2012

# PUBLIC FUNDING FOR GREEN ENERGY IN A CONTEXT OF CRISIS

## Country report (Germany)

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## Table of Contents



## Table of figures

# 1. Introduction

“In the context of the crisis and reduction of public expenses, there is a threat for ambitious politics for sustainable development. In Europe governments are reconsidering their support to green-energy initiatives in an age of austerity. In the boom times before the global economic crisis, the investments in clean energy have been continuously increasing, driven by the concern about energy security and climate change.

But under an economic crisis situation, targeted public funding, along with policy and regulatory certainty, are particularly important to maintain growth and realise economic potential.”

The country report describes the effects of the economic crisis on the German renewable energy sector. The main goal of the country report is to understand the latest development of public funding for renewable energy sources in Germany. The report describes the latest national development and identifies major future trends. The general desk research is submitted by phone interviews with stakeholders from trade union organisations and employer organisations in order to get a deeper insight into the current social debate about renewable energy sources. Both the phone interviews and the analysis on the social debate in Germany were conducted in September 2012. For the country report only federal support schemes are analysed and evaluated.

Germany has a unique situation among the European countries. It has a strong green industry, and the country set ambitious targets for the expansion of renewables, increased energy efficiency and greenhouse gas reduction. After the Fukushima nuclear power plant disaster, Germany decided to phase-out nuclear power plants by the end of 2022. This decision started a fundamental transformation on social, economic, technological and cultural development in Germany, and secured the leading situation of renewable energy sources. In this report only the situation of the renewable energy sector is analysed, nevertheless the German Energiewende (transition of the German energy system) has fundamental and comprehensive targets and measures across various fields of the entire energy sector.

The next two sections describe shortly the general situation of the energy sector in Germany and the deployment of renewable energies. Section 4 gives an overview about the development of general support schemes in electricity, heat and transport sectors. Section 5 specifies the effects of the economic crisis in Germany. Section 6 gives an overview on the social debate about renewables in Germany on the basis of expert interviews. It is followed by conclusions and key messages.

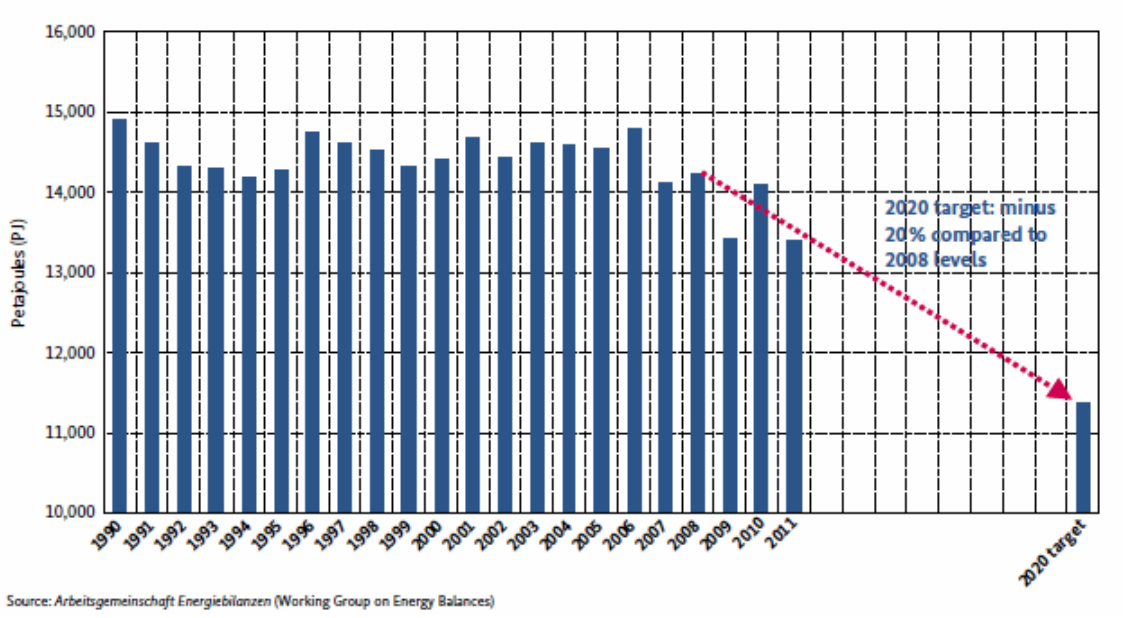
# 2. Renewable energy deployment

Germany's total primary energy consumption was 306.356 TOE in 2010 (Eurostat). **Figure 1** shows the aim of the German government to reduce the primary energy consumption by 20% compared to 2008-levels until 2020.

Oil makes up the largest share of TPES at more than one-third, followed by coal (24%), natural gas (23%) and nuclear (12%). Renewables in TPES have grown remarkably on the last two decades. They account currently for 10.9%(see

**Figure 5**).

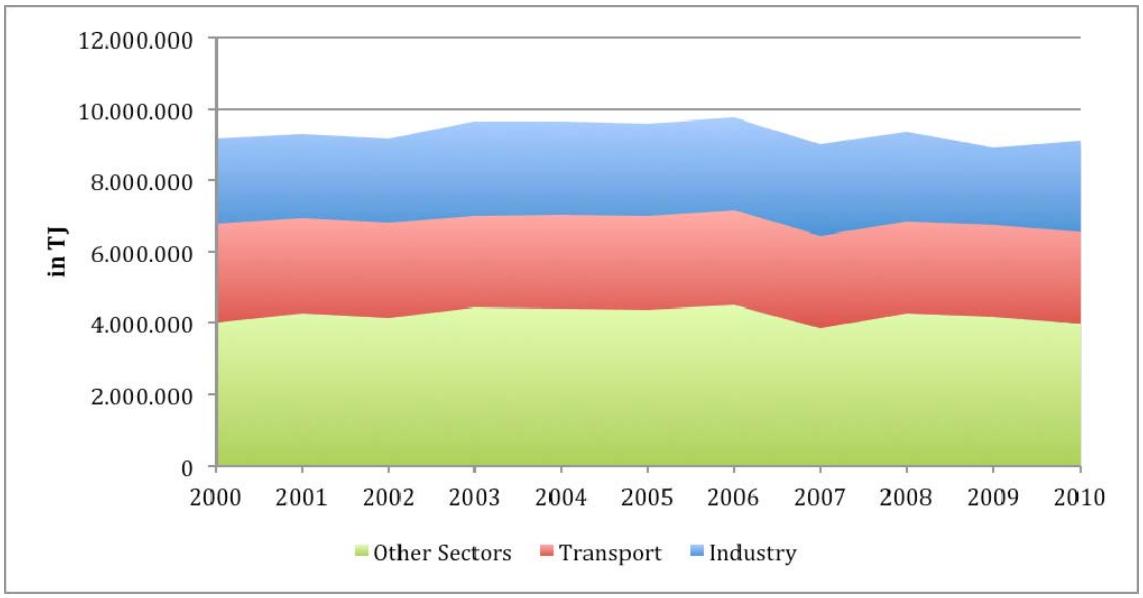
**Figure 1: Development of primary energy consumption in Germany**




**(BMWi 2012)**

**Figure 2** shows the development of final energy consumption by sector in Germany. The final energy demand was 217,378 TOE in 2010 (Eurostat). The development of TFC remained relatively flat over the last decade. Both the industry and transport sectors accounts for 28% of final energy consumptions (ibid).

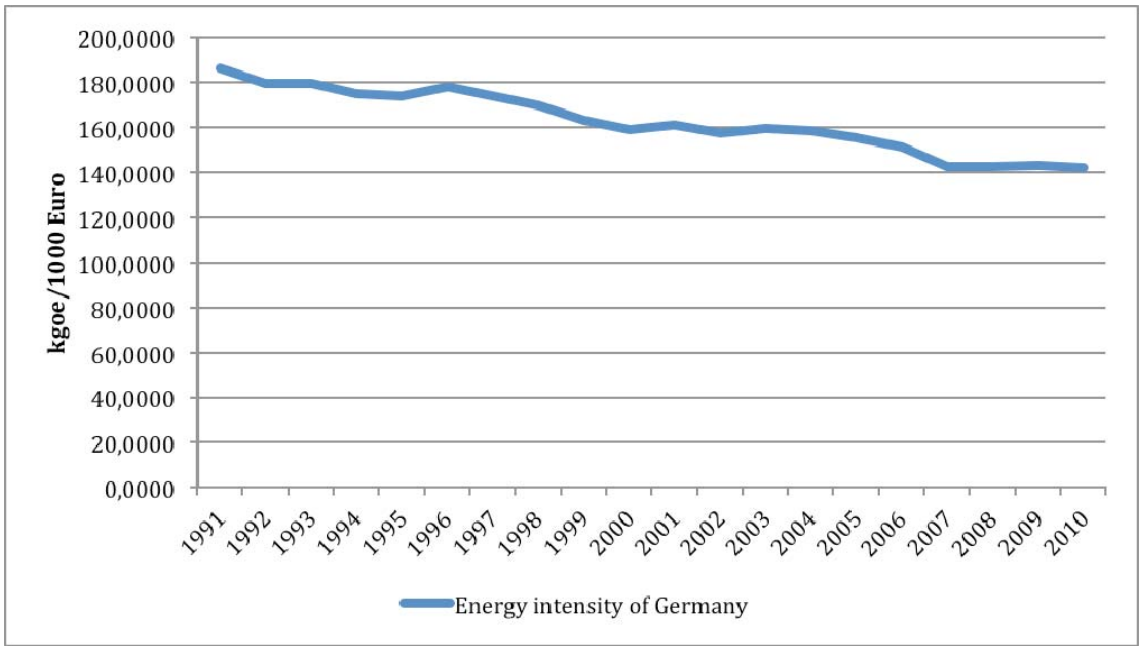
**Figure 2: Development of final energy consumption by sector in Germany since 2000**




**Source: Eurostat**

The energy intensity of the German economy decreased since 1991 by more than 30% (**Figure 3**).

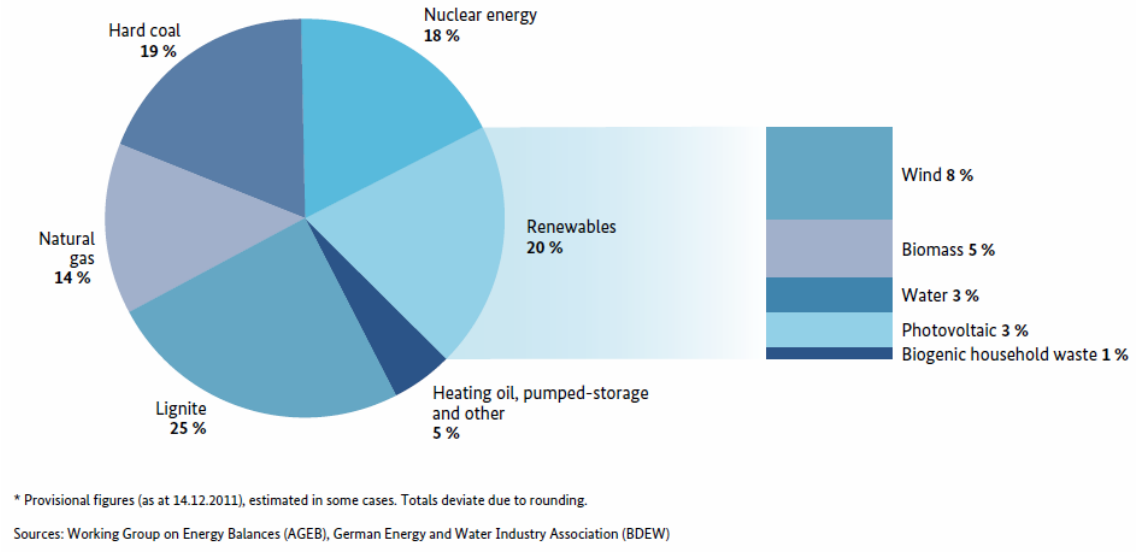
**Figure 3: Energy intensity of Germany (in kgoe/ 1000 Euro)**




**Source: Eurostat**

In 2011, 612 TWh on electricity were generated in Germany (BMWi 2012). The country has a relatively balanced mix of fuels (**Figure 4**). Lignite and hard coal have the largest share, followed by renewables, nuclear energy and natural gas. Germany has a very high share of renewables compared to other IEA countries. This share has grown extraordinarily in recent years. Renewables made up only 1.8% on TPES in 1995 and they have grown to 20% in 2011 (IEA 2007, BMWi 2012).

