

Renewable Energy Policy in Germany

1. Situation of Renewable Energy

The German government has made climate protection one of its key policy issues. A 25 per cent carbon dioxide reduction target by the year 2005 compared to 1990 levels was announced. Until 2010 the German government wants to double the contribution of Renewable energies to the total energy demand.

In 1998 the use of renewables in Germany reached 284 PJ of primary energy demand, which corresponds to a penetration rate of 2% of the total primary energy demand or 5% of the total electricity demand.

The renewable energy industry is still experiencing a period of growth. For example, the number of wind energy converters rose from 1998 to 1999 by approx. 21% up to 7.879 systems.

1.1 Renewable Energy Technologies

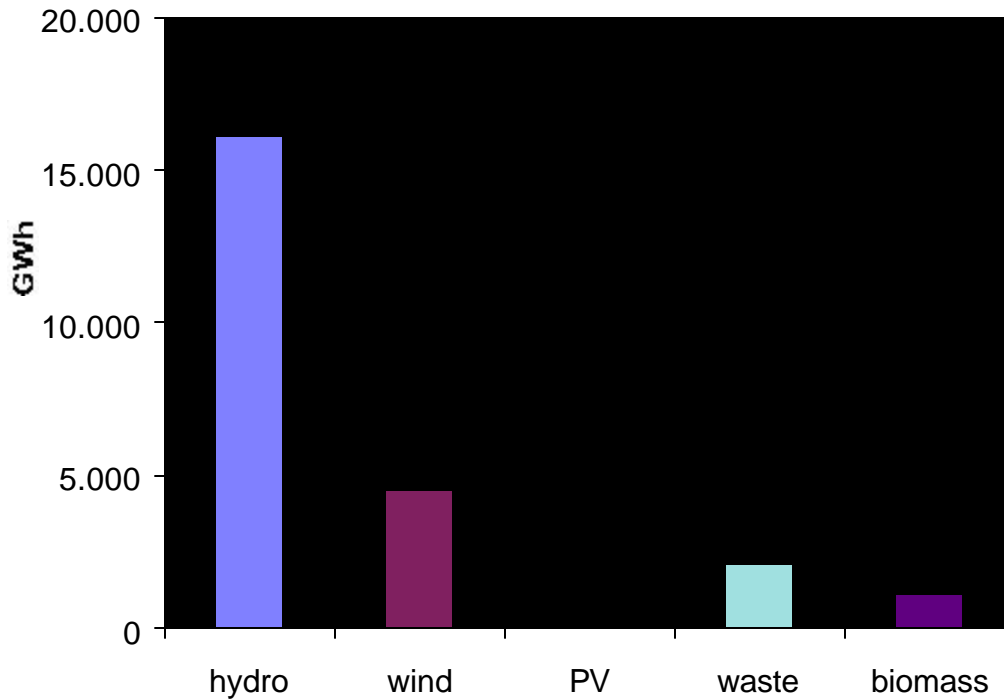
A relatively large number of solar photovoltaic systems are installed in Germany (1997: 6935 systems). It is estimated that the capacity had risen to 33 MWp by the end of 1997. The more significant applications are related to systems connected to the grid in low capacity power plants, in association with houses or buildings.

Solar thermal panels of 655 MW (1,786,000 square meters) were installed by the end of 1996, the highest capacity in the European Union next to Greece. Two thirds of the heat produced by solar thermal systems are for domestic applications.

Wind technology has received a great deal of attention in Germany. By the end of 1999 the number of installed wind turbines was approximately 7879, with a total rated power of 4.445 MW. By the end of 1999 wind power contributed with more than 1 % to the German public electricity consumption.

Germany generates a high bulk of waste. In 1994 approx. 380 kg waste per inhabitant were estimated. In 1997 53 incineration plants with a total capacity of 12 million tons per year were in operation and an additional 13 plants were either in the planning or erection phase. For the future it is expected that waste generated will tend to decrease as a consequence of policies and regulations adopted with regard to recycling.

Electricity from renewable energy sources generated in Germany 1998



The extent of the utilisation of biomass for energy production in Germany can only be estimated. In particular, the registration of small wood firing systems (smaller than 15 kW) is incomplete. Taking energy crops as well as waste biomass from industry and farming into account, around 10% of the technical potential of biomass are being used in Germany today.

