



NETZ
ENTWICKLUNGS
PLAN STROM

POWER GRID DEVELOPMENT PLAN 2012

START OF CONSULTATION: 30.05.2012



THE GRID DEVELOPMENT PLAN



- Establishes the principles for supply reliability and stable grid operation for the next ten years
- Is the grid development plan for a transmission grid onshore.
- Takes the integration of renewable energy sources and the development of the European power market into account.
- Is a solid planning basis and foundation for a Bundesbedarfsplan, a plan establishing federal requirements.
- Was created by the TSO's on behalf of the legislative authority.
- Describes measures that give consideration to legal requirements and underlying scenarios.
- Important inputs are type, quantity and geographic distribution of the renewable production, consumption, conventional power plants and the obligation to transmit 100% of renewables.

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THE GRID DEVELOPMENT PLAN SHOWS



- Nationwide development need, in a set framework, with a focus on north-south connections.
- The transmission need between the starting and end points.
- No new route corridors (> approval procedures).
- No suggestions for future sites for power plants or renewable energy plants, not even preferred ones.
- Measures with priority of grid optimization and enhancement prior to new construction.
- In the 380 kV AC power system, a reduction of the need for new routes by means of construction in currently existing routes.
- The extension of the 380 kV AC power grid and the high-voltage DC connections (HVDC) for the north-south transmission needs.