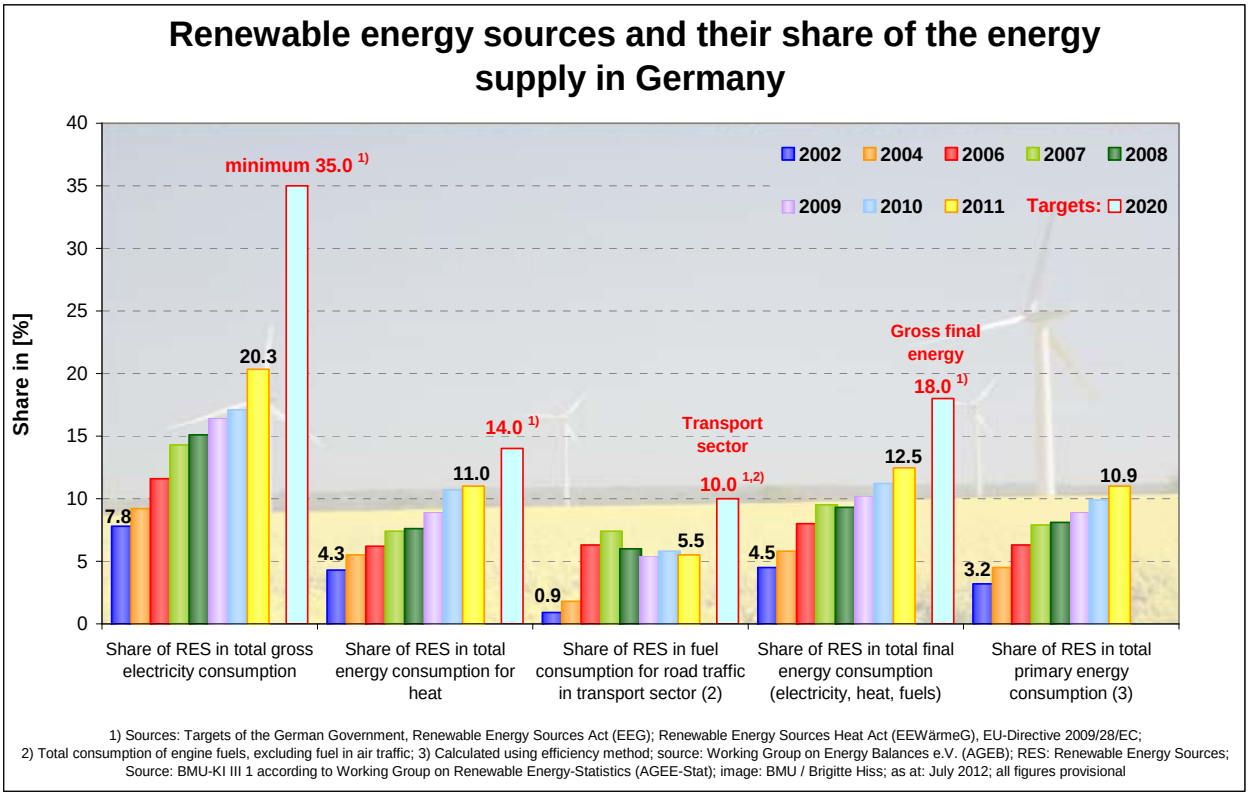
**Figure 4: Gross power production in Germany in 2011**




**(BMWi 2012)**

**Figure 5** shows the annual growth of renewables in Germany in various sectors, and the official national targets until 2020. Renewables now make up 12.5% of total final energy consumption (BMU 2012a).

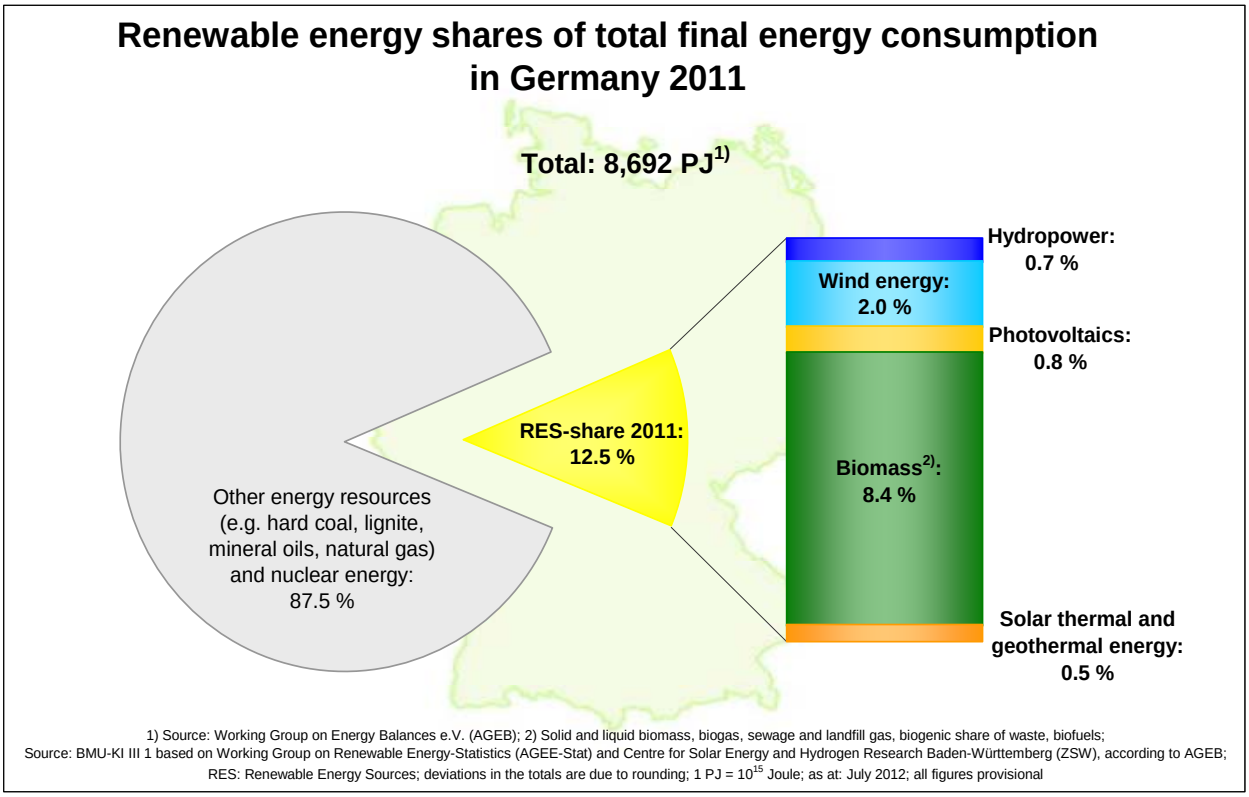
**Figure 5: Share of renewable energy sources in the energy supply in Germany**




**(BMU 2012a)**

From that, biomass (solid and liquid biomass, biogas, sewage and landfill gas) covers 8.4%; wind energy covers 2% (see Figure 6) (ibid).

**Figure 6: Share of renewable energy sources in the total final energy consumption in Germany in 2011**



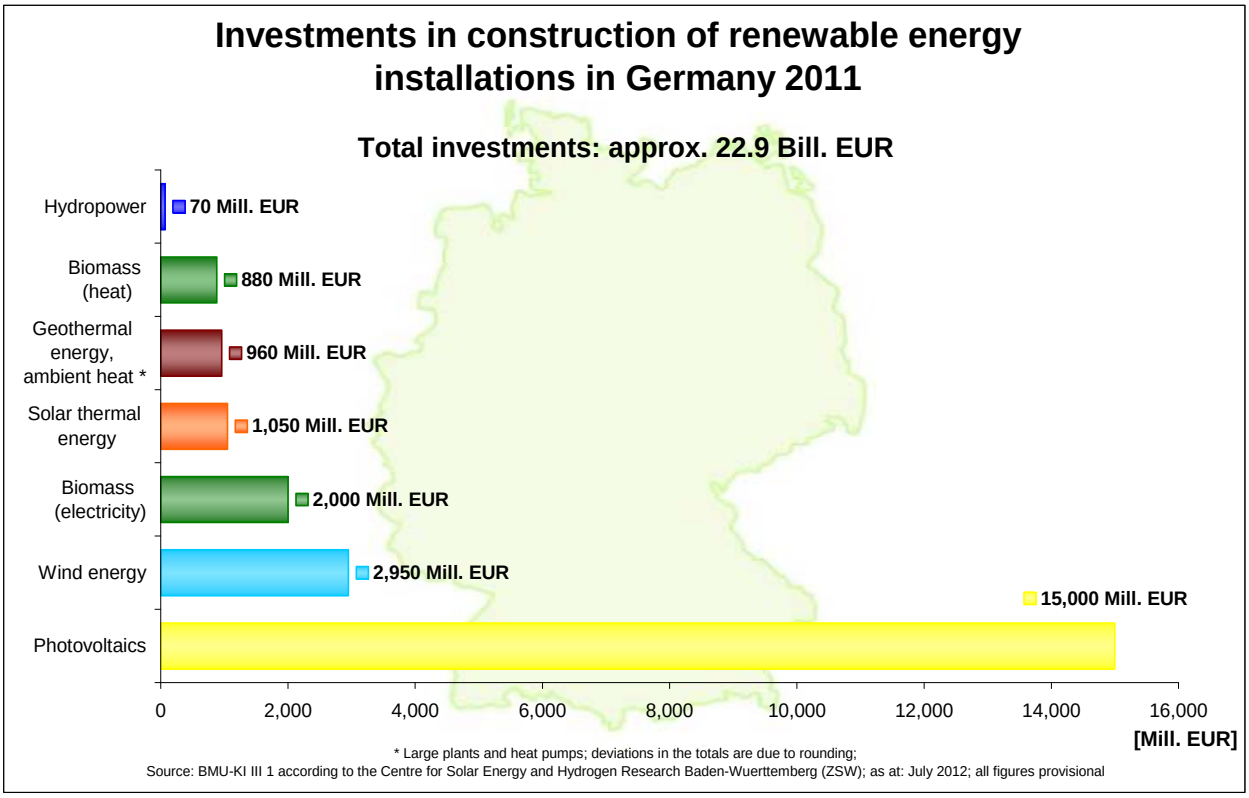

**(BMU 2012a)**

# 3. Renewable energy sector

In 2011 renewable energies continued to gain increasing importance in the German economy. Since the EEG entered into force, total installed capacity for renewables-based electricity generation has grown fivefold. Despite the reduction of feed-in tariffs for PV electricity, the photovoltaic sector had a strong growth in the previous year. 15,000 Million Euro investments were due in the PV sector last year (

**Figure 7**).

**Figure 7: Investments in construction of renewable energy installations in Germany in 2011**




**(BMU 2012a)**

**¡Error! La autoreferencia al marcador no es válida.** shows selected macroeconomic effects of renewable energy expansion in 2010 (BMU 2012a).

