“Energiewende“
– The German Energy Transformation to Renewables – and the Role of the Regulator:
The success story of a strong independent regulatory body

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Dr. Annegret Groebel, BNetzA
Head of Department International Relations / Postal Regulation
1. Presentation of BNetzA – the German regulator
2. German energy policy – the „Energiewende“
3. New competencies for BNetzA
4. Network Development Plan 2012:
   a) Consultation launched
   b) Grid expansion approved and submitted
5. Challenges and Next Steps
6. Conclusions
In Germany:

- Network industries traditionally were (legal) monopolies owned by the state or regional municipalities or at least enterprises under huge state influence.
- Deficits resulting from the monopolistic structures led to the desire for more dynamics, higher efficiency and lower prices.
- Process of liberalisation was initiated by the European directives in order to open up markets for competition while the state influence was restricted to regulation in order to guarantee and safeguard competition.
- Process of legal market opening (liberalisation) will not work without economic regulation to ensure new entrants (competitors) can make use of new possibilities and compete effectively: (ex ante) regulation guarantees a level playing field!
- For effective regulation the NRA needs to be independent
- Independence is increased in the case of a multi-sector regulator
Overall Mission of Bundesnetzagentur...

... to promote **sustainable competition** in the markets for electricity, gas, telecommunications, postal services and railways...

...via regulating these markets, i.e. market regulation by a regulatory body (i.e. imposing sector specific obligations)

administrative body whose decisions are administrative acts (subject to juridical control)

no micromanagement of markets, but **pro-competitive regulation:** setting conditions and giving price signals in order to steer market forces towards a competitive market development as competition is the best driver for efficient investment and delivering benefits to consumers (more choice and more value for money)
Independent higher federal authority in the scope of the Federal Ministry of Economics and Technology

Sector-specific authority tasked with ensuring effective competition in network industries

- Telecommunications and Posts (since 1998),
- Electricity and Gas (since 2005), and
- Railways (since 2006)

Electricity and Gas network planning (since 2011)

BNetzA employs ar. 190 staff in energy regulation, up to 240 staff will be recruited for Electricity and Gas network planning

Overall headcount for all sectors: ar. 2600 staff
BNetzA headed by **President** and **two Vice-Presidents**
- nominated by government upon proposal of Advisory Council
- appointed by the President of Germany
- besides their responsibility to govern BNetzA, President and Vice-Presidents form the so-called “President’s chamber”, a ruling chamber with legally defined competences with regard to market definition and analysis and frequency management

**Advisory Council**
- members of Upper House of Parliament & Lower House of Parliament (democratic control)
- advise BNetzA on various issues

**Ruling Chambers**
- key regulatory decisions executed by Ruling Chambers
- one chairperson and two vice chairs
- clear rules for ruling chamber proceedings
  - hearings and oral proceedings
  - participation in proceedings
  - investigation rights
- independent rulings and strict administrative procedures
- Short timelines and decision stays effective when challenged in court

**Departments:**
- Economic, Legal and Technical Department for telecommunications, departments for each of the other sectors, plus HR/accounting and IT department for all five sectors (synergies) as well as litigation office and press office responsible for all sectors
An Independent Regulator?

- What does “independent” mean?
  - no influence by market players
  - no influence on daily business by ministry

- Regulator has to be impartial, i.e. take neutral decisions

- Problem: how to guarantee it?
  - clear separation of functions
  - rules that clearly define the roles / competencies
  - clear assignment of powers (incl. enforcement)
  - institutional set-up (organisational structure / governance rules)
BNetzA is a **higher federal authority** in the scope of business of the Ministry of Economics and Technology.

Institutional set-up and rules, **transparency**:
- consultations
- oral hearings
- publication of docs

Ruling chambers’ decisions independent (consistency requirement), no overruling by Ministry.

