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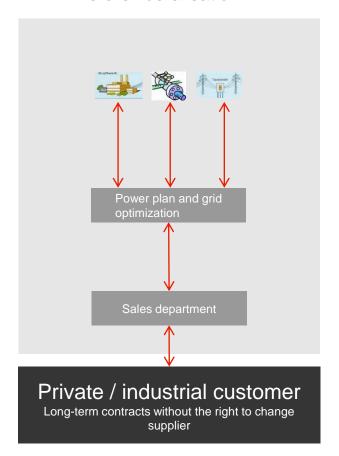




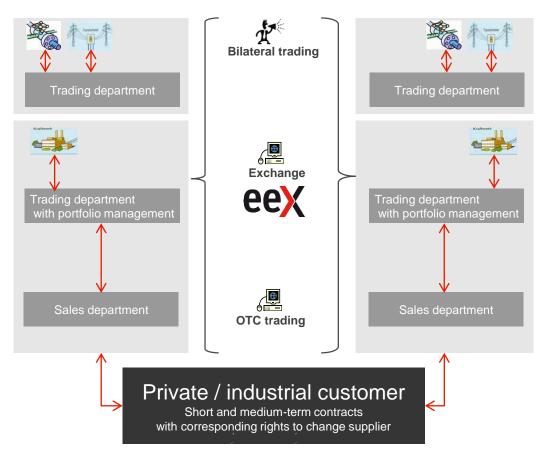
# The development of exchange trading Changes in the energy industry



#### Before liberalisation



### After liberalisation

















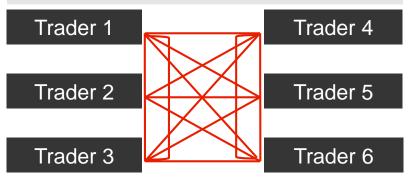


### The development of exchange trading The division of the markets



#### OTC

- Single contract relationship with one counterparty on the basis of a framework contract
- Non-anonymous spot and derivatives market
- Tailor-made...but a lot of standardisation
- Voluntary reports form OTC indices (e.g. GPI)
- Closing-out only after bilateral agreement
- Conditions depend on counterparty (price, quantity)
- Few rules and hardly any supervision
- Individual counterparty/credit risk











Trader 1





### **Exchange**

- Contractual relationship with all counterparties through the rules and regulations of the exchange
- Anonymous spot and derivatives market
- Standardised
- Full price and volume transparency
- Closing-out possible at any time
- Conditions determined by anonymous market
- Regulated and supervised
- Centralised counterparty risk (Central Counter Party = CCP)



Trader 4

# The development of exchange trading Segmentation of market



### **Spot market**

Settlement ≤ 2 days

Market on which commodities are traded. Payment and delivery take place within the next 2 days.

### Physical settlement

- Hours
- Intraday
- Within-day
- Day-ahead

### Trade

Delivery / Payment

### **Derivatives market**

Settlement > 2 day

Market on which financial instruments on commodities are traded. Payment and delivery of the commodity take place in the future.

# Physical, financial or contractual settlement

- Day
- Weekend
- Week
- Month

- Quarter
- Season
- Year

Delivery / Payment

The Art. 38 para. 2 subpara. 1 of the MiFID regulation (regulation (EG) Nr. 1287/2006) defines a delivery period for spot trades of two days or the standard delivery time which is regularly accepted by the market.

















# Basic structures & conditions Importance of exchange trading



- Creating transparency through recognized reference prices and the publication of market data (prices and volumes)
- Access to a large number of trading participants and concentrating liquidity at one trading platform
- Very high degree of automation on account of electronic and standardised trading and settlement processes
- Elimination of the counterparty risk through clearing and settlement via the clearing house of the exchange
- The anonymity of exchange trading and the regulation of the market ensure nondiscrimination and equal treatment of all trading participants

















# Basic structures & conditions History



- 2002 Establishment of EEX in Leipzig through the merger of the LPX and EEX power-exchanges trading on the power spot and derivatives market
- 2005 Launch of trading in emission allowances on EEX
- 2006 Spin-off of the clearing business into ECC and launch of coal trading on EEX
- 2007 Launch of natural gas trading on EEX
- 2008 Launch of cooperation between EEX and Powernext in power trading, foundation of EPEX SPOT SE
- 2009 Launch of the "Transparency in Energy Markets" transparency platform
- 2010 Launch of primary auctions for emission allowances on behalf of the Federal Republic of Germany
- 2011 Launch of 24/7 gas trading and expansion of the spot market with the TTF market area
- 2012 EEX carries out primary auctions of emission allowances on behalf of the EU commission and of 24 EU member states
- 2013 Launch of the EEX-Powernext cooperation on the gas market under the brand PEGAS
- 2014 EEX acquires majority shareholding in Cleartrade Exchange (CLTX)
- 2015 EEX acquires 50 % share in the Danish gas exchange GasPoint Nordic, acquires majority stake in Powernext and indirectly in EPEX SPOT (APX incl. Belpex becomes a 100 % subsidiary of EPEX SPOT).
- 2016 EEX acquires 66,67 % share in the Prague POWER EXCHANGE CENTRAL EUROPE (PXE), CLTX and GasPoint Nordic will be 100% subsidiaries of EEX
- 2017 EEX acquires 100% share in Nodal Exchange Holdings, LLC













