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Legal Framework for the Successful Network Integration of Renewables – the Example of the German EEG and EnWG

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Legal Framework for Successful Network Integration of Renewables

Outline

- Introduction: Success of renewables and consequences
- Example 1: Balancing markets
- Example 2: Development of the transmission networks
- Example 3: Restructuring of the distribution networks
- Conclusions

Success of renewables and consequences

- Power generation from renewable energy sources in Germany (in % of gross electricity consumption)
  - 2009: 16.4%
  - Target 2020: 35 %
  - Target 2030: 50 %
  - Target 2050: 80 %

- Consequences
  - Increasing volatility of power generation (wind, solar)
  - New generation sites (esp. wind onshore and offshore)
  - Increase in decentralized generation (lower capacity and lower voltage)

Success of renewables and consequences

- Need for adaptation of the legal framework

- 3 examples from the German experience
  - Balancing markets
  - Development of the transmission networks
  - Restructuring of the distribution networks

Example 1: Balancing markets

- Problem analysis

- Current configuration of the German balancing system
  - Mainly large conventional (coal, gas, oil) power plants
  - Nuclear power plants

- Difficulties to ensure sufficient balancing capacity in a system with increased renewable power generation
  - Necessity to use renewable power generation for balancing
  - Attraction of additional balancing capacities (pump storage, gas-fired power plants)

Example 1: Balancing markets

- Access to balancing markets

- General technical and economic considerations
  - Degree of reliability („prequalification“)
  - Flexibility (quickness of reaction)
  - Batch size (minimum capacity)
  - Duration of availability

- Legal adaptations discussed
  - Diminished batch size and duration requirements
  - Admissibility of „pooling“ of small plants

  ➔ better access for decentralized generation

Example 1: Balancing markets

- Access to balancing markets

- Specific preconditions for renewables
  - Distinction between directly marketed renewables and renewables marketed at feed-in tariffs
  - Distinction between positive and negative balancing power

- Legal adaptations discussed
  - Markets for positive balancing power: Admission only of directly marketed renewables → pressure to change to direct marketing of renewables
  - Markets for negative balancing power: Admission of renewables marketed at feed-in tariffs is controversial

Example 2: Development of the transmission networks

- Problem analysis

- Current situation
  - Power plants close to load (in the west and south of Germany)
  - Limited transmission capacity (extra-high voltage)

- Difficulties to ensure sufficient transmission capacity in the future
  - Wind power generation is built mainly in the north and northeast
  - Presumably 3.600 km of new transmission lines needed
  - Great public opposition (conservation of nature, reduced value of premises, no benefits for communities concerned)
  - TSOs (Transmission System Operators) want higher return on investment

Example 2: Development of the transmission networks

- Legal adaptations of the planning process

- Common demand planning of TSOs
  - EU law from 2011 onwards demands 10 year plans of TSOs
  - Possibilities of energy regulators to comment and demand changes of plans

- Authorization of transmission routes in Germany
  - Statutory confirmation of demand for the most important new power lines (24 extra-high voltage lines) since 2009
  - Streamlining of authorization procedures (adaptations in 2006, 2009, 2011)
  - Increased federal planning competences discussed
  - Increased financial incentives for TSOs discussed
  - Financial incentives for communities concerned in discussion

Example 2: Development of the transmission networks

- Legal adaptations regarding technical aspects

- Extra-high voltage underground cables
  - More expensive, but better public acceptance
  - Regulators have to allow costs for partial undergrounding on 4 pilot power lines (since 2009); authorities may oblige TSOs to build underground cables (since 2011)
  - Costs of undergrounding will be shared Germany-wide

- Extra-high voltage DC power lines
  - DC power lines to be tested on pilot routes
  - Regulators have to allow costs for DC power lines

Example 3: Restructuring of the distribution networks

- Problem analysis

- Current situation
  - Networks built to distribute the electricity fed into the transmission networks by large conventional or nuclear power plants at extra-high voltage
  - Size of distribution networks adjusted to customary current flows

- Difficulties to handle decentralized and volatile power generation
  - Grid congestion
  - Adjustment of power consumption to generation ➔ need for more detailed metering of consumers and for load management

Example 3: Restructuring of the distribution networks

- Legal adaptations regarding network congestion

- Precedence of power generated from renewables
  - Explicit duty of DSOs (Distribution System Operators) to develop their networks to accommodate renewables
  - Still congestion cases are increasing → compensation for renewable power plants (since 2009)
  - Possibility for the network operators to adjust renewable power generation (plants > 100 MW, discussed for solar energy)

- Costs of network development
  - Costs of distribution network checked by benchmarking → disadvantage for DSOs with strong decentralized generation
  - New parameter taking account of decentralized generation (since 2010); also for next benchmarking exercise 2012/2013?

Example 3: Restructuring of the distribution networks

❖ Legal adaptations regarding consumption

➢ Smart metering

- „Smart meters“: showing real consumption over time
- Duty of DSOs to install smart meters at least in new buildings (since 2010; further assessment 2012)

➢ Load management

- Possibility to influence consumption time by differentiated tariffs, external decisions on consumption time etc.
- Could also be done by DSOs ➔ whether this should be the task of DSOs is being discussed
- Practical importance e.g.: constraints of time for charging of electrically powered vehicles („e-mobility“)

Conlusions

- The success of renewables makes further adaptations of the legal framework necessary

- Examples for adaptations of the legal framework were
  - Balancing markets
  - Development of the transmission networks
  - Restructuring of the distribution networks

- Other areas of adaptation in Germany are e.g.
  - Market design for energy bought at feed-in tariffs (adaptations 2009, 2010) and for direct marketing of renewable energy (adaptations 2009, others in discussion for 2012)
  - Requirements for renewable power plants to provide network services like voltage and frequency control (2009 for wind, in discussion for other renewables)

Thank you for your attention!

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