

Power Exchanges in Europe

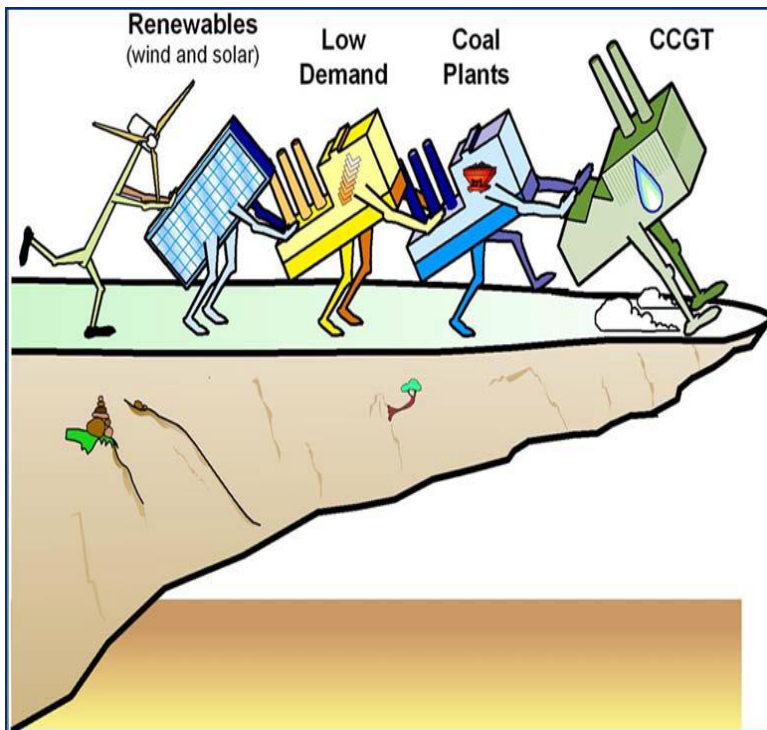
Rationale for consolidation

Rene Kerkmeester

VEMW/Febeliec Joint Seminar

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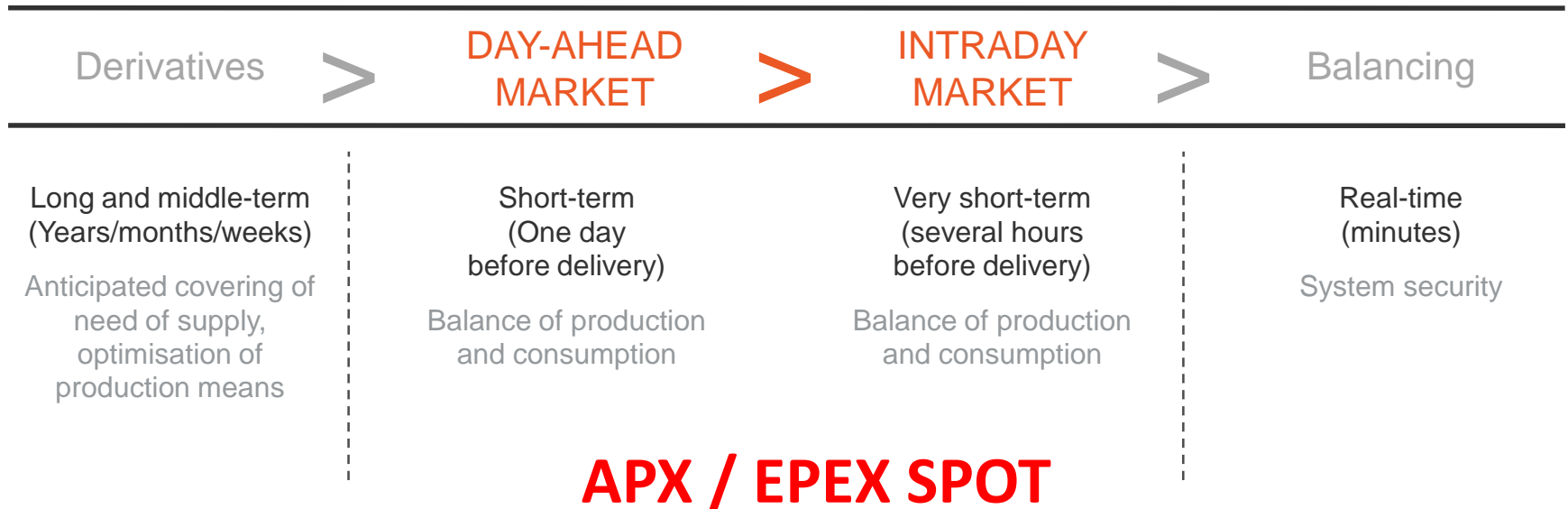
Amongst other reasons,
Increasing amount of renewables within an energy-only-marketet forces restructuring of conventional generation system