**Figure 8: Selected macroeconomic effect of renewable energy expansion in Germany, heat and electricity sectors in 2010**

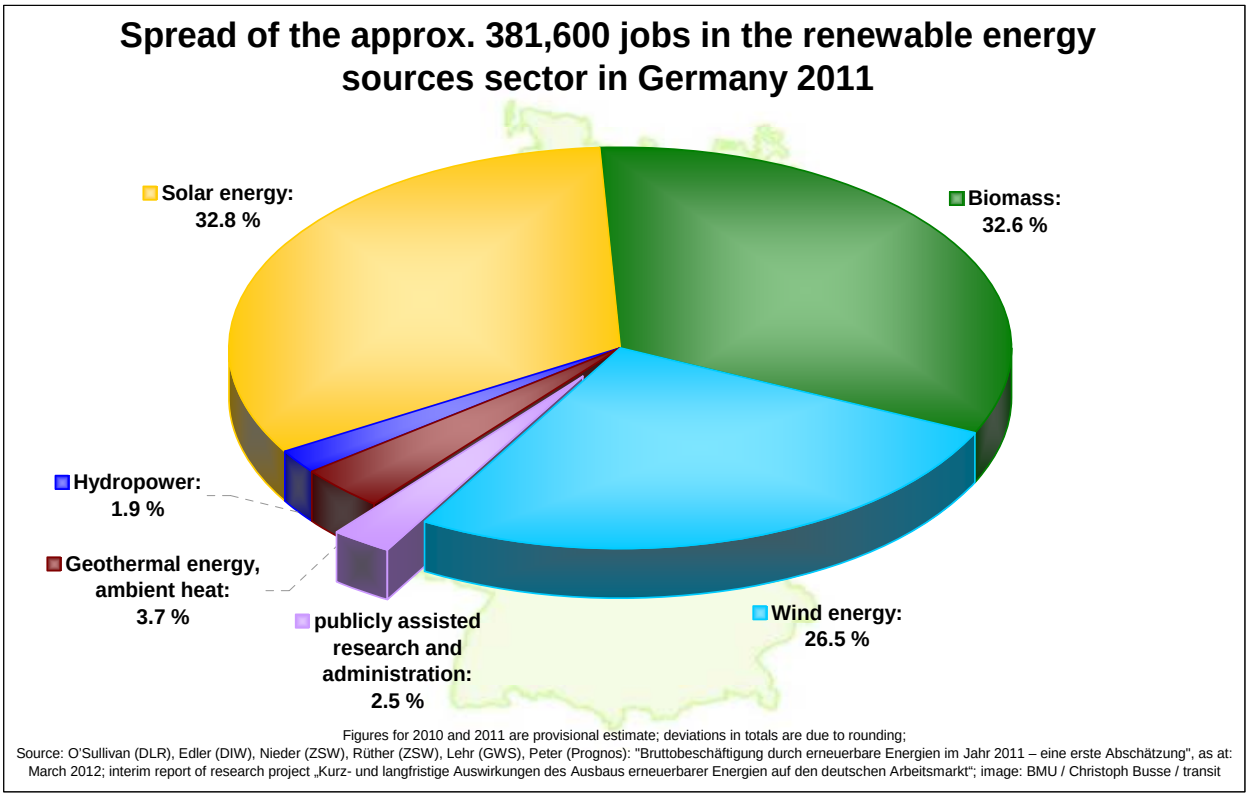
| | Macroeconomic and other effects (selection) |
|---|---|
| Sales by German companies including exports (all renewables) | 25.32 bn. EUR |
| Employment (all renewables) | approx. 367,000 directly and indirectly employed persons |
| Energy imports avoided (all renewables) | 6.7 bn. EUR (gross); 5.8 bn. EUR (net) |
| Energy price, GDP effect | 100 – 200 mill. EUR [4] |
| Impacts on internal and external security (reduced dependence on imports; lower risks etc.) | n.q. |

**Source: (BMU 2011a)**

Renewable energies are increasingly important as an economic factor in Germany. According to a BMU research project, approx. 381,600 jobs in Germany were estimated in the field of renewable energies in 2011 (**Figure 9** and

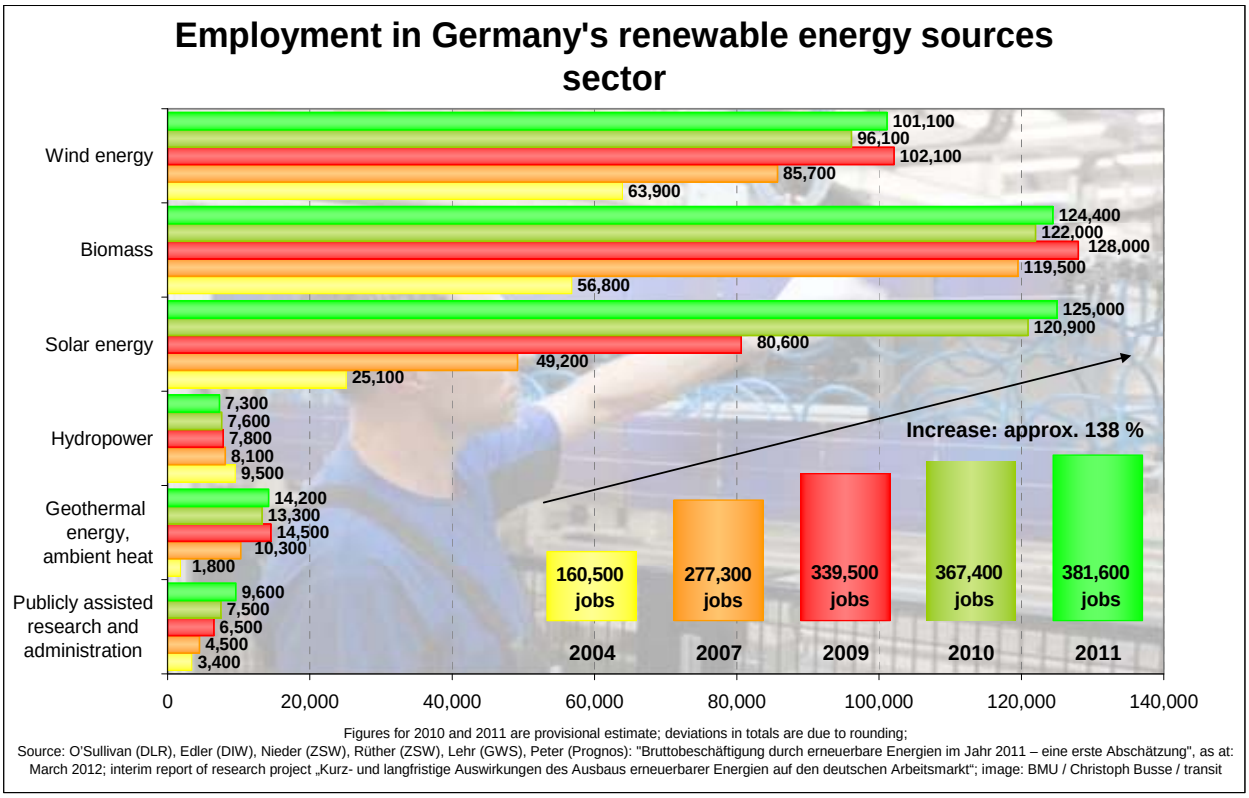
**Figure 10**). It is expected that the positive development will continue in the future (BMU 2012a). In order to ensure that there are enough skilled employees available for this growing demand on the labour market further training opportunities are needed in the renewable energy sector.

**Figure 9: Share of RE-technologies on the labour market.**




**(BMU 2012a)**

**Figure 10: Employment in Germany's renewable energy sources sector**



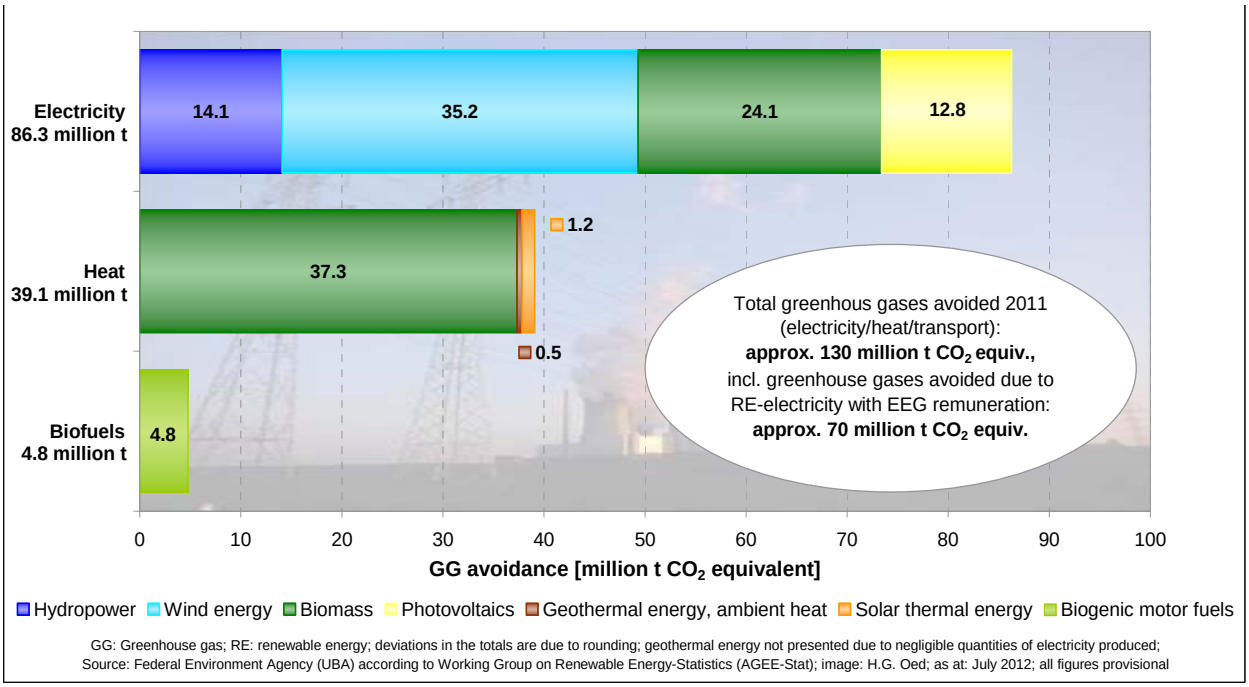

Figures for 2010 and 2011 are provisional estimate; deviations in totals are due to rounding;
Source: O'Sullivan (DLR), Edler (DIW), Nieder (ZSW), Rüther (ZSW), Lehr (GWS), Peter (Prognos): "Bruttobeschäftigung durch erneuerbare Energien im Jahr 2011 – eine erste Abschätzung", as at: March 2012; interim report of research project „Kurz- und langfristige Auswirkungen des Ausbaus erneuerbarer Energien auf den deutschen Arbeitsmarkt"; image: BMU / Christoph Busse / transit

**(BMU 2012a)**

**Figure 11** shows the amount of avoided GHG emissions in the electricity, heat and transport sectors. The total number of avoided GHG emissions came to about 130 million t $CO_2$ equivalent. Avoided emissions amounted to 86.3 million t in the electricity sector and 39.1 million t in the heat sector, 4.8 million t in the motor fuel sector (ibid).[1]

[1] In the case of electricity and heat the results depend to a considerable extent on which fossil fuel are replaced by renewables. In case biofuels it is not only dependent on the emission intensity of the fossil fuels replaced, but also on the nature and origin of the raw materials used.

