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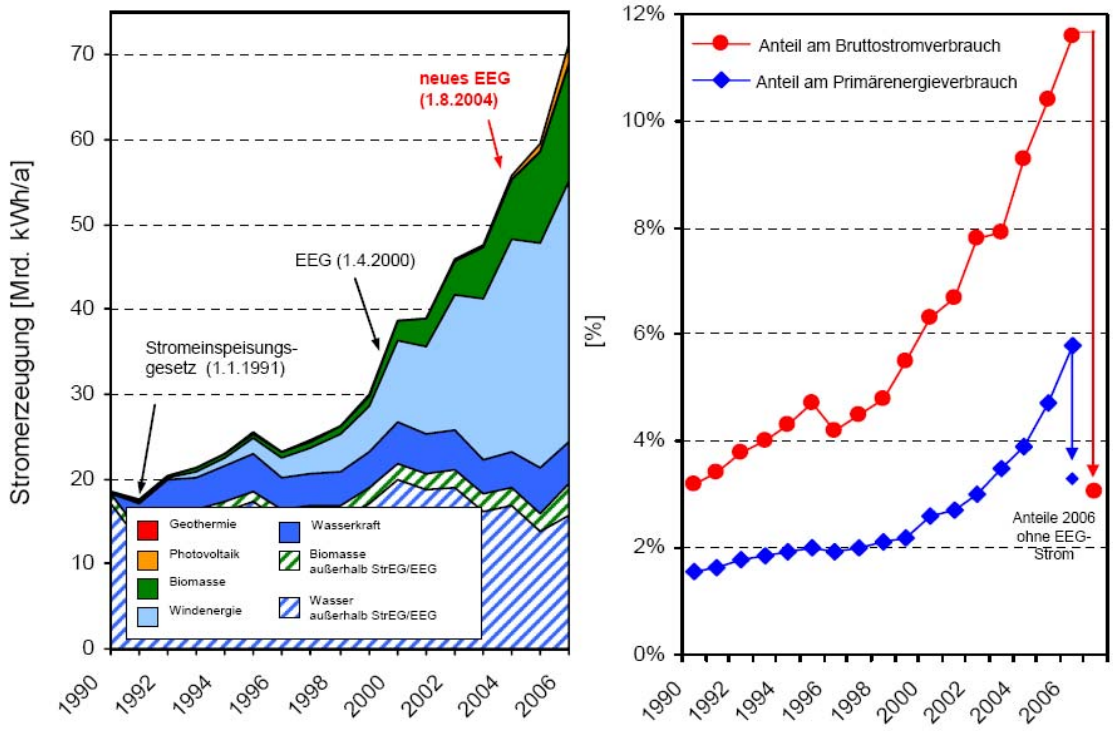
The German feed-in system pushing wind and other renewables to market success

Description of climate policy measure (& package)

The German feed-in system, the German Law on Renewable Energy (Das Erneuerbare-Energien-Gesetz, 2000, hereafter EEG) laid down the framework conditions for rapid growth of renewable energy sources (RES) in Germany during the 21st century. The feed-in system, which guarantees the RES producers a fixed price per kWh fed into the grid, has been at the core of the German renewables success story – over tripling the amount of renewable energy since 2000. The leading renewable energy source in 2006 - wind power provided 30,7 TWh or some 5 % of total electricity production (see picture below, Mrd. kWh = TWh).[1]



Picture. Development of electricity production from RES (left) and share of total electricity consumption and primary energy consumption (right) in 1990-2006 (as well as estimate of status in the absence of EEG).

In practice the EEG legislation (amended in 2004 and regularly reviewed) obligates electric utility companies to purchase renewable energy at set rates over the next 20 years. These in turn are allowed to redistribute the additional cost to the general public in the form of higher electricity rates - hereby there is an equalization of additional costs from RES between all grid operators and electricity suppliers. The feed-in system, building on substantial R&D as well as market simulation programmes during the 1980s and 1990s introduced two innovative aspects to RES policy

[1] Erfahrungsbericht 2007 zum Erneuerbare-Energien-Gesetz (EEG-Erfahrungsbericht), November 2007.

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implementation, in particular i) a degression of tariffs, supporting technology learning, and ii) a stepped nature of tariffs, supporting financial efficiency.

While in Germany the tariff (in 2006 ranging from ca 5 to 57 €cent/kWh) is guaranteed for approved renewable energy projects for a 20-year period from the plant commissioning, from 2002 onwards new installation have received lower tariffs (degression rate ranging from 1-6,5%/year depending on RES technology) in order to retain the incentive for manufacturers to systematically reduce production costs and offer more efficient products each year. The stepped tariffs, by defining the tariffs for different technologies based on yield/generation costs of each plant (e.g. for wind power depending on site-specific wind yield) the price of the tariff mirrors the cost resource curve of the technology, which results in a reduction of the producer profit and therefore in lower transfer costs for society.[2]

Key challenges in implementation and drivers/reasons of success

The international experiences of feed-in tariffs in several countries point to rapid increase of renewable technologies on energy markets unless hampered by major barriers (e.g. administrative, grid access). In Germany, a well suited additional support mix has been crucial for the overall success of the feed-in system. The complementary policy measures have included soft loans and investment incentives by the market incentive programme for biomass CHP, small hydropower, PV in schools, tax incentives (reduction of income tax granted in the federal tax law especially for wind energy investments) as well as soft loans by a federal investment bank. This framework has been administratively well coordinated on federal level by three key ministries, received strong political and financial backing on state level and catalyzed active cooperation in different technology sectors.

