

An overview of Electricity Trading in Europe

Expectations from Market Players

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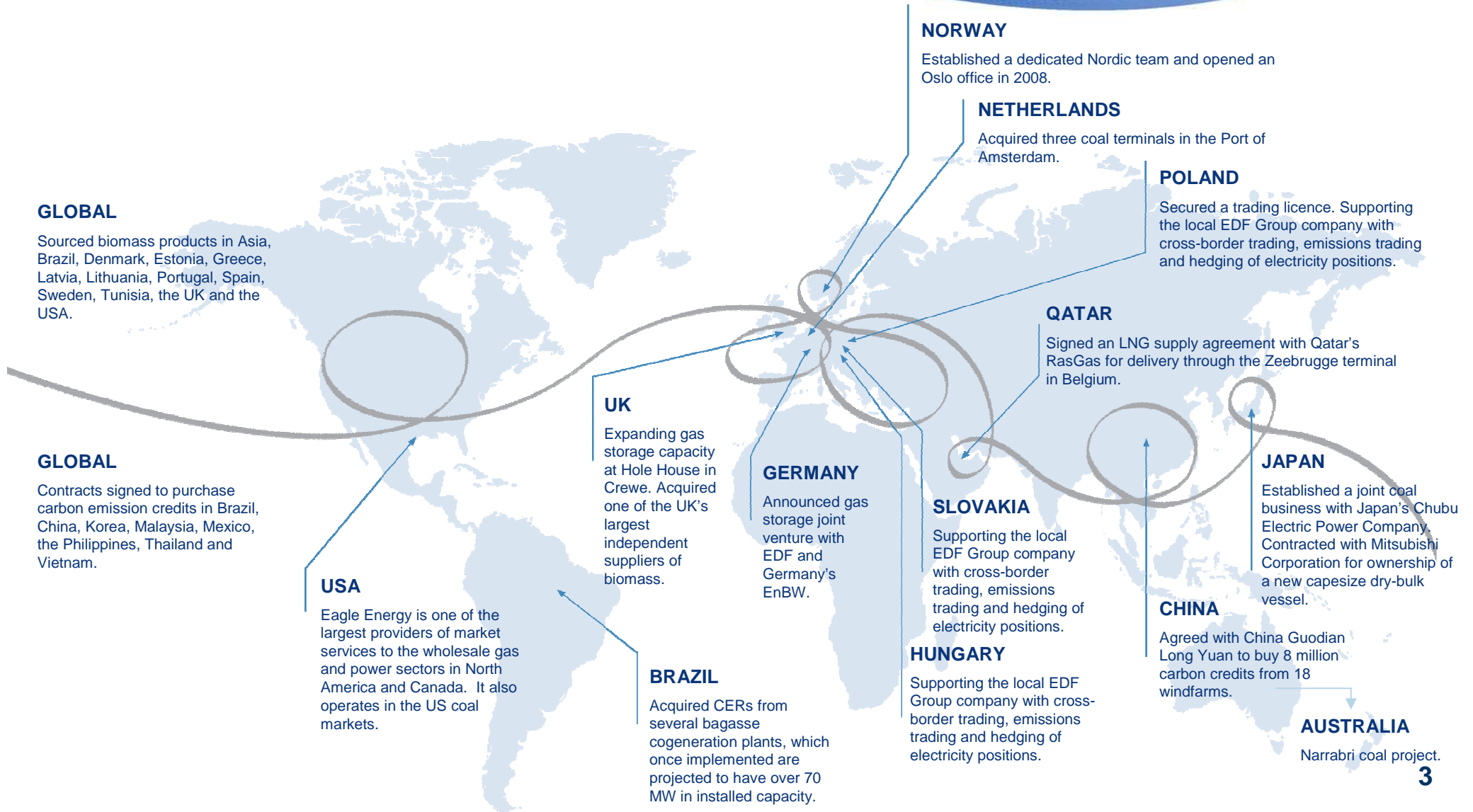
HEAD OF REGULATION – CONTINENTAL POWER MARKETS

EDF TRADING

A leader in the international wholesale energy markets

- Active in wholesale energy markets since 1999
- **Multi-commodity:** Biomass, Carbon, Coal, Electricity, Freight, Natural Gas, Oil
- **Business model:** Network of assets are the foundation of our business. The interface to the wholesale markets for EDF.
- **Employees:** 700
- **Locations:** London, Crewe, Paris, Oslo, Nagoya, Singapore, Beijing, Berlin, Amsterdam, Rotterdam, Houston, Denver, Calgary and Portland
- **Scale:** Over 500,000 transactions executed in 2008 with over 1,000 counterparts
- **Financials:** Shareholders equity of over €1.6 billion (2008), A3 credit rating (Moody's)
- **Parent company:** 100% owned by EDF Group, one of Europe's largest energy companies

GLOBAL TRADING ACTIVITIES



- Leading electricity trader in Europe
- Exclusive interface to wholesale markets for EDF
- Extensive portfolio of long-term contracts and assets facilitates our asset-based trading strategy
- EDF's position in France provides the ideal platform to trade the connected and liberalised wholesale markets
- Breadth and depth across Europe: France, Germany, Benelux, UK, Southern Europe, Nordic market, Central and Eastern Europe
- Expanding in the US market through Eagle Energy

- Enables flexibility
 - Trade allows market participants to adjust positions within and across borders
 - Trade provides choice about when and where to trade
- More efficient and competitive markets
- Efficient allocation of risks among market participants
- More accurate and efficient prices result in increased economic welfare



TYPES OF TRADERS

- Trading can be done to
 - Optimise generation assets
 - Manage risks (e.g. long term contract price exposure)
 - Take outright positions
- These goals are usually highly interrelated
- Traders differ as to why and how they trade, e.g.:
 - Banks
 - Hedge funds
 - Utilities
 - Large industrials

Physical transaction: an obligation to deliver (or receive)

- e.g.: Cal 2010 base load at German-French border

Financial transaction: a contract settled financially with no actual delivery

- same characteristics as a physical transaction
- BUT financially settled (so no scheduling/exchange of electricity) against some index (e.g. an exchange)
- based on the underlying physical commodity

- Financial and physical transactions achieve the same outcome and are transferable
- Financial transactions may complement physical ones

