EPEX SPOT: A Power Exchange at the Heart of Europe

Current trends in the European power market

1. European power market: fundamentals

2. EPEX SPOT in a nutshell

3. Focus on the intra-day market

4. Market Coupling & Intraday Target Model
“The price in Germany and France actually is the reference price for the rest of Europe. It is of an utmost importance that this reference price comes from a transparent market with sufficient volumes traded and with a sufficient number of actors. I believe, strongly believe, that with proper supervision of the exchange the price will and should be trusted by all market participants and all political decision makers, myself included.”

(Speech by the former European Commissioner for Energy, Andris Piebalgs, on the joint press conference announcing the creation of EPEX SPOT on 30 May 2008)
The organized market: The third pillar of the energy value chain
Ways of commercializing power

Power commercialization

Wholesale market

Organised market: Exchange
- Derivatives market
  - Futures/Options
  - Mainly financial fulfillment
- Spot market
  - physical fulfillment

Over-the-counter market (OTC)
- Derivatives market
  - Forwards/Options/structured products
  - financial and physical fulfillment

System services
- Balancing
- Other system services (e.g. losses)

Day-Ahead
- daily auctions
- hourly contracts

Intraday
- continuous trading
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Corporate facts

EPEX SPOT
EUROPEAN POWER EXCHANGE

207 members
65 employees with 14 nationalities
Based in Paris
Created in 2008
Branch in Leipzig

339 TWh traded in 2012

A European and international success story
Shareholder structure

Chairman of the Supervisory Board of EEX: Dr. Jürgen Kroneberg

50%

Chairman of the Board of Powernext: Pierre Bornard, RTE

50%
Markets and services

EPEX SPOT MARKETS

- Germany
  *Day-Ahead & Intraday*

- France
  *Day-Ahead & Intraday*

- Switzerland
  *Day-Ahead & Intraday*

- Austria
  *Day-Ahead & Intraday*

SERVICING OTHER EXCHANGES

- Market operation services for the Hungarian Power Exchange HUPX
- Market coupling services for the Czech Power Exchange OTE, Slovakian OKTE and HUPX
Markets, volumes 2012 and delivery zones

261 TWh
+ 9 %
Intraday: 15,8 TWh (± 0 %)

17 TWh
+ 38 %

61 TWh
± 0 %
Intraday: 2,2 TWh (+ 28 %)

339 TWh in 2012
on all EPEX markets

8 % increase of volume in 2012
In total, EPEX SPOT holds **207 Exchange Members** (Day-Ahead & Intraday) as of 1 August 2013.

**Legend:**
- 29 members trade on the German and French Day-Ahead markets.
- 48 on all three Day-Ahead markets.
- 23 on all four Intraday markets etc.
Who are sellers and buyers on EPEX SPOT?

**Trading companies and banks**
- BNP PARIBAS
- Deutsche Bank

have an essential role in providing additional liquidity on the wholesale power market. They do not necessarily own power assets but are active on the market and also trade cross-border.

**Municipal and regional suppliers**
- SW/M
- Terna

specialize in supplying end consumers. They do not always own power producing assets, and thus often buy energy on the wholesale market.

**Utilities**
- ALPIQ
- EDF
- E.on

buy and sell electricity to adjust imbalances between the production of their power plants and the supply of their customers.

**Some energy intensive industries**
- Rhodia
- DB
- ThyssenKrupp

are also involved in the wholesale market in order to purchase power at the best price.

**TSOs**
- RTE
- TRANSMIT NORTHERN

intervene on the spot markets in order to compensate their grid losses. In Germany they are also in charge of marketing green electricity provided by the feed-in tariff regulatory scheme.

**Traders**
can buy and sell on the Power Exchange (multilateral organized market).
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Optimising a power generation unit

Day-ahead, intraday and balancing

![Graph showing day-ahead, intraday, and balancing](chart.png)

- **Imbalance**
- **Position on balancing market**
- **Position on Intraday market**
- **Position on Day-Ahead Auction**
- **Purchase of a futures contract**
- **Generation unit**
- **Supply commitment**

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The role of the Exchange in the timeline of the market

- **Derivative market**
  - Long and mid term (years/months)
  - Anticipated covering of needs of supply, optimization of production means

- **Day-Ahead Market**
  - Short term (Day+1)
  - Balance between production and consumption

- **Intraday Market**
  - Very short term (hours)

