A market design for a future renewable-based energy system

A regulatory perspective

Vienna, 7 November 2018

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Electricity Department
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1.1 Policy dimensions of the Energy Union

Integrating RES into the market by ensuring that there is a fully-integrated and well-functioning internal energy market in the first place!

- Fully-integrated Internal Energy Market
- Research, innovation & competitiveness
- Energy efficiency
- Energy security, solidarity & trust
- Decarbonisation

→ closely related and mutually reinforcing dimensions of the Energy Union
1.2 Gradual liberalisation process of electricity markets

Creating a fully-integrated and well-functioning electricity market is a long and slow process...


1. First common rules for the internal market and liberalisation

2. Speeding-up liberalisation and market integration

Monopole

1st energy package

2nd energy package

3rd energy package

4th energy package

Competition

EU-wide institutional & regulatory framework

“Clean Energy for all Europeans”
- Energy performance in buildings
- Energy efficiency
- Renewable energy
- Electricity markets
- Risk preparedness
- Governance
- ACER regulation
1. Policy context

1.3 Vision of an integrated internal European electricity market by 2025

…but we have a clear vision of what we want to achieve by 2025!

**Generation**
- diverse production sources
- low or zero-carbon sources

**Wholesale markets**
- liquid
- competitive
- flexible response from all sources
- all forms of generation, storage and demand response
- level-playing field in all timeframes

**Transmission**
- increased interconnection
- dynamic cross-border capacity calculation
- efficient use of capacity

**Distribution**
- market facilitators
- TSO-DSO coordination
- resilience to security of supply threats (e.g. cybersecurity)

**Policy**
- address market failures
- minimise market distortions

**Regulation**
- supports investment in networks
- no discriminating between national and cross-border projects

**Retail markets**
- competitive markets
- active, informed, protected and empowered consumers
- direct participation or through service providers: e.g. owning and operating generation capacity connected to commercial or domestic premises

**Innovation**
- smart technologies and new services to manage consumption of smaller customers (including domestic customers)
- consumption management to reduce the cost of network operation, while reducing electricity bills
- newer technologies (storage)

**Governance**
- dynamic to address technical, political & societal developments
- active role of consumers in decision-making
- European energy sector in the public interest
- Transparency and accountability
- Independence (ACER and NRAs)

*Source: ACER: Energy Regulation: A Bridge to 2025 Conclusions Paper (19 September 2014).*
2. Internal Energy Market

2.1 Electricity target model

*We expect a liquid and competitive wholesale market, including arrangements which value flexible response from all sources, ensuring high levels of system security, which can be achieved through the implementation of the electricity ‘target model’.*

<table>
<thead>
<tr>
<th>Bidding zone configuration</th>
<th>Capacity calculation</th>
<th>Long-term capacity allocation</th>
<th>Day-ahead capacity allocation</th>
<th>Intraday capacity allocation</th>
<th>Balancing markets</th>
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<td>Unbundling</td>
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<td>Independence for NRAs</td>
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<td>Stronger coordination (ACER &amp; ENTSO-E)</td>
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<td>Adequate network development</td>
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**Shared vision:** 
*“Target model”*

**Common rules**
(Framework Guidelines and Network Codes)

**Implementation and monitoring**

*Technology-neutral*
2. Internal Energy Market

2.2 Electricity market integration

One of ACER’s mandate is to monitor the remaining barriers to the completion of the fully-integrated internal energy market and to make recommendations on how to improve the market design.
3. Market monitoring

3.1 Market integration status

The annual Market Monitoring Report (MMR) is an evidence-based analysis identifying inefficiencies and recommending how to improve the market design, with focus on cross-border issues.

3. Market monitoring

3.1 Market integration status

Our latest analysis shows that the completion of day-ahead and intraday market integration though market coupling is getting closer.

Figure 1: Implementation status of single DA and ID market coupling – October 2018

3.2 Use of existing infrastructure

The (limited) cross-border capacity made available to the market is used efficiently in the day-ahead timeframe, with room for improvement in the intraday and balancing timeframes...

Figure 2: Efficient use of interconnectors in the different timeframes – 2017 (%)

Note: * Intraday and balancing values are based on a selection of EU borders.

Source: ACER calculations based on ENTSO-E, NRAs and Vulcanus (2018).
3.3 Capacity made available for trade

…but the low level of cross-zonal capacity made available for trading remained the main barrier to market integration.

Figure 3: Ratio of available tradable capacity to benchmark capacity on HVAC borders per capacity calculation region – 2017 (%)

Source: ACER calculations based on ENTSO-E and NRAs (2018).