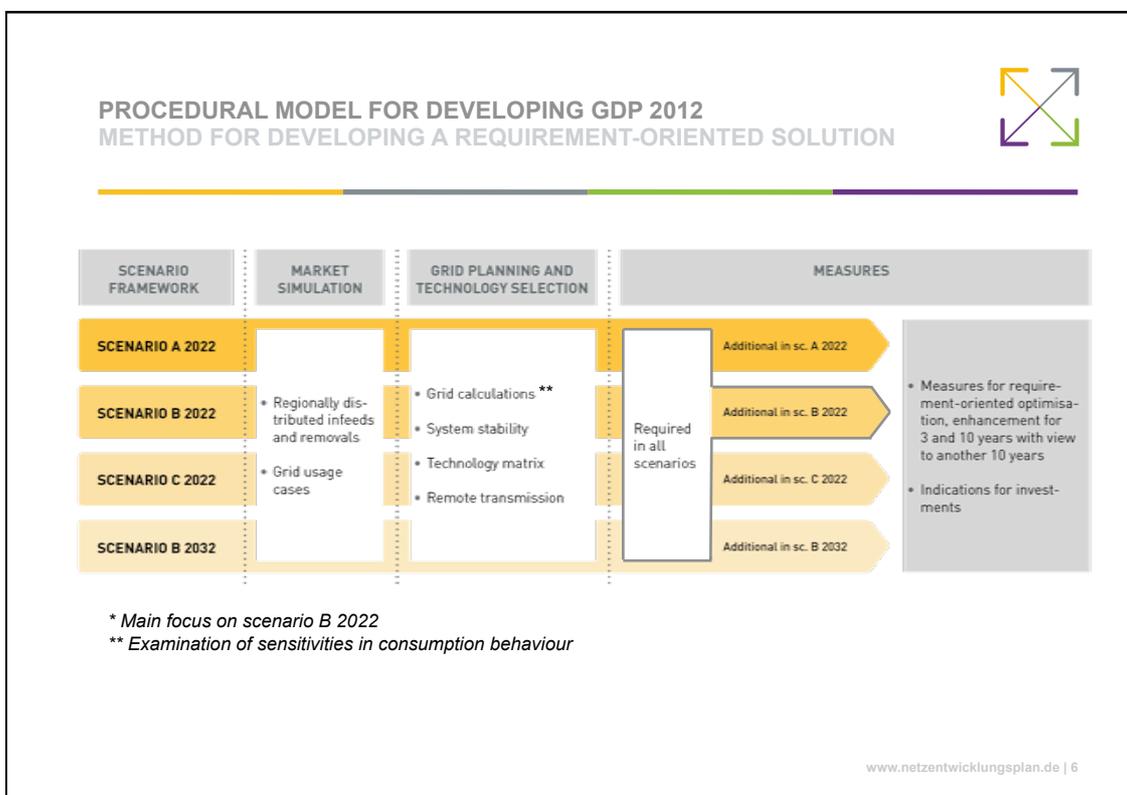
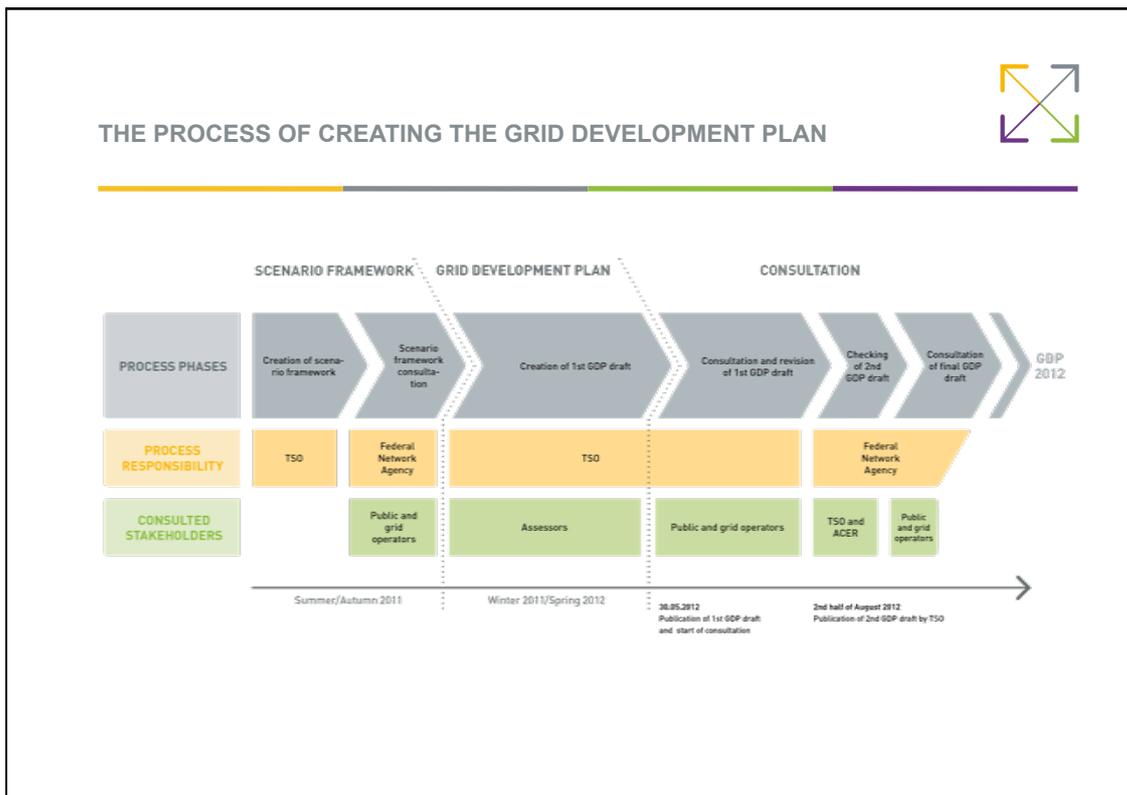
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GDP – CORNERSTONE OF THE "ENERGIEWENDE"



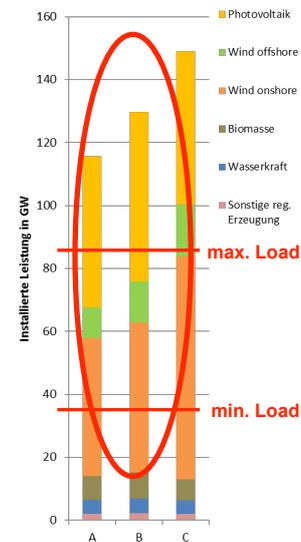
- The GDP (Grid Development Plan) is a critical contribution to the implementation of the Energiewende, the German energy revolution.
- The TSO's are taking an active role in the implementation of the energy revolution.
- We can make our transmission grid suitable for a successful energy revolution.
- In order to succeed, the grid must be expanded and enhanced to a large extent.
- This is a herculean task that can only be accomplished if everyone pulls in the same direction: politicians, TSO's, society.
- For this we need to shake-up society.