- **Balancing market**
  - Real time (minutes)
  - Security of the system

**Overview – Day Ahead Auctions**
- France
- Germany / Austria
- Switzerland

**Overview – Intraday Continuous Trading**
- Germany
- France
- Austria
- Switzerland
Two Main Products at EPEX SPOT

### Day-Ahead

**Overview – Day Ahead Auctions**

- **Market Areas**
  - France
  - Germany / Austria
  - Switzerland

- Blind auction procedure, takes place on 7 days a week, year-round
- 24 hours of the respective next day are traded
- Hourly and block contracts available for trading
- Integrated in CWE Market Coupling
- Trading is conducted via the EPEX trading system (ETS)

### Intraday

**Overview – Intraday Continuous Trading**

- **Market Areas**
  - France
  - Germany

- Continuous trading and price formation, 24 hours a day, 7 days a week, year-round
- 24 hour-contracts can be traded until 45 minutes before the beginning of delivery
- Hourly and block contracts available for trading
- 15-minute contracts on German market allow flexible integration of renewables
- Cross-border trading between France & Germany – Flexible Intraday Trading Scheme (FITS)
Overview - Day Ahead Auctions

- Blind auction procedure, takes place on 7 days a week, year-round
- 24 hours of the respective next day are traded
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Order book closing time (CET time):

- 11:00: CH
- 12:00: DE/AT & FR

Market results published from:

- 11:10: CH
- 12:40: DE/AT & FR

- During the auction, all orders in the order book will be matched to trades at a specific moment.
- The buy entries are aggregated to form a demand curve, and the sell entries are aggregated to form an offer curve.
- The Market Clearing Price (MCP) and the Market Clearing Volume (MCV) are determined at the intersection point of the two curves.
Day-Ahead volumes on all 3 hubs since 2000

2001: Establishment of Powernext SA
4/2005: Austria becomes a new market
12/2006: Switzerland becomes a new market

9/2008: Creation of EPEX SPOT SE
1/2009: Transfer of Powernext Power Spot into EPEX SPOT SE
9/2009: Transfer of EEX Power Spot into EPEX SPOT SE
# Intraday market

<table>
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<td><strong>Market Areas</strong></td>
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<td>Switzerland</td>
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- Continuous trading and price formation, 24 hours a day, 7 days a week, year-round
- Contracts can be traded until 45 minutes before the beginning of delivery (Austria and Switzerland: 75 minutes)
- Hourly and block contracts available for trading
- 15-minute contracts on German and Swiss markets allow flexible balancing of portfolio
- Cross-border trading between Germany, France, Austria and Switzerland

## Reasons for trading on the Intraday market

1. Buy or sell volumes that were not able to be traded on the auction
2. Better ability to carry out last-minute optimization of portfolio, e.g. in case of an unplanned power plant outage
3. Lower balancing costs through advanced optimization possibilities and more efficient capacity usage
4. Enables arbitration between neighboring countries, provides opportunities for cross-border trading (e.g. DE-FR)
Orders Matching Rules

Rule

The system will match compatible orders according to priority rules.

Orders are arranged in the order book:
• by side (bid or ask),
• by limit price,
• by time of reception.

The best orders in the order book are matched automatically with same- or better-priced orders entered in the order book. The order is executed at the price of the order already present in the order book.
• The Intraday market has proven to be a suitable tool for the market integration of RES.
• Together with the optimization of forecasting accuracy, Intraday markets provide flexibility for market participants. They can react quickly to differences between prevision and production or unforeseen outages.
Submit orders on the Intraday segment: Order Types

• With a continuous trading modality, orders can be more complex and sophisticated than with an auction.

• Different types of orders exist on the intraday market:
  
  • **Limit Orders** are buy and sell orders which carry a price limit: they can only be executed at this price or at a better price (maximum bid price or minimum ask price).
  
  • **Market sweep orders** apply to several contiguous individual hours within a specified range, matched with orders on individual hours only.
    
    • All orders within the hours range may not be executed.
    • The executed volume may also be different on each hour.
Submit orders on the Intraday segment: Order Types

Orders can also be restricted in their execution:

• “Immediate-or-cancel” (IOC)
  - The order is either immediately executed or automatically cancelled. The order can be partially executed and any unexecuted quantity is cancelled.

• “Fill-or-kill” (FOK)
  - The order is either immediately and entirely executed or cancelled in its entirety.

• “All-or-none” (AON)
  - The order is executed completely or not at all. AON orders remain in the order book until they are executed or cancelled.
Submit orders on the Intraday segment: Order Types

• “Iceberg” or hidden-quantity

  • An iceberg order is a large order, divided into several smaller orders which are entered in the order book sequentially.