TRADED PRODUCTS

Spot

The immediate price now

Forwards

For deliveries sometime in the future

Futures

A forward trade executed on an exchange

Options

The right, but not the obligation, for deliveries sometime in the future

Forward, Futures and options transactions are very important risk management tools

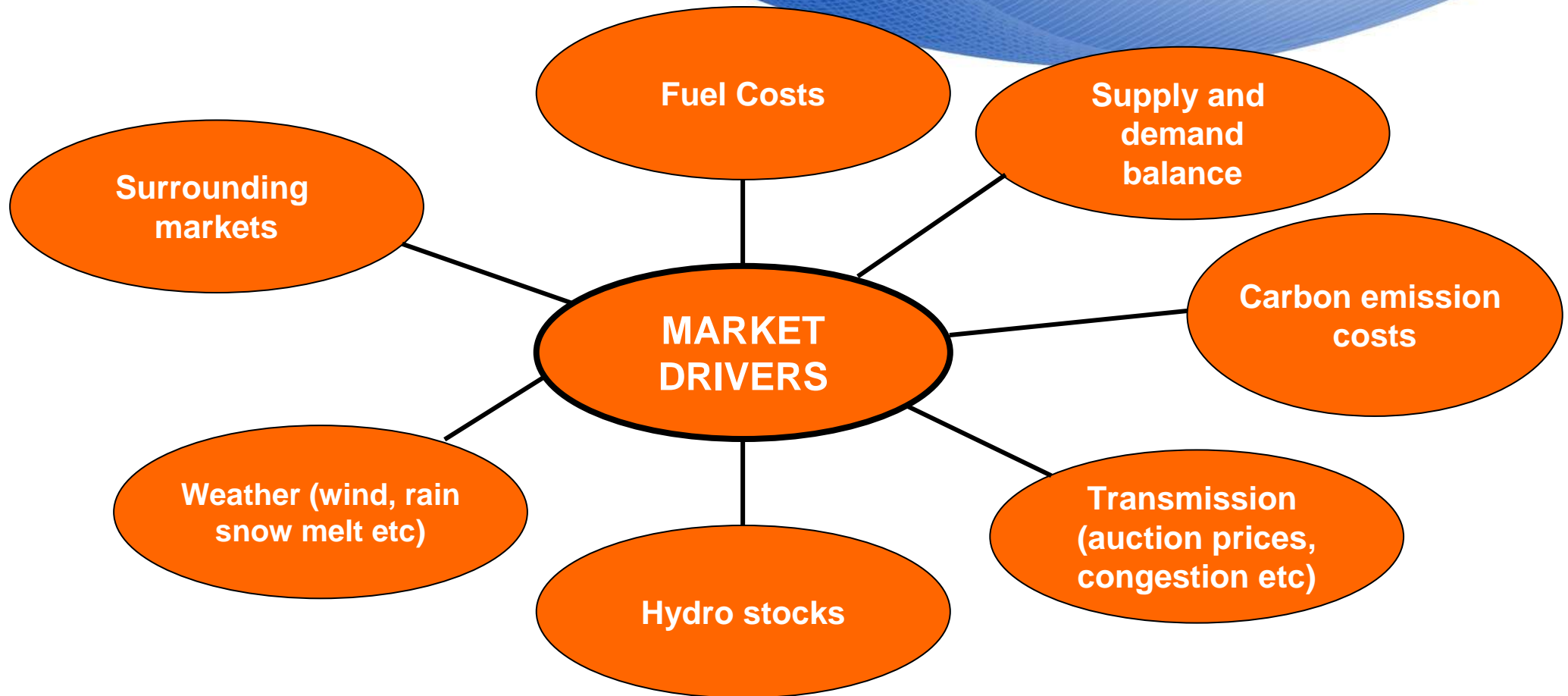


OVER THE COUNTER (OTC) TRADING

- Takes place directly between counterparties (who usually sign a master agreement) or through brokers
- Trades done by phone or electronically
- Fees are low, but carry counterparty risk
- Trading takes place continuously (respond to new information)
- Concentrates trading liquidity in products
- Ability to tailor transactions to needs (e.g. double volume from initial quotes on screen)

- Financial and physical transactions
- Exchange is counterparty to all transactions so bears credit risks (trades cleared by exchange)
- Auction once a day only concentrates liquidity in time
- Trading is fully anonymous
- Facilitates market entry, low risk for participants, provides good reference price (which financial contracts can be settled against)
- BUT higher costs of trading, only standard transactions, only trades once a day (for spot)