2. Policy affecting RES

2.1. Institutional Framework

As the German government and administration are organised in accordance to the federal structure of the country, federal, regional and local authorities are promoting the use of

renewable energy sources in many different programmes. The programmes that show growing importance in the area of demonstration and dissemination are described in the following:

- The **Federal Ministry of Economics and Technology** (BMW_i) will support the application of renewable energy technologies with DM 1 billion in the period 1999-2003. In addition there will be another billion DM for the 100.000 Roofs-PV-Programme between 1999 and 2004.
- The **Federal States** (Länder) have defined their own programmes, mainly to support the application of renewable energy and energy conservation.
- The **Federal German Environmental Foundation** (DBU, established in 1990) supports development and demonstration in the field of renewable energy sources and energy conservation with about DM 15 million annually.
- Favourable credit conditions for renewable energy investments are provided by **government banks**.
- Since 1991 the "**Electricity Feed Law**" regulates the input and favourable payment of electricity from renewable energies by the utilities. In 2000 the law will be replaced by the "**Renewable Energy Law (EEG)**" with even improved conditions.
- A number of **utilities** have launched initiatives to build demonstration and pilot systems or to provide advice and information. In a growing number of cases, financial support for the rational use of energy and for renewable energies is provided. At the end of 1996 more than 60 utilities belonging to cities and communities had already implemented cost-effective payments for every kilowatt hour of energy fed into the public grid from PV and other renewable energy systems.

2.2. Incentives

2.2.1. Electricity Market

The 250 MW Wind Programme of the German Federal Government led the way in funding wind turbine investors per produced kWh or in certain cases by funding the investment.

The Electricity Feed Law from 1990 enabled independent electricity producers to feed electricity into the public grid, whereby the utilities were obliged to reimburse the producers 90 % of the average tariffs per kWh which private users have to pay.

This law will be replaced in 2000 by the “Renewable Energy Law”. The existing system of payments linked to end-user prices will be replaced with tariffs fixed by central government. One novelty is the plan to spread the burden of payments made under the law equally over all grid companies in the whole republic, meaning less of load on utilities in north German coastal areas.

In January 1999 the Federal Ministry of Economics and Technology announced the "100,000 roofs solar power programme" for the period of 1999 to 2004. Interest-reduced (actually interest-free) loans are to be provided for the erection and extension of photovoltaic power systems with a capacity of 1 kW_p or more. The programme has a total volume of 1.000.000.000 DM (500 million EURO).

2.2.2. Heat Market

Solar thermal techniques are mainly subsidised in programmes of the German Länder. In addition, a tax incentive, that was designed to support the building of private homes, offers a special incentive for solar thermal systems too.

The main target of the programme „Solarthermie 2000“ is a significant improvement of the economic viability of solar thermal systems. Costs of less than 0.25 DM per kWh thermal will be the result of this programme. Therefore reduction of specific costs of solar thermal systems as well as an increased energy output from such systems are the main topics of interest within this programme.

2.3. Research and Development

Following the last federal elections, since autumn 1998 responsibility for applied energy research has shifted to the Federal Ministry of Economics and Technology (BMW_i). The basis for R&D on renewable energy is the 4th Programme of Energy Research and Energy Technology adopted in 1996. The main goals of this programme are:

1. Development of any technological option that may contribute to a significant and sustainable reduction of burdens to environment and climate.
2. Support the modernisation of the German economy and enhance the possibilities of German industry on world energy markets.

The programme focuses on efficient energy utilisation as well as on the development of renewable energies. In 1999 almost 219.9 mill. DM were spent within the framework of this programme:

Research Topic	Total in mill. DM
<i>Photovoltaics (projects).....</i>	56.4
<i>Wind Energy (projects).....</i>	4.4
<i>Wind Energy 250 MW Programme</i>	32.1
<i>Systems for Southern Climatic Zones (incl. ELDORADO programme).....</i>	9.0
<i>Geothermal Energy</i>	3.1
<i>Cross-Cutting Activities (incl. Hydropower).....</i>	18.4
<i>Secondary Energy Systems (Electricity Storage and District Heating)</i>	3.7
<i>Electrochemical Processes and Hydrogen</i>	10.8
<i>Energy Saving Industrial Processes</i>	7.3
<i>Efficient Use of Energy and Use of Solar Energy in Households and by Small Consumers</i>	24.3
<i>Solar Energy Programme - Solarthermie 2000.....</i>	3.6
<i>.....</i>	<u>173.1</u>