Assessment of CO_2-emission reductions and if available any preliminary estimates of emission reduction costs (euro ton/CO_{2ekv})

The EEG has considerably contributed to annual GHG reductions in the order of tens of millions of tons. In 2006 the reduced GHG emissions, due to RES in electricity production was estimated to some 44 million CO2- tons[3]. Looking at the economic costs of this energy sector transformation, the additional costs for consumers has been estimated to a mere € 0.007 per kilowatt-hour (kWh), corresponding to less than 4 % of the average consumer price for German rate payers.[4]

Presentation of existing estimates concerning ancillary effects and benefits

With regards to economic ancillary effects the EEG has been the key contributor to the growth of the renewables sector into a over 20 billion euro business in Germany proper with in addition considerable export – in 2006 the export share of the German wind power industry raising to above

[2] Feed-In Systems in Germany and Spain and a comparison. Dr. Mario Ragwitz (corresponding author), Dr. Claus Huber. Fraunhofer Institut für Systemtechnik und Innovationsforschung, 2005
[3] Through the use of renewables, in total (covering electricity, heat and fuels) some 100 million tons of CO2 emission were avoided. Almost 50% of this emission cut can be attributed to the EEG.
[4] Looking at the electricity price increases 2002-2006 in Germany, the EEG has contributed to some 13% of the total price increase during the same period. Erfahrungsbericht 2007.

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70%. Likewise the EEG has contributed to rapid employment growth in the renewables, approaching a total 250 000 employed. Even taking into account the negative transitional and structural effects in other economic sectors (incl. losses in purchasing power), the total positive employment effects reach some 70 000-80 000, with wind power leading the employment growth numbers. In addition, the EEG has contributed to improved energy security and cost-savings through avoided coal and gas imports.[5]

Preliminary assessment of feasibility and any required modifications for similar policy measures in Finland

As the feed-in system can support a broad portfolio of RES technologies a system specifically tailored for the Finnish conditions could be rapidly introduced – taking into account the maturity and competitiveness of available technologies in Finland as well as the open energy markets. As in Germany the feed-in system could become a key policy measure in the Finnish national climate and energy strategy implementation.

The key criteria for success lie in the high price security and market stability, which creates the long term planning security for investors. The Finnish feed-in system could guarantee a dynamic market based premium and be differentiated in order to promote technology learning and market success in specific areas of global RES market growth, be it wind power in cold & arctic regions or distributed bioenergy based CHP solutions.

In this respect the German system with a stepped nature and degression of tariffs may provide some useful guidance for a Finnish system that should adapt to technological development and foster innovation. The international feed-in experiences from over 40 countries[6], covering close to 20 EU countries provide a solid basis for designing a Finnish system with lean administrative costs and coordinated network management with high stability and solid grid integration. The Finnish supporting policy mix will also need to be adjusted and diversified to allow rapid deployment of available renewable technologies.

[5] Erfahrungsbericht 2007 zum Erneuerbare-Energien-Gesetz (EEG-Erfahrungsbericht), November 2007
[6] Se e.g. International Feed-In Cooperation, http://www.feed-in-cooperation.org/content/view/24/36/

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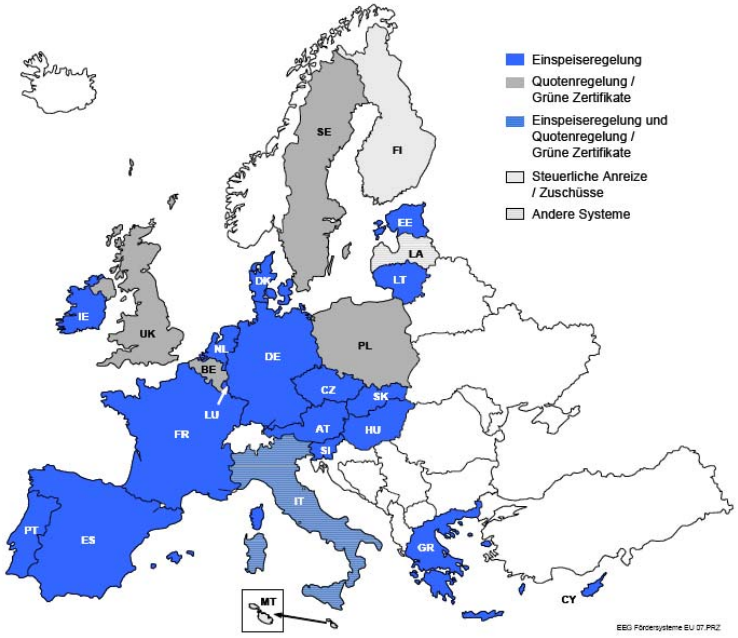

Abb. 4-7: **Förderinstrumente zum Ausbau der Erneuerbaren Energien im europäischen Strommarkt 2006 (ohne Rumänien und Bulgarien, die erst am 1.1.2007 der EU beigetreten sind) [17]**