



P R E S S R E L E A S E

The Future of Wind Energy:

German Energy Agency Study shows Ways of Integrating Wind Energy into the Electricity Grid

Berlin, February 24, 2005. The final version of the study "Energy Planning for the Integration of Wind Energy in Germany on Land and Offshore into the Electricity Grid" was presented by the German Energy Agency (dena) at a press conference today. The necessary concept to integrate power production, especially from wind systems, into the electricity supply system is now available in the completed study with over 500 pages.

"With the 'dena-grid study' we can now present the feasible and sensible onward development of the whole power system" dena managing director Stephan Kohler said. "This enables a thorough and above all long term energy planning borne by all participating players with solutions which have been coordinated with each other. Moreover, electricity supplies, as an important factor for economic development and business investment decisions, will be stabilized in a sustainable fashion with coordinated planning", Kohler summarizes.

"The study develops strategies for the increased use of renewable energies and their effects on the grid until 2015", Stephan Kohler explained. "The study focuses on the integration of the approximately 37,000 MW wind capacity expected in 2015 in the On- and Offshore area into the electricity grid, since on a mid-term basis this has the highest potential of increasing the share of renewable energies in power generation", Kohler continued.

Dena-grid study shows: a 20 percent Share for Renewable Energy in the Electricity Supply System in Germany is feasible

The results of the study show, that the Federal Government's planned goal of a share of at least 20 percent of renewable energy in power generation in Germany between 2015 and 2020 is achievable. However, the precondition for this is the implementation of the measures shown in the study in regard to the onward development of the power supply system. On this basis, the study answers the most important questions:

- Approximately 400 km of the existing 380 kV grid has to be upgraded; approximately 850 km new construction is needed.
- reliable energy supplies on today's standards can be guaranteed if certain technical measures are implemented
- approximately 20 to 40 million tons CO₂ emissions can be avoided in 2015 according to the structure of the power plans in operation then
- the additional costs for the expansion of wind energy will cost private households between 0.39 and 0.49 Cent € per kWh in 2015.

Increased Wind Energy Use Requires Grid Expansion

The necessary expansion of the existing 380 kV grid which rising wind energy capacity brings with it is manageable in its size on the one hand, however on the other hand not very easy to implement insofar as the legal authorization process is concerned. By 2015 the existing length of power lines in the German grid needs to be extended by about 5%. About 400 km of the existing grid needs to be upgraded and about 850 km will be new construction. The costs for this expansion of the grid come to a total of € 1.1 billion. This expansion of the grid initiated by wind energy would then also be available for electricity trading in a liberalized EU internal electricity market.

Security of supply at the current standard would remain ensured with the presumed expansion of wind energy in the time frame of the study up to 2015. For this, however, the implementation of the grid expansion and upgrade measures is necessary. The study, however, demonstrates there are thoroughly critical operating situations when there are certain error situations in the grid. Technical measures in the grid and for wind energy converters, which when implemented keep the security of the system ensured even in critical error situations, are suggested for solving this problem.

Wind Energy Leads to Increased Demands for Balancing and Reserve Capacity

The further expansion of wind energy leads to higher demands for the provision of balancing and reserve capacity. This need will be covered by existing fossil fuel as well as pumped-storage power plants. In the course of the upcoming power plant replacement cycle, power plants retired for reasons of age will in the future to a greater extent than before be replaced by gas turbine power plants. In total, the conventional power plant park of the year 2015 can be reduced, however, by about 2,200 MW through use of wind energy.

Despite the Nuclear Phase-Out CO₂ Emissions Will Be Stabilized or Reduced

The study reaches a positive end result as regards CO₂ emissions: through the expansion of wind energy, in the year 2015 about 20 to 40 million tons of CO₂ can be avoided, depending on the structure of the entire power plant park. This means that, despite the beginning of the phase-out of nuclear energy, which in 2015 will be one-third complete, the CO₂ emissions can be stabilized or reduced, depending on the scenario.

There Will Be Additional Costs for Electricity Customers from the Expansion of Wind Energy as well as Avoidance of CO₂

The costs for the further expansion of wind energy in 2015 depending on the scenario will amount to € cent 0.39 to 0.49 per kWh for non-privileged electricity customers (e.g., private households). For privileged electricity customers (Industry), the costs will rise about € cent 0.15 per kWh. In these costs are included the premium tariff for supplying into the grid, the balancing and reserve costs and the costs for grid expansion, less the avoided costs in the conventional power plant park.

The costs of CO₂ avoidance through wind energy will drop by the year 2015 to a range between €41 to 77 per ton CO₂. Price developments for conventional energy sources (oil, gas, coal) have a special significance in this context, as well as the further increase in efficiency (cost reductions) for wind power plants. All together the additional costs for the expansion of wind energy in the power plant park in the year 2015 amount to between €1.6 and 2.3 billion.

Power Plant Renewal Process and Climate Protection Program Requires Decisions

The background to the commissioning of the study is the upcoming power plant renewal process in Germany as well as the federal government's goal of expanding electricity generation from renewable energy, in particular from wind energy. Through the shut-down of fossil power plant capacity due to age as well as the agreed phase-out of nuclear power plants, a substitute must be created for 40,000 MW of power plant capacity that by 2020 will be removed from the grid.

Independent of the global climate and environmental problems, which are ever more noticeable, the Kyoto Protocol and the Federal Government's climate protection program require decisions in time, in order to increase the proportion of renewable energy in electricity generation by 2020 to the planned 20 percent. Thereby the federal government will implement on a national level the expansion goals set by the EU.

The dena Grid Study Develops a Strategy in Consensus

The dena-Grid-Study was jointly financed by associations and firms in the sectors of wind energy, electrical grid equipment manufacturers, and conventional power plants, as well as by the Federal Ministry of Economics and Labor. In addition, the terms of reference for drawing up the Grid Study, as for example the energy price developments were determined via consensus inside the responsible Project Steering Group (PSG). Those who financed the study have decided at the PSG session on February 23, 2005, to examine in a second part of the study the expansion of renewable energy technologies up to the year 2025 as well as look more deeply into certain issues.

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