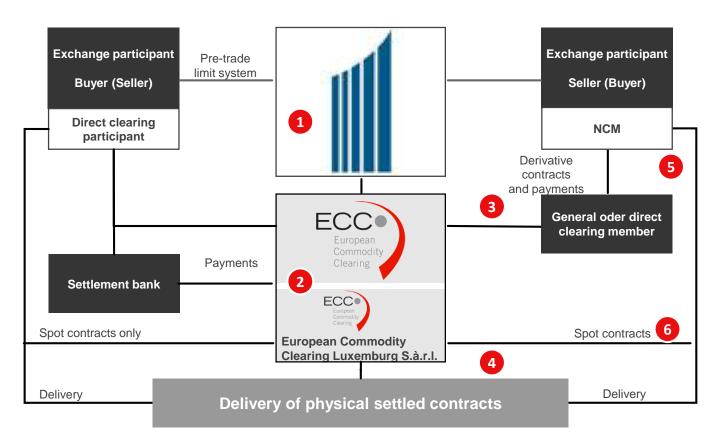




# Basic structures & conditions Exchange structure



The EEX group develops, operates and connects secure, liquid and transparent markets for energy and commodity products. Standardized contracts are traded or registered for clearing. Clearing and settlement of all trading transactions are provided by the clearing house European Commodity Clearing (ECC).



















# Basic structures & conditions Exchange bodies and supervision



### Exchange Council

#### EEX/EPEX

- Represents the exchange participants
- Must agree with rule changes

#### PWX

 Takes strategic advisory functions

# Exchange Management EEX/EPEX

### Board PWX

- Manages exchange's day-to-day business
- · Can issue sanctions
- Develops products, markets
- Can request changes to the rules or make them yourself

#### Board

Supervisory Board
/ Board of Directors

Exchange operating company

### Market Surveillance

- Permanent control of the market
- Analysis of market indicators
- Reports to the exchange management, board, exchange council or the exchange supervisory authority

### Exchange Supervisory Authority

 Monitors the exchange bodies and supervisions

### Sanctions Committee of EEX

- Can impose fines
- Can exclude exchange participants from trading

















### Basic structures & conditions Tradable contracts



Both an order book as well as a trade registration functionality are usually offered for all spot and derivate market products.

Exceptions will be announced by newsletter.

		Spot market	Derivative m	Derivative market (option for future)		
		Physical	Financial	Physical	Contractual	
ф	Power	Day ahead and intra day Germany, Austria, France, Switzerland, Netherland, Belgium, UK	Germany, Netherlands, Belgium, Italy, France, Spain, Nordic, Switzerland, Romania, Greece, UK, Romania, Czech, Hungary, Slovakia, Poland		Germany, France, Italy, Nordic, Spain	
			Cap and floor future			
Ò	Gas	Day ahead and within day NCG, GASPOOL, TTF, NBP, TRS, ZTP, ZEE	PSV	NCG, GASPOOL,TTF,PEGN, TRS, ZTP, ZEE, NBP, PSV		
		Day ahead		EUA, EUAA, CER	EUA	
<u>ල</u>	Environmental	EUA, EUAA CER Green	Wind power	Guarantees of Origins (Nordic/alpine hydro/ wind)		
Ĉ S S	Coal		API 2, 4, 5 , 8, Indonesia		API 2, 4, 5	
	Metals		Iron ore			
€>€	Freight		Time Charter/ Voyage Routes/Trip Time Charter		Dry-Bulk-Time-Charter	
$\hat{\varphi}$	Agriculture		fertiliser, potatoes, milk, meat	Trade registration	n products	











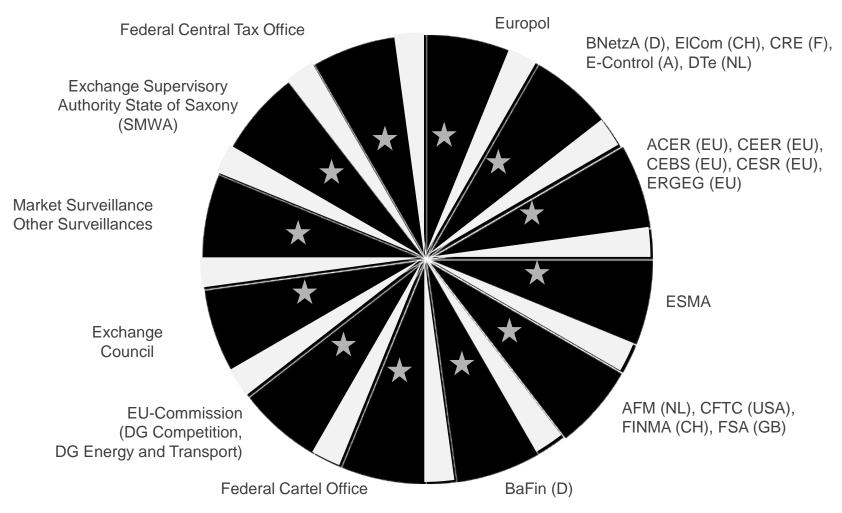






# Basic structures & conditions Supervision and cooperation





















# Basic structures & conditions Corporate structure



### **European Energy Exchange AG**

APX Shipping B.V. – 100 %

Agricultural Commodity Exchange GmbH – 100 %

Cleartrade Exchange Pte Ltd. – 100 %

EEX Link GmbH – 100 %

EEX Power Derivatives GmbH – 100 %

EPEX SPOT SE - direkt 10,7 % inkl. direkter Anteil 51 %

EPEX SPOT Belgium S.A. – 100 %

EPEX SPOT Schweiz AG – 100 %

JV Epex-Soops B.V. – 60 %

SEEPEX a.d. – 25 %

European Commodity Clearing AG – 100 %

European Commodity Clearing Luxembourg S.á.r.l. 100 %

Global Environmental Exchange GmbH – 100 %

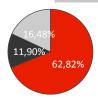
Power Exchange Central Europe a.s. – 66,67 %