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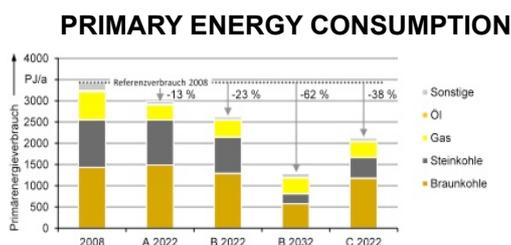
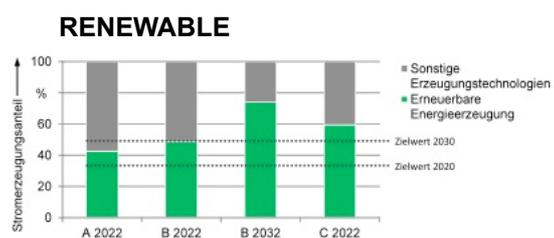
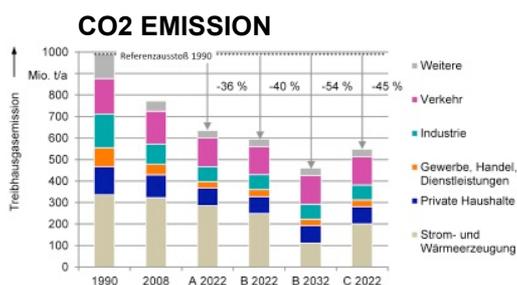
Scenario frame as accredited by regulator

| Technology | Reference 2010 | Scenario A 2022 | Scenario B 2022 | Scenario B 2032 | Scenario C 2022 |
|-----------------------------------|----------------|-----------------|-----------------|-----------------|-----------------|
| Installed power generation | | | | | |
| Total conventional power | 101,8 | 91,1 | 89,1 | 87,3 | 89,1 |
| Hdropower | 4,4 | 4,5 | 4,7 | 4,9 | 4,3 |
| Wind (onshore) | 27,1 | 43,9 | 47,5 | 64,5 | 70,7 |
| Wind (offshore) | 0,1 | 9,7 | 13,0 | 28,0 | 16,7 |
| Photovoltaics | 18,0 | 48,0 | 54,0 | 65,0 | 48,6 |
| Biomass | 5,0 | 7,6 | 8,4 | 9,4 | 6,7 |
| Other renewable energies | 1,7 | 1,9 | 2,2 | 2,9 | 2,0 |
| Total renewable power | 56,3 | 115,6 | 129,8 | 174,7 | 149,0 |
| Total power | 158,1 | 206,7 | 218,9 | 262,0 | 238,1 |



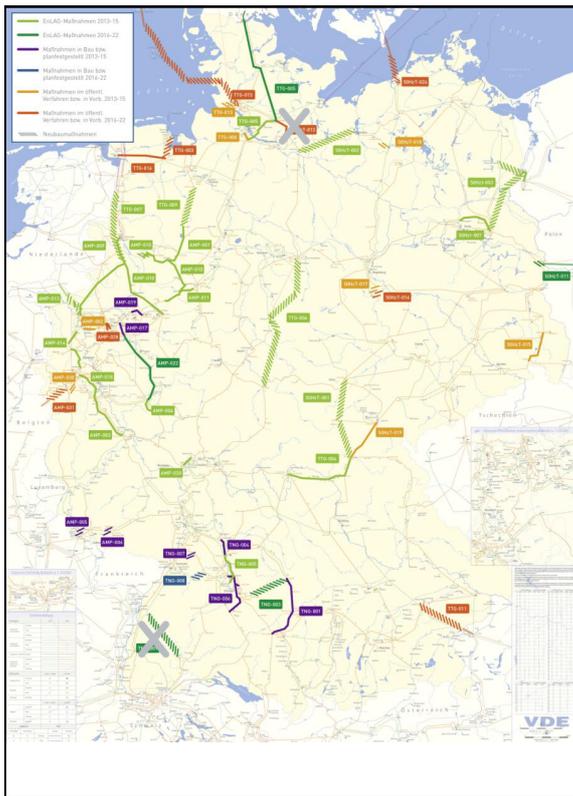
Source: German Transmission System Operators