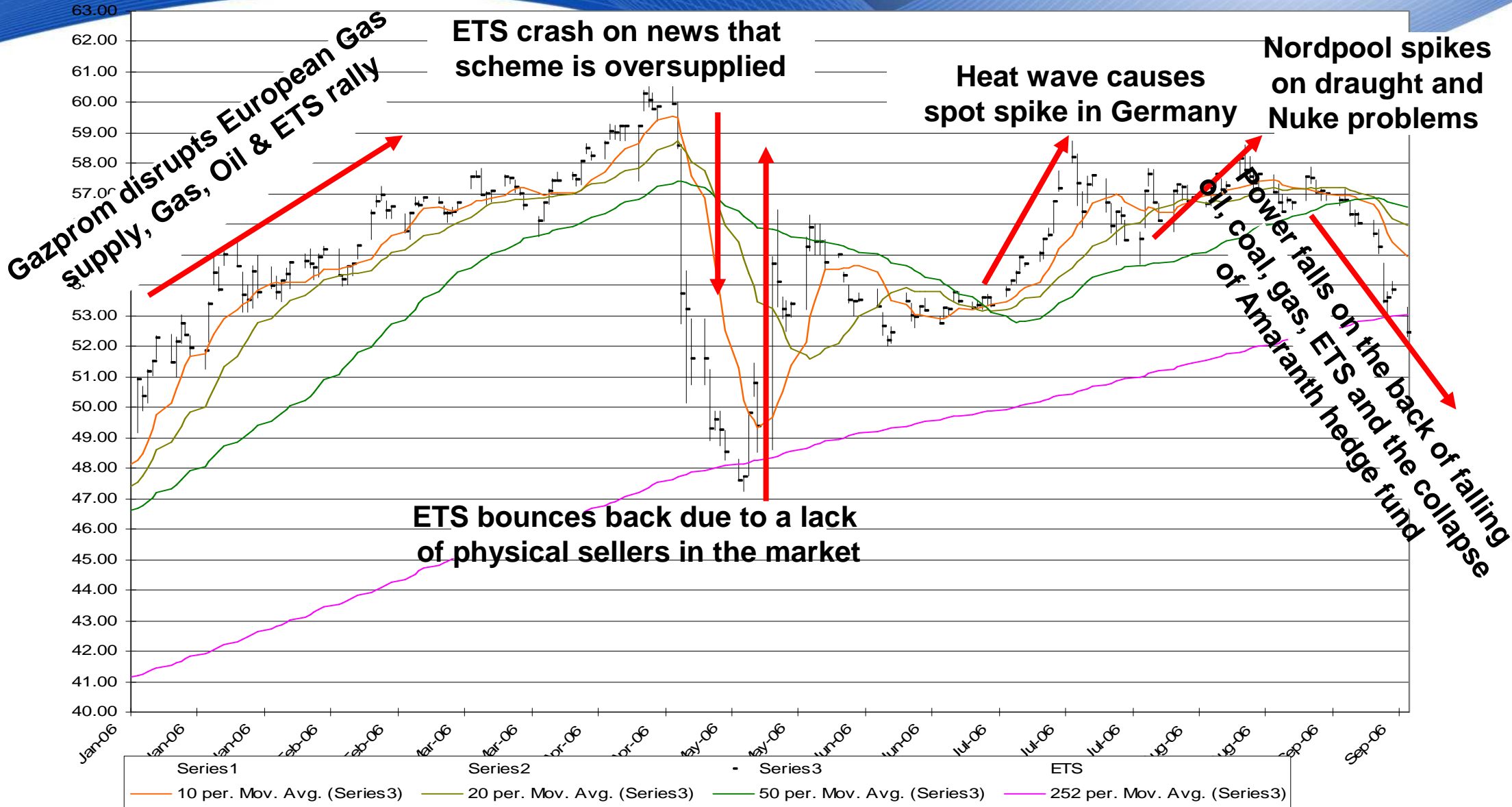




These factors influence the various traded products differently
e.g. short versus long term factors