**Figure 11: GHG emissions avoided via use of RE sources in Germany in 2011**

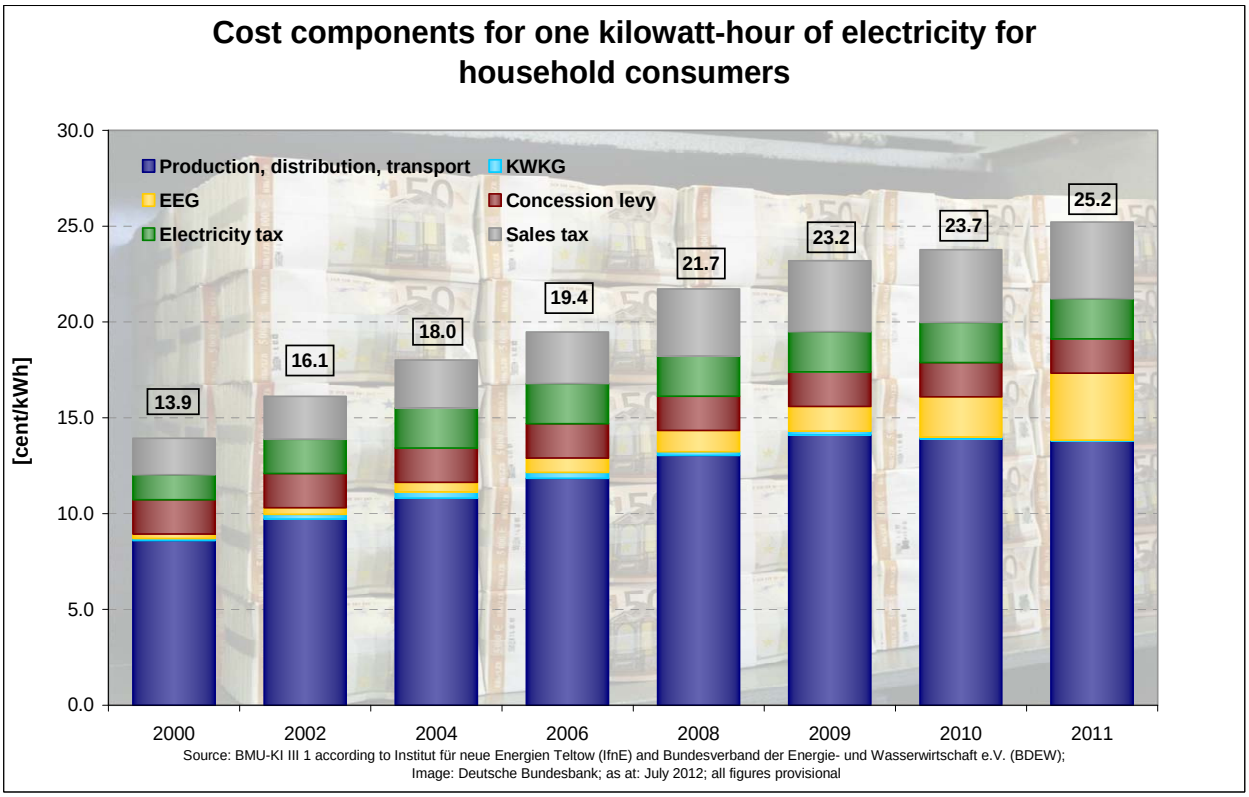



GG: Greenhouse gas; RE: renewable energy; deviations in the totals are due to rounding; geothermal energy not presented due to negligible quantities of electricity produced;
Source: Federal Environment Agency (UBA) according to Working Group on Renewable Energy-Statistics (AGEE-Stat); image: H.G. Oed; as at: July 2012; all figures provisional

**(BMU 2012a)**

The German feed-in tariff requires all electricity suppliers to have the same share of electricity from renewable energy in their fuel mix. **Figure 12** gives an overview on the increase of cost components for 1 kWh electricity for households (ibid).

**Figure 12: Cost components for a kWh electricity for household consumers**




Source: BMU-KI III 1 according to Institut für neue Energien Teltow (IfnE) and Bundesverband der Energie- und Wasserwirtschaft e.V. (BDEW);
Image: Deutsche Bundesbank; as at: July 2012; all figures provisional

**(BMU 2012a)**

The greatest cost components are production, distribution and transport (dark blue). The EEG surcharge (Renewable Energy Sources Act) is increasing steadily since its introduction in 2000 (from 0.4 ct/kWh in 2003 to 3.6 ct/kWh in 2012). The surcharge finances the feed-in tariff for renewable electricity plant operators. This cost component is going to increase remarkably in 2013 as well because of the strong development in the RE-sector. The electricity tax (green) amounts to 2.05 ct/kWh since 2003. Revenues from the Electricity tax are largely paid into the state pension scheme in order to stabilise the level of contributions. The light blue KWKG means a compensation for combined heat and power generation. These surcharge never exceeded 0.3 ct/kWh. The Concession levy (brown) has to be paid to local authorities so that they can build and operate public lighting. Its amount depends on the population of the municipality and it sums between 1.32 and 2.39 ct/kWh. Sales tax or VAT (grey) has a rate of 19% on the net electricity price since 2007 (before 16%). Non-tariff customers (consumption over 10.000 kWh/year) receive reliefs on several cost components and they pay individual electricity price (BMU 2009 and Öko-Institut 2012).

# 4. Overview of available renewable energy support instruments before the crisis

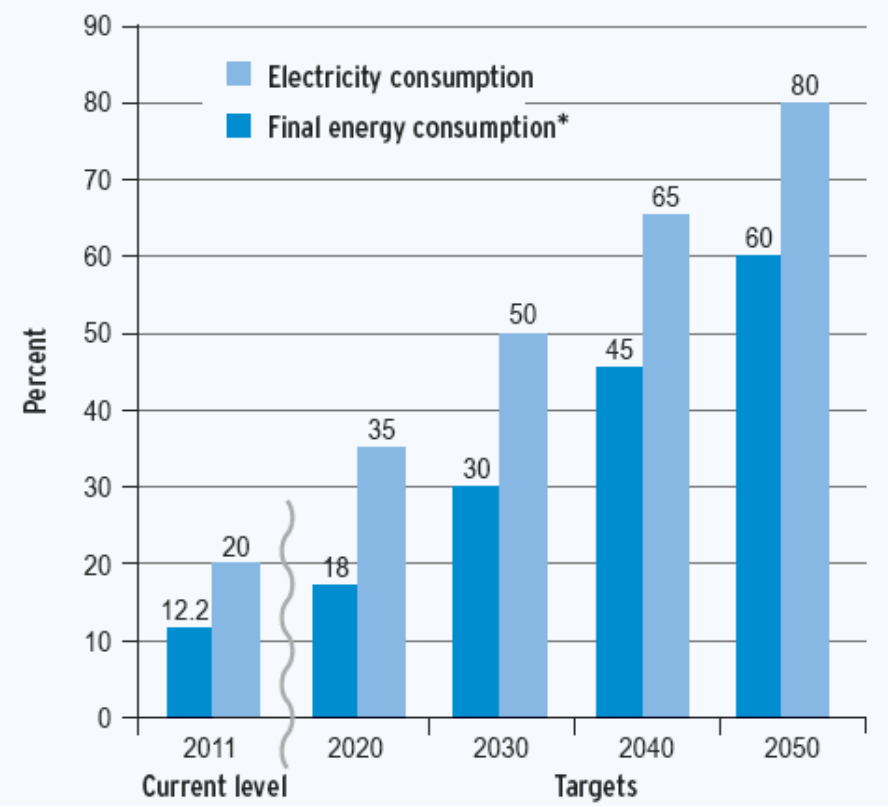
Promotion of renewable energy is crucial for the German government. Germany has ambitious mid- and long-term targets to reduce its GHG-emissions and improve sustainable energy sector. The government has taken on three renewable specific targets and objectives until 2020:

- Increase the share of renewable energy in electricity generation to at least 20%.
- Increase the share of renewable energy in TPES to at least 10%.
- Increase the share of biofuels to 10% in total fuel consumption.

After the nuclear accident in Fukushima Germany adopted decisions on the gradual phase-out of nuclear power by 2022. The German Energy Change has a long-term comprehensive strategy for transforming the energy system. It set ambitious long-term targets for the expansion of renewables until 2050 (**(BMU 2009)**):

- At least 60% share of RE in gross final energy consumption
- At least 80% RE share in electricity consumption (BMWi 2012).

**Figure 13: Long-term RE-targets of Germany (Electricity and gross final energy consumption)**



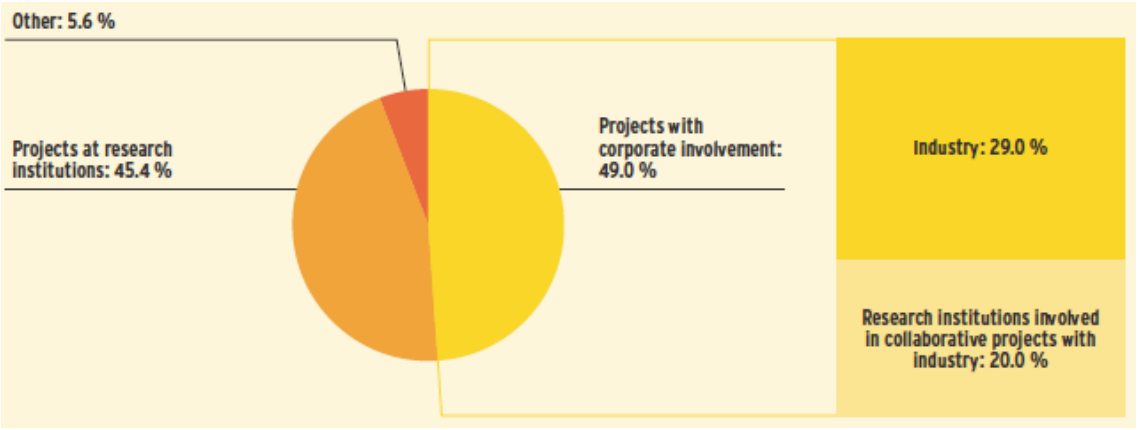

**Source: (BMU 2012c)**

In Germany a substantial renewable energy industry emerged in the past years, which is a further driving force for support of the renewables sector.

Renewable energy sources are promoted with various incentives and measures in Germany. The Renewable Sources Act (EEG) is the core supporting law on the electricity market, biofuels benefit from the Biofuels Quotas Act and mineral oil tax concessions. The Market Incentive Programme supports use of renewable energy in the heating sector. Smaller plants belonging to private investors receive support in the form of subsidies, while larger plants are eligible for interest-reduced loans and repayment subsidies. The Reconstruction Loan Corporation (KfW) offers a range of attractive financing schemes in the buildings sector. Support from national level is supplemented by a wide range of measures in various federal states and local authorities (BMU 2007).

**Figure 14** and **Figure 15** give an overview on the allocation of funding for renewable energy sources. In 2011, BMU significantly increased its renewable energy founding. It approved 300 new research and development projects with a total volume of over 240 million euros in the renewable energy sector in 2011 (BMU 2012b).