No control at all?
- Ministry can give (general) directives, but they have to be published
- BNetzA decisions subject to juridical review by independent courts
- Democratic oversight via the Advisory Council and **accountability rules**
- **Activity Report** on status and development of telecoms and postal sector as well as for energy and railway sector to be submitted to the legislative bodies of Germany every two years ensures *accountability*

- **Principles of administration** to be published at regular intervals (*transparency and predictability*)

- **Report of the Monopolies Commission** to be submitted every two years to report whether there is effective competition in the *telecoms + postal markets* as well as in the *energy and the railway markets* (assessment of whether objectives have been reached)
General Advantages of a multi-sector approach:

- Regulatory capture can be avoided.
- Regulator can take its decisions based on a wider perspective.
- Broad expertise strengthens the regulator’s role as professional policy adviser.
- Multi-sector competences strengthen the regulator’s independence.
- Different levels of regulatory powers are levelled up to the strictest one!
- Advantages both in terms of professional decision-making as well as in organisational terms: realizing synergies and saving administrative costs.
Advantages with regard to regulatory decisions

**Reflection of market realities**
- Networks are increasingly converging.
- Struggling over competences between different authorities can be avoided.

**Synergies**
- Similar questions arise in all sectors.
- Broad expertise can be used and shared/transferred.
- Expertise and experiences from other sectors can easily pour in regulatory decisions.

**Regulatory Consistency**
- Close co-operation of experts from different sectors allows consistent regulatory approaches and measures.
BNetzA’s competence to regulate different infrastructure based sectors (network industries) allows for the creation of synergies and a broad discussion of regulatory issues as problems and tools to solve them are the same: pro-competitive market regulation that needs to be enforced with ex-ante access and price regulation.

Examples:

- BNetzA’s telecommunications and energy experts have substantially contributed to the ongoing discussion about the determination of adequate capital costs in the railways sector (project team).
- BNetzA’s experts for telecommunications standardisation are deeply involved in the work and discussion to develop smart grids in the energy sector.
- Rotating of staff members ensures knowledge transfer, particularly important where networks, services and markets converge.
- BNetzA’s responsibility for energy regulation and the network development plan facilitates new task of planning and permitting to speed up the necessary grid expansion.

Some departments are responsible for the authority as a whole: e.g. HR for all recruitments of BNetzA, IT for all IT services (synergies, cost saving).
In the past 15 years regulation in Germany has provided for a stable framework and the promotion of effective competition and efficient investment.

Transparent, reliable, predictable and proportionate regulatory decisions are crucial for attracting investors, which is particularly important now with the expansion of the electricity grid as well as the roll-out of highspeed broadband networks.

Multi-sector competence and expertise is beneficial in converging markets and environments.

In the case of new challenges a multi-sector regulator is better prepared and has the capability to
- elaborate similarities,
- transfer experience and knowledge,
- prevent anti-competitive interference,
- maintain flexibility.
Network regulation in the energy market value chain

**Potentially competitive market segments**
- No ex-ante regulation, ex-post supervision by the Competition Authority

**Natural monopoly**
- Regulation

- Separation of generation and supply activities from network operation (*Unbundling*)
- Network access regulation, including tariff regulation (incentive regulation)

Limited responsibility of Bundesnetzagentur in comparison with other national energy regulators – More recently, however, rapidly growing fields of activity recently, linked to the *Energiewende*
Energy regulation in practice

Examples for BNetzA’s activities:

- Approval of investment budgets with regard to the connection of offshore wind farms to the transmission networks onshore.
- Guidelines concerning the induction of renewable energy into the transmission networks.
- Assessment of the effects resulting from the plan to take off nuclear power plants from the grid.
- Like in the telecommunications sector BNetzA also provides advice to the German Ministry of Economics and other decision makers as well as the legislator with regard the transposition of the European energy directives (2009 – 3rd energy internal market package) and the amendment of the German Energy Act.
- According to the energy package (approved 7/8 July 2011) BNetzA will be responsible for the spatial planning procedures concerning the roll-out of supraregional (interstate) and cross-border transmission lines) in order to accelerate the required extension of the networks.
- Closer coordination with regard to cross-border issues with NRAs of the Member States of the EU within ACER – Agency for the Cooperation of Energy Regulators
Electricity Transmission System Operators

TenneT
(formerly E.ON Netz, acquired by TenneT, publicly-owned Dutch TSO, Ownership Unbundling)

Amprion
(subsidiary of RWE, a Vertically Integrated Undertaking)

TransnetBW
(subsidiary of EnBW, a Vertically Integrated Undertaking)

50Hertz
(formerly Vattenfall Europe Transmission, acquired by Elia, publicly-owned Belgian TSO and IFM, an Australian investment fund, Ownership Unbundling)

More than 10 gas TSOs,
Circa 1600 electricity and gas DSOs
On 15 March 2011, the German government announced to shut down 8 of its 17 reactors immediately, i.e. all reactors that went online before 1981.