A need for:

- Horizontal, Cross Border Integration:
 - Day Ahead
 - Intraday
 - Balancing
- Vertical System Integration:
 - Congestion Management
 - Integrating RES/DSM in the Balancing Market

Cross Border Solutions



DAY-AHEAD AUCTION

- Optimisation of liquidity via an auction
- Market areas: Germany/Austria/Luxembourg, France, Great Britain, the Netherlands, Switzerland and Belgium

CONTINUOUS INTRADAY

- Flexibility through continuous trading
- Market areas: Germany/Luxemburg, France, Great Britain, the Netherlands, Switzerland, Belgium and Austria

Integration of APX and EPEX spot

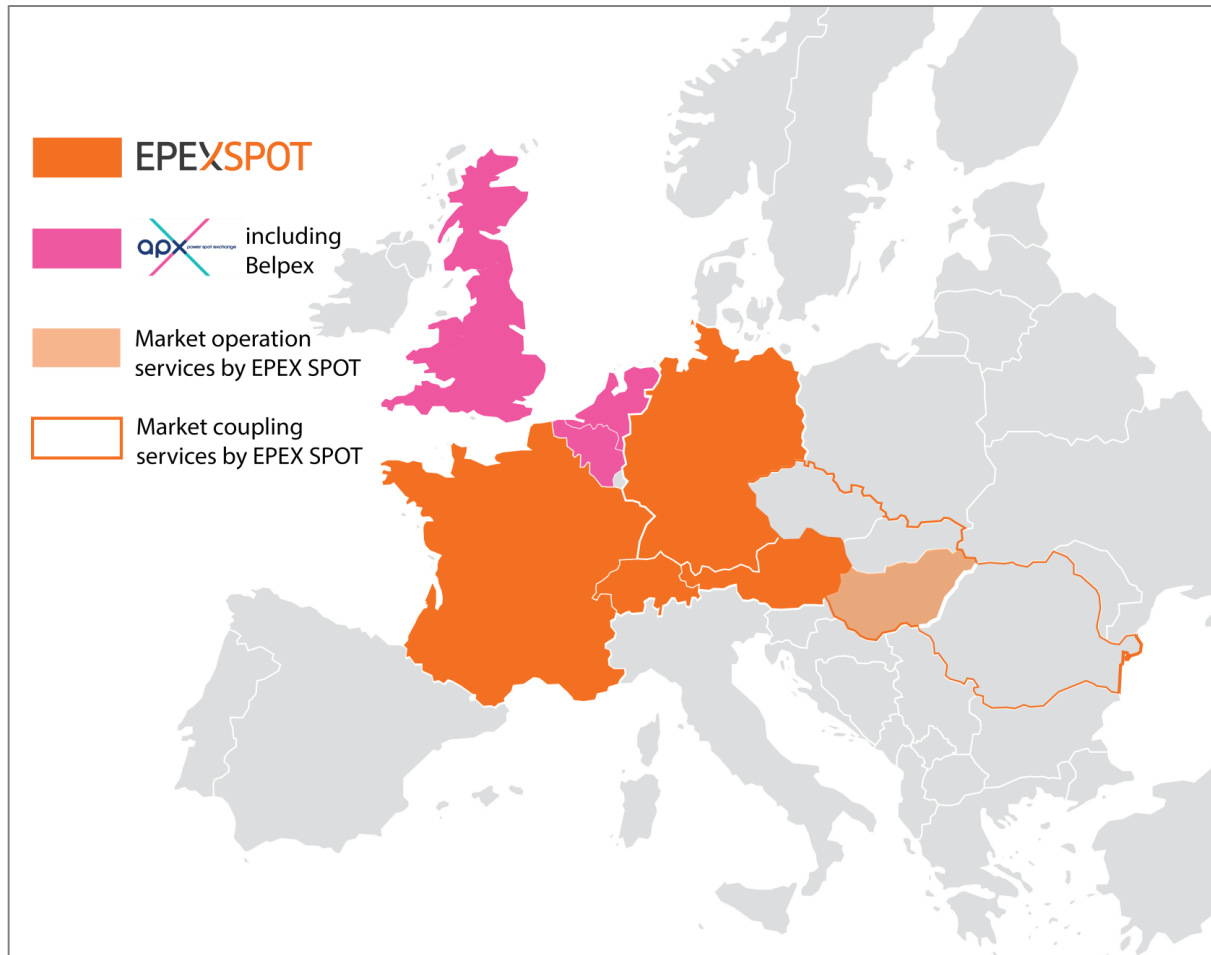
- Integration of APX and EPEX is a logical step in the context of European electricity markets and the existing cooperation between the PXs.
- The merger is a result of a long-standing relationship between APX Group and EPEX SPOT with the goal to establish a Power Exchange for Central Western Europe (CWE) and the UK, fostering each of the covered national markets in the context of the European wide internal energy market.
- APX Clearing will be sold to European Commodity Clearing (ECC); preferred clearing house of EPEX Spot.
- Years of cooperation through numerous market integration projects, such as Tri-Lateral Market Coupling (2006), CWE (2010) and PCR (2014).