**Figure 14: Use of research funds by recipient group in 2011**




**(BMU 2012b)**

**Figure 15: Allocation of funds to newly approved projects**

| Allocation of funds to newly approved projects (million euros) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
| Photovoltaics | 17.8 | 32.3 | 43.3 | 41.6 | 39.7 | 31.4 | 39.8 | 74.3 |
| Wind | 12.6 | 22.7 | 16.1 | 34.7 | 40.1 | 28.2 | 53.0 | 77.1 |
| Geothermal | 11.9 | 18.0 | 23.7 | 8.1 | 16.4 | 14.9 | 15.0 | 24.1 |
| Low-temperature solar thermal | 4.8 | 3.9 | 5.1 | 7.5 | 10.1 | 7.0 | 6.8 | 9.4 |
| Solar thermal power plants | 10.4 | 7.5 | 6.9 | 5.9 | 8.2 | 8.6 | 9.7 | 11.2 |
| System integration | | | | | 28.2 | 11.5 | 12.2 | 26.3 |
| Other | 2.7 | 13.7 | 3.7 | 4.4 | 8.1 | 16.8 | 4.2 | 22.9 |
| Total | 60.2 | 98.1 | 98.8 | 102.2 | 150.8 | 118.4 | 140.7 | 245.2 |

**(BMU 2012b)**

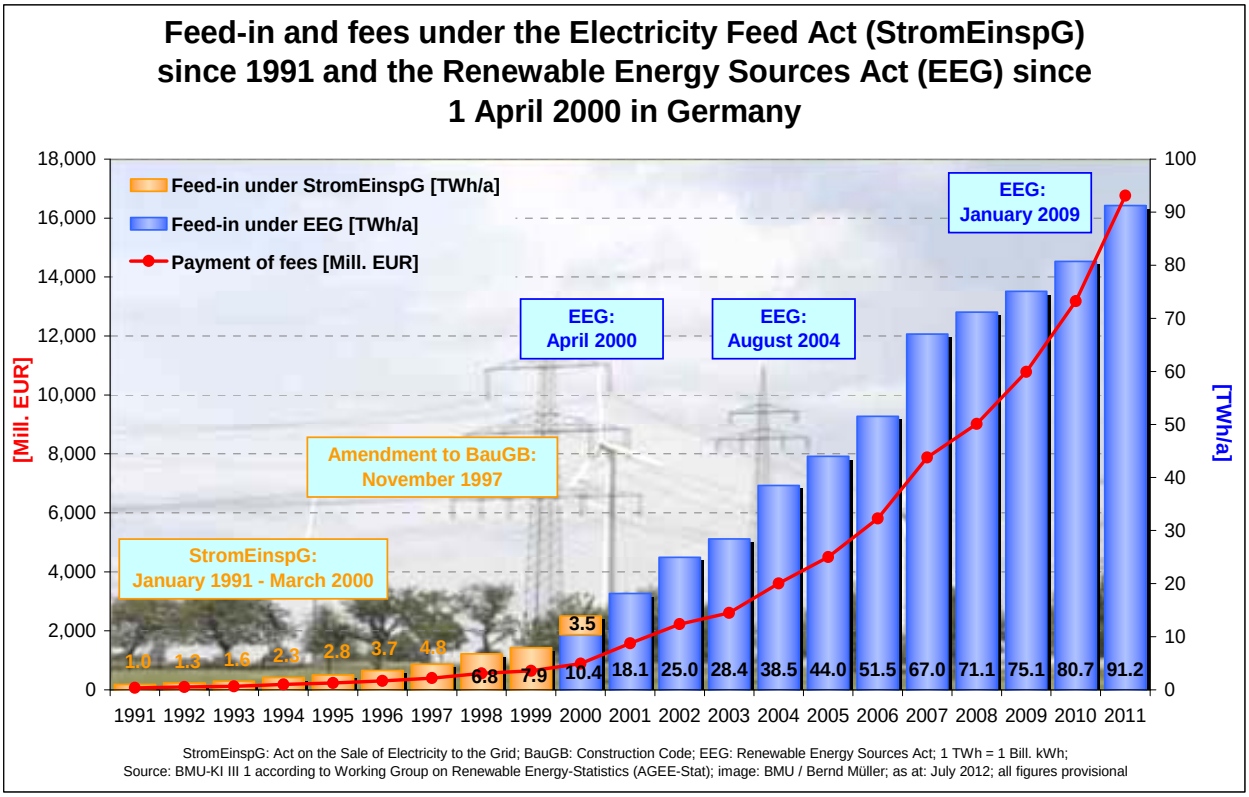
# Electricity

The feed-in tariff system was originally established in December 1990 under the law on the obligation to compensate for the input of renewable energy sources (StrEG). This law was replaced by the EEG in 2000. EEG provides producers a guaranteed rate for electricity production to the renewables producers. **Figure 16** shows the amount of fees paid under the EEG and the amount of promoted electricity.

The grid operators are obliged to give grid access to renewable energy plants and purchase the electricity at premium prices. The EEG covers the whole range of renewable energies and sets bonuses of different value according to market maturity and other aspects of the incurred technologies. The EEG prescribes fixed tariffs generated from hydro, landfill gas, sewage treatment and mine gas, biomass, geothermal, wind, and solar sources. The minimum payments, (differentiated by energy source), vary depending on the size of the installation. For an individual plant, the remuneration level stays fixed over 20 years. The remuneration for an individual plant is not adjusted for the inflation rate this means a decrease of remuneration in real terms.

The differentiation of tariffs is based on equalisation of cost across all technologies. According to the defined rates renewable electricity producers should make the same profit regardless of the cost of each technology. The tariffs decline annually according to a fixed degression rate to take into account technical development in each technology.

**Figure 16: Feed-in and fees under the StrEG/EEG**




**(BMU 2012a)**

From 2002 on, the remuneration paid for newly commissioned plants has been reduced annually to provide stronger incentives for cost reductions. This factor was e.g. 5% for photovoltaic installations and 1.5% for wind power plants. The Act also stipulates obligations concerning costs of grid connection and reinforcement. Plant operators have to pay for the grid connection, but the grid operator has to bear the cost of grid reinforcement if necessary.

Every two years, the parliament re-evaluates the Act on the basis of a report that is prepared by the Ministries of Economics and Technology, in close consultation with the Ministry of Environment and the Ministry of Agriculture.

The Act was amended for the first time in 2004, while maintaining the prior act's general principals. It aimed to further develop renewable technologies for the generation of electricity, thus contributing to a reduction in costs. Therefore it defined a target to increase the share of renewable energies in the total electricity supply to at least 12.5% by the year 2010 and to at least 20% by the year 2020 in line with the EU directive 2001/77/EC.

For 2005, fees under the new EEG ranged from 5.39 euro cents/kWh for electricity from wind energy (basic payment) and 6.65 euro cents / kWh for electricity from hydropower, to 59.53 euro cents / kWh for solar electricity from small façade systems. Comparing to the EEG from 2000 the amendment provided a more differentiated tariff structure, taking into account the efficiency aspects. To improve transparency, the first amendment of EEG required grid operators to publish energy volumes and payment figures.

The next amendment of the German Renewable Energy Sources Act took place in 2009. This amendment provided a higher feed-in tariff for wind energy, and other measures to stimulate the development of both onshore and offshore wind power. The amendment reflected the increasing costs faced by wind turbine manufacturers, largely due to increases in the costs of raw materials such as steel and copper (IEA Country Homepage). The changes of the feed-in tariffs are described more detailed in Annex.

The next amendment of the feed-in tariffs took place on the 1 July 2010. It significantly reduced the feed-in tariffs for solar power generated by installations on buildings and in open spaces. According to BMU (BMU, 2010), these corrections were necessary as market prices dropped by around 30 % last year. The feed-in tariff for new PV-installations attached to or on top of buildings was reduced by 13%. The feed-in tariff for other new (freestanding) facilities was decreased by 12%.

The last revision of EEG took place on 1$^{st}$ January 2012. Besides the feed-in tariffs, market premiums were introduced (res-legal 2012). In general, market premiums are available for all renewable energy generation technologies. As explained in **Figure 17**, power plant operators can receive a market premium for electricity they sell directly on the electricity market for third-party consumers. The amount of the market premium is calculated each month according to the following elements:

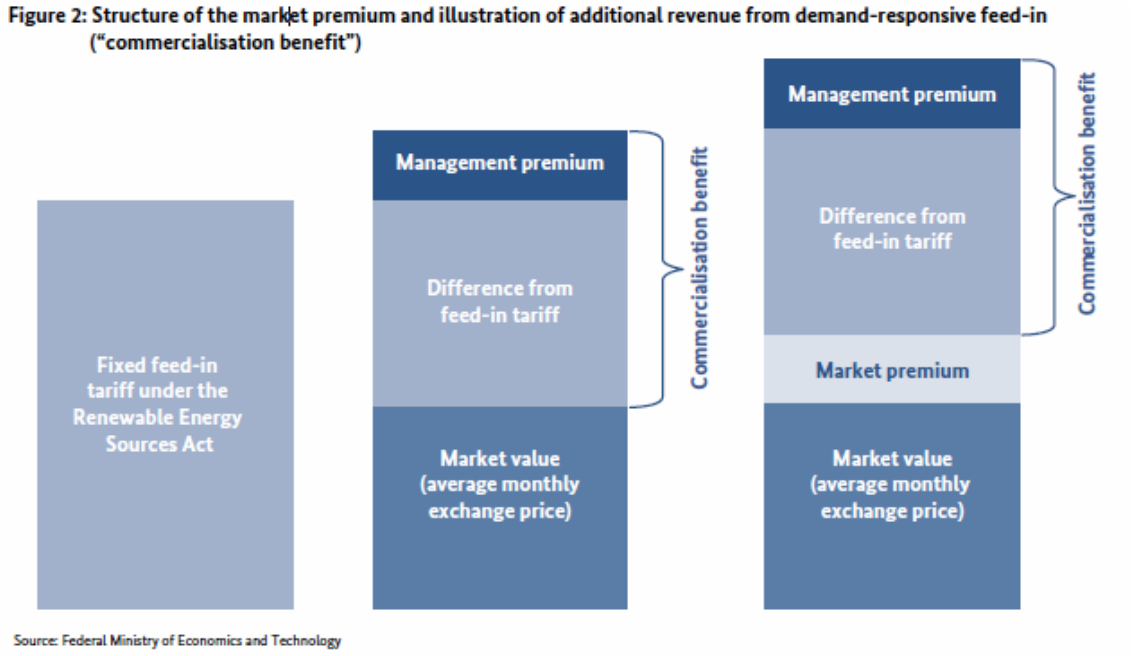
- Difference between the feed-in tariff for the specific technology and the average stock market price
- Management premium, which covers the costs for variations of the actual grid exports compared to the forecast and for stock market participation.

Furthermore flexibility premium is available for electricity generation from biogas (res-legal 2012).

This incentive comprises financial compensation for the difference between the market price of electricity and the fixed feed-in tariff as well as a management premium. The market premium gives plant operators the opportunity to sell their electricity in a more

profitable way. Furthermore controllable renewable energy plants receive incentive for a demand-responsible supply of the electricity grid (BMWi 2012).

**Figure 17: Structure of market premiums**




**(BMWi 2012)**

# Heat

Firstly, renewable in the heat supply sector was only promoted by some federal states. The Market Incentive Programme (Marktanreizprogramm, MAP) promotes the use of biomass, solar energy and geothermal energy in heat generation through financial assistance. Since 2004 the programme was opened for wider groups of applicants. In 2007 the funding available under this scheme has been doubled. Under the MAP, the KfW Renewable Energies Programme has agreed to provide over 3,300 loans totalling more than 911 million Euros for large installations for the combustion of solid biomass, installations for the utilisation of deep geothermal energy as well as biogas plants between 2000 and 2007.

From 2008 the programme had a new focus. Additional incentives for exceptionally efficient or innovative applications received bonus grants. In the residential buildings sector, solar panel installations for hot water, combined hot water supply and heating support as well as biomass heaters have been received subsidies. Grants have also been introduced for innovative heat pumps. Solar panel installations for the production of process heat or cooling, and secondary measures to reduce emissions and boost efficiency in biomass plants were also all eligible for attractive supports in 2007-2008 (BMU 2007).

The Act on the Promotion of Renewable Energies in the Heat Sector (EE-WärmeG) entered into force at the beginning of 2009. This obligates owners of newly constructed buildings to meet a proportion of their energy requirements for heating and cooling as well as hot water supply from renewable energies. The EEWärmeG provides funding up to 500 million Euros/year under the MAP for the utilisation of renewable energies for heat generation between 2009 and 2012. BMU hoped, that this measure would help to

significantly accelerate the expansion of renewable energies in the heating market. The support of MAP was divided into two parts:

- Investment cost subsidies via the Federal Office of Economics and Export Control (BAFA) for smaller facilities, mainly for private investors
- Interest-reduced loans with repayment subsidies under the KfW "Renewable Energies – Premium" programme for larger facilities generally for commercial investors (BMU 2012a)

The changes of the RE support incentives in the heat sector are described more detailed in Annex.

## Transport

Until 2000 fossil resources were used almost exclusively in the transport sector. From 2004 onwards, all biofuels for transport and heating became eligible for tax concessions. In October 2006 the Biofuels Quotas Act (Biostoffquotengesetz). Since 2007 the tax concessions have been confined to pure biofuels beyond the quota, while admixtures of fossil fuels were supported via the biofuels quota. Under the Biomass Sustainability Ordinance (BioNachV) funding is linked to biomass production, which is proven to meet certain sustainability requirements. Biofuels only count towards the quota and receive tax concessions if their GHG reduction potential is at least 35% (IEA 2007, BMU 2012b).