On 30 May 2011, the government plan to progressively shut down all nuclear reactors by 2022 and massively foster the development of renewable energy production.

By 2050 80% of the production with renewables.

Consequences on the grid stability analyzed by BNetzA - Report on our website.
Following the Fukushima catastrophe, the orientations set in 2010 have been complemented by an accelerated nuclear generation exit (previously foreseen for 2036)

- Moratorium imposed by the Government on the eight oldest nuclear power plants immediately after the Fukushima catastrophe rendered permanent

- Closure of the remaining nine nuclear power plants by 2022

Nuclear Phase-Out in Germany (2)
Important that the previous Socialdemocrat/Green Party government under Chancellor Schröder had launched the slow phase out of nuclear power to be replaced by renewables already

When Merkel was reelected in 2009 she reversed this approach by prolonging the time nuclear power plants were allowed to run

When Fukushima happened, Merkel was shocked as obviously all the safety measures failed and ordered (overnight) a shutdown of the 8 oldest nuclear power plants („moratorium“)

In the following discussions she had to convince her own party more than the opposition which favoured the phase out of nuclear power anyhow, thus the Green Party was in favour as were the Socialdemocrats

Important to remember that without the original shift towards renewables, Merkel would not have been able to push through the „Energiewende“ which consisted of a package of 8 new or amended laws
Effects of the *Energiewende*

- Change on the generation level away from conventional and nuclear power to renewables as well as the shut down of nuclear power plants after Fukushima caused a number of effects on the electricity grid:
  - Short term: more redispatching measures needed to stabilize the grid (more critical situations) and temporary change in the direction of cross-border electricity trading: Germany became a net-importer for a while whereas it usually is a net-exporter
  - Middle term: more efficient use of existing capacities
  - Long term: grid expansion and reinforcement plus smart grid development on the distribution level
  - Long term: smart market development and increase of energy efficiency (energy savings)
  - Bundle of measures on both the transmission and distribution level as well as on the demand side
Legislative measures – 8 new laws or amendments to existing laws adopted in July 2011

- **Atomic Energy Act** – phase-out of German NPPs
- **Act to Accelerate the Expansion of the Grid** – including acceleration of spatial planning (NABEG)
- **Energy Industry Act** – transposition of 3rd Internal Market Directives
- **Renewable Energies Act** – cost-efficient expansion of renewables
- **Energy and Climate Fund Act** – from 2013 all revenues from auctioning emission allowances will be a contribution to this fund
- **Energy efficiency** – i.e. tax concessions for renovation of buildings; climate-friendly development of cities and municipalities; public procurement

Range of new provisions to implement the *Energiewende* given to BNetzA!
A long process…with impact on its neighbors
Basis for the success of renewable electricity in Germany is the **Renewable Energy Sources Act** *(Act on granting priority to renewable energy sources, Erneuerbare-Energien-Gesetz, EEG)*

EEG entered into force in 2000 and has been amended several times

Purpose of the EEG: Facilitating a sustainable development of energy supply by promoting the development of technologies for the generation of electricity from RES

Objective: Increasing the share of renewables in electricity supply to **at least 35 % by 2020** and continuous increase thereafter (up to **80 % in 2050**)

BNetzA must **inter alia** monitor:

- the transfer of renewable electricity and tariffs including the marketing of such electricity by the TSOs, calculating and claiming the EEG-surcharge by the TSOs
- in case BNetzA has a legitimate doubts, audits of installation operators may be conducted
- compliance of Grid System Operators with feed-in management rules; BNetzA may set further feed-in management guidelines
- Additional task: Calculation of the feed-in tariffs for PV installations
Germany’s *Energiewende* (energy turnaround)