Rationale for the Merger

All in all the benefits for market participants are a reduction of barriers for power trading in CWE and the UK by one trading system, one single rulebook, one admission process and one clearing for all seven national markets.

- Centralised and increased liquidity on power spot markets in CWE and the UK;
- Standardisation and harmonisation of the trading and clearing processes reducing market participants' trading costs (including admission process, trading systems), and lowering entry barriers for new participants;
- Best practice in high transparency and surveillance standards;
- Highly effective clearing and risk management services;
- Access to a wider range of products; and
- More effective governance and implementation of market coupling projects and, finally, the creation of the pan-European power market in line with the objectives of the European electricity regulatory framework.

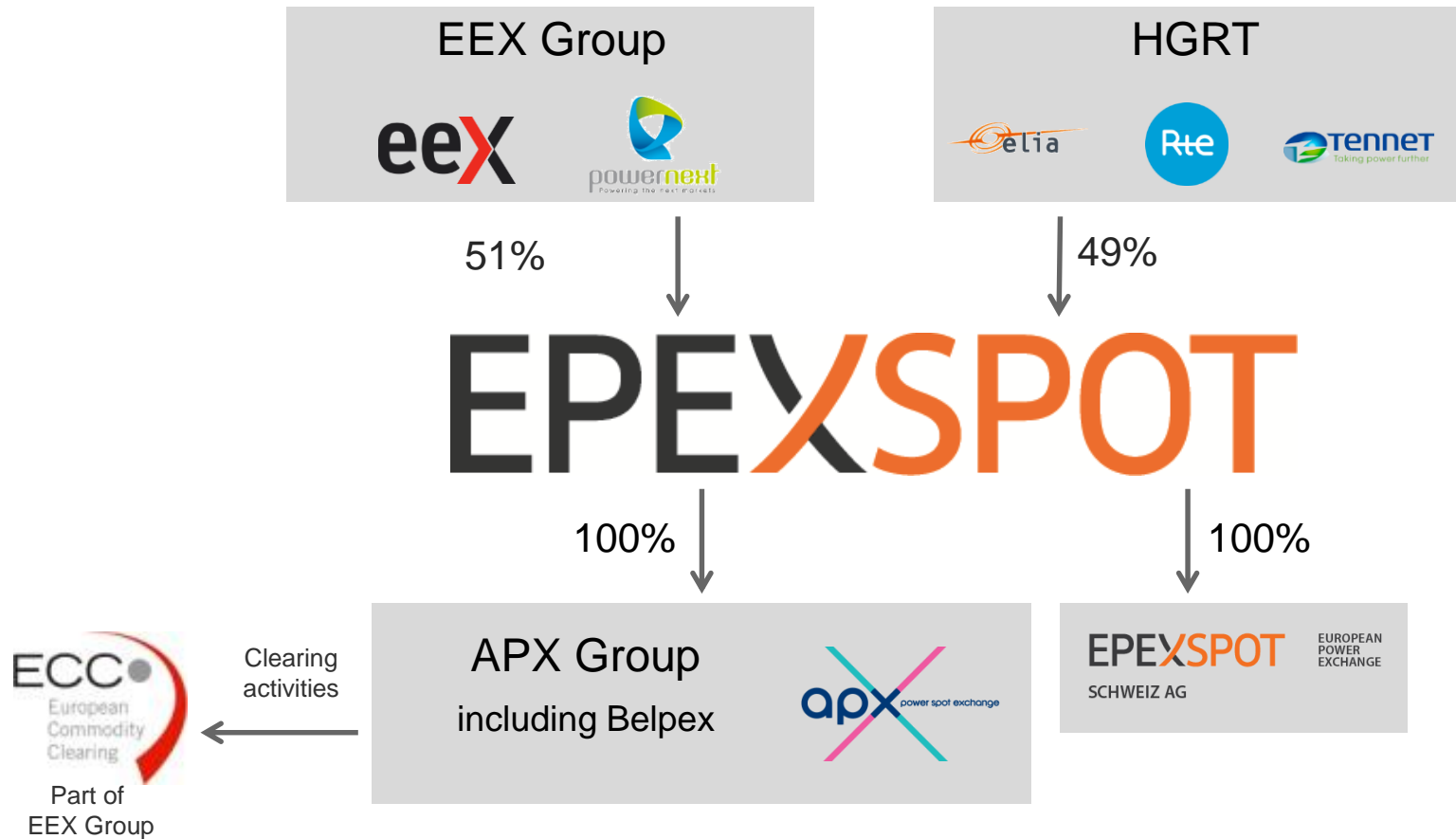
Markets Operated



APX EPEX Spot - Key figures

Key figures	EPEX SPOT	APX Group
Countries covered	4 (DE/AT, FR, CH)	3 (NL, BE, UK)
Exchange Members*	224	105
Yearly power consumption of countries covered** (TWh)	1,160	523
Volume Day-Ahead (TWh)	351	76
Volume Intraday (TWh)	31	16
Total trading volumes	382	92

New Shareholder Structure



Some examples: cross border integration efforts

Cross Border interconnectors

- Norned, Britned
- Nemo

Market Integration

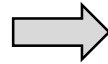
