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Energy

Challenges and solutions in the expansion and modernisation of the power grids in Germany

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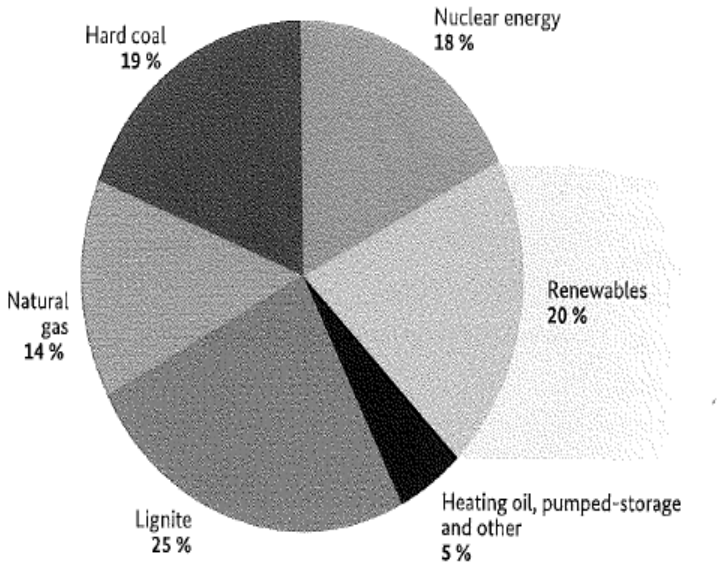
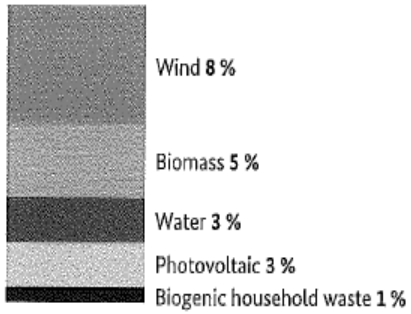
Figure 1: Gross power production in Germany in 2011 (612 TWh)*





* Provisional figures (as at 14.12.2011), estimated in some cases. Totals deviate due to rounding.

Sources: Working Group on Energy Balances (AGEB), German Energy and Water Industry Association (BDEW)

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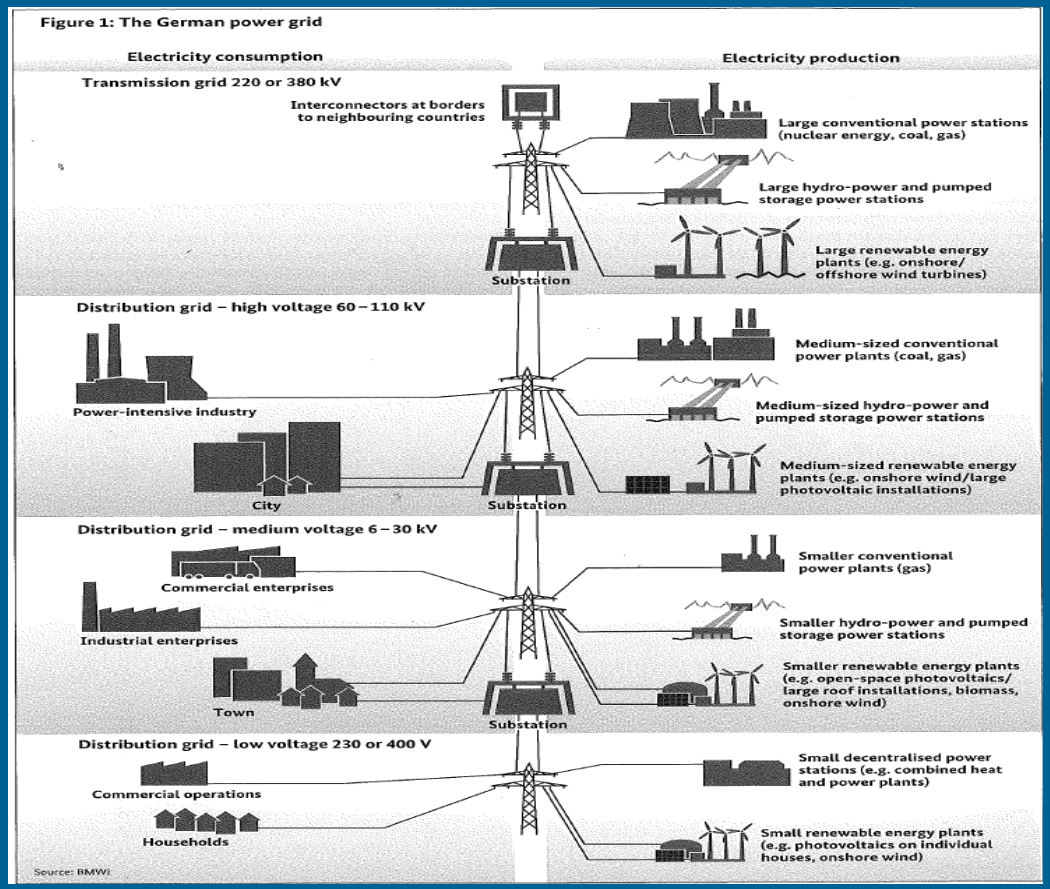