The German 2020-target is to reach 10% of renewables in the transport sector. This quota does not have to be entirely covered by biofuels. The growing electric mobility sector also supports the share of renewables in the transport sector.

## Evaluation of effectiveness in terms of meeting the renewable energy targets

The support of electricity generation from RE sources in Germany has been very effective. The development of RE-electricity is well on track, and the German 2020-targets are realistic to meet. However, the increasing share of RE is involved with new challenges. On the one hand the RE-development should supported by cost-effective and sufficient policies and measures. On the other hand the further development of RE-electricity depends on the success of more market-based support schemes, particularly in the context of a liberalised electricity market. Furthermore there is a broad consensus that further development of the electricity grid plays a prominent role in the future RE-electricity development. The expansion of the electricity grid and the storage systems are the greatest challenges of Germany. In order to reach the long-term targets it is urgently necessary to expand the existing power infrastructure (WI 2012, BMWi 2012, BMU 2011b, BMU 2012c, dena 2005, dena 2010, dena 2011).

Similarly, the percentage of RE in the heat sector is increasing steadily. However, it is currently developing slower than expected. Complications in the MAP and missing state-level programmes hamper the development. Despite these, the German RE-heat sector may reach its 2020-targets (WI 2012) (see

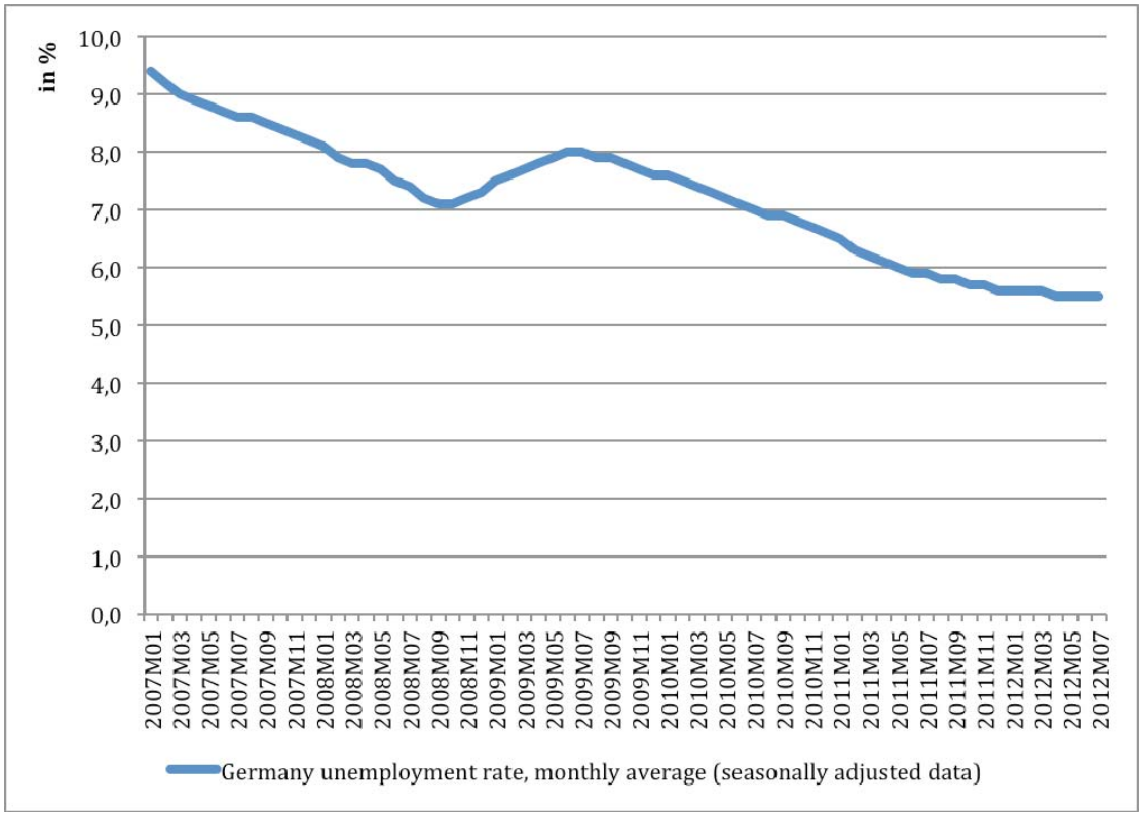
**Figure 5**). Renewables now make up 12.5% of total final energy consumption (BMU 2012a).

# 5. The economic crisis effects in financing RE

In 2009, for the first time in six years, the German economy shrank considerably (price-adjusted GDP -5%). Especially export-oriented sectors were hard-hit. In particular, orders from the Eurozone collapsed. Therefore investments in Germany also dropped sharply during the crisis: overall, price-adjusted gross investments were down 12.5% compared to the previous year (BMU 2010b). **Figure 1** shows the change of primary energy consumption in Germany. The energy consumption dropped significantly in 2009.

**Figure 18** shows the development of the German unemployment rate since 2007 (seasonally adjusted data). Until September 2008 the unemployment rate decreased to 7,1%. Since autumn of 2008 the global economic crisis had clearly affected the German labour market. The unemployment rate increased until June/July 2009, and reached its peak by 8%. Since then the rate is continuously decreasing again. The value of September 2008 was reached again in June 2010. Currently the German unemployment rate amounts to 5,5% (Eurostat).

**Figure 18: Development of the German unemployment rate 2007 - 2012**

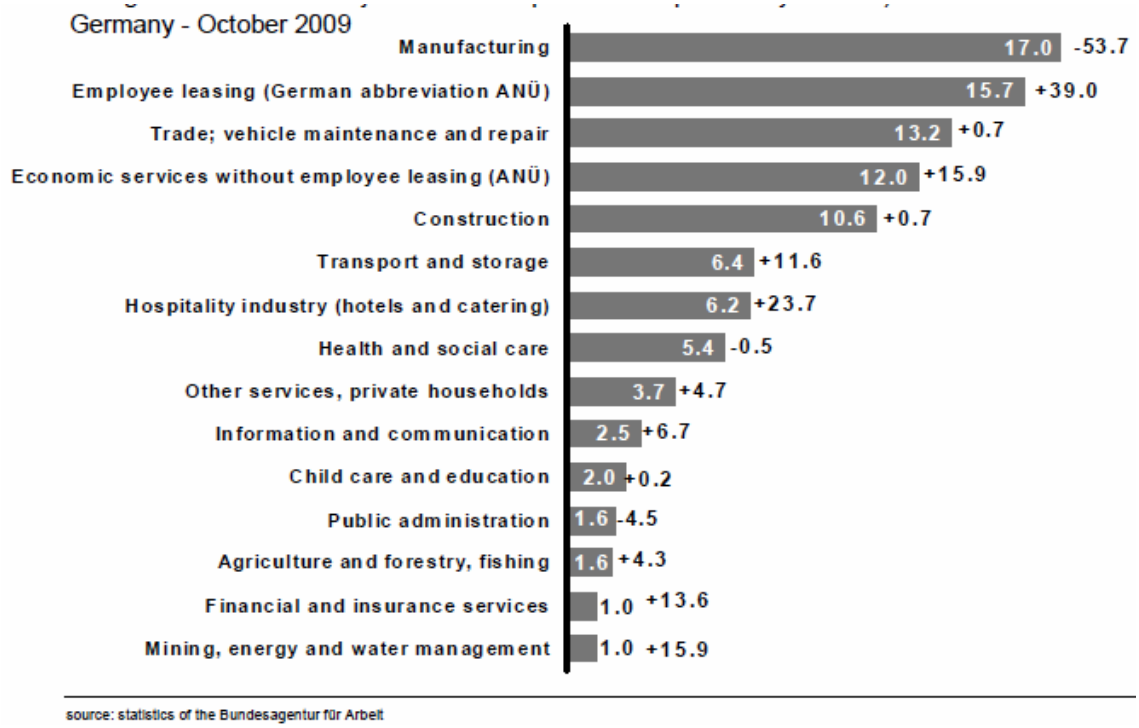



**(Eurostat)**

Therefore the economic crisis mainly affected Germany between September 2008 and June 2009. In this time the crisis had different degree of impact on various sectors of industry. There was a big decline in employment in the manufacturing industries, employee leasing (short term employment). **Figure 19** shows the number of new job losses per branch as a proportional of all branches in %. There was a big decline in the manufacturing industries, employee leasing, transport and logistics, and the fields of

information and communications. Contrary, the areas of education, health and social care had increasing employment numbers, as a result of structural changes and political decisions. The Hotel and catering sector remained also stable during the crisis (BA 2009).

**Figure 19: Impact of the crisis by branch of industry**



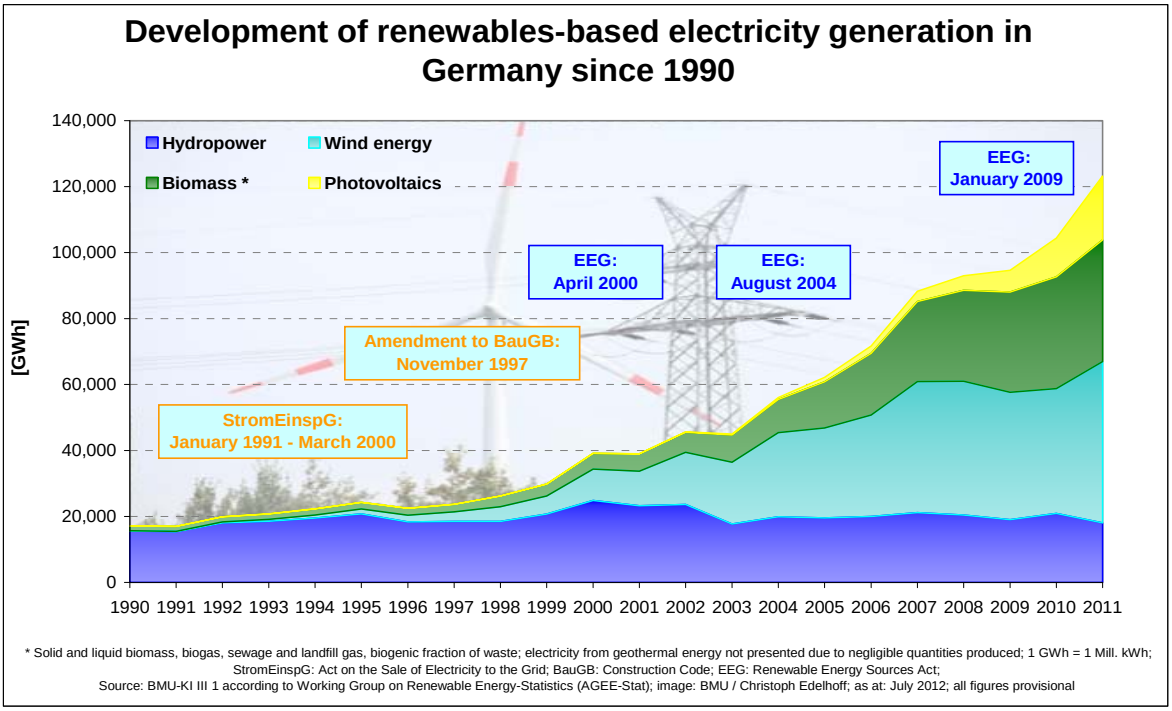

**(BA 2009)**

In order to milden the impacts of the global economic crisis on the labour market in Germany, short-time working allowances were introduced. This measure had led to job saving and reduced the number of unemployment during the crisis. Most short-time working occurred in the manufacturing industry. In June 2009 around 117,000 employees were engaged in short-time working. The relative impact of short-time working in the metal industry as a proportion of all employment subject to social contributions in this sector was 35.3%. In the car industry 174,500 employees (21.5%) were affected by short-time working, similarly to the engineering (24.7%) and the electrical industry (21.9%).