**Action plan adopted by the Federal Government in 2010**

<table>
<thead>
<tr>
<th>National targets</th>
<th>2020</th>
<th>2030</th>
<th>2040</th>
<th>2050</th>
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<tbody>
<tr>
<td>Reduction of greenhouse gas emissions (in comparison with 1990)</td>
<td>40 %</td>
<td>55 %</td>
<td>70 %</td>
<td>80-95 %</td>
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<tr>
<td>Share of renewable energy in final energy consumption</td>
<td>18 %</td>
<td>30 %</td>
<td>45 %</td>
<td>60 %</td>
</tr>
<tr>
<td>Share of renewable energy in electricity generation</td>
<td>35 %</td>
<td>50 %</td>
<td>65 %</td>
<td>80 %</td>
</tr>
<tr>
<td>Reduction of primary energy demand (in comparison with 2008)</td>
<td>20 %</td>
<td></td>
<td></td>
<td>50 %</td>
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</table>
Ambitious targets on Renewable energy, energy efficiency and electricity imports

<table>
<thead>
<tr>
<th>Year</th>
<th>Electricity Generation (TWh)</th>
<th>Energy Efficiency Increase (TWh)</th>
<th>Electricity Demand (TWh)</th>
<th>Electricity Imports (TWh)</th>
<th>Domestic Electricity Generation (TWh)</th>
<th>Conventional Electricity Generation (TWh)</th>
<th>Renewable Energy Generation (TWh)</th>
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<tr>
<td>2008</td>
<td>90</td>
<td></td>
<td>510</td>
<td></td>
<td></td>
<td></td>
<td>130</td>
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<tr>
<td></td>
<td>14.5% share of renewables</td>
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<td></td>
<td></td>
<td></td>
<td>65</td>
</tr>
<tr>
<td>2050</td>
<td>640</td>
<td>130</td>
<td>510</td>
<td>160</td>
<td>350</td>
<td>65</td>
<td>285</td>
</tr>
<tr>
<td></td>
<td>80% share of renewables</td>
<td></td>
<td>+ &gt; 300%</td>
<td></td>
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</tr>
</tbody>
</table>

Germany’s *Energiewende* (energy turnaround)
Government Energy Policy:
- Share of electricity produced by renewables to rise to 35% by 2020
- 80% by 2050

Renewable Energy Act (EEG) designed to foster this process

NABEG to speed up grid expansion and ensure integration of renewables

Electricity Mix Germany 2011
Renewables: 19.9%
Key Challenge: Grid expansion for the integration of the Renewables

- Wind energy
- Grids
- Photovoltaics
- Storage power stations
- Electric mobility
- Biomass power plants
- Climate-neutral buildings
- CCS systems
Changes in Generation Require New Grids (1)

Traditionally, fossil and nuclear production plants have been built close to where the energy was actually needed, i.e. where most of the industrial load is located: in Southern/Western Germany.

Renewable energy production develops mainly in Northern Germany, esp. wind.
Changes in Electricity Generation Require New Grids (3)

- **Expansion and reinforcement** of the networks urgently needed
  - Transmission system
  - Offshore wind farm connection
  - Modernization of the distribution system

- Investments needed of approx. € 30 to 50 billion until 2020 (DENA-II study)

- New competences for BNetzA: a new role beyond regulation!

- Nuclear power plants
  - Planned shut down
  - Shut down

- Wind offshore
  - Increase by 2022: 12.900 MW
  - Scenario B

- Wind onshore
  - Increase by 2022: 20.400 MW
  - Scenario B

- Gas-fired plants
  - Increase by 2022: 7.300 MW
  - Scenario B

- Solar
  - Increase by 2022: 36.000 MW
  - Scenario B
Reasons for Network Development:

Underlying transformation of the energy system

German „Energiewende“ package 2011

- Rapid expansion of renewables: 80% wind, solar and biomass by 2050
- Nuclear phase-out by 2022
- Reduced electricity consumption as a result of increased efficiency
- Increased cross-border electricity trading

Consequences for the network

- Volatility of consumption and production in terms of both time and location reduces predictability and requires higher resilience
- Average distance between production and consumption increases
- Volatility of the network situation increases: more difficult to manage
- Network development (grid expansion) is a clear priority
How will BNetzA work on this?

