Marktintegration von Erneuerbaren – Markt statt Förderung?!
A truly European Power Exchange

- 20+ nationalities in staff
- 302 members in 21 EU countries
- 7 European shareholders
  - 51% private, 49% TSOs
- 8 European markets operated
  - 8 new planned
- 21 borders
  - market-coupled
- 7 local offices across Europe
- 14 EEX Group

Markets covered under the roof of the Clearing House

- Current EPEX markets
- Coming soon
- Serviced Power Exchanges

Local EPEX / EEX Group offices
One gateway to value the whole chain of power trading

EEX

EPExSpot

FUTURES MARKET
Year/Month/Week before delivery
HEDGE fluctuations

CAPACITY MARKET
Year(s) before/after delivery
Value CAPACITY & DEMAND RESPONSE

DAY-AHEAD AUCTION
One day before delivery
Value PRODUCTION CONSUMPTION

INTRADAY CONTINUOUS
Until 5 min before delivery
Value FLEXIBILITY

Integrated & Secure Clearing Solution
A multifold use of the intraday market

Traditionally, main reasons for intraday trading are:

1. Adjust purchase and sale based on the results of the day-ahead auction
2. Run and plan power generation closer to delivery
3. Manage unforeseen events such as power plant outage
4. Enable arbitrage between neighboring countries

Today with increased share of renewables, **new reasons** for intraday trading are:

5. **Balance forecast errors**
6. **Handle generation ramps with finer granularity products**
Subhourly contracts: products responding to market needs

Volumes of selected 15- and 30min products on EPEX SPOT markets (in TWh)

Success of 15-min products

25% of German intraday volumes traded on 15-min contracts in 2019

Clean Energy Package

confirms high priority for 15min products for intraday and day-ahead (Art. 7 Electricity Regulation)
Intraday: a dynamic market, trading closer to real-time, at finer granularities

Lead time of all trades of 60min products in the German Intraday market

Source: EPEX SPOT
The functioning of the feed-in premium

The feed-in premium sets incentives for the most efficient commercialisation of renewables at the power exchange and thus promotes the integration of renewables into the market.

- Behaviour of renewable energies on the electricity market like other generation sources
- Incentives for systemic behaviour and efficient marketing
- Improvement of forecast quality
- Remote control of the renewable plants
Rise of aggregators

Volumes (in TWh) of aggregators* on the German spot market

*In this charts, 22 companies whose declared main business model is aggregation of RES energy are taken into account. Therefore some utilities also acting as aggregators have been excluded.
Direct marketing works – Aggregators react to the market price signal

Aggregated curve on a windy day 26/12/2016, hour 7, price –67 EUR/MWh

Wind plateau ~ 12GW

The size of the wind plateau is highly correlated to wind forecast.
From global to local: the micro-local will support flexibility needs at all grid levels

- Wholesale market
- Local flexibility markets, when and where relevant
- Microgrids
- Smart devices
- Electric vehicles
- Storage
- Any type of flexibility

Automated connection between the microgrid and the wholesale market

- SELL TO THE WHOLESALE MARKET
  - PV Oversupply • Battery full • Demand response

- PURCHASE FROM THE WHOLESALE MARKET
  - Lack of PV/Wind • Cold Wave • Battery empty

2020 - EPEX SPOT – All rights reserved
Thank you for your attention!

EPEX SPOT Paris
5 boulevard Montmartre
75002 Paris
France
Tel +33 1 73 03 96 00
info@epexspot.com

EPEX SPOT London
11 Westferry Circus
Canary Wharf
London E14 4HE
United Kingdom

EPEX SPOT Bern
Marktgasse 20
3011 Bern
Switzerland

EPEX SPOT Amsterdam
Quarter Plaza
Transformerweg 90
1014 AK Amsterdam
The Netherlands

EPEX SPOT Leipzig
Augustusplatz 9
04109 Leipzig
Germany

EPEX SPOT Brüssel
Treesquare, Square de Meeus 5-6
1000 Bruxelles
Belgium

EPEX SPOT Wien
Mayerhofgasse 1/19
1040 Wien
Austria
Backup
Day-Ahead markets: Price evolution