The renewables sector was able to avoid the economic crisis to a large extent. It even increased its share in energy supply in Germany. As a result of rising investments it was able to record a further growth in employment figures. (BMU 2010a)

While electricity generation from conventional energy forms decreased in 2009, renewables remained stable - their share in electricity consumption rose further to 16.1%. In comparison with the previous year there was also a significant increase in biogas, photovoltaic and wind-power installations (**Figure 20**). Investments in the renewables sector reached a record total of 17.7 billion Euros. The number of employees rose once again. Over 300,000 people, around 8 % more than in the previous year, found a relatively secure job in the renewables sector (ibid). The sharpest rises in investments were seen in electricity generation from biomass (doubled), PV (+22%), and wind energy (+15%) (BMU 2010b).

**Figure 20: Development of RE-based electricity generation in Germany since 1990**




**(BMU 2012a)**

The amendment 2009 of EEG decreased considerably the feed-in tariffs for solar PV for all capacity sizes. According to the environmental ministry, these corrections were necessary, because market prices for solar PV constructions dropped significantly (see page 14). Already before the crisis in 2007 one of the main recommendations of IEA (2007) was to review the high feed-in tariff system and to move towards a more market-based way of promoting renewables. Especially the very high amount of feed-in tariffs to promote solar PV was criticised in the German country study. The EEG amendment of 2009 was only following the international market situation similarly to the earlier IEA recommendations. These changes had no direct connections to the financial crisis.

# 6. Social debate about renewable energies

## 6.1. Methodology

This chapter extends the previous desk research with an in-depth field analysis on the public debate about the role of renewable energies in Germany in the future. For this reason phone interviews were carried out with representatives of a trade union and an empoyers' organisation in September 2012. The following table introduces the interview partners (**Figure 21**).

**Figure 21: Interview partners**

| | Organisation | Name | Position |
|---|---|---|---|
| **Trade Union** | IG Metall | Mr. Emanuel Glass | Trade union official Region Hamburg |
| **Employers' organisation** | German Wind Energy Association (GWEA) | Mr. Tom Lange | Policy Adviser |

In Germany there is no general trade union organised specially for the renewable energy sector. The workers in the energy sector are represented by various trade unions such as the Industrial Union of Metalworkers (IG Metall), or German Trade Union of Mining, Chemicals, Energy (IG Bergbau, Chemie, Energie IG BCE) depending on their field of work. Currently IG Metall is conducting a campagne in order to achieve collective bargains for workers at wind manufacturing companies. Therefore the phone interview was held with Mr. Emanuel Glass who is involved in this action as one of the representatives of the trade union in the region Hamburg.

The German Wind Energy Association representing the wind energy sector in Germany. The phone interview was held with Mr. Tom Lange who is acting as Policy Adviser at the association.

During the period of the research the German Ministry of the Environment had an ongoing review process on the German renewable energy support scheme, therefore the governmental institutions were not able to give public opinion about the German renewable energy law. Therefore a written speach of the parliamentary State Secretary Katherina Reiche on 23th February 2012 (BMU 2012c) was analysed as the opinion of the ministry.

## 6.2 Renewable energy (RE) situation

All of the interview partner agreed (IG Metall 2012, GWEA 2012) that energy production from renewable energy sources is essential for the future energy supply system. Currently renewable energy sources cover 25% of the German electricity mix, and the share of RE will continue to increase in the future.

One of the main driving forces for renewable energy sources is the strong general opposition to the use of nuclear energy. The German energy strategy schedules the phased out nuclear energy in the German electricity production system by 2022. Regarding to the CO2 emission reduction targets the future German energy supply will predominantly based on renewables (ibid).

According to the speech of Ms Reiche (BMU 2012c) "with our energy policy in Germany we are striving to give solutions to key global challenges. We live in a world with a growing population, and as a result with rising energy demand and increasingly

scarce resources. And we are confronted with the impacts of global climate change. This development establishes both the framework and the necessity for sustainable and resource-efficient growth, which in turn shapes Germany's energy policy. This is why we are pursuing the goal of a virtually CO2-neutral energy supply by 2050. We translated this aim into concrete action with our Energy Concept in autumn 2010 and our measures to accelerate the transformation of our energy system last summer. Germany has decided to restructure its energy supply: we will phase out nuclear power by 2022, further accelerate the expansion of renewables and continue improving energy efficiency. We have set out a clear roadmap for renewables up to 2050. We want to increase the current 20% share of renewables in gross electricity consumption to at least 35% by 2020, 50% by 2030 and to 80% by 2050. ”

The other main driving force for the increased use of renewable energies is the growing importance of the renewable energy sector (IG Metall 2012 and GWEA 2012).

The interview partners agreed (IG Metall 2012 and GWEA 2012) that development of the renewable energy sector remained stable during the crisis in Germany. “In the economic crisis year 2009, renewable energy sources proved themselves to be a stable factor. Despite exceptionally unfavourable wind conditions, in 2009 renewable energy sources supplied slightly more energy than the previous year, with around 238 billion kWh in total (previous year: 236 billion kWh). This is particularly noteworthy given that energy supply from all other sources was down on 2008 levels for economic reasons” (BMU 2010b).

Both phone interview partners admitted (IG Metall 2012 and GWEA 2012) that RE-sector has high growth rates, increasing number of jobs. It is expected, that this development will continue in the future. The crisis had only little effect on this development.

Both IG Metall (2012) and GWEA (2012) mentioned the consequences and implications of the nuclear accident in Fukushima as an essencial influencing factor that strengthened the status of renewables in Germany. The decision about the nuclear phase-out was the major driving force, which secured the demand for RE technologies even during the crisis. Therefore the financial crisis did not have a big impact on the RE sector here. In the future all interview partners (ibid) expected, that the RE sector will continue to growth.

Similarly the interview partners (ibid) generally agreed on role of the German renewable energy targets. These are regarded as quite ambitious but realistic targets. The slightly difference between the opinions was that the representative of GWEA was a bit more optimistic about the German long term targets than the representative of the trade union. Mr Glass was more concenrned about future political uncertainties that could jeopardise the achievement of these targets.

The German renewable energy targets are only a part of a comprehensive restructuring plan of the entire German energy system. The overall long-term goal is to reach a virtually CO2-neutral energy supply by 2050. The Energy Concept from 2010 and the decision of the Energiewende include milestones and measures to reach this target. The decision on restructuring of the German energy supply system is supported by every interview partner (IG Metall 2012; GWEA 2012). However, it is clear for everybody that this transforming process is a long-term ambitious project for the next decades. It presents many technological and organisational challenges and calls for fundamental changes to the existing energy infrastructure (IG Metall 2012).

The aims of the German Energiewende are to reach a secure and sustainable energy supply for the future, to remain - in the same time - one of the most competitive economies in the world, and to create new opportunities for the German research & development and industrial production (BMU 2012c).

## 6.3 Support schemes and funding

### 6.3.1 General opinion about the renewable support schemes in Germany

The German renewable energy law (EEG) is regarded by every interivew partner (IG Metall 2012, GWEA 2012) as a useful support scheme. The EEG protects the investments of new renewable energy projects and equipment in order to support the entrance to the electricity market.

„The Renewable Energy Sources Act, the EEG, is largely responsible for the successful expansion of renewables in the electricity sector. This Act creates a reliable and predicable political framework. The basic principles of the EEG include:

- fixed, long-term expansion targets,
- stable and technology-specific feed-in tariffs with fixed degression rates,
- guaranteed grid connection and priority feed-in for renewables, and
- a continuous monitoring and evaluation process under the Act.

We remained true to these basic principles in the revised EEG that entered into force on 1 January this year (2012). Our aim is to ensure that the expansion of renewables continues. And secondly, through degression and continuous monitoring, we aim to create incentives for technological advances and to keep costs for consumers at an acceptable level (BMU 2012c).“

GWEA (2012) mentioned that currently there are four big players on the German electricity market, and they have a kind of monopoly situation. Therefore new players need an incentive system, which is secured through the EEG. Through the EEG renewables have a priority connection to the grid and receive a feed-in tariffs for 20 years. The costs of the system are covered by the final consumers via their electricity bills.

The interview partners agreed on that a major challenge for the RE development is development of the electricity grid. GWEA (2012) mentioned already situations that the transmission grid was not capable to feed in 100% of the electricity produced from RE power plants. Therefore the capacity of the electricity grid is a barrier for further development.

The interviewed persons gave only small supplementary recommendations to the existing renewable energy support scheme (depending on their position):

- the extension of the feed-in tariff support from 20 years to 25 years (GWEA 2012)
- the introduction of accelerated authorisation procedures for new investments (IG Metall 2012).

According to BMU (2012c) “the increasingly significant role of renewables, with larger shares of fluctuating energy feed-in, means we need measures to ensure their successful system and market integration. Renewable energies are no longer in their infancy. They have matured and the sector must now take on responsibility.”

### 6.3.2 Support schemes and the economic crisis

There was a general consent (IG Metall 2012; GWEA 2012) that the German support schemes were not directly affected by the current economic crisis. The feed-in tariff for PV technology was decreased by the federal government, but this was independent

from the crisis. The main driving force for that were the technology development and the political situation (IG Metall 2012).

### 6.3.3 Opinion on the future of the support schemes

Currently the EEG is under revision. Especially the feed-in tariffs for PV were reduced in the last years (GWEA 2012). IG Metall (2012) mentioned that in the future a new kind of conflict around redistribution might emerge. GWEA (2012) hold that the main decision point will be the amount of money that the society is prepared to pay for the support of RE. Therefore the public funding might be affected by the economic crisis in the future. The situation can be worsened or the financial scheme could gain more specific characteristics (GWEA 2012).

The opinions of the interview partners were quite similar in regard of the future of renewable energies (IG Metall 2012; GWEA 2012). The feed-in tariffs will continue to drop in the future, which is the good way of development. The RE technology will become mainstream, and the costs will decrease. In few years the costs of RE technology might be similar to the costs of conventional energy technologies. Furthermore the increasing oil prices will further support the competitiveness of RE technologies. Simultaneously RE will achieve a more integrated market situation. RE power plants should define their market position. Parallel to this the state activities will be reduced in this field.

The main recommendation of the interviews was the support of grid extension (especially GWEA 2012). In order to push this the network operators should receive special support and necessary stimuli.

According to Ms. Reiche (BMU 2012c) "… a strong and modern grid is a further precondition for an energy supply primarily based on renewables. This is why grid expansion and expansion of renewables have to go hand in hand. At the moment our grid is not adequately equipped to deal with large volumes of renewable electricity. This is why, in parallel to amending the EEG, we have adopted other measures to accelerate grid expansion. This is one of the key challenges facing Germany, and Europe as a whole. "

## 6.4 Employment

All interview partner agreed (IG Metall 2012; GWEA 2012) that the employment in the RE sector continues to increase. RE might become the most important employer in the German industry. The economic crisis had only little effect in the RE-sector. The reason was, that the demand remained stable for those technologies.

Currently almost 400.000 people are employed directly in the RE sector. These job positions will be needed in the future as well, and the number should further increase, because Germany should remain a technology exporting country (ibid). IG Metall mentioned (2012) that in the future the German RE sector might catch up the automobile industry and become one of the most important manufacturing sectors of the German economy. In the future, the service sector of RE might develop similarly to the manufacturing.

According to GWEA (2012) Germany as a centre for technological innovation should further develop and provide new jobs in this field. RE-technologies will become a further mainstay of the German economy. This sector is not that vulnerable to the crisis than others. There are some challenges for the German RE-industry such as the

competition with Chinese companies and the dumping prices (like recently in the PV sector) (GWEA 2012).

