats.

The coalition agreement states that in the next future "Germany will continue to take a leading role in national and international climate protection". The SPD is supposed to have enforced pledges to expand renewables to a share of at least 20 % of the overall energy requirement by 2020 although the CDU was only prepared to commit itself to the pragmatic rate of 12.5 % by 2010. The coalition agreement also outlines the intention of preventing German companies making windfall profits from trading carbon dioxide emission certificates from 2008.

Conventional producers were disappointed that the status quo was left unaltered. By contrast, the wind power association BWE rejoiced that “the expansion of renewable energy has been secured and that the big energy utilities' hopes of a return to a conservative policy have been shattered. Now they have to adjust and start investing more into modern, decentralised energy sources”¹⁷. BWE affirmed that support for renewable energy in the new coalition deal would set free huge investments. They claimed that the unhindered expansion of alternative energy (of which wind power which accounts for the lion's share) is likely to attract investments of 110 bn € by 2020-2030.

¹⁷ See press release of November, 14 2005, “Große Koalition zählt auf Windenergie“ ([http://www.windenergie.de/index.php?id=270&tx_ttnews\[tt_news\]=657&tx_ttnews\[backPid\]=138&cHash=11a14a5edd](http://www.windenergie.de/index.php?id=270&tx_ttnews[tt_news]=657&tx_ttnews[backPid]=138&cHash=11a14a5edd)).

The German industry association BDI published a 136-page study of leading research institutes coordinated by Arthur D. Little calling for industry-friendly approaches to energy policy (BDI 2005)¹⁸. They ask for lowering costs for German industry in order to improve its competitiveness. Renewable energy tariffs and the decision to phase out nuclear power were blamed for current high electricity prices¹⁹. BDI warned that industry's competitiveness would be further undermined if the Kyoto protocol on greenhouse gas emissions were extended after 2012. The outgoing green environment Minister in a statement accused the BDI of recycling discredited arguments.

EnBW, number four in the German electricity market, published on November 9, 2005 a statement about the future support scheme for renewables. With this statement EnBW is the first important German utility with a clear pro-active position concerning the domestic feed-in tariff system. EnBW demands to maintain the Renewable Energy Sources Act (EEG). The company emphasises that it has no general objections to quota obligations and certificate trading. But the risks connected with a change in the support scheme are deemed too high. Furthermore the construction of the EEG (amount of payments, technological differentiations, high efficiency due to digressions for new installations) is praised. For the next amendment of the law in 2007, EnBW demands to improve the conditions for large hydro installations²⁰.

Within the same context, during the year 2006, the German government organised two so called energy summits (in April and October), where government, industry and consumer representatives discussed the outlines of a new general energy policy concept to be presented in the second half of 2020. Among the preliminary outcomes were the announcements of the energy industry to invest more than 30 billion euros in new power plants and other energy infrastructures by 2012 as well as 40 billion euros by the renewable industry for an increased use of RES until the same date and up to 200 billion euros until 2020. In addition, the government announced to adopt legislative steps to speed up the approval procedures of RES-E plants (BMU 2006b)

10. The future of the EU Support schemes. Harmonisation or coordination?

The former government presented its policy in a reply to a parliamentary interrogation of the Christian Democratic Parties and clarified that it had made a major contribution to EU co-ordination efforts with the amendment of the RES Act transposing the EU directive 2001/77/EG²¹. The previous Federal Government had engaged in the EU-Energy ministries Council at the end of November 2004 pressing the EU to take a decision till 2007 over the continuation of its strategy for the middle and long-term objectives for the year 2020. The

¹⁸ See <http://www.strom.de/wysstr/stromwys.nsf/WYSFrameset1?Readform&JScript=1&>.

¹⁹ See BDI (2005) and “Ökonomische Auswirkungen alternativer Laufzeiten von Kernkraftwerken in Deutschland“, Study of the Energiewirtschaftliches Instituts an der Universität zu Köln (EWI) and Energy Environment Forecast Analysis GmbH, Berlin (EEFA), Köln, Berlin, October 2005 as well as the press release of October 15, 2005 (<http://www.bdi-online.de/download/PM.pdf>).