Note: The benchmark capacity is calculated by ACER as the capacity which could be made available while preserving operational security. ACER extensively consulted with stakeholders, including TSOs and ENTSO-E, in order to elaborate the methodology underlying the calculation of benchmark capacities. The full methodology is available at https://www.acer.europa.eu/en/Electricity/Market%20monitoring/Documents/ACER%20Methodological%20paper%20-%20Benchmark%20cross-zonal%20capacity%20calculation.pdf
### 3.3 Capacity made available for trade

*Low cross-border capacity has several underlying causes, which could be tackled.*

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<th>How much?</th>
<th>What?</th>
<th>Why?</th>
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<tr>
<td>86%</td>
<td>Share of relevant congestions located inside bidding zones (CWE, 2017)</td>
<td>Internal congestions addressed by limiting cross-border exchanges</td>
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<td>87%</td>
<td>Share of network capacities in relevant network elements consumed by internal exchanges (CWE, 2017)</td>
<td>Lack of rules to avoid discrimination, leading to free-riding on neighbours (loop flows)</td>
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<td>&gt;2 bn €/year</td>
<td>Costs to handle internal constraints (50% of these costs in Germany)</td>
<td>The problem is so serious that TSOs still need to apply remedial actions to preserve internal exchanges</td>
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**Main recommendations:**

1. *Improvement of bidding zone configuration*
2. *Improvement in capacity calculation methodologies*
3. *Increased level of coordination in capacity calculation*

*Source: ACER calculations based on ENTSO-E and NRAs (2018).*
3.4 Intraday markets

**Intraday markets provide an effective solution for integrating vRES, enabling market participants to balance their positions closer to real-time. So the sooner the gate opens, the more trading opportunities for market participants to optimise their portfolios.**

Figure 6: Distribution of total ID volumes per trading hour, per trading system and NEMO in Europe – 2017 (% volumes per hour when trade occurred on trading day D-1 and D)

Source: NEMOs and ACER calculations (2018).
3.4 Intraday markets

At the same time, setting the gate closing time as close as possible to real time (at most 1h before delivery) provides the necessary trading flexibility, when more accurate forecasts are available.

Figure 7: Share of ID-traded volumes per relative trading hour for hourly, half-hourly and quarter-hourly products in implicit continuous markets – 2017 (% volumes of continuous trades per hour left until delivery)

Note: Hour 1 represents the trading interval between 60–120 minutes before the start of physical delivery. The number in brackets in the legend of the figure refers to the number of bidding zones included in the analysis for each traded product.

Source: NEMOs and ACER calculations (2018).
3.4 Intraday markets

Liquid intraday markets are key for vRES integration and the granularity of the offered intraday products could be an important element in attracting more liquidity (to be further monitored).

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<th>MS</th>
<th>Auction</th>
<th>Continuous trading</th>
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Table 1: Overview of the availability of ID products (trading mechanism and granularity) per country – 2017

3.5 National adequacy assessments

In addition to integrating vRES, a well-functioning fully-integrated internal electricity market could contribute to security of supply, but national assessments underestimate the contribution of interconnectors, while capacity mechanisms emerge in an uncoordinated manner.

Figure 8: Treatment of interconnectors in generation adequacy assessments in Europe – 2016

Background: heterogenous capacity mechanisms continued to emerge in Europe in 2017 (six mechanisms approved by the EC in February 2018).

Facts: more than 2 billion euros to be spent in capacity mechanisms in Europe in 2018, while the charges to finance capacity mechanisms are becoming a noticeable share of the wholesale prices (e.g. more than 30% of day-ahead prices in Ireland, around 5% in Greece and France).

Note: The percentages represent the ratios between the net contribution of interconnectors at times of stress, as considered in national assessments, and the average commercial import capacities. These percentages do not represent the actual contribution (in MW) which can be negligible on some borders (e.g. on some of the Polish borders).

Source: NEMOs and ACER calculations (2018).
3.6 Welfare benefits

While important progress was made towards completing the internal electricity market, any step to implement the existing legal framework or to improve the current market design, such as removing discrimination of cross-zonal exchanges, brings significant welfare benefits to all EU citizens.

Figure 9: Social welfare benefits already obtained and to be obtained from various actions intended to increase EU market integration

**Source:** ENTSO-E, NRAs, NEMOs, Vulcanus and ACER calculations (2018).
3.7 Retail markets

Last, but not least, developments in wholesale markets have repercussion on retail markets. E.g. the relative share of the energy component in the total EU electricity retail price for households decreased over time, leaving less room for competition among suppliers.

Figure 10: Weighted average breakdown of incumbents’ standard electricity offers for EU households in capital cities – 2012–2017 (%)

Source: ACER calculations based on data from price comparison tools, incumbent suppliers’ websites, NRAs, collected via ACER Retail Database (2018).
Thank you for your attention!