  • All the orders have the same quantity

  • Each successive order is treated as a new order in terms of priority in the order book
• Intraday markets are very active both locally and cross-border
• Cross-border trades represented on average 13% of total traded volume

EPEX SPOT Intraday Monthly Volumes

Cross-border trades facilitated by the Flexible Intraday Trading Scheme (FITS) – Liquidity doubled in France
A snapshot of the intraday liquidity pooling and arbitrage between PX markets (excl. OTC)

**Volume Traded - 2012 (Exchange)**

- ComXerv-based intraday markets
- Elbas-based intraday markets
- Auction-based intraday market
- Other platform or no organised intraday markets

GME and OTE volumes estimates based on 2009 data

Spain and Italy volumes include all intraday auctions from D-1 to D, after the main D-1 auction

UK volumes include spot + prompt continuous markets

Means of intraday arbitrage:
- Automatic implicit
- Manual, without capacity constraints
- Manual, with capacity constraints

**Volume Traded - 2012 (Exchange)**

- 55 TWh (OMIE)
- 20 TWh (GME)
- 2.2 TWh (EPEX)
- 15.8 TWh (EPEX)
- 3.2 TWh (APX)
- 13.7 TWh (APX Eurolight system)
- 38.4 TWh (N2EX Condico system)
- 0.5 TWh (OTE)
- 0.2 TWh (APX)
- 0.5 TWh (NPS)
- 0.7 TWh (NPS)
- 0.3 TWh (APX)
- 1.3 TWh (NPS)
- 0.2 TWh (NPS)

Going live Q2 2013
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Market Coupling Initiatives: Overview

- CWE Market Coupling 2010
- NWE Price Coupling 2013
- Single European Price Coupling 2014
Market Coupling – step by step towards the pan-European power market

Macroeconomic advantages through cross-border cooperation
Regional model practical for the harmonization of political goals
The pan-European power market – part of the solution for current challenges

Big European market areas are a prerequisite for market and system integration of RES
- Wide-ranging balancing of production and consumption
- Synergies between fluctuating production, storage technologies and flexibility
- Efficient use of power plant capacities

The energy market anticipates upcoming challenges and provides solution by ist own
- 15min products on the Intraday
- Guarantees of Origin for „green power“
- Cross-border harmonized market rules

The energy market is already more European than the political discussion
The Price Coupling of Regions is the way Power Exchanges cooperate to deliver the single coordinated matching function necessary to implement by 2014 the European Day-Ahead Target Model (price coupling) described in ACER’s CACM Framework Guideline.

The design phase of PCR is today finalized.

PCR is being pragmatically progressed by a limited task force of Power Exchanges but all spot Power Exchanges in Europe closely follow the developments.
The Intraday Target Model: What and why

- One European integrated solution, handling the trading and the capacity allocation functions
- PXs are in charge of both functions using a single IT provider
- The model is made mandatory by law (defined in the CACM Network Codes and governed by the Day-Ahead / Intraday Governance Guidelines)
- PXs outside of the cooperative agreement will not be able to offer cross-border trading to their members anymore, since all cross-border capacity will be allocated on the single SOB/CMM solution
- Explicit capacity allocation to enable OTC trading will be allowed on certain borders, for an interim period only

Objectives:
1. Allocate implicitly all the Intraday cross-border capacity on a single platform
2. Pool all the PXs’ Intraday liquidity on a single trading screen

Benefits expected by the Authorities:
1. Facilitated cross-border access to Intraday markets
2. Improvement of the intraday liquidity and price-signal
3. Better short-term management of the power system, especially with regard to intermittent energy
Outlook: Which role will the Market play in the future?

Power exchange suitable instrument for market integration of renewables:
- Increased liquidity
- Enhanced transparency
- Reduction of marketing costs

Coupling of EU day-ahead & intraday markets facilitates integration:
- Reduced price volatility
- Smoothing of price spikes
- Flexible trading

Renewables impact price formation during high feed-in & low demand:
- Merit-Order Effect
- Change of Peak-Base structure
- Steep production ramps

On medium to long term, how can state-supported renewable energy with feed-in priority and low marginal costs successfully integrate the market design of the European Electricity Market?

Based on functioning Energy-Only markets

Coupling of European Electricity Markets

Harmonization of European support schemes for renewables

Contribution of renewables to system security

Demand-based renewable supply reacting to market price signal

Investment in network infrastructure

Valorisation of storage & demand-supply

Enhanced transparency for consumers
Thank you for your attention!

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www.epexspot.com