- Auctions
- Day Ahead (incl. flow based)
- Intraday (Xbid project)

Cross Border Balancing

New trends require additional measures

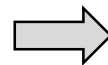
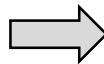
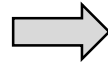
Trends

- Wind and solar are pushing conventional plants out of merit order
- Wind and Solar are decentral
- Smart meters will enable dynamic pricing models and demand response
- Market parties want to have the possibility to trade as close to delivery as possible
- DSOs are positioning themselves as matchmakers between local demand and supply



Implications for system

- Volatility and unpredictability of generation are increasing
- The availability of conventional ancillary power sources to rely on will at some point no longer be sufficient.
- The behaviour of connections in DSO grids is becoming more unpredictable
- New behaviour may change demand patterns for investment decision making
- A shorter window to balance the remaining imbalance
- Risk of subscale cost levels of systems and diluted liquidity on the wholesale market



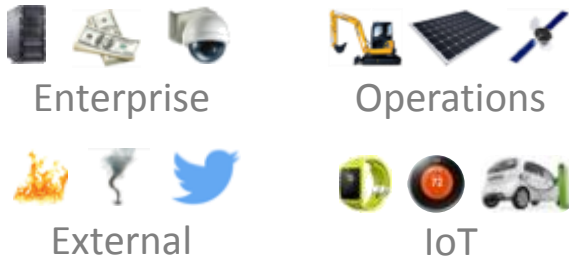
Additional measures ?

“Vertical” System Integration:

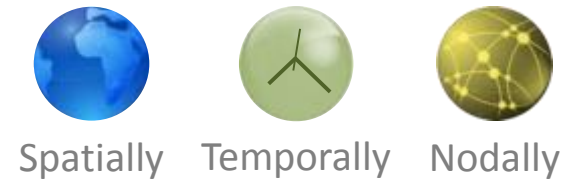
- Integrated Congestion Management?
- Integrating RES/DSM in the Balancing Market?
- Integrated network planning solutions (horizontal & vertical)?
- Data and Analytics

Moving into a new data world ..