Source: EPEX SPOT

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AT (Phelix AT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>59.92</td>
<td>40.06</td>
</tr>
<tr>
<td>DE/AT/LU (Phelix)</td>
<td>38.85</td>
<td>44.49</td>
<td>51.12</td>
<td>42.60</td>
<td>37.78</td>
<td>32.76</td>
<td>31.63</td>
<td>28.98</td>
<td>34.19</td>
<td>41.73</td>
<td>-</td>
</tr>
<tr>
<td>DE/LU (Phelix DE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>52.60</td>
<td>37.67</td>
</tr>
<tr>
<td>FR</td>
<td>43.01</td>
<td>47.50</td>
<td>48.89</td>
<td>46.94</td>
<td>43.24</td>
<td>34.63</td>
<td>38.48</td>
<td>36.75</td>
<td>44.97</td>
<td>50.20</td>
<td>39.45</td>
</tr>
<tr>
<td>CH (Swissix)</td>
<td>47.92</td>
<td>51.02</td>
<td>56.18</td>
<td>49.52</td>
<td>44.73</td>
<td>36.79</td>
<td>40.30</td>
<td>37.88</td>
<td>46.22</td>
<td>52.22</td>
<td>40.92</td>
</tr>
<tr>
<td>NL</td>
<td>39.16</td>
<td>45.38</td>
<td>52.03</td>
<td>48.00</td>
<td>51.95</td>
<td>41.18</td>
<td>40.05</td>
<td>32.24</td>
<td>39.31</td>
<td>52.53</td>
<td>41.20</td>
</tr>
<tr>
<td>BE</td>
<td>39.36</td>
<td>46.30</td>
<td>49.37</td>
<td>46.98</td>
<td>47.45</td>
<td>40.79</td>
<td>44.68</td>
<td>36.61</td>
<td>44.58</td>
<td>55.27</td>
<td>39.35</td>
</tr>
<tr>
<td>GB (in £)</td>
<td>-</td>
<td>-</td>
<td>47.18</td>
<td>44.51</td>
<td>49.68</td>
<td>42.02</td>
<td>40.43</td>
<td>40.43</td>
<td>45.32</td>
<td>57.44</td>
<td>42.85</td>
</tr>
</tbody>
</table>

- Subprime crisis
- Increase of Brent
- CWE Market Coupling
- Cold spell all over Europe
- Integration of Renewables under EEG
- Overcapacities in BE & FR
- Banking crisis
Day-Ahead markets: Traded volumes
A dynamic Intraday market, trading closer to real-time, at finer granularities

- Intraday markets are very active both locally and cross-border
- Cross-border trades represent on average 20% of total traded volume

© 2020
Two «Target Models» for market integration, now set in the EU Law

Day-Ahead Market Coupling

Intraday Market Coupling

CACM Regulation (EU) 2015/1222

Coupled under MRC
4MMC members
PCR members (not coupled)

1st wave – June 2018
2nd wave – November 2019
3rd wave – TBC
3 steps of market integration

1. Pure system integration
   - Regulated remuneration (feed-in tariff)
   - No reaction to market price signal
   - No price risk
   - TSOs in charge of commercialisation of renewables

2. Direct marketing
   - Mixed remuneration from market revenues and support scheme (feed-in premium)
   - Limited reaction to market price signal
   - Limited price risk
   - Incentives for the most efficient commercialisation of renewables

3. Full market integration
   - No support scheme, but remuneration from market revenues (power exchange, PPA, GoO, etc.)
   - Full reaction to market price signal
   - Full market price risk
   - Well-functioning carbon market needed
Power markets successfully integrate considerable amounts of renewables

Installed capacity in the EU (in GW)

Generation mix evolution as renewables enter

Source: IRENA, 2019

In Germany:
• 79.7 GW renewables are marketed under feed-in premium (Direktvermarktung)
• 95% of wind and 25% of solar are marketed under feed-in premium.

Source: Green and Léautier, 2015

CCGT = Combined cycle gas turbine power plant
OCGT = Open cycle gas turbine plant