Powernext SA – 83,73 %

Gaspoint Nordic A/S – 100 %

PEGAS CEGH Gas Exchange Services GmbH – 51 %

► EPEX SPOT SE – 40,3 %



■ Eurex Zürich AG

■ Saxon shareholders

■ Pool (minor shareholders from industrilal, energy and financial companies)











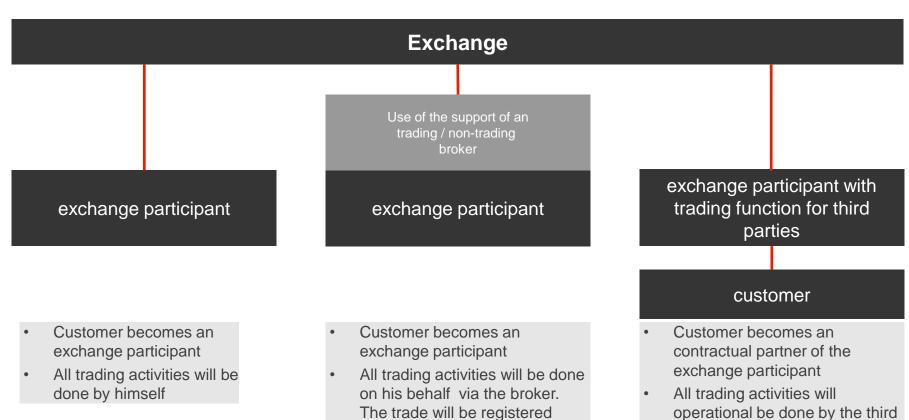






# Basic structures & conditions Access to the exchange





afterwards at the exchange

participant position account













party



Third party will send own statements to the customer



# Basic structures & conditions Exchange participants of EEX group



EEX-Group connects **555** trading participants from **37** countries:

36 non-European participants:

Bermuda, British Virgin Islands, Canada, Cayman Islands, China, Singapore, South Korea, USA















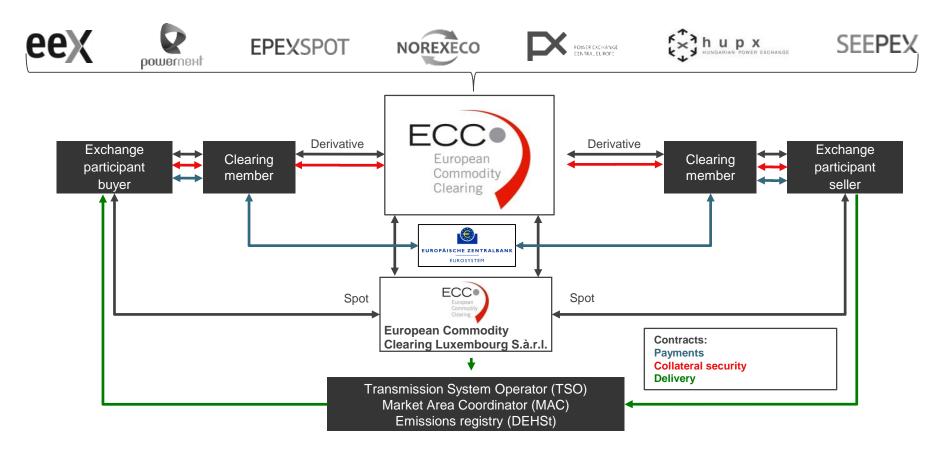




### Overview of general processes General structure



ECC takes care of the correct clearing and settlement process for all transactions. Hereby ECC is not only offering clearing and settlement services for transaction concluded at EEX, but also for transaction concluded at partner exchanges.