²⁰ See press release of 9. 11.2005:“Die EnBW Energie Baden-Württemberg AG und die Erneuerbaren Energien – Positionspapier“

(http://www.enbw.com/content/de/presse/pressemitteilungen/2005/11/pm_20051109_cu_mw01/index.jsp;jsessionid=FC9068BE9005B8FF0C108B9997D91C0.nbw10).

²¹ Antwort der Bundesregierung auf die Große Anfrage der Abgeordneten Dr. Peter Paziorek, Doris Meyer (Tapfheim), Horst Seehofer, weiterer Abgeordneter und der Fraktion der CDU/CSU „Erneuerbare Energien in Deutschland“ - Drucksache 15/4014 -

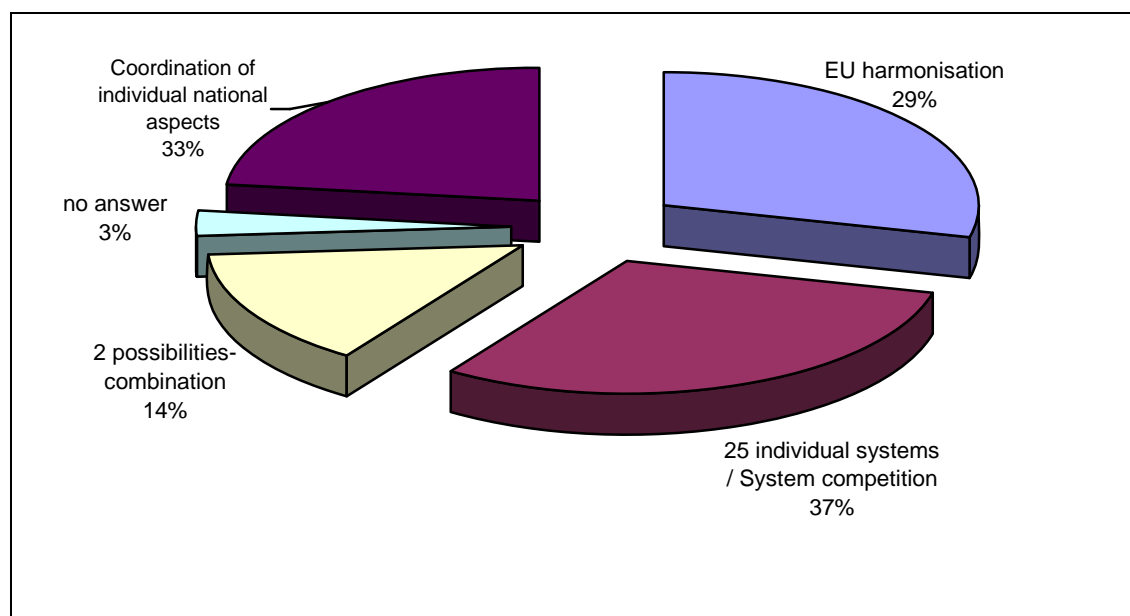
government welcomed the statement of EC Energy Commissioner of January, 11, 2005 asserting that the goal of the Union should be a co-ordination, but not necessarily a harmonisation of the renewable energy policies.

VDEW launched the discussion on the need for harmonising the schemes promoting the use of RES in the EU in its conference in spring 2005. A single European market for renewables based on a quota and certificates system would lead to efficiency gains of several billions (see section 8).

On the whole, public opinion has shown a still rather indifferent position on harmonisation issues. The REALISE survey collected various, differentiated statements, most of which however pointed in the same direction: German stakeholders do not endorse harmonisation on account of preservation of established and favourable domestic support conditions. Yet approximately 29 % of the interviewed stakeholders stressed the importance for a harmonised support system across the EU and favoured the convergence of the national systems to promote RES. It is interesting to notice that this was a somehow composite front comprising almost all stakeholder groups. It was noticed that only this path can avoid market distortion and instigate a competition among RES sources. Part of them argued that harmonisation would be preferable with a RES certificate trading system. Some stakeholders (among which a majority of institutional actors) considered internationally harmonised solutions with FIT-systems as a logical consequence of the fact that already 18 MS implement this scheme and considered this option as the one offering best conditions to boost renewables.