ACHIEVEMENT OF ENERGY-POLITICAL TARGETS
CO2 EMISSION / RENEWABLE / PRIMARY ENERGY USAGE



→ Achievement of all energy-political targets, except in scenario A, in which some are narrowly missed

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THE BASIS OF THE GRID DEVELOPMENT PLAN: THE STARTING GRID



The starting grid contains:

- The current grid (actual network)
- The EnLAG (law related to grid expansion) measures
- The grid expansion measures involved in the implementation (identified development, some already under construction)
- Further measures with approved investment budgets whose planning status is already extremely advanced and that are already in the public and legal approval process – or in preparation for it.

Optimization of existing routes

- New AC construction in existing routes: 1,000km
- AC enhancements and AC power circuit systems: 400 km
- **Grid construction in new routes**
- AC route construction 1,000 km
- **Estimated investment: Eur 7 billion**

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THE PILOT SCENARIO FOR B 2022



- Based on the pilot study of the BMU (Ministry of Environment)
- Fulfills all requirements for the target year 2022
- The outlook for the year 2032 confirms the measures
- The result of the grid development plan

Optimization in existing routes

- New AC construction in existing routes: 2,800 km
- AC enhancements and AC power circuit systems on existing routes: 1,300 km
- DC power circuit systems: 300 km

Grid expansion in new routes

- AC route construction 1,700 km
- 4 DC corridors
Transmission capacity 10 GW
- New DC route construction: 2,100 km

- **Estimated investment: Eur 20 billion**

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GRID EXPANSION NEEDS THE SUPPORT OF POLITICS



- A suitable framework for investments.
- Consensus in the federal government and states regarding the 'if' - the need for expansion of the grid, and the 'how' - the technology and route corridors.
- Speedy planning approval processes at state level / waiver of regional planning procedures where possible and implementation thereof within the legal time limit of 6 months.
- Close coordination of cross-border projects without loss of time or - if this is not possible - planning approval processes at the federal level.
- Close coordination between federal planning and state planning authorities without loss of time.
- Political backing for the authorities in local planning conflict management.
- Adequate staffing of the authorities.

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The speed of grid expansion determines the speed of the Energiewende



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START OF 6-WEEK CONSULTATION



- Consultation: <http://www.netzentwicklungsplan.de/content/konsultation-2012>
- Report: <http://www.netzentwicklungsplan.de/content/netzentwicklungsplan-2012>
- Events: <http://www.netzentwicklungsplan.de/content/dialogveranstaltungen>



The screenshot shows the website header with the logo and navigation links: Impressum / Kontakt, Presse, Fragen / Antworten, Dialogveranstaltungen. Below the logo is a menu with 'Stromnetze', 'Übertragungsnetzbetreiber', and 'Prozessp'. The main content area features the title 'Konsultation 2012' and the text: 'Mit dem Netzentwicklungsplan auf dem Weg zu einer neuen Energieinfrastruktur. Am 30.05.2012 veröffentlichen die Übertragungsnetzbetreiber den ersten Entwurf des Netzentwicklungsplans Strom 2012 auf dieser Website.' The footer of the screenshot shows 'www.netzentwicklungsplan.de | 13'.



THANK YOU FOR YOUR ATTENTION



The photograph shows a series of wind turbines in a rural landscape with green fields and trees under a cloudy sky.