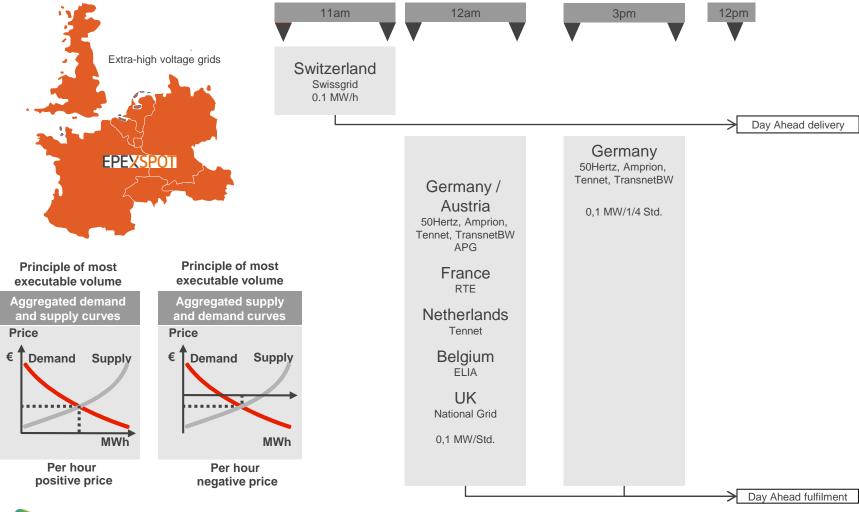






# Physical power spot market contracts Auction / day ahead

















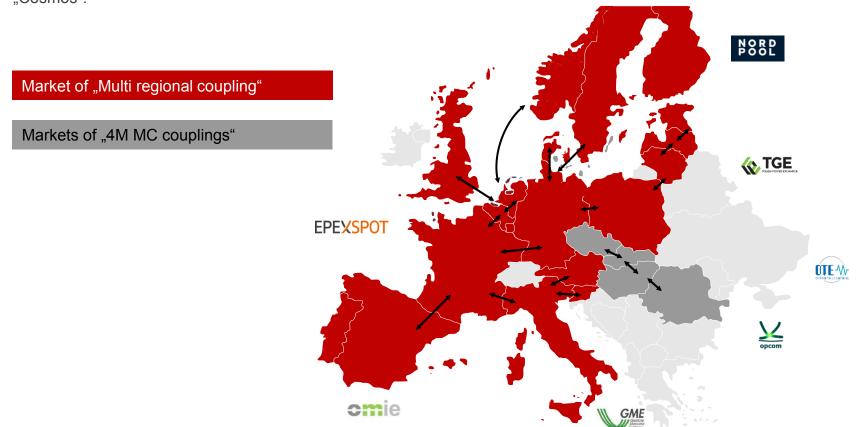




# Physical power spot market contracts Auction / day ahead / market coupling



Market coupling is the balancing of a supply surplus and a deficit in supply between different market areas by considering available and free transportation capacities between these market areas. The used algorithm "Euphemia" (Pan-European Hybrid Electricity Market Integration Algorithm) was developed by the company N-Side and is the successor of the algorithm "Cosmos".













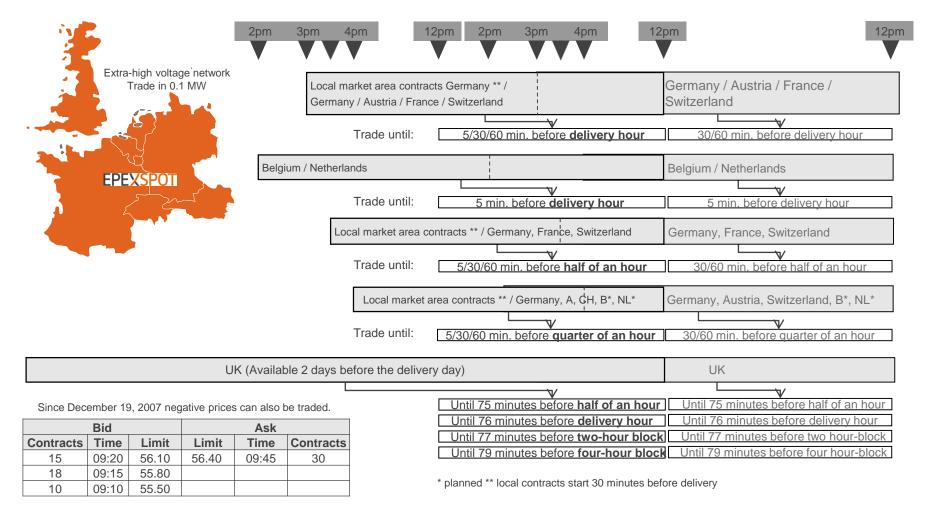






# Physical power spot market contracts Continuous trading / intraday















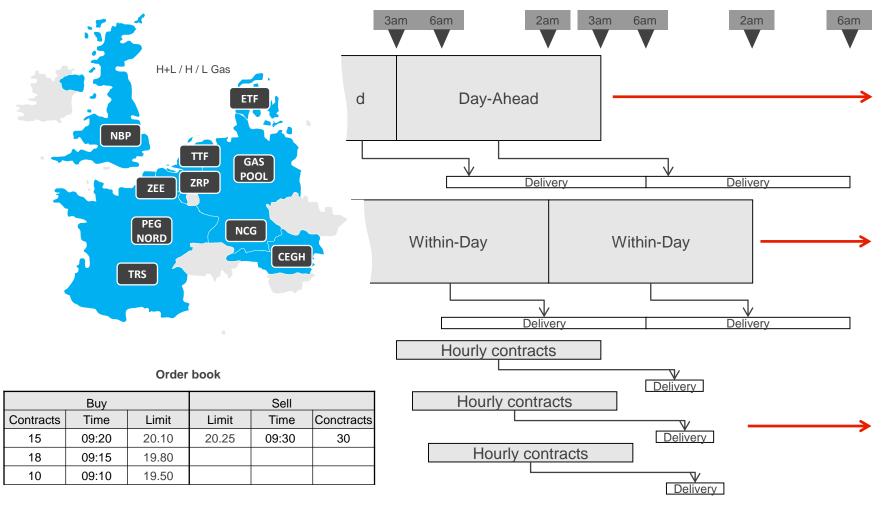






# Physical gas spot market contracts Cont. Trd. / day-ahead, within-day, hour















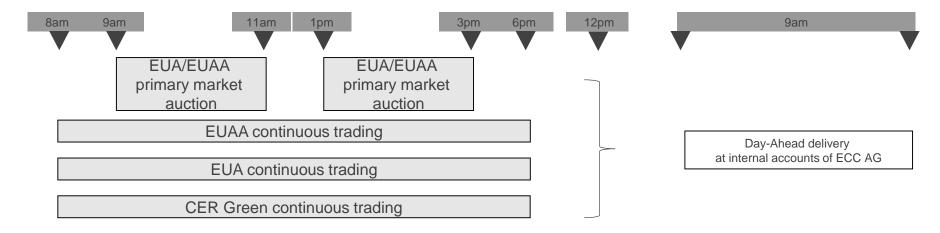


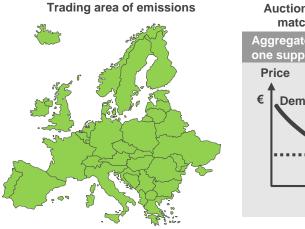




# Physical emission spot market contracts Cont. Trd. / auction, day-ahead







# Auction with a unit price matching algorithm Aggregated demand and one supply curves Price € Demand Supply Lots

#### Continuous trading with automatic matching algorithm

	Bid		Ask				
Contracts Time		Limit	Limit	Time	Contracts		
15	09:20	6.10	6.25	9:30	30		
18	09:15	5.80					
10	09:10	5.50					