Implementation of EnWG 2011 and NABEG:

- BNetzA is building up competence in –
  - network modelling and network planning
  - specialist planning and plan approval
  - environmental issues and
  - procedures of participation
- Around 240 new colleagues being recruited
- Connection between the new tasks and energy regulation issues ➔ synergies and bundling of competence
- Cooperation with Laender level:
  - consistent decisions
  - Bundesfachplanungsbeirat
New network development process: From scenarios to plans and permits

- Scenarios
- Network Development Plan
- Federal Requirements Plan
- Corridor permitting
- Line path permitting

2011
- BNetzA approved TSO scenario framework
- TSO consulted on draft Network Development Plan

2012
- BNetzA consults on revised TSO NDP

2013
- BNetzA to confirm NDP and draft a Federal Requirements Plan
- Legislator to adopt Federal Requirements Plan
- TSOs to submit permitting applications

2014
Enhancement of Network Development

- Network development as a transparent concept under federal supervision of BNetzA
- Faster permit procedures are on the way in Germany – legislation passed in June 2011
- Network expansion is clearly decided: “of highest public interest”
Draft **Scenario Framework** by TSOs

**Scenario Framework** reflects the development of the energy policy framework (e.g. production capacities, consumption, etc.). It is the starting point to define the need for network development.

Consultation

Approval of the TSOs’ **“Scenario Framework”** by BNetzA

Approved **“Scenario Framework”**

Establishment of the Draft **German Network Development Plan** involving all TSOs by 3th June 2012

Consultation of German Network Development Plan and of the Environment Report by BNetzA

**Draft Federal Requirements Plan** by BNetzA

**Federal Requirements Plan** reflects the need to develop the network in a concrete way

**Federal Requirements Plan (Bundesbedarfsplan)**
Network Development Plan: Involve the public

- **Objective of the National Network Development Plan:** Increasing local acceptance

- **Prerequisite is improved transparency**

  → **Consultation** of network development plan on several stages:

  → Include the public (especially the actual and potential users) with 6 townhall meetings

  → **Acceptance** of public: overcome NIMBY
Consultation of the „NEP 2012“ started on 6 September – lasting until 17/10/12

All in all 3,800 km of new transmission lines are needed (current total: 17,500 km)

The Network Development Plan, consulted on and modified by the four transmission system operators, sets out the nationwide expansion measures for the grid up to 2022 / 2032 that are needed to secure electricity supplies into the future. The Bundesnetzagentur with the help of TU Graz has made its first assessment of these which it has published in an accompanying document.

Contains a total of 50 projects, 13 accepted in principle, the rest will be reviewed in parallel to consultation

Strategic environmental assessment: BNetzA is taking protection of the environment, too, extremely seriously

6 public hearings are scheduled to take place across Germany

NEP and following from that the draft Federal Requirements Plan (containing the concrete corridors/routes) is expected to be adopted by end 2012

All information published on extra website: www.netzausbau.de
Initial transmission network planning for 2022

- **Scenario B** of draft TSOs' NDP
- Contains all measures needed for a secure and reliable network system operation, contains time plan (prioritisation) of measures
- Recommends for the first time the use of HVDC to a considerable extent
- NOVA principle
- Assessment of necessity of measures by BNetzA and of consistency with Europ. TYNDP
- Most important: **North-South transmission lines** to bring electricity from the Offshore wind farms in the North Sea to the industrial users concentrated more in the South of Germany
Electricity transmission network planning

- National Ten-Year Network Development Plan (TYNDP) prepared by the 4 TSOs for consultation, based on EU Directives
- Covers 2012-2022 submitted to consultation end of May 2012
- Based on generation/load scenarios
- Identifies requirements for network optimisation, improvement and expansion
- New AC links:
  - 2800km on existing routes, 1700km in new routes
- For the first time, 2100km of DC links
  - (10 GW capacity) in 4 corridors
- Cost estimated at 20bn euro over 10 years
- BNetzA consulted on the TYNDP and approved it with revisions
- TYNDP submitted as draft federal requirement plan to the Ministry of Economics on 26 Nov. 12 to be turned into federal law, spatial planning and line permitting for nationwide and cross-border transmission lines to follow to fasten permitting procedures
- On 19 Dec. 2012 the Ministry published the draft Federal requirement plan law including competencies for BNetzA with regard to permitting of nation wide and cross-border transmission lines
- All information can be found online: www.netzausbau.de
BNetzA for now only confirmed the need for:

- 51 out of 74 proposed projects
- Only 3 out of 4 proposed DC corridors were approved
- Overall 2800 km in new routes were confirmed, 2900 km reinforcement of existing routes