Mr. Glass explained more detailed their work at IG Metall in the wind energy sector (IG Metall 2012). Currently the trade unions are putting lots of effort into the RE-sector. This is not belonging to the classical industries, where the members of trade unions traditionally come from. This is a new sector with relatively young firms and short development history. Therefore the affiliation of the workers is not that strong compared to the traditional sectors. However, the number of members is increasing. Meanwhile the negotiations for the first collective labour agreement are under progress

The RE-sector is a new sector with young firms without a long tradition. Therefore there are sometime problems with rules and regulations about safety at work. The average of salary is also lower than in the traditional machinery sectors. The fluctuation of workers is however higher. These factors show, that the situation is not optimal (IG Metall 2012).

In the RE-sector are different qualifications needed. There are plenty of developers with university degree. Furthermore there is a need for skilled labour for the production. This shows the situation at the job market. These firms are quite young, therefore they have only a limited number of training positions. Therefore they cannot cover their need for skilled workers through their trainees, and need to recruit skilled workers from the job market. This is quite difficult, because of the relatively low unemployment rate (IG Metall).

According to IG Metall (2012) currently there are no negotiated collective labour agreements in the RE sector. The only exception is Siemens, because this is a traditional company. At the production sites of RE-technologies there are currently freely negotiated salaries. Trade unions want to change this and IG Metall is fighting for collective agreements. Right now the first consultations for collective labour agreements are on the way.

### 6.5 Conclusion of the social debate

The interview partners had very similar opinions about RE. Renewable energies are regarded as fundamental for the future development in Germany. The decision about the Energiewende is supported broadly. Therefore the main driving force for the increased use of renewable energy sources was the decision about the phasing-out of nuclear energy in Germany. Therefore the economic crisis had almost no effect on the development in this sector.

Furthermore there was a general consensus, that the German RE-sector has high growth rates and increasing number of jobs. Generally expected that this development will continue in the future.

The EEG is regarded as a very successful instrument to support RE in Germany. Especially the protection of investments of new renewable energy projects were mentioned which is necessary for the entrance to the electricity market. The interviewed persons gave only minor recommendations to the existing scheme. The German renewable energy targets are seen as quite ambitious but realistic targets. The future development of the renewable electricity infrastrucutre is regarded as the most crucial challenge by every interview partner.

The main future challenge of trade unions is to represent workers in the renewable energy sector as well. This is a newly emerging sector with a new generation of firms, therefore trade unions are currently focusing on the quality of these jobs.

# 7. Conclusions and key messages.

Germany has a special situation among the European countries. On the one hand Germany set ambitious targets for the expansion of renewables, increased energy efficiency and greenhouse gas (GHG) reduction. There is strong social agreement on the importance of renewable energy sources and the anti-nuclear movement has a long tradition in the country.

The long-term restructuration strategy of the energy system aiming to cut greenhouse gas emissions by 80 to 95 % by 2050 compared to the level of 1990. Therefore the German government set ambitious targets for the expansion of renewable energies with a corresponding infrastructure, significantly improved energy efficiency and reduction of greenhouse gas emissions.

Following the Fukushima nuclear power plant disaster, Germany re-evaluated the residual risks of nuclear power and decided to phase-out the use of nuclear power more quickly. The last nuclear power plant is to be disconnected from the grid by the end of 2022. The decision about nuclear phase-out secured the situation of the German renewables sector. Under the new direction of the energy policy renewable energies and energy efficiency are at the heart of energy supply. There is a broad public consensus on the importance of renewable energy sources for the future energy supply in Germany.

Therefore the German renewables sector was able to avoid the economic crisis to a large extent. Renewable energy technologies continued to growth even during the economic crisis. Both domestic demand and foreign markets contributed to this stable development in the German industry.

In Germany a substantial renewable energy industry emerged in the past years. Currently more than 380,000 employees are working in the renewables sector. Furthermore the sector is expected to continue its positive development.

Renewable energy sources are promoted with various incentives and measures in Germany. The German renewable electricity support scheme (EEG) was successful to increase gradually the amount of renewable sources in the electricity production. The EEG remained largely unaffected during the financial crisis. In 2010 the feed-in tariffs were gradually decreased for PV installations. However, the main reason for that were the dropping costs of the technology.

The support schemes in the heat sector are less effective than the electricity sector. Nevertheless, the 2020-targets of the renewable heat sector are still feasible.

There is a public agreement that the challenge of the renewable electricity sector is linked to the development of energy infrastructure. The transmission grid over long distances should be extended. Furthermore there is a need for smart grids and meters, variable grid and load management, new storage technologies. It is also important to increase the number of flexible power plants.

Currently the main support scheme of renewable electricity (EEG) is under revision. The costs of the German feed-in tariffs are mainly covered by the EEG surcharge of the electricity bills of household consumers. This surcharge is continuously increasing. In the future a new kind of conflict around redistribution might emerge. The main decision points will be the amount of money that the society is prepared to pay for the support of RE and the alleviation of the energy intensive industry.

# 8. Annex

Feed-in tariffs for onshore wind energy

**Basic fees**

| | **2009 EEG** Decision by the German Bundestag 06.06.2008 | Government's draft amendments to the EEG 05.12.2007 | EEG Progress Report 07.11.2007 | 2004 EEG |
|---|---|---|---|---|
| ***Initial fee (first 5 years from beginning of operation)*** | **9.2** | 7.95 | 7.87 - 7.95[1)] | 7.87 |
| ***Final fee*** | **5.02** | 5.02 | 4.97 - 5.02[1)] | 4.97 |

[1)] Range taken from EEG Progress Report policy recommendations, which set the degression at 1-2 percent from 2009 (see below)

**Payments for system services from onshore wind turbine generators**

| ***System services bonus*** | | | |
|---|---|---|---|
| **2009 EEG** Decision by the German Bundestag 06.06.2008 | Government's draft amendments to the EEG 05.12.2007 | EEG Progress Report 07.11.2007 | 2004 EEG |
| **For facilities commissioned 2002-2008 retrofitted by1.1.2011 – payable for 5 years:** **0.70** | For facilities commissioned 2002-2008 retrofitted by 1.1.2011 – payable for 5 years: 0.70 | For facilities commissioned 2002-2008 retrofitted by 1.1.2011 – payable for 5 years: 0.70 | |
| **Where new technical requirements for facilities commissioned 1.1.2009 to 1.1.2014 have been fulfilled, initial fee rises by** **0.50** | Evaluation if new technical requirements for facilities commissioned 1.1.2009 to 1.1.2014 have to be fulfilled; if so necessitates rise in initial fee by 0.70 | Where new technical requirements for facilities commissioned 1.1.2009 to 1.1.2014 have been fulfilled, initial fee rises by 0.70 | |

**Degression for onshore wind**

| **2009 EEG** Decision by the German Bundestag 06.06.2008 | Government's draft amendments to the EEG 05.12.2007 | EEG Progress Report 07.11.2007 | 2004 EEG |
|---|---|---|---|
| **Basic Fee and Bonus** | Basic Fee and bonus | Basic Fee | Basic Fee |
| **1.0%** | 1.0% | 1.0 – 2.0% | 2.0% |

Feed-in tariffs for offshore wind energy

**Basic fees**

| | **2009 EEG** Decision by the German Bundestag 06.06.2008 | Government's draft amendments to the EEG dated 05.12.2007 | EEG Progress Report of 07.11.2007 | 2004 EEG |
|---|---|---|---|---|
| ***Initial fee*** | **13.00** | 12.00 | 11.00-15.00 | 8.74 |
| | **additional 2 ct/kWh where commissioned by 31.12.2015** | additional 2 ct/kWh where commissioned by 31.12.2013 | | |
| ***Final fee*** | **3.50** | 3.50 | 3.50 | 5.95 |

**Degression for offshore wind**

| **2009 EEG** Decision by the German Bundestag 06.06.2008 | Government's draft amendments to the EEG dated 05.12.2007 | EEG Progress Report of 07.11.2007 | 2004 EEG |
|---|---|---|---|
| **From 2015: 5.0%** | From 2015: 5.0% | 5-7% beginning between 2008 and 2013 | From 2008: 2.0% |

Feed-in tariffs for PV

**Roof-mounted facilities**

| **Share of capacity** | **2009 EEG** Decision by the German Bundestag 06.06.2008 | Government's draft amendments to the EEG 05.12.2007 | EEG Progress Report 07.11.2007 | 2004 EEG |
|---|---|---|---|---|
| ***Up to 30 kW*** | **43.01** | 42.48 | 42.48 | 44.41 |
| ***30 kW – 100 kW*** | **40.91** | 40.36 | 40.37 | 42.26 |
| ***Over 100 kW*** | **39.58** | 39.90 | 39.91 | 41.79 |
| ***Over 1000 kW*** | **33.00** | 34.48 | 34.48 | 41.79 |

**Fee payable when electricity produced is used within building/facility**

| **Share of capacity** | **2009 EEG** Decision by the German Bundestag 06.06.2008 | Government's draft amendments to the EEG 05.12.2007 | EEG Progress Report 07.11.2007 | 2004 EEG |
|---|---|---|---|---|
| ***Up to 30 kW*** | **25.01** | 24.48 | - | - |

## Degression for Solar Radiation

| | **2009 EEG** Decision by the German Bundestag 06.06.2008 [1)] | Government's draft amendments to the EEG 05.12.2007 | EEG Progress Report 07.11.2007 | 2004 EEG |
|---|---|---|---|---|
| **Freestanding Facilities** | **Basic fee and bonuses 2010: 10.0 % ab 2011: 9.0 %** | Basic fee and bonuses From 2009: 7.0% From 2011: 8.0% | Basic Fee From 2009: 7.0% From 2011: 8.0% | Basic Fee 5.0% Freestanding facilities 6.5% |
| **Roof Systems:** | **Basic fee and bonuses**<br><br>**Up to 100kW 2010: 8.0 % from 2011: 9.0 %**<br><br>**Up to 100 kW 2010: 10.0 % from 2011: 9.0 %** | Basic fee and bonuses From 2009: 7.0% From 2011: 8.0% | Basic Fee From 2009: 7.0% From 2011: 8.0% | Basic Fee 5.0% Freestanding facilities 6.5% |

[1)] Degression is to be either

a) increased by 1 percentage point in the following calendar year when the capacity reaches more than:
   1) 1500 MW in 2009,
   2) 1700 MW in 2010 and
   3) 1900 MW in 2011

or

b) decreased by 1 percentage point in the following calendar year when the capacity remains below:
   1) 1000 MW in 2009
   2) 1100 MW in 2010 and
   3) 1200 MW in 2011.

## Freestanding facilities

| | **2009 EEG** Decision by the German Bundestag 06.06.2008 | Government's draft amendments to the EEG 05.12.2007 | EEG Progress Report 07.11.2007 | 2004 EEG |
|---|---|---|---|---|
| **Irrespective of share of capacity** | **31.94** | 32.00 | 32.01 | 33.18 |

## Bonuses

| ***For building integrated facilities (façade facilities)*** | | | |
|---|---|---|---|
| **2009 EEG** Decision by the German Bundestag 06.06.2008 | Government's draft amendments to the EEG 05.12.2007 | EEG Progress Report 07.11.2007 | EEG 2004 |
| **Not applicable** | 5.00 | 5.00 | 5.00 |

Development of the support elements in the governmental support MAP for a single-family terraced building (changes between 2008 and 2012)

| | Brine-water heat pump | | Pellet | |
|---|---|---|---|---|
| | 2008 | 2012 | 2008 | 2012 |
| Basis | 10-20 €/m² (max. 2000 – 3000 €) (existing or new building) | 2800 €+100-120€/ kW (over 10 kW) + 500 € if at least 30l/kW thermal storage | 36 €/kW (min. 2000 €) | 36 €/kW (min. 2400 €) |
| Bonus: combination with solar thermal | 750 € | 500 € | 750 € | 500 € |
| Bonus: efficiency | +50% of the Basis | +50% of the Basis | 54-72 €/kW (mind. 3000-4000 €) | +50% of the Basis |
| Promotion of innovation | | | 500 € (if emission reduction or increasing efficiency of construction) | 750 €/construction in existing buildings 850 €/construction in new buildings |

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