EPEX SPOT: A Power Exchange Integrator of European Markets

Seminar organized by XM Compañía de Expertos en Mercados

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“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)
Agenda

1. The Place of Power Exchanges in the European Market

2. EPEX SPOT at the Heart of the European Power System

3. EPEX SPOT, a Model to Create Trust and Liquidity

4. The Products of EPEX SPOT
   1. Day-Ahead Auction
   2. Intraday Continuous Trading
   3. Market Coupling

5. Challenges Ahead
Energy exchanges and energy trading are visible results of market liberalization

- The completion of the Single European Market, the promotion of interconnections, the diversification of supply and a low-carbon energy future are among the main challenges.

- The liberalization of the electricity market in Europe since the late 1990s was an essential cornerstone for further market integration.

- A citation from the Proposal for a Regulation of the European Parliament and of the Council on Energy Market Integrity and Transparency – REMIT from December 2010 sums up the development of the last 10 years:

  “A positive outcome of a decade of electricity and gas market liberalization has been the development of power exchanges and standardized over the counter (OTC) contracts which attract a wide range of actors including generators and suppliers, large energy users, pure traders, financial institutions and other trade facilitators.”
Energy exchanges offer a trading platform to generators, transmission system operators (TSO), importers, distributors, traders, industries and large consumers submitting bids for buying and selling energy and energy related products as gas and CO2.

The organized markets are optional and anonymous and accessible to all participants satisfying admission requirements.

The main objective of energy exchanges is to ensure a transparent and reliable wholesale price formation mechanism.

Price fixing, i.e. matching of orders and calculation of the price, is transparent and transactions are secure.

Increasing the liquidity of the European market place is a means to maximize social welfare. In this way, energy exchanges render more competitive the European energy market and provide a means of improving energy efficiency.
Liberalisation created the instrument of energy wholesale markets

Before liberalisation

Production ➔ Transmission ➔ Distribution

After liberalisation

Production ➔ Trading ➔ Distribution

Transmission

Source: BDEW

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Liberalization of the European Power Market

- 1996: European Directive on energy market liberalization
- 2001: Establishment of POWERNEXT SA
- 2002: Merger of the former Leipzig Power Exchange LPX and the EEX Frankfurt to EEX AG
- 17 September 2008: Creation of EPEX SPOT SE, owned 50/50 by POWERNEXT SA and EEX AG
- 1 January 2009: Transfer of POWERNEXT Power Spot into EPEX SPOT SE
- 1 September 2009: Transfer of EEX Power Spot into EPEX SPOT SE

The Creation of EPEX SPOT and the development of power trading are one of the most visible results of the liberalization of the European Power Market.
EPEX SPOT: facts and profile

203 members
60 employees with 10 nationalities
Based in Paris
Created in 2008
Branch in Leipzig
314 TWh traded in 2011

A European, an international success story to create liquidity in free markets under an entrepreneurial, for profit, customer driven spirit
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EPEX SPOT in a nutshell – the objectives

EPEX SPOT is an organized market

- optional & anonymous
- accessible to all participants satisfying admission requirements
- 314 TWh traded in 2011 on its markets

EPEX SPOT objectives are

- To ensure a transparent and reliable wholesale price formation mechanism
- To standardize and harmonize trading and clearing processes
- To facilitate a more effective governance and implementation of market coupling projects
- To be a leader in the European power market integration
EPEX SPOT’s market areas are covering an area of 1,200 TWh of yearly power consumption which is 40% of the European Integrated Electricity Market.