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Challenges (I)

- Increasing generation of electricity a long way away from the main centres of demand.
- Growing level of volatile power generation which cannot be controlled.
- Closure of power plant capacities in regions of high demand.
- Lengthy planning and authorisation procedures for new grid construction.

Quelle: RainerSturm / pixelio.de

Challenges (II)

- Need for renewable energy increasingly to provide system services.
- Rising expectations in the flexibility of power demand (load management) and power supply (control also for micro generation facilities).
- Considerable uncertainties, e.g. uncertainty about
  - availability and costs of new technologies (storage, new grid technologies),
  - market roles and business models in the smart grid,
  - developments in the EU's internal energy market (e.g. power generation mix in neighbouring countries, long-term EU strategy to expand renewables).

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Legal framework

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Energy package of 8 July 2011 (I)

- Central element: grid expansion!
- Improvement and acceleration of grid planning and authorisation procedures via
  - greater transparency,
  - more effective involvement of civil society, and
  - avoidance of double checks and testing.
- The rules in detail:

Energy Package of 8 July 2011 (II)

- Amendment of the Energy Industry Act :
  - The first-ever 10 year grid development plan to be produced in 2012.
  - Involvement of public in drafting scenarios for grid planning.
  - Adoption of the grid development plan as a Federal Needs Plan by act of parliament.
  - Transparency about load-flow data.
  - Joint connection of offshore wind farms.
- Improvements which will also affect authorisation procedures already underway
  - Possibility to engage project managers.
  - Parallel handling of planning and expropriation procedures.
  - Planning also possible for 110kV powerlines.
  - New projects at the 110kV level must normally be implemented underground.
- Grid Expansion Acceleration Act (NABEG)

Grid Expansion Acceleration Act (NABEG)

- In the case of future grid construction projects under the Federal Needs Plan which affect several states or cross national borders: the responsibility for spatial planning is removed from the states and replaced by uniform federal planning by the Federal Network Agency.
- Possibility to have planning procedures implemented by the Federal Network Agency.
- Shortening of the planning and authorisation procedures from ten to four years, and prevention of the fragmentation of responsibilities.
- Increased acceptance via early involvement of the general public.