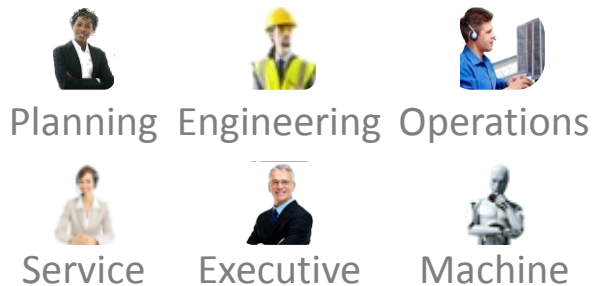
DATA FROM ANY ASSET, METER, SENSOR OR SYSTEM



CORRELATED, LEARNED AND CONTEXTUALIZED



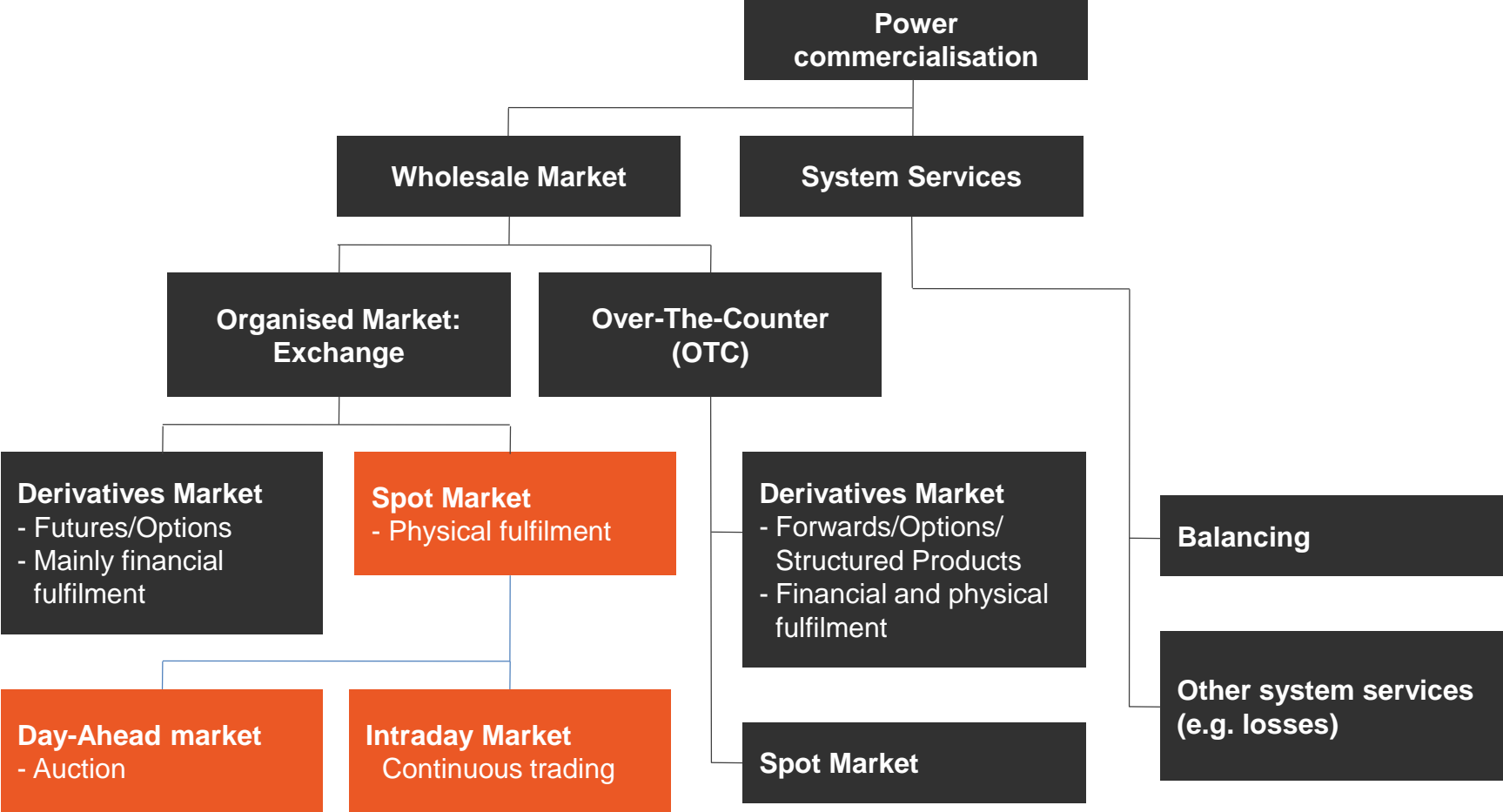
PROVIDING ACTIONABLE INSIGHT AND CONTROL



VISUALIZED TO SPEED DECISION-MAKING



Additional ways to commercialise power ?



Thank You

Rene.kerkmeester@tennet.eu

+31-6 5192 5420