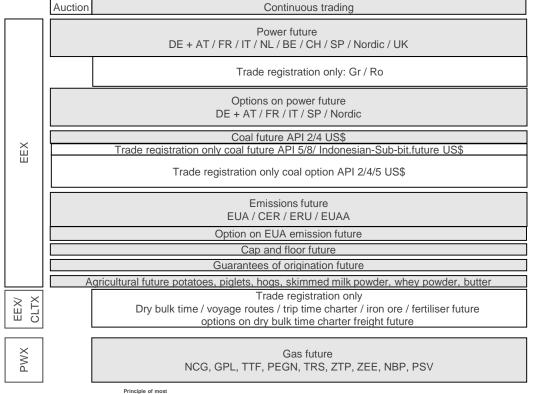




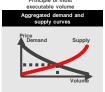


# Financial, physical and contractual derivatives market products





year
season
quarter
month
w/w
Ш
year
quarter
month
month
year
quarter
month
year
quarter
month
year
week
month
month
month
year
season
quarter
month



	Bid		Ask				
Contracts	Time	Limit	Limit	Time	Contracts		
15	09:20	56.10	56.50	09:45	30		
18	09:15	55.80					
10	09:10	55.50					











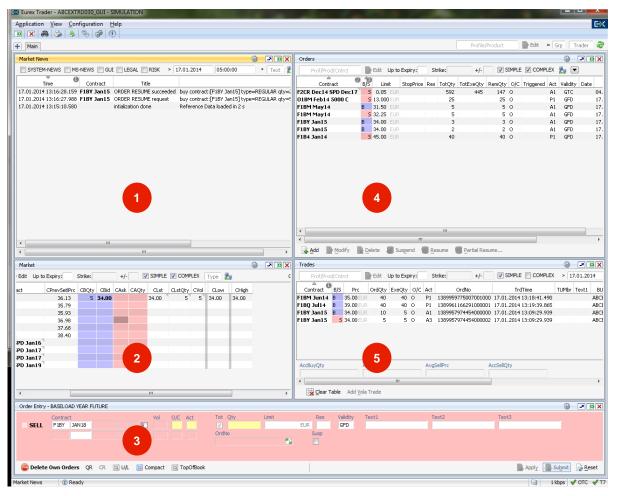






# Exchange trading systems Spot and derivatives market





- 1. Public information
- 2. Market overview
- 3. Order entry
- 4. Own order overview
- Own trade overview

















# Order book trading Continuous trading / price calculation



### Automatic matching algorithm with price / time priority

Within the trading system ComTrader and EUREX T7, an automatic matching algorithm applies which sorts the order book as follows:

- 1. Buy orders have to be placed at the bid side and sales orders at the ask side.
- 2. Highest bid and lowest ask orders stay on the top. In the derivative market orders are placed before limit orders. Therefore they always stay on the top.
- 3. Order with the oldest entry time in-between buy and sales orders with the same price stays at the top.

Rule: The last entered order will be matched and executed best with orders waiting at the opposite side of the order book.

Entering limit order:

Buy 35 contracts Limit: 26.00

### **Execution**

- 5 contracts at the price of 25.50
- 5 contracts at the price of 25.50
- 10 contracts at the price of 25.50
- 12 contracts at the price of 25.80
- 3 contracts at the limit of 26.00 remain in the order book

	Buy		Sell				
Contracts Time		Limit	Limit	Time	Contracts		
			М	9:00	5		
			М	9:01	5		
			25.50	09:10	10		
			25.80	09:15	12		
			26.10	09:05	10		
			26.10	09:20	10		
·							

	Buy		Sell					
Contracts Time		Limit	Limit	Time	Contracts			
3	3 09:25		26.10	09:05	10			
			26.10	09:20	10			

















# Trade registration functionality Comparison with master agreements



The ECC or ECC Lux assumes the role of the central counterparty regardless of whether the transaction is concluded by registration at EEX or is concluded as an off-exchange transaction (OTC) for registration on the EEX.

Handel Exchange participan Exchange participa Pre-trade Seller (Buyer) Master agreements: Confirmation of business deals required narticinant Counterparty limits Clearing Nettina **ECC** Securities Payments 2 Settlement bank ECC. Bank quarantees

Advantages of registration at the exchange and usage of the ECC clearing service:

- · All exchange participants are able to trade with each other
- Settlement takes place with standardized processes via the CCP (clearing house / clearing member) in the same way as an order book trade.
- Centralization of the counterparty risks by using the established clearing processes
- Netting of trade registration deals with order book trades, which may lead to a reduction in margin requirements
- Due to the settlement through the CCP, the transactions do not have to be accounted for by the clearing threshold of the "EMIR" (European Market Infrastructure Regulation).

















### Admission and Annual Fees



All fees are listed in the price lists of the respective exchange.