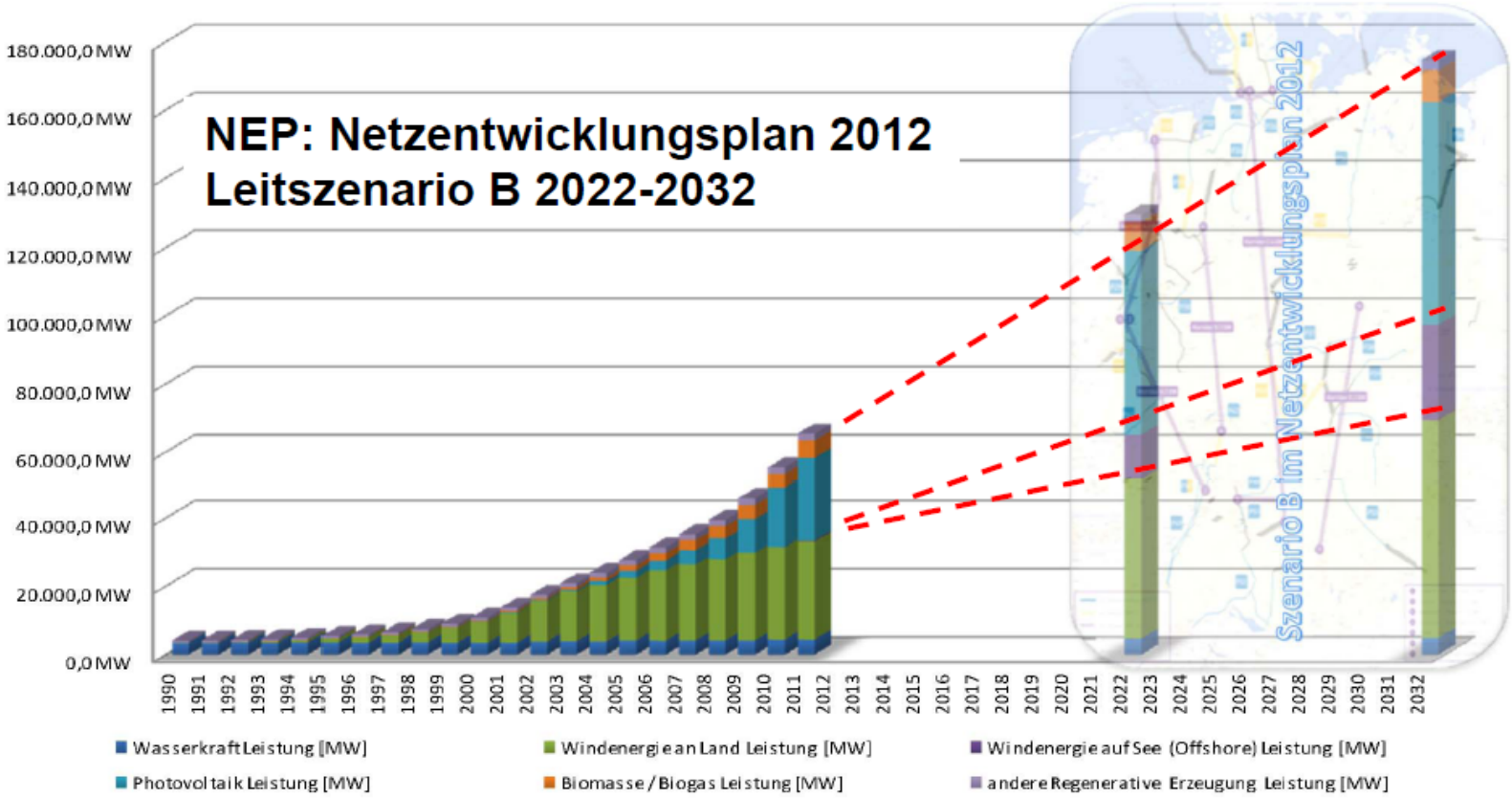
EnLAG Progress Report

- Regular monitoring of the progress on construction and planning for the most urgent grid projects by the Federal Network Agency since May 2012.
- Of 24 projects (= 1,834 km) defined in the EnLAG (Energy Line Expansion Act), only around 214 km has been built (July 2012).
- Two projects in operation, parts of four other projects completed
  → most projects will come on stream later than expected.

Grid Development Plan (NEP)

- The 10-year Grid Development Plan of the TSOs contains the main grid development projects for the next few years. It is updated annually.
- The Plan is drawn up on the basis of scenarios which developed in consultation with the TSOs.
- In fall 2012, Federal Network Agency presented a draft Federal Needs Plan. The Federal Needs Plan Act will be adopted on this basis.
- The Grid Development Plan does not indicate where the grid should be built, or where electricity is generated, but shows the need for development and transmission!

Development of installed renewable capacity in Germany



Source: TSO presentation on 5 July.2012

Need for redispatch measures

- Increasing burden on the transmission system in the North-South and East-West direction.
- Following closures of nuclear power plants, overloading has increased significantly (especially between 50Hertz and Tennet control zone).
- Since then, number of redispatch interventions has increased substantially.

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Future-oriented Energy Grids Platform