EXAMPLE: OUTRIGHT POSITIONS

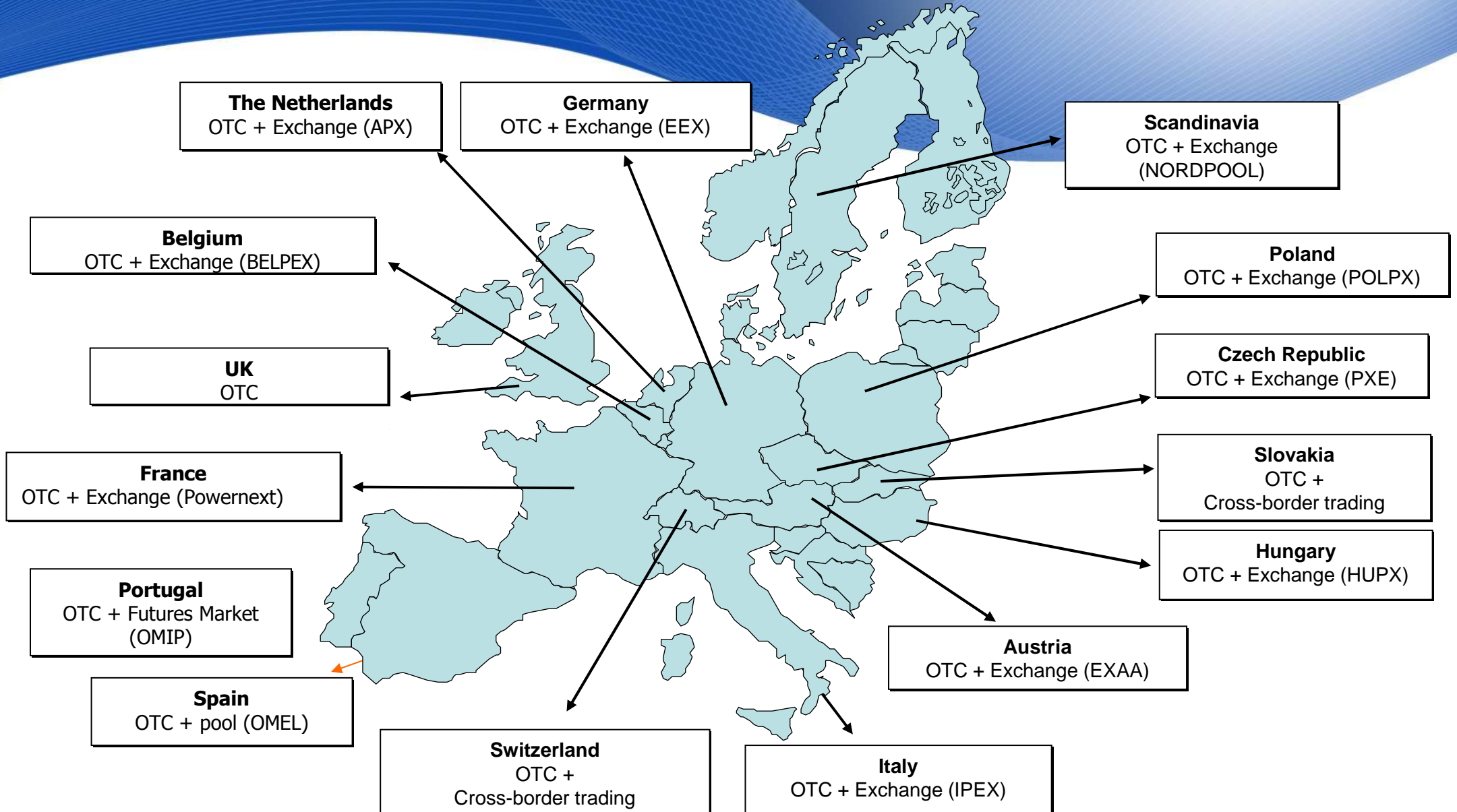
CAL 07 Germany



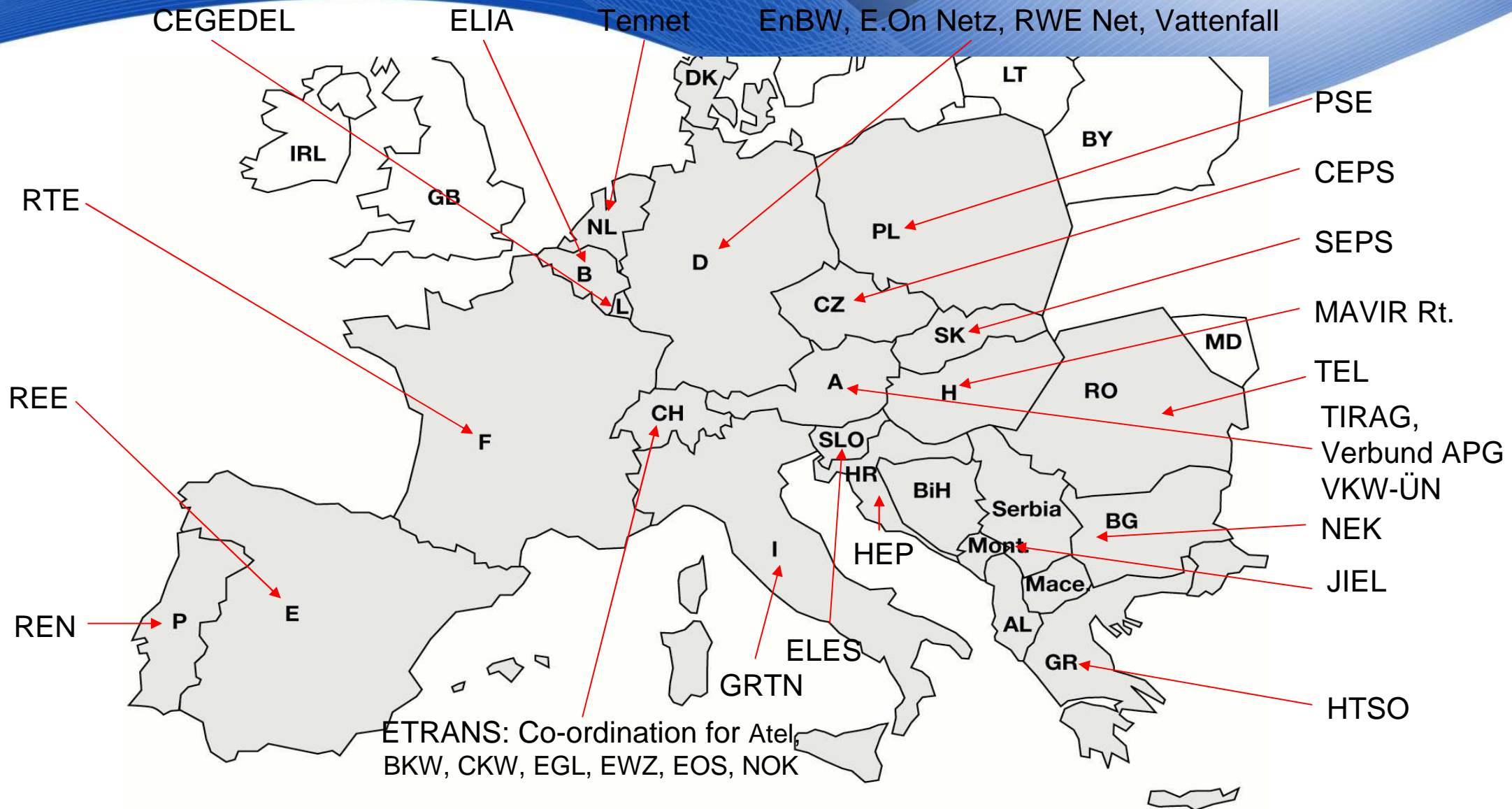
- To trade physical
 - Exchange agreements
 - Collateral requirements
 - Counterparty master agreements
 - Balance responsible party agreement
 - Auction agreements
 - Credit risk management
 - Scheduling
 - Order processing – confirmation, matching, settlement
 - Shipping issues

- To trade financial - much easier
 - None of the operational issues
 - Collateral requirements
 - Counterparty master agreements
 - Auction agreements
 - Credit risk management
 - Order processing – confirmation, matching, settlement






