The Future Perspective of the Electricity Market – Unbundling and Market Integration: A German Perspective

International Symposium
“Towards YR2030 and Beyond”
Japan Renewable Energy Foundation (JREF)

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The German context: Energiewende
Ambitious and long term targets

<table>
<thead>
<tr>
<th>Year</th>
<th>GHG emissions</th>
<th>Renewable Energies</th>
<th>Energy efficiency</th>
<th>Nuclear power</th>
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<td></td>
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<td>Gross final</td>
<td>Primary energy</td>
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<td></td>
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<td>consumption</td>
<td>Space heating</td>
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<td>Power generation</td>
<td>Final Energy</td>
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<td>Power consumption</td>
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<tr>
<td>2011</td>
<td>-40%</td>
<td>18%</td>
<td>-20%</td>
<td>-41%</td>
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<td>2015</td>
<td></td>
<td></td>
<td>-20%</td>
<td>-47%</td>
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<td>2917</td>
<td></td>
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<td>-10%</td>
<td>-54%</td>
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<td>2019</td>
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<td>-10%</td>
<td>-60%</td>
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<td>2020</td>
<td>-55%</td>
<td>30%</td>
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<td>-80%</td>
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<td>-70%</td>
<td>45%</td>
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<td>-100%</td>
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<td>2030</td>
<td>-80 to -95%</td>
<td>60%</td>
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<td>2040</td>
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<td>80%</td>
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<td>2050</td>
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<td>Base year</td>
<td>1990</td>
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<td>2008</td>
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<td>2010</td>
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Source: BReg (2010/2011)
Significant share of renewables
It’s reality

Transparency data for power generation
Day ahead prognosis

6 September 2012
• A sunny, low-wind day
• Renewables share at noon ~ 40%

Source: EEX Transparency Platform
Power generation from renewables
Challenges & policy approaches

Source: BReg (2012), Öko-Institut (2012)
The recent German support scheme (Feed-in Tariff) was the key policy for the take-off phase

- Fixed and long-term feed-in tariffs, based on costs
- Obligation for connection to the (existing) network
- Priority access to the network and the market

The next phase will require a broader policy approach

- Today’s liberalized (EU) electricity (energy only) market creates neither a solid basis for integration of renewables nor a sufficient economic framework for the necessary conventional investments
  - Price formation based on short-term marginal costs (~0 for wind & solar)
  - No long-term contracts
  - No capacity markets/payments
- Market integration of renewables requires a reform of today’s power markets and a (stepwise) reform of the support scheme
The next phase will require a broader policy approach (ctnd)

- Significant shares of renewables require new approaches to infrastructure design, operations & development
  - Massive upgrading of transmission and distribution networks is necessary (= significant investments)
  - Unbiased network operators
    - In planning processes
    - With regard to the necessary (long-term) investments
    - Within network operations (access, system services etc.)
  - Independent regulators with a clear mandate
    - Creating an enabling framework
    - Avoiding abuse of market power from infrastructure monopolies

This presentation is about infrastructure integration only. However, market integration is another challenging issue.
Recent phase of infrastructure integration benefited from EU market liberalization

**EU market liberalization**

- First package (1996): opening national markets
  - Networks: legal, functional and accounting unbundling for TSOs and DSOs (>100,000 customers)
- Second package (2003): further opening of national markets, regulation of cross-border trades
  - Networks: legal, functional and accounting unbundling of TSOs and DSOs (>100,000 customers)
- Third package (2009): development of regional/European markets, institutions for European co-operation, European guidelines and network codes
  - Transmission Networks: ownership unbundling for TSOs or Independent System/Transmission Operator (ISO/ITO)
  - Distribution networks: legal, functional and accounting unbundling for DSOs (>100,000 customers)
  - High-standard medium-term network planning
Rapidly changing structures in the German electricity supply system

• Starting point
  – Four major vertically integrated utilities (generation, transmission, distribution, sales): RWE, E.ON, Vattenfall, EnBW
  – Regional & municipal vertically integrated utilities

• Recent status
  – Four major unbundled utilities
    • Separate entities for generation and sales
    • Unbundled transmission system
      – Full ownership unbundling: 50 Hertz (formerly Vattenfall), TenneT (formerly E.ON)
      – Partly ownership unbundling: Amprion (formerly RWE which still owns 25%)
      – No ownership unbundling: Transnet BW (formerly EnBW which still owns 100%)
  – Regional & municipal utilities, the larger ones legally unbundled
Experiences from unbundling
The German case

- The German government and significant parts of the German electricity industry opposed all mandatory unbundling provisions when the respective EU legislative proposals were discussed.
- Ironically, German utilities often went beyond the minimum requirements for unbundling, after these has been approved.
- What has changed since further steps of unbundling were implemented?
  - Much more unbiased activities, network companies are a more accepted and reliable partner for policy.
  - Significantly more investments in network infrastructure.
  - Network companies became a key player on medium- and long-term infrastructure planning with broad and intensive consultations of assumptions, methodologies and results.
- However, this results from the structure of the network companies as well as a (new) effective regulatory body.
Infrastructure planning in Germany
The recent Network Development Plan

Power system structures
Lessons learned

• An ambitious and comprehensive support scheme for renewables (financing, network connection, dispatch) as primary instrument is key for the take-off phase

• Beyond the take-off phase broader approaches are essential
  – More complex financing for renewables is essential to optimize investments and operations
  – Creating market structures which are more appropriate
  – Creating an infrastructure industry (transmission and distribution)
    • which is supportive for infrastructure upgrades and roll-out
    • which has an self-interest in infrastructure investments and the ability for implementation of these investments
  – Far-reaching (ownership) unbundling has been effective
  – Creating an effective regulatory body
    • Effective oversight on infrastructure monopolies
    • Effective planning for major infrastructure upgrades & roll-out
Thank you very much

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