	EEX		Powernext		EPEX	SPOT
Admission fees					G/A., CH, F, UK, NL B B + strategic reserve Czech Republic G/A, CH, F, NL B F Capacity Market	€ 25,000 (£ 21,000) € 5,000 € 12,500 € 15,000 € 5,000 € 500 € 5,000
Annual fees	European Power Derivatives exclusive PXE Strom Futures (inclusive NON-MT and regulated markets), Metal, Agricult Environmental Markets, Coal, mineral Calloys, Freight  PXE Power Futures  Environmental Markets, Coal, Freight, mineral Ores, UK Power Futures, Meta Agricultural, Alloys plus Trade Registra products not traded in the order book  US Power via Nodal Exchange Primary Auction EUA Spot Agricultural Products  CLTX Oil, mineral Ores, Metals, Alloys, Freight	ural, Dres, € 15,000 € 14,700  Is, tion of € 2,500 \$ 12,000 € 0 € 0	2 Countries from: G (NCG & GASPOO F (PEG Nord & TRS), B (ZTP & ZEE), NL (TTF), UK (NBP) I (PSV) including Spot, Non-MTF und regulated Market  3 Countries and more from: G (NCG & GASPOOL), F (PEG Nord & TRS), B (ZTP & ZEE), NL (TTF), UK (NBP) I (PSV) including Spot, Non-MTF und regulated Market  A (CEGH VTP) including Spot, Non-MTF und regulated Market  DK (ETF) including Spot, Non-MTF und regulated Market	€ 9,000	G/A, CH, F, UK, NL, B B + strategic reserve Czech Republic G Intra 15-min. Auction G/A, CH, F, UK, NL (Cont. Intraday) B (Cont. Intraday) G/A, CH, F, NL B (indirect member) B + strategic reserve F Capacity Market	€ 10,000 (£ 8,500) € 20,000 € 0 € 5,000 € 4,000 € 5,000 € 5,000 € 5,000 € 5,000 € 2,000
ECC AG	Clearing-Members Non-Clearing-Members DCP-Clearing-Members DCP-Clearing-Members 1 Spot Market DCP-Clearing-Member in UK Spot Mar Registered Exchange participant for Cle		ding to Austrian EEffG	€ 12 € 1 € 12 € 9 £ 6 € 50	,000 ,500 ,000 ,000	

















### Transaction fees



		Unit	Exchange trading	Clearing	Delivery
Power spot market	Day ahead	€/MWh	0.04 / 0.07 FR	0.015	
	Day ahead OTC	€/MWh	0.04	0.015	
	Intraday + intraday OTC	€/MWh	0.10	0.035	
Power derivative	Exchange trading & trade registration in power futures	€/MWh	0.0075	0.005	-
market	Optional physical settlement on EPEX SPOT	€/MWh			0.001
	Exchange trading & registration of options with a premium of € 0.15 per MWh or more	€/MWh	0.0025	0.0025	
	Exchange trading & registration of options with a premium of less than € 0.15 per MWh	€/MWh	0.00125	0.00125	
	Position transfer between financial and physical future positions	€/MWh	0.0075		
	Exchange trading & registration of trades in futures on guarantees of origin	€/MWh	0.006	0.0025	0.0002
	Cap and floor futures	€/MWh	0.002	0.001	
Emission spot market	Secondary exchange trading & trade registration	€/CO2	0.0025	0.0005	
market	Trading in the primary market auction	€/CO2	0.002	0.0010	
	Trading in the transitional auction platform EU	€/CO2	0.001	0.0005	
Emission derivative market	Exchange trading & trade registration	€/CO2	0.0025	0.0005	
Gas spot market	Exchange trading TTF	€/MWh	0.005	0.01	-
		€/MWh	WD 0.015		-
	Exchange trading Gaspool and NCG		DA 0,005	0.01	
			LOC 0,03		
Gas derivative market	Exchange trading PegNord, TRS, ZTP	€/MWh	0.01	0.01	
market	Exchange trading ZEE and NBP	GBp/thm	0.0015	0.0025	
	Exchange trading & trade registration PEG Nord, TRS and ZTP	€/MWh	0.005	0.0025	0.01
	NCG, GASPOOL, PSV and PSV Fin	€/MWh	0.0025	0.0025	0.01
	TTF	€/MWh	0.002	0.0025	0.0002
	ZEE and NBP	GBp/thm	0.0007	0.0006	0.0002

















### Calculation of margin requirements Protection against risk



European Commodity Clearing (ECC) AG together with the clearing members take over the counterparty risk for all transactions. In the case that a clearing member or exchange participant becomes insolvent, ECC has to guarantee that all outstanding payments and deliveries (in specific cases) are fulfilled.

Clearing member

Clearing member

Exchange participant

Exchange participant

If the clearing fund cannot cover all outstanding payments ECC becomes liable

If the security deposits of the exchange participant as well as of the clearing member are not sufficient, a clearing fund becomes liable for all outstanding payments. These clearing funds will be paid by all clearing members as well as ECC AG.

In order to protect themselves from the possibility of insolvency of an exchange participant or the clearing member, the ECC must have certain guarantees (known as margins). The securities ECC is asking for shall cover the risk that, on the next day, one party is no longer able to pay. According EMIR regulation securities have to be deposited for two days. The calculation of the amount is based on the internationally recognized method SPAN® (Standard Portfolio Analysis of Risk). The securities can be provided by recognized securities or cash.

'SPAN®' is a registered trademark of Chicago Mercantile Exchange Inc. Chicago Mercantile Exchange Inc. assumes no liability in connection with the use of SPAN® by any person or entity.

















