The Internal Market for Electricity in the European Union

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Director ad interim

The Pan-Arab Energy Trade Conference
Cairo, 6 - 7 November 2019
<table>
<thead>
<tr>
<th></th>
<th>EU</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area (km²)</td>
<td>4,422,773</td>
<td>9,147,593</td>
</tr>
<tr>
<td>Population (million)</td>
<td>≈510</td>
<td>≈320</td>
</tr>
<tr>
<td>Final Electricity Consumption (TWh)</td>
<td>≈2800</td>
<td>≈3950</td>
</tr>
</tbody>
</table>
The EU Internal Energy Market: a 20+-year project

1st Package
“First common rules for the internal market and liberalisation”

2nd Package
“Speeding up liberalisation and market integration”
- Full market opening;
- obligation for MSs to establish NRAs independent from industry;
- legal & functional unbundling

3rd Package
“EU-wide Institutional & Regulatory Framework”
- Reinforcing unbundling (including ownership);
- harmonised cross-border rules;
- strengthened NRA independence & powers;
- establishment of ACER & ENTSOs

“Clean Energy” Package
“Meeting the decarbonisation challenge”
- Enhance the electricity market design to promote flexibility and enhance supply security

1996 1998
2003 2005
2009
2019
Completing the Internal Energy Market

Shared Vision: “Target Model”
An efficient Internal Electricity Market for the benefit of EU energy consumers

Integrating the IEM

1-Efficient bidding zones configuration
2-Capacity available for cross-border trade
3-Efficient use of cross-zonal capacity
4-Integrated wholesale markets
5-Retail markets
6-Consumer benefits
**Electricity Target Model**
... for forward, day-ahead, intraday and balancing timeframe

<table>
<thead>
<tr>
<th>Capacity Calculation</th>
<th>OPTIMAL BIDDING ZONES + FLOW-BASED to optimise the use of infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward</td>
<td>SINGLE EU RULES AND ALLOCATION PLATFORM to allocate transmission rights</td>
</tr>
<tr>
<td>Day-Ahead</td>
<td>SINGLE EU-WIDE (AUCTION-BASED) PRICE COUPLING to optimise XB capacity use</td>
</tr>
<tr>
<td>Intraday</td>
<td>SINGLE EU-WIDE (CONTINUOUS) XB TRADING with the possibility of auctions</td>
</tr>
<tr>
<td>Balancing</td>
<td>SINGLE EU COMMON MERIT ORDER LIST for all balancing energy products</td>
</tr>
</tbody>
</table>
Completing the Internal Energy Market

Shared Vision: “Target Model”

Common Rules (Framework Guidelines and Network Codes)
The legislative and normative construct under the Third Package

Electricity and Gas Directives
Electricity and Gas Regulations
Agency Regulation

Framework Guidelines

Network Codes
Guidelines

Terms and Conditions
or
Methodologies
## Electricity Framework Guidelines and Guidelines/Network Codes

<table>
<thead>
<tr>
<th>Priority Area</th>
<th>Network Code/Guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grid Connection</strong></td>
<td>2016: Network Code on Requirements for Grid Connection of Generators (RfG NC)</td>
</tr>
<tr>
<td></td>
<td>2016: Network Code on Demand Connection (DCC NC)</td>
</tr>
<tr>
<td></td>
<td>2016: Network Code on Requirements for Grid Connection of High Voltage Direct Current Systems and Direct Current-connected Power Park Modules (HVDC NC)</td>
</tr>
<tr>
<td><strong>Capacity Allocation and Congestion Management</strong></td>
<td>2015: Guideline on capacity allocation and congestion management (CACM GL)</td>
</tr>
<tr>
<td></td>
<td>2016: Guideline on forward capacity allocation (FCA GL)</td>
</tr>
<tr>
<td><strong>System Operation</strong></td>
<td>2017: Guideline on Electricity Transmission System Operation (SO GL)</td>
</tr>
<tr>
<td></td>
<td>2017: Network Code on Emergency and Restoration</td>
</tr>
<tr>
<td><strong>Balancing</strong></td>
<td>2017: Guideline on Electricity Balancing</td>
</tr>
</tbody>
</table>
CACM Guideline: Terms and Conditions or Methodologies

EU-wide TCMs

(a) plan on joint performance of Market Coupling Operator function
(b) capacity calculation regions
(c) generation and load data provision methodology
(d) common grid model methodology
(e) harmonised capacity calculation methodology
(f) back-up methodology
(g) intraday capacity pricing methodology
(h) intraday cross-zonal gate opening and intraday cross-zonal gate closure times
(i) day-ahead firmness deadline
(j) congestion income distribution methodology
CACM Guideline: Terms and Conditions or Methodologies

All-TSO proposals (all-NRA approvals)

Regional TCMs

- (a) common capacity calculation methodology
- (b) decisions on the introduction and postponement of flow-based calculation and on exemptions
- (c) methodology for coordinated redispatching and countertrading
- (d) common methodologies for the calculation of scheduled exchanges
- (e) fallback procedures
- (f) complementary regional auctions
- (g) conditions for the provision of explicit allocation
- (h) redispatching and countertrading cost sharing methodology
Completing the Internal Energy Market