POWER EXCHANGES IN EUROPE

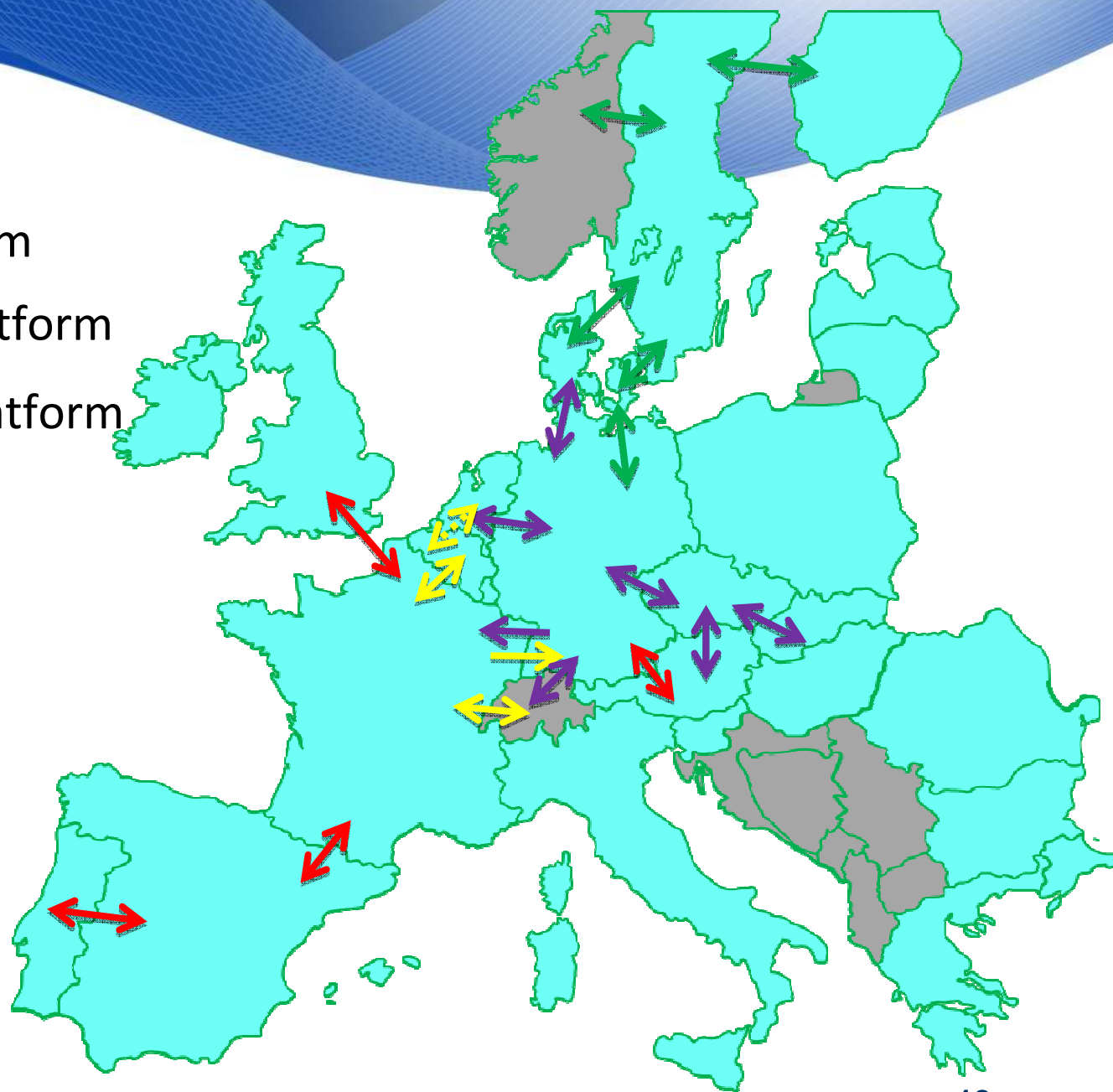


TRANSMISSION SYSTEM OPERATORS IN EUROPE



EXISTING INTRADAY CAPACITY ALLOCATIONS

-  Continuous trading platform
-  Improved Pro Rata RTE platform
-  Improved Pro Rata ELIA platform (NL/BE)
-  Obligatory use
-  Other
 - UK: renomination,
 - ES-FR: explicit auction (2 GC)
 - ES-PT: implicit auction (6 GC)
 - AT-DE: no congestion



EXAMPLE: ITALY – RELATIONSHIPS OF CONTROL

AEEG Deliberation ARG/elt 115/08

Article 8

Obligatory information to be provided by market operators and dispatching users

8.1 For the purposes of the provisions of paragraph 4.1, letter a), all market operators and all dispatching users, are required to provide the Authority with a report, the object of which is to show the control relationships that exist between one or more market operators or dispatching users or producers who make use of the special provisions for the sale of electric energy, as identified in **Articles 25 and 26 of Italian legislative Decree no. 127/91**, accompanied by an organisational chart for the group, showing the relationships in que

Italian Presidential Decree no. 445/00

Article 47 (R)

Affirmations equivalent to a notarial act

8.2 For the purpose operators and all di: object of which is t market operators or provisions for the s and 26 of Italian Le for the group, show electronic format, o the regulations and

1. A notarial act relating to the legal status, personal capacities or characteristics directly known to the person in question, is replaced by an affirmation made and signed by the person in question, following the procedure set out in Article 38. (R)
2. An affirmation made in the interests of the declarant may also relate to the legal status, personal capacities or characteristics of other persons, which are directly known to the declarant. (R)
3. Without prejudice to the exceptions expressly provided for by the law, in relations with public authorities and those holding public service concessions, the legal status, personal capacities and characteristics not expressly referred to in Article 46, are considered proven by the interested party by means of an affirmation equivalent to a notarial act. (R)
4. With the exception of the cases for which the law expressly requires a statement to be made to the Judicial Police Authority in order for the administrative procedures to be activated for the issue of an identity document or any other document confirming the status or personal capacities or characteristics of the interested party, the loss of the documents in question is considered proven by the affirmation equivalent to a notarial act, made by the person requesting the duplicate. (R)

Article 76 (L)

Penalties

8.3 Within 60 days and documentation by the legally appo: users, for each men of **Articles 47 and 7** by the Authority. A paragraphs 8.1 and within 30 days of t

1. Any persons making false affirmations, compiling false documents or making use of these in the cases referred to in this consolidated act, shall be subject to the penalties provided for in the Penal Code and any special legislation on this subject.
2. The exhibition of a document containing information that no longer conforms to the truth is equivalent to the use of a false document.
3. Affirmations replacing a notarial act, made according to the provisions of Articles 46 and 47, and affirmations made on behalf of the persons indicated in Article 4, paragraph 2, are considered to have been made to a public official.

ITALIAN LEGISLATIVE DECREE no. 127 of 9 APRIL 1991.

Text extracted from the archives of the electronic system ItalgireWeb of the data processing centre for the Court of Cassation (Appeal Court)

CHAPTER: Italian Civil Code

Article 25 E **Article 2201 Public entities**

1. Public li Public entities whose sole or principal object is a commercial activity that control (2093) are obliged to be registered in the companies register (att. 100).

2. The sam **Art. 2093 Enterprises undertaken by public entities**

Civil Code.

company, a The provisions of this volume apply to public entities that belong to one of the officially listed professional associations.

Article 26 C The provisions of this volume for non-listed public bodies apply according to the enterprises they engage in.

1. For the y indicated in Other legal provisions still apply.

2. For the s enterprises:

a) enterp **Article 2359 Controlled and associated companies**

statutory cl: Controlled companies are defined as follows:

- a) enterpri
 - b) enterpri
- another pers
- 1) companies in which another company holds the majority of voting rights that can be exercised at ordinary general shareholder meetings;
 - 2) companies in which another company holds a sufficient number of voting rights to exercise a dominant influence at ordinary general shareholder meetings;
 - 3) companies that are under the dominant influence of another company by virtue of particular constraints contracted with the latter company.

3. The tern companies, parties. In order to apply items 1 and 2 of paragraph 1, the votes of controlled companies, trust companies and intermediary persons are included; voting rights exercised on behalf of third parties are not included.

