Sustainable market model?

EnergyDays

Frank Nobel
Eindhoven, 13 February 2014
Existing studies

**WHITE PAPER ON A SUSTAINABLE DESIGN OF THE ELECTRICITY MARKET**

Challenges for Renewable Energies and Guidelines for a Sustainable Market Design
PREPARED ON BEHALF OF TENNET TSO B.V.

21.10.2013
Final Report
E-BRIDGE CONSULTING (GERMANY) AND UMS GROUP (THE NETHERLANDS) IN COLLABORATION WITH PROF. FRANK A. WOLAK, STANFORD UNIVERSITY (USA)

**Towards a sustainable market model**

*Why there is a need for a modified market model*

Remco Frenken
Jens Buchner

*Study commissioned by TenneT, April 2013*

**Flexibility Markets – a possible element for a future market design**

European Electricity Regulatory Forum, Milan
Agenda Point 4.4

Thomas Tillwicks
Senior Advisor
November 13, 2013
TenneT’s view on market design

- Maximum freedom for all participants
- Optimal dispatch of all assets (P, t, €)
- Transparent cost allocation

**Market**
- Rights
- Connection
- Transaction
- Dispatch

**System Operations**
- Security of supply
- Frequency (jointly)
- X Zonal Power
- Control Targets

**System services**

**Ancillary services**
TenneT’s view on market design

- Maximum freedom for all participants
- Optimal dispatch of all assets ($P, t, \€$)
- Transparent cost allocation
Criteria for a secure system

- **System requirements**
  - Adequate generation to meet demand at all times
  - Adequate grid infrastructure to secure continuity of service
  - Sufficient inertia which is essential for a stable frequency
  - Flexibility for balancing and ramp speed for compensating for fluctuating production
  - Sufficient means of voltage control
  - Controllability of generators in the event of major disturbances

- **Market instruments for providing system stability**
  - Properly designed responsibilities and incentives for market parties
  - Market integration as a cost-efficient tool for successfully integrating renewables
Sustainable market model?

**Turnover**
(guestimate for German Situation)

<table>
<thead>
<tr>
<th>Category</th>
<th>Turnover (Bln €)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional Generation</td>
<td>35</td>
</tr>
<tr>
<td>Customer Sales + PF mgt</td>
<td>10</td>
</tr>
<tr>
<td>Renewable Generation</td>
<td>15</td>
</tr>
<tr>
<td>Grid Infrastructure</td>
<td>5</td>
</tr>
<tr>
<td>System Management</td>
<td>0</td>
</tr>
</tbody>
</table>

The chart illustrates the turnover in billions of euros across different categories:
- **Market Based**: 35 Bln €
- **Subsidized**: 10 Bln €
- **Regulated**: 15 Bln €

*Note: The regulated category often competes at a subsidized rate.*

**Tennet**
Taking power further

*Sustainable market model?*
How much market should be in the future?

Focus on regulatory correction?
- RES are exempted from balancing responsibility
- Flexible capacities are mainly traded on balancing and are partially subsidized by capacity markets
- Remaining generation capacity is traded on the free wholesale market

Further development of market?
- RES are integrated in the free market and are responsible for balancing themselves
- Flexible capacities are traded on flexibility and balancing markets
- Different subsidy forms for flexibility and RES possible

Market today
- TSO-markets
- Exempted RES
- Free wholesale market

Special arrangements for RES
- Free market, supply/demand offered by many market participants, no regulation
- Single-buyer-markets, auction-based, maybe regulated
Main future market challenges*

1. Increase in volatile production raises need for flexibility
2. Widening gap between market and physics
3. Integration of new technologies into the market
4. Utilization of existing grid assets
5. Declining price signals for power plant investments
6. Market integration of new players
### Challenges

| Network congestions jeopardize system security | Acute and possibly temporary |
| Excess cost for the German electricity supply industry |
| - Current subsidization scheme for renewable leads to excessive electricity costs |
| - "Premature" decommissioning of conventional power plants |
| Feasibility of targets of the Energiewende within the European internal energy market is unclear |
| - Possibilities for cross-border exchanges to compensate for the short-fall or surplus of renewable energy production is limited |
| - Security of supply in the event of generation scarcity is not guaranteed |
| Risk of insignificant incentives for investment in generation, storage and load management |
| - Increasing market risks for power plant operators |
| - Lack of willingness of wholesale consumers to pay the required risk premiums of long-term contracts |
| - Risk of insufficient acceptance of price peaks |
| | Acute and long-term |
| | Mid- and long-term |
### Challenges

**Renewables:**
- Wrong place
- Wrong time
- Wrong price
- Wrong pace?

**Market design:**
- Wrong signals

### Urgency

- **Acute and possibly temporary**
- **Acute and long-term**
- **Mid- and long-term**
TenneT’s view on market design

- Strengthen the energy-only-market and complete European market integration.
- Integrate RES into the electricity market:
  - no unlimited expansion of capacity
  - responsive to price signals (commodity and balancing)
  - actively participating delivering system support.
- European coordination to safeguard security of supply in each country:
  - Taking into account reliable cross border supply can prevent the need for national measures.
- Monitor the functioning of the energy-only-market and its capacity to deliver the system requirements.
- Allow the market to develop and use all competitive sources of flexibility like storage and demand response and exchange flexibility over a large area.
- Cooperation between TSO and DNO to combine use for flexibility for national balancing and for capacity management and voltage control in lower voltage.
prevent the need for national measures….

Instead of flexibility, Europe is rewarding capacity (but not across borders)

- **GB** Developing capacity auctions
- **Belgium** Tenders for new CCGT
- **Sweden & Finland** Strategic reserve supplements energy only market
- **Germany** Discussions about introduction of national capacity mechanisms; Grid stability reserves in south since 2011
- **Poland** Proposals for new market with capacity mechanism
- **Italy** Proposals to replace current mechanism (with low payments) with reliability contracts
- **Greece** Quantity based capacity mechanism

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**SEM**
- CCGT tender (2002/3); Ongoing price-based capacity mechanism

**France**
- Call for tender; Capacity obligations being developed

**Portugal**
- Price based capacity mechanism for new units

**Spain**
- Current price based capacity mechanism being re-developed

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13 February 2014
TenneT is Europe’s first cross-border grid operator for electricity. With approximately 20,000 kilometres of (Extra) High Voltage lines and 36 million end users in the Netherlands and Germany we rank among the top five grid operators in Europe. Our focus is to develop a north-west European energy market and to integrate renewable energy.

Taking power further

www.tennet.eu