**EPEX SPOT Markets**

- France
- Germany/Austria
- Switzerland

+ Hungarian Day-Ahead Market on behalf of the Hungarian Power Exchange HUPX

19 interconnectors with own and neighbouring markets

A natural incentive to integrate the European power markets, facilitated by harmonised trading systems
Markets, volumes 2011 and delivery zones

- **Germany/Austria**
  - **241 TWh**
  - + 12%
  - Intraday: 15.9 TWh (+ 56%)

- **Switzerland**
  - **12 TWh**
  - + 30%

- **France**
  - **61 TWh**
  - + 13%
  - Intraday: 1.7 TWh (+ 70%)

- **314 TWh** in 2011 on all EPEX markets

- Share of national consumption:
  - 39%
  - 21%
  - 13%

- Delivery zones:
  - 50hertz
  - amprion
  - TRANSNET BW
  - TenneT
  - APG
  - Swissgrid
  - RTE

- **12.5 %** increase of total volume in 2011
- **57 %** increase of Intraday volumes in 2011, due to renewables

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Shareholders of EPEX SPOT

50%  

EPEX SPOT  
EUROPEAN POWER EXCHANGE

50%
EPEX SPOT Federates Many Interests

Chairman of the Board of Powernext: Pierre BORNARD, RTE

Chairman of the Board of EEX: Dr. Jürgen KRONEBERG
In total, EPEX SPOT counts 203 exchange members (Day-Ahead & Intraday) as of 19 April 2012.
Trading Participants at EPEX SPOT
The Exchange Council

- Official body of the Exchange
- 16 members from various sectors
- Adopts the Rules & Regulations and trading systems of the Exchange
- Approves products and activities
- Takes position to European power market development

Current Chairman:

Dr. Günther Rabenstein
Chairman of the Exchange Council
and Member of the Executive Board,
Verbund AG
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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)
• Day-Ahead auction and Intraday are completing each other

• The auction is a **blind process:**
  • No pre-auction price indicator
  • Anonymous fixing of quantity and price
  • Simple order types

• This blind auction mechanism is the best way to **optimize liquidity**
  • Auction as a liquidity pool

• The continuous Intraday is a flexible tool to trade **closer to real-time**
  • Intraday allows trading until 45 minutes before delivery
Phelix – the European reference price

MARKTDATEN
European Electricity Index (ELIK)

Auktionshandel
Intraday-Handel
Transparenzinformationen

Marktreferenz
Boersentransparenz (Chart)
Boersentransparenz (Dokumente)
Historische Daten
Marktdaten
Feiertagekalender

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Price development: German day-ahead Base price 2007-2012
Day-Ahead volumes on all 3 hubs since 2000

- **2001**: Establishment of Powernext SA
- **9/2006**: 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

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Volume and price development in face of increasing renewable volumes

Spot market has proven to be a suitable instrument for the integration of RE in Germany.

Market Coupling has facilitated the integration of renewables on the exchange and provided an open, secure and transparent marketplace with high liquidity and a legitimate, stable reference price.
Intraday markets are still very active both locally and cross-border.

Cross-border trades represented on average 13% of total traded volume.

Cross-border trades facilitated by the **Flexible Intraday Trading Scheme (FITS)** – *Liquidity doubled in France*
The First European Electricity Index – ELIX

• ELIX is calculated in an auction based on the aggregated offer and demand of the order books of EPEX SPOT

• ELIX corresponds to the congestion-free market price for these areas, not considering limited cross-border capacities between neighboring markets

• The Index is calculated for every hour of the delivery day. In addition, the ELIX Day Base and ELIX Day Peak are calculated and published
Market Coupling Initiatives: Overview

- Regional Initiatives (PLEF) 2006
- TLC – Trilateral Market Coupling 2006
- MoU on CWE Market Coupling 2007
- CWE Market Coupling 2010
- NWE Price Coupling for end 2012; Flow-Based MC 2013
- Single European Price Coupling 2014

Prerequisites

Projects

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Several market areas with an PX of their own
Goal of Market Coupling is the optimal use of cross border capacities in Central West Europe (CWE)
CWE Market Coupling Go-live: 09/11/2010
The cross border flows at the interconnections are used in an optimal way by implicit allocation of electricity and capacities over the exchange
- The access to the market becomes easier and fairer
- The realisation of transactions become more efficient
- Less price volatility
- Prices converge over the market areas when sufficient cross-border capacity is available
Market Coupling