**AC 380 kV new build**

**3 HVDC corridors – new build**

**AC 380 kV reinforcements**
One and a half year after…

- not so optimistic any more, but still supported by 80% of the population
- But: it is a „Generation project“
- BNetzA to support the policy goals on the regulatory side and by using its new competences to shorten planning procedures („OSS“)
- Grid expansion is a key issue
  - Reduce congestion on transmission grids
  - Integrate offshore wind production in the transmission grids
  - Have smart distribution grids
- Tight time table can only be met if all parties involved cooperate as closely as possible each one playing its role
- Early involvement of public in every stage of consultation to overcome NIMBY effect as there is a general acceptance of nuclear shut down
- In the long term all elements must work together: grid expansion, smart grids and energy efficiency of users in a smart market design, probably capacity mechanisms, process to be coordinated
- Close cooperation with all NRAs + ACER to reach European targets
The Energiewende requires the integration of renewables and thus an expansion and reinforcement of the electricity grid (both on the transmission as well as on the distribution level) requiring considerable investment.

The Energiewende will work only if the grid expansion is speeded up by shorter planning and permitting procedures as one of the main obstacles.

The Energiewende requires in the short term more redispatching measures of the TSOs to stabilize the grid.

New competences of BNetzA with regard to planning procedures for nationwide and cross-border electricity transmission lines: synergies as BNetzA is the energy regulator: OSS concept.

Shortening of planning and permitting procedures requires also a greater coordination both within Germany between the Federal and the Laender level as well as on the European level (European Energy Infrastructure Package of 27/11/12).
Acceptance of the users is essential: extensive consultation process started by BNetzA on 6 September 2012 of the **NEP 2012** containing all grid expansion measures planned by TSOs (more than 3000 comments)

NEP and draft Federal Requirements Plan approved by end of Nov. 2012 by BNetzA and submitted to the Ministry of Economics on 26 Nov. 2012

Necessity and obligation of operators to invest once the Federal Requirements Plan Law is finally adopted and legally binding, BNetzA to be responsible for permitting

Incentive regulation is designed in such a way that all new projects can be realized, attractive rate of return on equity of 9.05%, stable + predictable regulatory regime provides confidence to investors

Tight time table, but so far BNetzA has delivered and performed the new tasks assigned with NABEG, the *Energiewende* is manageable, but all players must coordinate and join the effort!

Overall, a strong independent regulator well resourced is essential
Thank you for your attention
Smarkt grid and smarkt market distinction

Grid → Smart Grid → Smart Market

Existing energy network (capacity “KW”)

Increase of transmission/distribution capacity for renewable energy needs by building new lines

Upgrade of existing (distribution) grids by adding communication-, metering-, control- and automation technology + IT to enhance quality, efficiency and capacity of the grid

Establishing technical prerequisites for markets (e.g. data hub) and establishing market rules beyond the grid

intelligent Energy Markets (Trading of energy and energy-related services “kWh”)
Political / regulatory action

(Smart) Grid

- Existing grid
- + intelligent grid control (adding ICT)

→ Natural monopoly requires regulation

Smart Market

- Intelligent markets
- Increased energy trading and new services
- Prerequisite:
  Smart Meter and availability of consumption- and price data

→ Liberalisation, deregulation and competition
Transmission grids are already smart today…
- Where appropriate, enhancement of „Smartness“ could be needed (monitoring of power lines, better information flow from DSOs to TSOs)
- Focus on new (conventional) power lines (Offshore connection, SuperGrid, corridors)

Distribution grids have to become smart…
- Network status / usage not really known
- Feed-in (amount and generation profile) of local generation not known
- No or little possibility for active switching operations
- Focus on refitting of grid with communication, metering, control, regulation and automation technology and IT components as well as expansion of grid

Smart Grids vs. conventional grid expansion
- This is a entrepreneurial decision of the DSO (not the regulator) in line with incentive regulation
- Decision is dependent of many parameters (available technology, anticipated utilisation, capacity need due to business models of Smart Market etc.).
Kapazitäten und Netze – Herausforderungen für die Versorgungssicherheit

Smart Market

existing grid + intelligent control = Smart Grid

smart generation

smart consumption

smart metering

smart storage
Most recent developments:

- Transmission network tariff increases due to:
  - capital costs of approved “investment measures” in the incentive regulation system for connecting offshore wind farms and reinforcing onshore lines
  - cost for system services such as balancing, redispatch or the contracting of “reserve power plants” to ensure security of supply in winter are passed on to final customers

- Distribution network tariff increases due to:
  - upstream transmission network tariff increases passed on to final customers
  - remuneration for network tariffs avoided through decentralised feed-in
  - use of the “extension factor“ in the incentive regulation system
  - retrofit costs for older PV to address frequency stability issues („50.2 Hertz“)
Development of household electricity retail tariffs in 2006-2012
(volume-weighted average across all tariff plans)

ct/kWh

Source: BNetzA Monitoring data
Breakdown of the household electricity retail tariff in 2012 (volume-weighted average across all tariff plans)

- Network tariff: 24.1%
- Metering and billing: 20.6%
- Electricity tax: 15.9%
- Value-Added Tax: 8.2%
- Concession fee: 7.9%
- Renewable energy surcharge (EEG): 6.4%
- Co-generation surcharge (KWKG): 5.6%
- Energy procurement: 2.5%
- Network tariff reallocation charge (§19StromNEV): 0.0%

Source: BNetzA Monitoring data
Remuneration for feed-in under the EEG in 2011 (2010 figures in brackets)

- **Solar**
  - 7,766 Mio. €; 46%
  - (5,090 Mio. €; 39%)

- **Wind**
  - 4,250 Mio. €; 25%
  - (3,342 Mio. €; 25%)

- **Hydroelectric**
  - 231 Mio. €; 1.4%
  - (421 Mio. €; 3%)

- **Biomass**
  - 4,476 Mio. €; 27%
  - (4,240 Mio. €; 32%)

- **Gas**
  - 36 Mio. €; 0.2%
  - (83 Mio. €; 1%)
EEG remuneration scheme 2013

Shares of individual cost positions

- PV: 41.82%
- Wind Onshore: 12.70%
- Wind Offshore: 20.55%
- Biomass: 13.28%
- Landfill/Sewage gas + Geothermal: 7.91%
- Hydro: 1.68%
- Operational cost of RES marketing: 0.84%
- Green power privilege: 0.51%
- PV retrofitting cost (50.2 Hz issue): 0.24%
- Settlement of 2011 deficit: 0.20%
- Liquidity reserve of 10%: 0.25%
Retail electricity price developments in 2013

Overall level of fees, taxes and surcharges

- Offshore liability surcharge (from 2013)
- § 19 StromNEV reallocation charge
- KWKG surcharge
- EEG surcharge
- Electricity tax
- Concession fee (average)

Source: BDEW

Retail electricity price developments in 2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Value-Added Tax</th>
<th>Concession fee (average)</th>
<th>EEG surcharge</th>
<th>KWKG surcharge</th>
<th>§ 19 StromNEV reallocation charge</th>
<th>Offshore liability surcharge (from 2013)</th>
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<tbody>
<tr>
<td>2012</td>
<td>4.13 ct/kWh</td>
<td>1.79 ct/kWh</td>
<td>2.05 ct/kWh</td>
<td>1.79 ct/kWh</td>
<td>3.592 ct/kWh</td>
<td>11.7 ct/kWh</td>
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<tr>
<td>2013</td>
<td><strong>4.6</strong> ct/kWh</td>
<td><strong>2.05</strong> ct/kWh</td>
<td><strong>2.05</strong> ct/kWh</td>
<td>1.79 ct/kWh</td>
<td>5.277 ct/kWh</td>
<td>14.4 ct/kWh</td>
</tr>
</tbody>
</table>

** estimate
Hurdles that need to be overcome

- Planning and permitting procedures to be shortened:
  - Implementation of a “One Stop Shop”
    - BNetzA in charge of
      - Approval of investment financing (“budget” for new projects)
      - Federal sectoral/spatial planning
      - Plan permitting approval
        (if determined by ordinance requiring the consent of the “Bundesrat”)

- Ownership unbundling requirements
  - Investors are not interested in controlling rights, shareholder agreements are a common approach

- Traditional financial regulation which considers investments in energy infrastructure as “risky” (eg Solvency II)
Capital spending globally cautious… but: investors look for attractive opportunities; stable economic data in Germany