Shared Vision: “Target Model”

Common Rules (Framework Guidelines and Network Codes)

Implementation and monitoring

A Parallel Process to deliver tangible benefits to EU energy consumers as soon as possible

Formal Framework Guidelines / Network Codes Process

Voluntary Early Implementation of the Target Model
The EU internal electricity day-ahead market

Today:
80% of borders coupled
46 borders coupled in a single coupling
3 borders coupled separately
12 borders still waiting to be coupled

Final goal:
EU-wide day-ahead market coupling with implicit auctions

PCR = Price Coupling of Regions

4M MC = 4M Market Coupling

Not coupled yet
Day-Ahead Electricity Market Coupling: a Success Story!

2013

Source: ACER (2019)
Day-Ahead Electricity Market Coupling: A “parallel” approach paid out!

Source: ACER (2019)
Significant improvements in the efficiency of the use of cross-border capacity in the day-ahead timeframe

Share of the available capacity (NTC) used in the ‘right direction’ in the presence of a significant price differential (>1 €/MWh) on 37 European electricity borders (%)

More efficient use of cross-border capacity through “market coupling”

Estimated Annual Benefits

€ 1 billion

Source: ACER (2019)
... but there is scope for further improvement

Estimated social welfare gains still to be obtained from further extending DA market coupling per border – 2017-2018 (million euros)

Welfare gains in excess of €150-200 million/year from the extension of market coupling to the remaining EU zonal borders

Source: ACER (2019)
Although full price convergence is not an objective in itself, market coupling contributes to increase price convergence ...

... but there are still significant price differences across some borders

*In the Ireland–UK Region it was implemented in Oct 2018
Scope for improvement also exists in the efficiency in the use of cross-border capacity in the intraday and balancing timeframes

Share of the available capacity (NTC) used in the ‘right direction’ in the presence of a significant price differential (>1 €/MWh) on 37 European electricity borders in different timeframes

2018 (%)

<table>
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<tr>
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<tbody>
<tr>
<td>Day-ahead</td>
<td>86%</td>
<td>+0%</td>
</tr>
<tr>
<td>Intraday*</td>
<td>50%</td>
<td>+0%</td>
</tr>
<tr>
<td>Balancing* (incl. netting)</td>
<td>23%</td>
<td>+1%</td>
</tr>
</tbody>
</table>

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

Source: ACER calculations based on ENTSO-E, NRAs and Vulcanus (2017)
... and in the amount of cross-border capacity made available to the market

Ratio of available tradable capacity to benchmark capacity on HVAC borders per CCR 2017 (%)
Why is so little capacity made available to the market?

Illustrative facts

<table>
<thead>
<tr>
<th>How much?</th>
<th>What?</th>
<th>Why?</th>
</tr>
</thead>
<tbody>
<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>
</tr>
<tr>
<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>
</tr>
<tr>
<td>❌ &gt;2 bn €</td>
<td>Spent per year 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>
</tr>
</tbody>
</table>

Main Agency’s recommendations:

1. **Bidding Zone configuration**: Improvements should be investigated with priority where the problem is most severe, i.e. the German bidding zone (involving the Core and Hansa regions) and to a lesser extent in the South-West Europe region. However launching a bidding zone review process is not advisable at the moment.

2. **Capacity calculation methodologies** need to be significantly improved to address the discrimination issue.

3. **The level of coordination** in capacity calculation should be increased (including the implementation of flow-based capacity calculation where relevant).
Current Capacity Calculation Methodologies do not prevent discrimination of cross-border exchanges

Extent of the prevention of undue discrimination of cross-border exchanges in the approved CCMs (%)

<table>
<thead>
<tr>
<th>Region</th>
<th>Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>83%</td>
</tr>
<tr>
<td>Nordic</td>
<td>43%</td>
</tr>
<tr>
<td>Baltic</td>
<td>50%</td>
</tr>
<tr>
<td>Channel</td>
<td>38%</td>
</tr>
<tr>
<td>GRIT</td>
<td>14%</td>
</tr>
<tr>
<td>Hansa</td>
<td>50%</td>
</tr>
<tr>
<td>IU</td>
<td>25%</td>
</tr>
<tr>
<td>SEE</td>
<td>25%</td>
</tr>
<tr>
<td>SWE</td>
<td>50%</td>
</tr>
</tbody>
</table>

Source: ACER
EU energy consumers have gained a lot from the integration of the internal electricity market, but could gain even more!

Social welfare* benefits already obtained and to be obtained from various actions intended to increase EU markets integration

Source: ENTSO-E, NRAs, NEMOs, Vulcanus and ACER calculations

Note: *Gross benefits. The fading colour for some categories indicates that the welfare gains are based on third-party estimations and/or subject to considerable uncertainty.
Thank you for your attention

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