# Market information services Transparancy / Compliance services

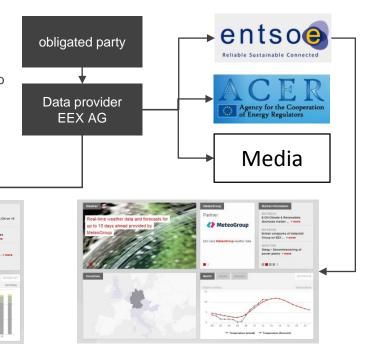


For the purpose of covering various reporting obligations, EEX AG offers a fee-based service to receive data subject to reporting requirements in order to forward it to the appropriate reporting points and publish it on the so-called Transparency Platform (TP).

The <u>EU transparency regulation 543/2013</u> introduced a reporting obligation about capacities, availabilities, operation of power plants, storage and consumption of electricity to the Association of European Trans-mission System Operators (ENTSO-E).

The Regulation in Market Integrity and Transparency REMIT 1227/2011 introduced a reporting obligation for insider information on wholesale energy transactions (Article 4.1) to the Agency for the Cooperation of Energy Regulatory Authorities (ACER).

The <u>Market Abuse Regulation MAR 596/2014</u> introduced a reporting obligation for insider information on the trading of emission rights (financial instruments).



The <u>EEX Transparency Platform (TP)</u> was created in 2008 to create more transparency in the energy wholesale market. Since then, it has evolved into the leading European transparency platform with fundamental data available for Austria, Belgium, the Czech Republic, Germany, the United Kingdom, Hungary, Italy, Switzerland and the Netherlands. On the platform, data about capacities, availabilities, operation of installations to produce, storage, consumption of power/gas and also meteorological data will be published. <a href="https://www.transparency.eex.com">www.transparency.eex.com</a>



8.52 GW



<u> Himiliaaliidilli</u>li













# Market information services Info services – Market data Download



As part of the information product service which is subject to a fee, EEX makes the data from trading and clearing as well as the data from the transparency platform available for download.

### Right of use

#### **User EPEX**

Right to the internal and external use of the data depending on the respective agreement with EPEX.

#### **User GDB**

Right to the internal and external use of the data depending on the respective agreement with GDB.

#### Info user

Right to the internal use of the data. Publication or reselling of the data is not permitted.

#### Info vendor

Right for commercial use or publication.

#### Uni vendor

Right to forward the data to students for publication in the framework of academic work.
Additionally, students have the possibility of ordering the infostudent product.

#### Info user SMS

Right to the internal use of the data. Publication or reselling of the data is not permitted.