- Active trading can only be made possible thanks to standardisation of grid and trading agreements
- Grid agreements will define the following
 - Rules for notifying transactions to the grid operator
 - Penalties for non-delivery
 - Rules for acquiring and using transmission capacities
 - Rules for supply to end users
- Standard trading agreements will ensure
 - Definition of responsibilities and liabilities for buyer and seller
 - Credit and other provisions to mitigate the risks faced by traders

- Some achievements have been made
 - Cooperation between PEXs
 - Day-Ahead Market Coupling
 - Some common sets of cross-border capacity auction rules

- But there is still room for improvement!!!
 - Align Transmission products with Energy traded products (max capacity, firmness, matched maturities, secondary markets, etc.)
 - Avoid regulatory burdens
 - Think wide (European integration), future-proof, and user friendly

- Separate trading 'books' track profits and losses
- Some key risks include
 - Market risk (measured by VaR models)
 - Legal/contractual risk
 - Regulatory risk
 - Flow/capacity risk
 - Counterparty credit risk



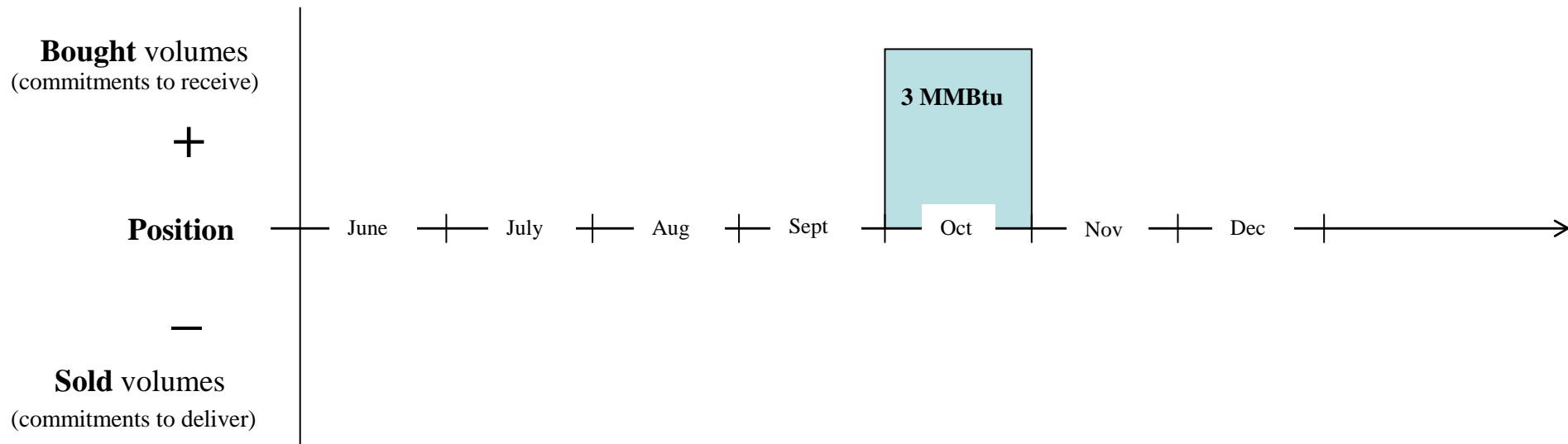
RISK MANAGEMENT HAS TWO SIDES

- **Measuring risk** (with IT systems, mathematics and standardisation)
 - Position (how much has been bought vs how much has been sold)
 - Exposure (net open position)
 - VaR Value at Risk (how much can the net position change in market value)
- **Managing risk** (through decision making with professional judgement)
 - “Trading” – opening and closing positions to manage exposure



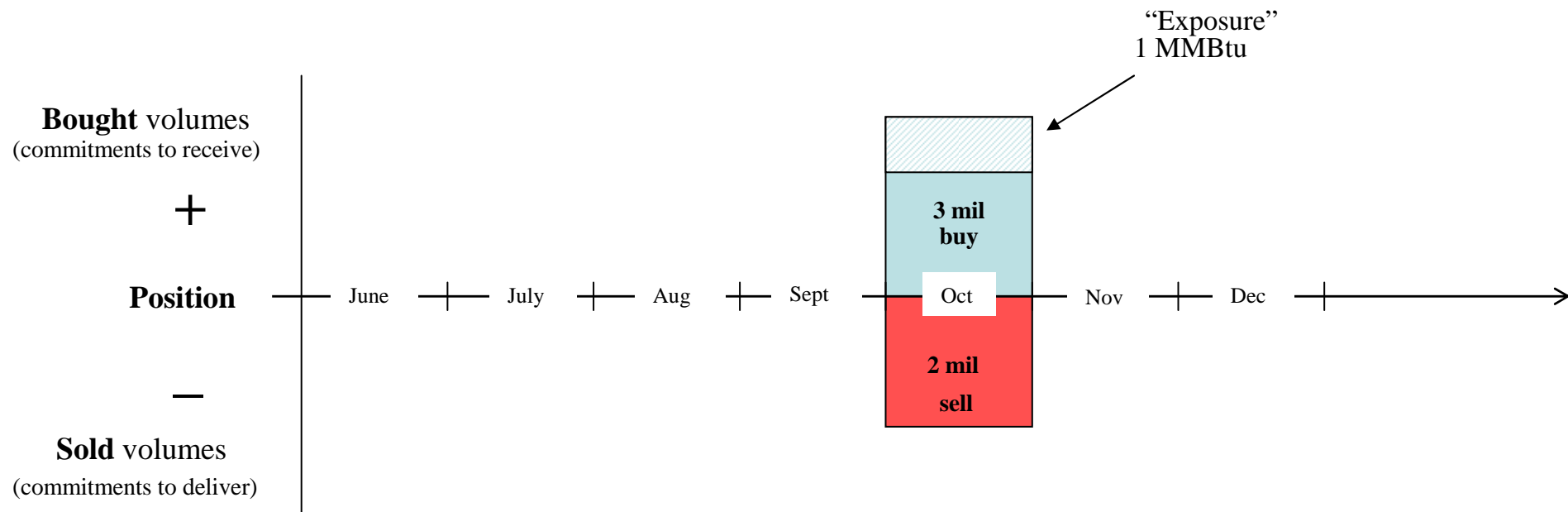
Every transaction creates a “position” ...