The majority of respondents of the survey agreed that harmonisation of policies across the EU is not yet necessary and endorsed the position of Commissioner Piebalgs that it is premature to propose a harmonised European support scheme. Approximately 14 % of the respondents gave two answers, thus conceding that whilst competing national schemes could be seen as the best solution, on the short and medium term a co-ordination of the existing systems is necessary.

Figure 11: Perceived need for a harmonised RES- support scheme.



As a consequence of the broad acceptance of the FIT scheme in Germany and the (political) will - mainly of the German Ministry for the Environment, Nature Conservation and Nuclear

Safety – to improve the cooperation among EU Member States using FIT schemes and in order to promote the exchange of experiences with the national systems, the governments of Spain and Germany at the International Conference for Renewable Energies in Bonn in June 2004 (renewables2004) initiated the so called Feed-In Cooperation. Thereafter, a joint declaration between both governments was signed on October 6, 2005 in Madrid.

The International Feed-in Cooperation aims at demonstrating the advantages of a feed-in system. In this context, both countries intend to stimulate the enhancement of feed-in tariffs worldwide by including other countries into their information exchange process. For instance, existing knowledge and experiences gained in the two countries are supposed to serve as valuable information for other countries planning the introduction or further development of feed-in tariffs. The knowledge exchange is realised by various international workshops and it is supported by the information available on the Cooperation's website.²² Furthermore, design criteria for successful policy implementation are specified and best practice examples throughout Europe are identified. During the last workshop of the feed-in cooperation at late November 2006 in Madrid, further steps of a harmonised feed-in system at EU level were discussed like a harmonised approach based on a feed-in law with a modular and transparent premium for RES-E producers, which considers technology costs, some grid services, political incentives and national priorities. This common approach should also comprise flexible mechanisms to update and revise premiums, to avoid windfall profits for producers, and to share technology innovation benefits with electricity consumers while maintaining incentives for innovation. The proposed common approach also takes into account other necessary considerations for harmonization, such as grid access, additional national funding, definition and standards, ownership of rights derived from renewables, and exceptions for small non-commercial producers and energy-intensive industries. The workshop was held in Madrid on November 23rd and 24th, 2006, and was attended by representatives from nine EU Member States, from Ontario (Canada), as well as the European Commission and non-governmental organisations.

11. Barriers for further expansion of renewables in Germany.

Although opinion polls show a very positive attitude and support of renewables by the general public, this attitude seems to have a strong NIMBY (“Not-In-My-Back-Yard”) component. There are especially local resistance movements against wind energy projects. Reasons given are visual intrusion, noise, land devaluation, health problems due to radiation, negative impact on local tourism, etc.

As remarked in section 6, the consumers' willingness to change to a green electricity supplier is still limited. The main reason for that are the allegedly higher prices for green power and a certain resistance to change the supplier in general. As remarked in section 5.2, by the end of 2005 approx. 600.000 customers have been supplied with one of the more than 130 green electricity products offered on the German electricity market. This amounts to an annual market volume of approx. 2 TWh which corresponds to a market share of about 1.5% of the domestic sector (CLEAN-E 2006: 49).

The biggest obstacle for wind energy – which is the most important renewable energy source in the German electricity market – is the present grid capacity. Grid expansion measures are needed. According to the grid study by the German Energy Agency (dena) by the year 2020

²² www.feed-in-cooperation.org

various grid sections covering an overall length of approximately 400 km will need to be reinforced and routes spanning around 850 km will need to be completely rebuilt. Further more the grid needs to be extended by around 5 % (BMU 2005a).

Another restriction for the future wind energy development in Germany is the increasingly more restrictive policy of some Länder, such as for example the largest Land North Rhine-Westphalia (NRW). In May 2005, NRW became a new government. Christian Democrats (CDU) and Liberals (FDP) replaced the so called red-green government (Social Democrats, SPD, and the Green Party). One of the first measures of the new government was a new provision for distance and height limitations of wind turbines. This has significantly reduced the potential for further onshore expansion. Possibilities to replace old with more powerful new installations (“repowering”) are also affected by these provisions of the Länder (BMU 2005a).