#### Real time data

### **Delayed data**

### End of day data

**EPEX API-Format** 

Proprietary CEF(r)data format

XML

XLS, CSV, XML

SMS

















# Training courses of EEX Overview



#### **Training offerings**



for

Supplier

Banks

Broker

Educational providers

Universities

Association

Exchange trader exam

Admission

EEX exchange trader exam

EEX certificate course

EPEX exchange trader

EEX exchange trader emissions

Education / certification

EEX certificate course
Introduction to Exchange Trading
Clearing

Individual trainings

information

Speeches

Presentations

Visitor groups











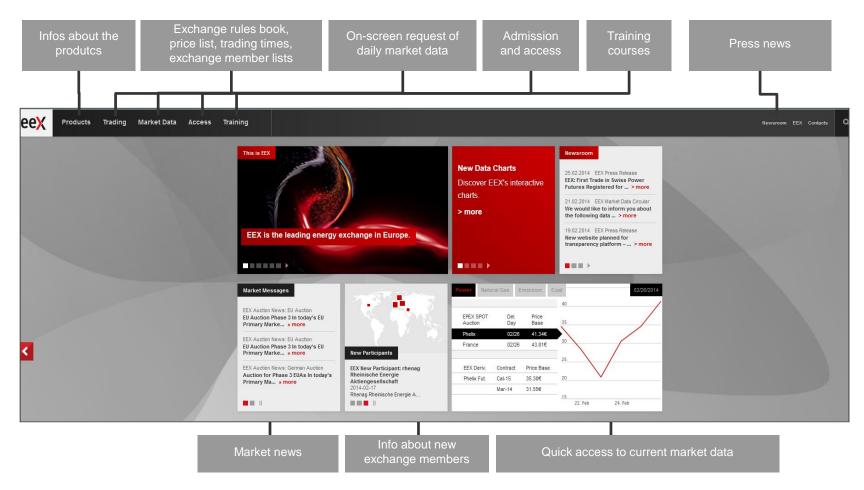






# Web page Main page

















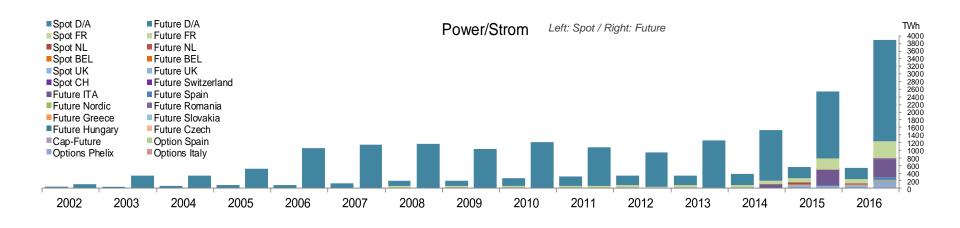


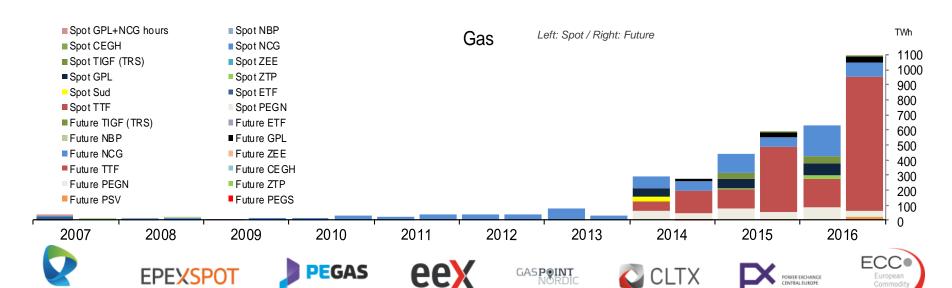


# Handelsvolumina und Ergebniszahlen Trading volume and results

powernext

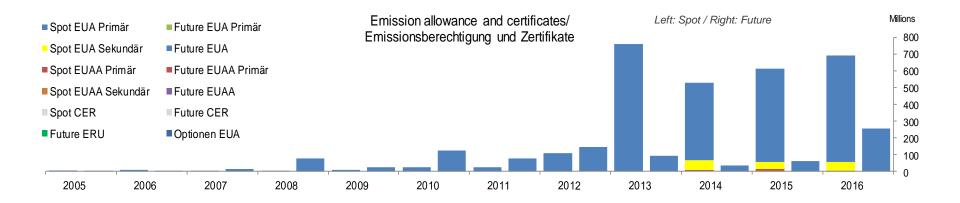


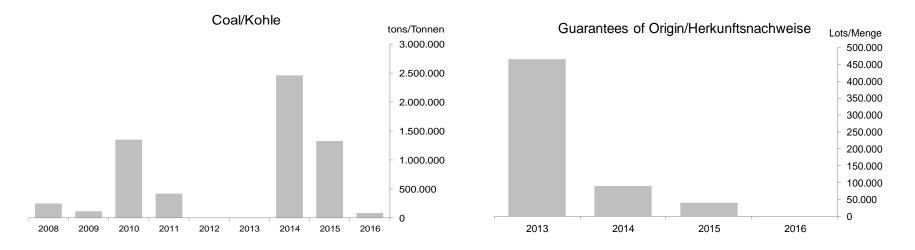




# Handelsvolumina und Ergebniszahlen Trading volume and results

















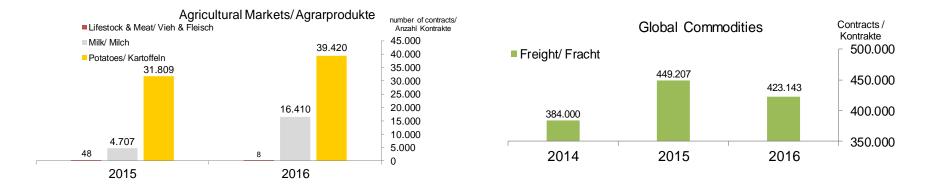


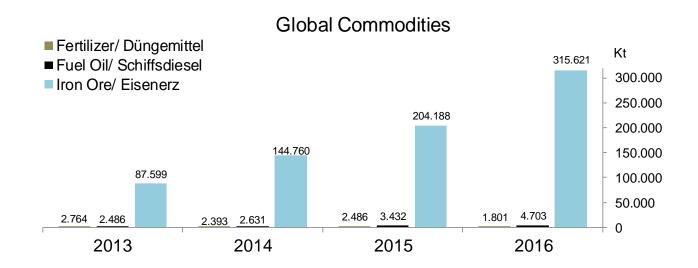




### Handelsvolumina und Ergebniszahlen Trading volume and results























### Trading volume and results



- The sales revenue of EEX Group rose by 23% from EUR 190,4 million in the previous year to EUR 234,2.
- Earnings before taxes (EBT) rose by 76% from EUR 49.7 million in the previous year to EUR **87.6** million.
- The annual net profit rose from EUR 30,1 million in the previous year to EUR **57,7** million.
- At the end of 2016, EEX Group employed in total **450** employees at **15** sites.













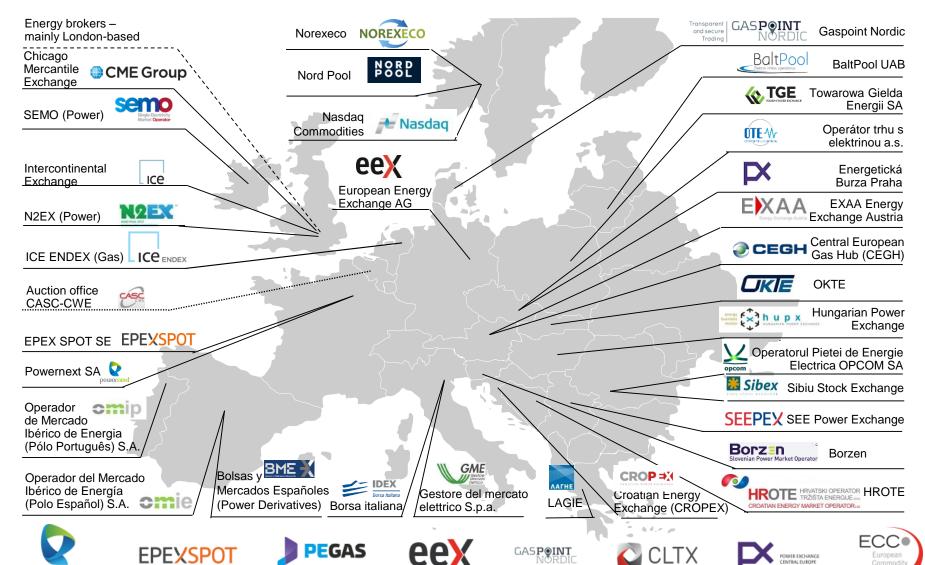




# Overview of exchanges and trading venues 2016

powernext





### Websites



