- **Example Transaction 1:** EDF buys 3 MMBtu of gas to receive in October
- **Result:** EDF has a 3 MMBtu October position (take or pay)



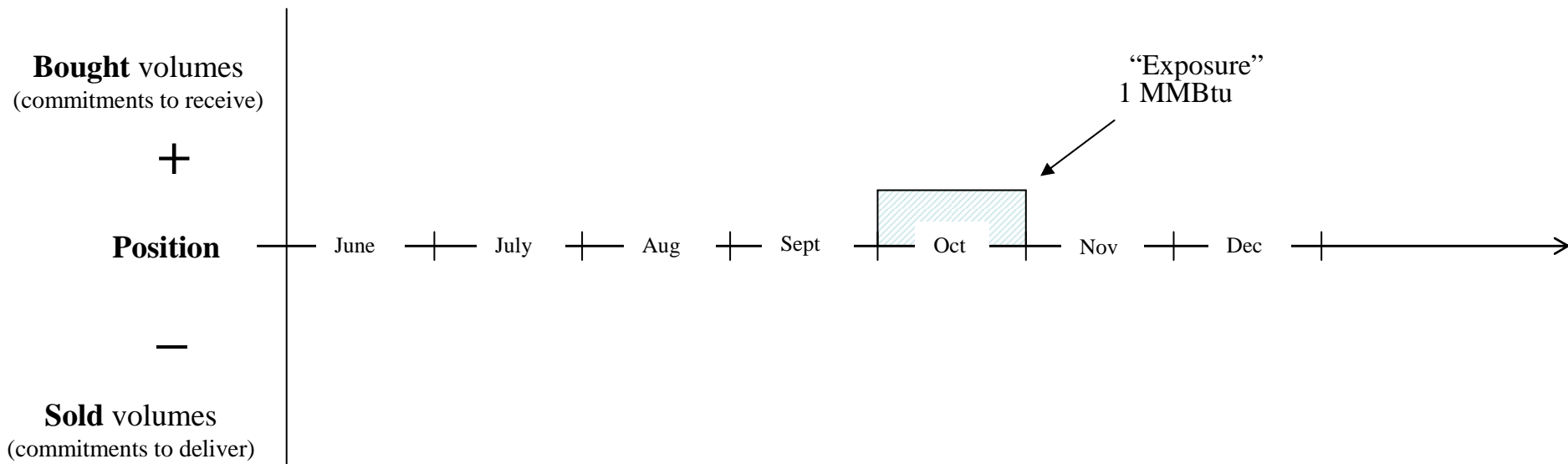
... all net positions create some “exposure” ...

- **Example Transaction 2:** EDF sells 2 MMBtu of gas for delivery in October
- **Result:** EDF has a 1 MMBtu October net position = “Exposure”

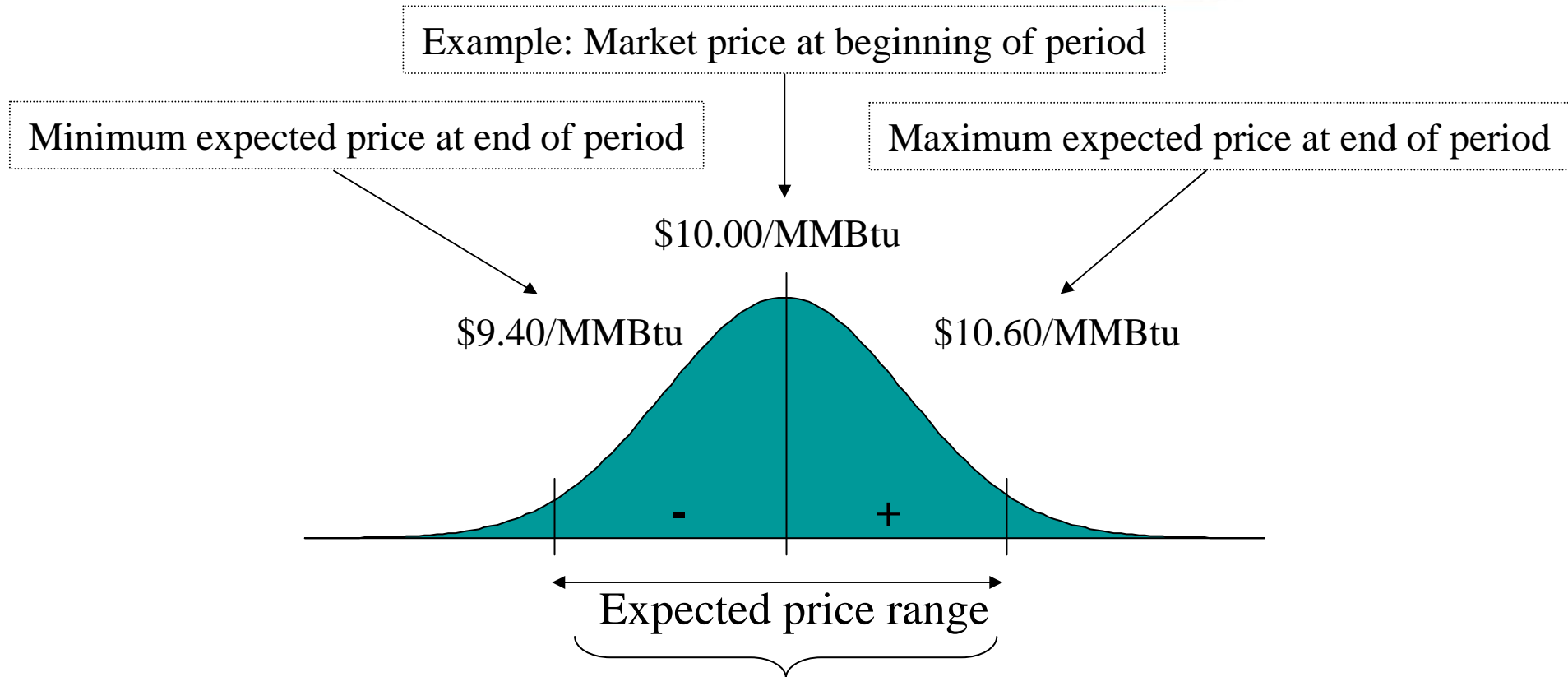


...and every exposure is a financial risk

- If the market price of October gas goes up, EDF may gain from the exposure
- If the market price of October gas goes down, EDF may lose from the exposure



