



How much wind energy can be introduced into the grid?

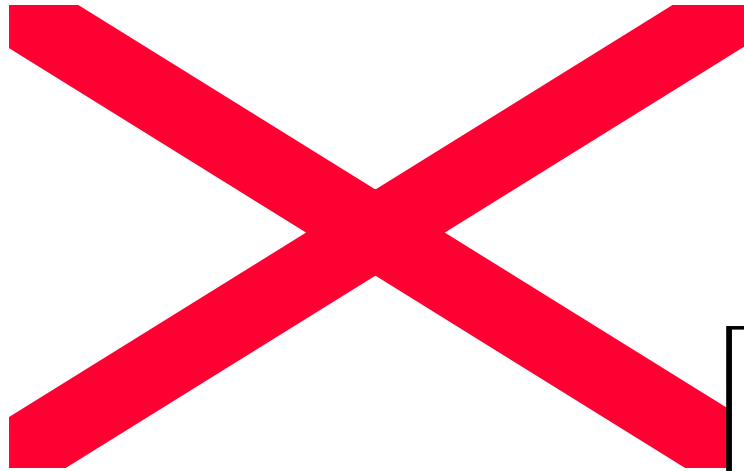
Experience from Germany

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Future Energy- and Mobility Structures

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Installed Wind Energy Capacity in Germany 1992 - 2004

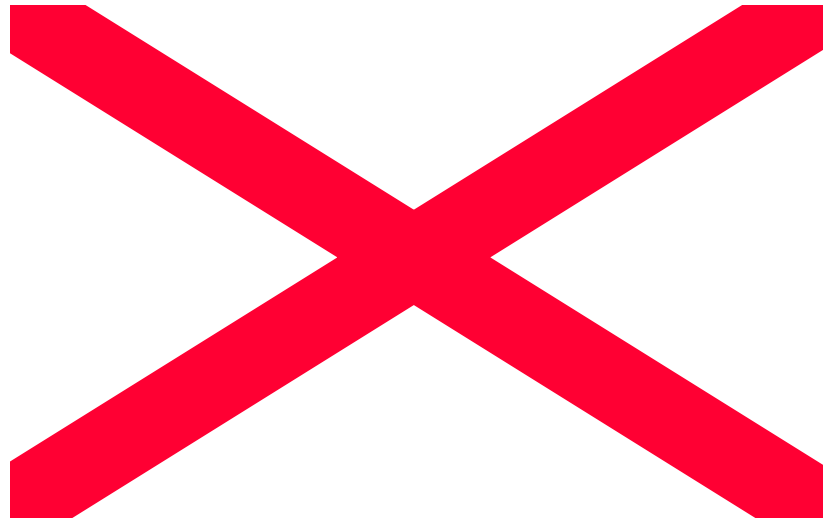


5.4 % total electricity generation

Source: DEWI Magazin

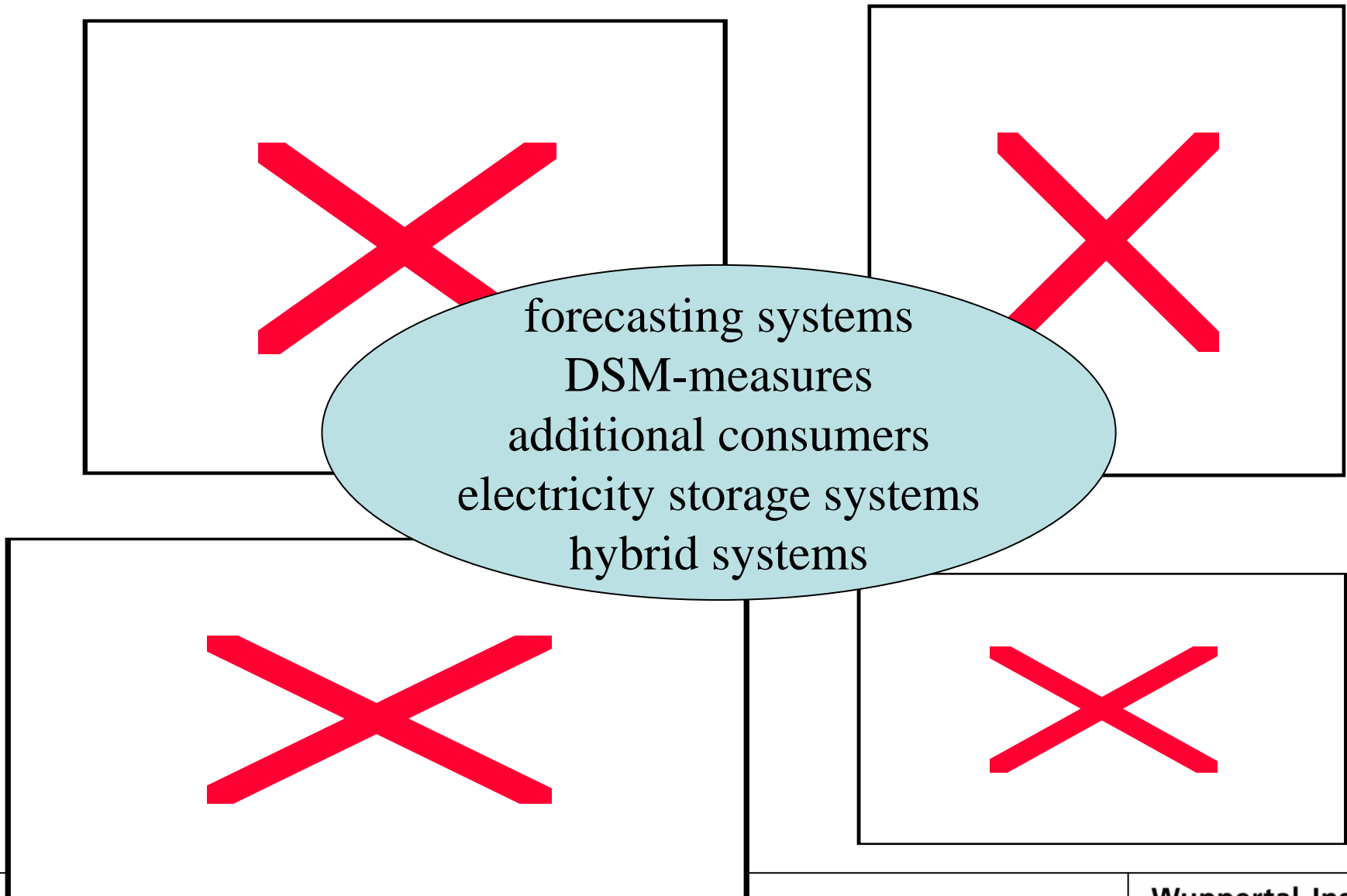
Wind energy is meanwhile the most important but not the only renewable energy option