A general barrier for the development of renewables in Germany is the availability of coal and the strong influence of the coal sector, with a high number of lobbyists in the Social Democrat Party (SPD). This resulted, for example, in a virulent campaign against wind power in Germany in connection with the amendment of the EEG of 2003 and the assurance of the then Chancellor Schröder to further subsidise the German hard coal mining industry between 2006 and 2012 with €17 billion. Another problem for the future RES development in Germany is the procurement policy in the case of natural gas. The supply contracts with the most important providers will not expire before 2011 and some contracts are even fixed until 2030. Most of these have so called “take or pay” conditions (Reiche 2004). Although there has been a sort of convergence of interests between the gas and RES sectors, especially in the heat market, a too strong volume of gas could somehow create priority conflicts and slow down RES-E deployment in the electricity market

12 Concluding remarks

The natural potential for wind power is clearly greater in the UK and France than in Germany, especially due to their long seacoasts. Nonetheless, by the end of 2005 Germany had around 13.6 times more installed wind power capacity if compared to the UK and about 24.3 times more than France. These peculiarity exemplifies that availability of resources (i.e. national potential) may provide a head start but does not necessarily guarantee for success. Other factors are obviously more relevant. Besides the deployment of RES promotion instruments (like feed-in tariffs or quota models), a series of further factors influences the success or failure of RES development. These are on the one side the specific design of the promotion instruments itself and on the other side geographical, political, economical, technical and cognitive framework conditions. The importance of single factors differs from country to country and there is always a combination of factors influencing the success or failure of national RES development paths.

Even if no “natural” pre-eminence of any (RES) promotion instrument can be claimed, until now renewable energy feed-in tariffs (REFITs) have shown the highest effectiveness concerning the creation of new RES installed capacity. In fact, the leading wind energy countries Germany and Spain have implemented REFIT systems and the majority of installations in Denmark are based on this system, too. Nearly 78 % of all wind power capacity in the EU-28, accounting to 40.504 MW at the end of 2005, was installed in these three countries (EWEA 2006).

What are the reasons for this impressive development? In the first place this is the *planning security* that these three countries offered potential investors with the specific design of their REFITs. Germany guarantees investors the feed-in tariff for a period of 20 years (and even 30 years for hydropower till 5 MW). Another very important design criteria for a successful RES development of several kind of RES technologies is the *technology-specific remuneration* for RES electricity. If the different power production costs of the individual RES technologies are considered in the form of varying remuneration, the possibilities to reach a broad RES supply or technology mix seem without doubt higher than with a uniform remuneration level for RES power. In Germany, the EEG established a broad promotion approach with remuneration rates depending on the technology used, the size of the plant and - in the case of wind energy - also the age and the generated power output of the installation. The success of these provisions speaks for itself: world leadership in installed wind capacity. Also for photovoltaic electricity, whose production costs are still much higher than those of hydropower, wind, and biomass, the REFIT system of Germany offers an adequate feed-in tariff.

Against this background, it is not surprising that the willingness to change the German support scheme is very low. As illustrated in Section 8, with the exception of the VDEW and the liberal party, most of the actors are generally in favour of the EEG, because from their point of view, the current feed-in system optimizes the differentiated aspects of RES-E support (effectiveness, efficiency, transparency, etc.). Also the coalition agreement of the new governing Social Democrat and Christian Democrat parties from November 2005 re-confirmed the adoption of a REFIT scheme. It remains to be seen how the amendment of the EEG planned in 2007 will set some new accents (probably lower promotion of onshore-wind power) and in which direction the co-ordination of the EU support system will affect the further development of RES in Germany. A fully open issue concerns the question how the RES market will interact with emission trading and whether the government's policy will lead to a conflict with the German power industry when permits and quotas on carbon dioxide emissions for 2008-2012 will come up for negotiation.

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