**INPUT**

- **Market A**
  - Aggregated hourly orders
  - Anonymous list of block orders

- **Market B**
  - Aggregated hourly orders
  - Anonymous list of block orders

**OUTPUT**

- **Market A**
  - Prices
  - Accepted block orders
  - Net positions/ Flows

- **Market B**
  - Prices
  - Accepted block orders
  - Net positions/ Flows

**Network topology**

**OPTIMIZER**

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The involved power exchanges send their respective order books to the market coupling system. A central matching algorithm determines and delivers to the exchanges the market area prices (distinct whenever a congestion occurs), a list of accepted block orders for each bidding area and the net positions (or flows) between the bidding areas. These results are then used by power exchanges for the allocation of traded quantities towards the exchange members.

😂 Economic efficiency
Provides a single price if the interconnection between areas/electrical systems can accommodate the cross border flows resulting from the market outcome
Different price areas whenever congestion occurs

😊 Operational efficiency
One single matching algorithm is used
1 step process

😊 Requires efforts to reach an agreement between the stakeholders
A price coupling scheme requires that cross-border volume calculation is performed by the PXs as it becomes an integrated part of their core responsibility of order matching and price formation.

As a consequence, PXs must take into account the TSO requirements regarding the cross-border volume calculation in a similar manner as they take into account the market participants’ requirements regarding price determination and order execution.

→ TSOs are in charge to calculate Available Transmission Capacity, according to rules that ensure security of the power system.
Coordinated ATCs calculation

1. NTC determined independently by each TSO
2. NTC shared between all TSOs and matched centrally → NTC domain
3. Creation of a common grid model: 2 basecases per day
4. NTC verification: each TSO checks the grid security
5. Coordinated adjustment (in case a TSO foresees grid security problems)
6. Calculation of ATC
7. Publication of ATC

Improved regional view between TSOs
• TSOs share regional data and coordinate on potential problems on a daily basis
• Harmonised approach

Better linked to actual grid conditions
• NTCs are expected, where grid conditions are comparable, to be similar to today on most days (i.e. non-stressed days)
• NTCs can be lower in stressed cases, maintaining required security of supply

Improved coordination

Step towards the Flow Based target
• Daily use of a common base case is a key element of the fine-tuning of the Flow Based method
Sequence of the CWE + ITVC integration projects

Day-ahead markets before CWE-ITVC launch

**Former solutions**
1. Market splitting Nordic and Estonia
2. Price coupling in the Netherlands, Belgium and France
3. Tight volume coupling between Denmark, Sweden and Germany
4. Explicit auctions on other borders

Day-ahead markets since CWE-ITVC launch

**Current solutions**
1. Tight volume coupling on all connections between the CWE and Nordic regions
   - An ITVC light without the NorNed Cable: 9 Nov. 2010
   - A Full ITVC with NorNed included: 11 Jan. 2011
2. Market splitting in the Nordic
3. Price coupling in CWE
Markets that could join next as part of an agreed European roadmap

2/3 of the European power consumption is today covered by 5 PXs only

* Source: UCTE 2007 power consumption data
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Contributing to the political goal of having an integrated spot market in Europe by 2014...

PRESS RELEASE

Nord Pool Spot and EPEX SPOT cooperate to create Joint Venture

London, 28 September 2011 – The power exchanges Nord Pool Spot and EPEX SPOT recently signed a Letter of intent in order to create a Joint Venture, to build a joint system platform and later operate this platform together.

• Both power exchanges operate Day Ahead and Intraday Markets in a region comprising more than 2000 TWh/year in electricity consumption
• A single system and operations platform on which more than 600 TWh/year could be traded
The market results are available on EPEX SPOT’s Website

www.epexspot.com
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