Some of these options are more predictable



Vgl. 46.5 TWh in 2002

Wind energy electricity generation is depending from wether conditions
No deterministic but predictable source
Intelligent integration systems are necessary



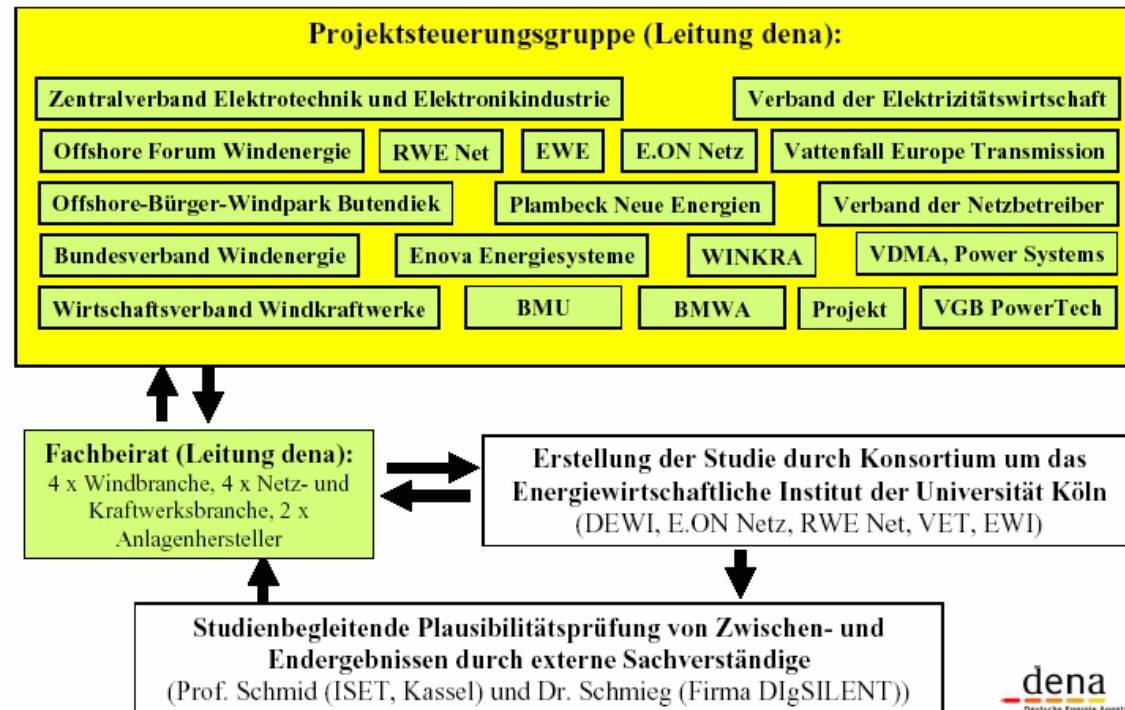
Current results of common wind energy net introduction study (power plant owner, electricity net operator, scientific institutions)

Overall goal:

Identification of technological and economic impacts of ongoing dynamic wind energy integration into the grid until 2015 (including wind energy application in offshore areas)

Extension path:

- 16.000 MW in 2004
(5.4 % of el. generation)
- 35.000 MW in 2015
(ca. 12% of el. generation)
- total contribution of renewable energies exceeds 20%



Current results of common wind energy net introduction study (power plant owner, electricity net operator, scientific institutions)

Main (and common) results

- a further extension of energy electricity generation based on renewable energies to at least 20% (including high amounts of wind energy) is viable from technological point of view and due to limited additional costs

- Until 2015 a construction of 845 km new high voltage transportation lines is necessary (bringing the electricity from the northern coastal line to the consumer center in central and south Germany)

Compared to the existing grid (30.000 km) the necessary extension represents 1,5% (investment volume: 1.14 Billion Euro cumulated until 2015)

- The implementation of new transportation lines requires a comparable long legal procedure and takes 5 up to 10 years (public reservations) - good planning procedure is crucial

- No common position could be found concerning the security level of the electricity system (probability of net blackouts) - additional research program has been launched

For further extension not only home based resources are important

Looking behind the border - global link and international cooperation

The regional utilization of renewables has to be integrated timely in supraregional and trans-European utilization systems