Considerable **investment needs** in power grid

**Regulatory framework** in Germany is **economically interesting** and **legally stable**

Bundesnetzagentur has done a lot to **clear up any cases of doubt** regarding the framework conditions
Basic principle: All Projects should be privately financed

- Network is **refinanced by the users** (rolled in network charges)
- In case a **network operator** is unable to **organize** the financing of the needed measures **involvement** of **financial Investors** possible
- No scarcity of capital, **investment budgets/measures** approved by BNetzA for all but one project
BNetzA's philosophy on returns

More important than the **nominal** rate of return is the **sustained** profitability of the investment, generating steady, stable cash flow.

Providing certainty to investors: regulation is predictable
<table>
<thead>
<tr>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporation tax</td>
<td>1.66%</td>
</tr>
<tr>
<td>Risk premium</td>
<td>3.59%</td>
</tr>
<tr>
<td>Risk-free rate: historic 10 year current yield</td>
<td>3.80%</td>
</tr>
<tr>
<td>interest</td>
<td></td>
</tr>
<tr>
<td>before corporation and trade tax:</td>
<td>10.48%</td>
</tr>
<tr>
<td>before corporation tax:</td>
<td>9.05%</td>
</tr>
<tr>
<td>Interest rate after taxes:</td>
<td>7.39%</td>
</tr>
</tbody>
</table>
Investments in grid: almost no investment risk (1)

- **No planning and approval costs**, ie the costs incurred before a line is taken into service are borne by the consumer.

- **Cost increases are recognised fully** where there is proof of good reason for the increase.

- There is no risk for **German network operators** as a result of the incentive regulation account and individual consideration of the **cost of debt**.

- "**Stranded investment" costs are borne entirely** by the consumer (for instance, if the line is built but the wind farm doesn't materialise).

- **No risks from fluctuating capacity**
  - as a result, for instance, of weather-reflective feed-in, or
  - cyclical consumption, or
  - technical faults in the generating facilities (eg wind farms).
Proposal of BNetzA: **Strong limitation of liability.** Regarding construction and operation of offshore connection lines TSOs are liable for claims of offshore-operators only with respect to intention and gross negligence. Liability for damages due to gross negligence is limited. Any additional liability of TSOs is excluded.

**Real time refinancing;** investors earn money from the very first day

**Actual cost of debt are remunerated,** if the cost of debt correspond to market condition

**Strict continuation of the calculation methodology ensures risk-adequate rates of return that are predictable and that can be planned for in the long term**
CEER/ACER is actively following the ongoing discussions on the Energy Infrastructure Package proposed by the Commission in October 2011: promote transeuropean energy infrastructure.

The criteria for the selection of Projects of Common Interest (PCI) projects should be clear and quantifiable. Otherwise we will have long discussions which will just delay investments – which is not the intention.

Investors need to be clear that only efficiently incurred costs will be allowed by national regulators for cost recovery from network tariffs in order to ensure the effective use of capital.

We do not want to delay commercially sound projects by suggesting that they may be eligible for incentive that they don’t actually need. Nor do we want to allow the costs of investments to spiral inefficiently. It is essential that national regulators retain the power to decide on the nature of incentives, on a case-by-case basis, and that such incentives should be proportionate to the risk incurred by investors.

National Regulatory Authorities have the core expertise in ensuring that investments in infrastructure are made, and are made efficiently. However, the critical issue is whether the framework within which regulators operate helps them to work effectively – or hinders them.
Incentive regulation works as it can provide incentives both for efficiency as well as investments.

Strict continuation of the calculation methodology ensures risk-adequate rates of return that are predictable and that can be planned for in the long term providing certainty for operators and giving investors confidence.

There is no risk for German network operators as a result of the incentive regulation account and individual consideration of the cost of debt.

Higher rates of return do not deliver more rapid expansion but mean higher use of system charges!
4 reasons why it is worth investing in German energy infrastructure:

1. Germany is the biggest electricity and gas market in Europe.

2. Germany has the most secure electricity network in Europe and an excellent natural gas infrastructure.

3. Germany has the most ambitious energy and climate change targets. Infrastructure expansion is a growth market.

4. Bundesnetzagentur has done a lot to clear up cases of doubt regarding the framework conditions