Volatility: how quickly and how far prices can change



Simple Example

- Period of time: 1 Day
- Confidence level: 95% (2 std dev)
- Max price change: +/- \$0.60/MMBtu

Confidence level

- Measures of how much an exposure may change in value during a period of time

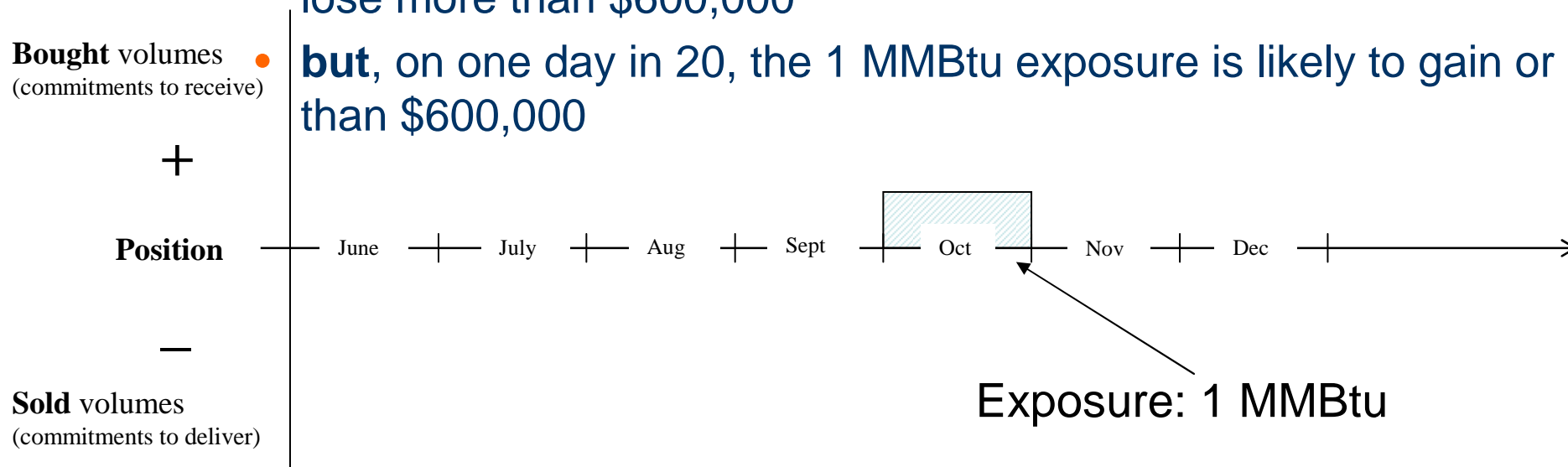
- Simple Example

- Period of time: 1 Day
- Confidence level: 95% (2 std dev)
- max potential price change: +/- \$0.60/MMBtu
- Value at Risk: +/- \$600,000

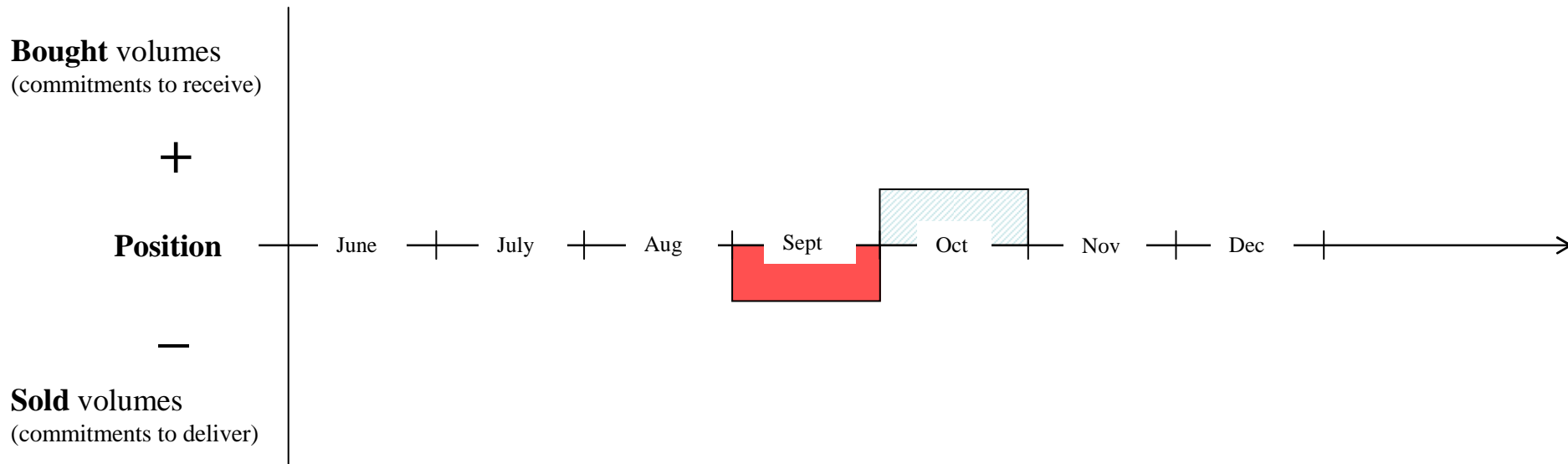
- This means that

- over the next 24 hours, the 1 MMBtu exposure is not expected to gain or lose more than \$600,000

- but, on one day in 20, the 1 MMBtu exposure is likely to gain or lose more than \$600,000



- **Example Transaction 3** : EDF sells 1 MMBtu of gas for delivery in September
- **This means that**
 - if Sep and Oct prices have 100% correlation, then the net exposure is reduced to 0 MMBtu
 - if Sep and Oct prices have 0% correlation, then the net exposure is increased to 2 MMBtu



Trade example

- A German generator sells 200 MW of base-load electricity on the RWE Grid to a trader for delivery in 2010 at a price of €57.40/MWh
 - This ensures that the generator achieves a fixed value for part of the output of its power plant (hedging of risk)
 - The sale can be made as an alternative to selling to end users
 - The trader will profit if the price of Year 2010 German electricity rises (as he will then sell that at a profit)
 - The trader might in turn on-sell part of this to manage own risk profile or take profit
- A more complex example is buying an option to buy power from the German generator