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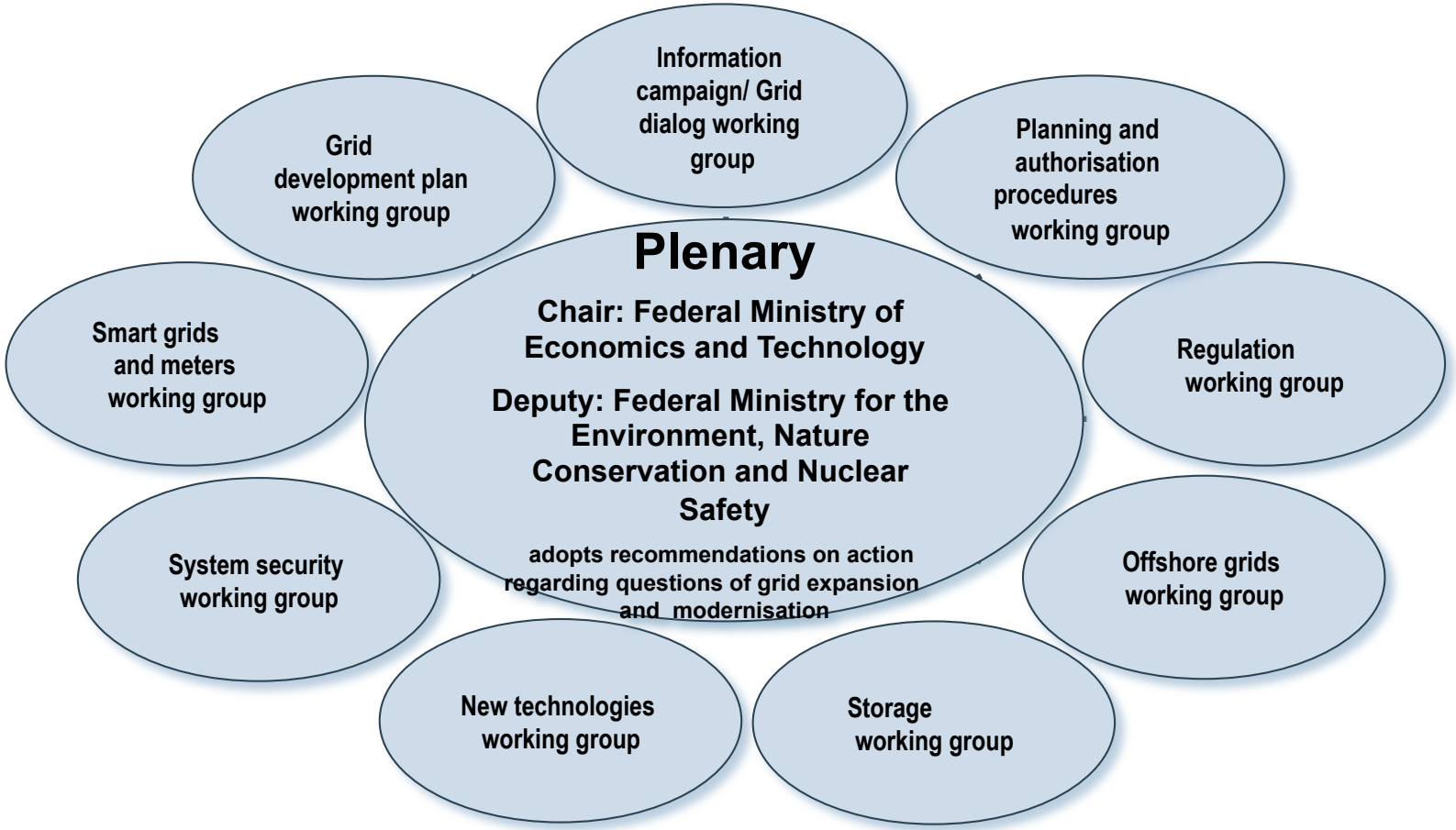
Idea for the Energy Package from: the BMWi's Future-oriented Energy Grids Platform

- Platform launched in June 2010, restructured as a permanent dialogue forum in February 2011.
- Broad group of participants:
  - Energy, business, environmental and consumer associations,
  - TSOs and DSOs,
  - Economics Ministry, Environment Ministry, Federal Network Agency, states, German Energy Agency (dena).

Structure of the Grid Platform



Basic principles of the Grid Platform

- All participants agree: grid must be expanded and modernised.
- Decision-making via open dialogue.
- Aim: consensus between all parties.
- No taboo subjects.
- Development of specific recommendations for action.

Examples of recommendations for action (I)

- Joint connection of offshore wind farms on the basis of an offshore grid plan which identifies the various offshore facilities
  → avoids expensive individual connections.
- Establishment of an energy information network between grid operators, electricity generators, sales companies and industrial and commercial electricity consumers.
  → improves the possibilities to control the grid.
- Retrofitting of photovoltaic facilities which currently switch themselves off in case of disruption to grid
  → prevents mass switch-offs which endanger the system.

Examples of recommendations for action (II)

- Greater support for research by the grid operators. In case of publicly funded research projects, some costs should be fully covered.
- Acceleration of connection of offshore wind farms by clarifying rules on liability.
- Agreement on ambitious target data for the commissioning of particularly urgent new grid, such as the Krümmel – Schwerin line in northern Germany and the Bad Lauchstadt – Redwitz line (Thuringia).

Summary and outlook

- Enormous challenges for the power grids as Germany moves into the age of renewables.
- The Energy Package of 8 July 2011 contains important reforms to accelerate the expansion of the grid.
- Compliance with agreed targets and implementation of EnLAG projects are a priority, in order to avoid overloading of grid.
- National Development Plan describes need for transmission and paves the way to the building of Germany's future energy infrastructure.
- Federal and state activities must take place hand in hand.
- Central elements of the Energy Package have been drafted in the "Future-oriented Energy Grids" Platform. This involves all the stakeholders.

Thank you for your attention!

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