

Concept of regional markets - aims, principles and tools

POWER RING 2007

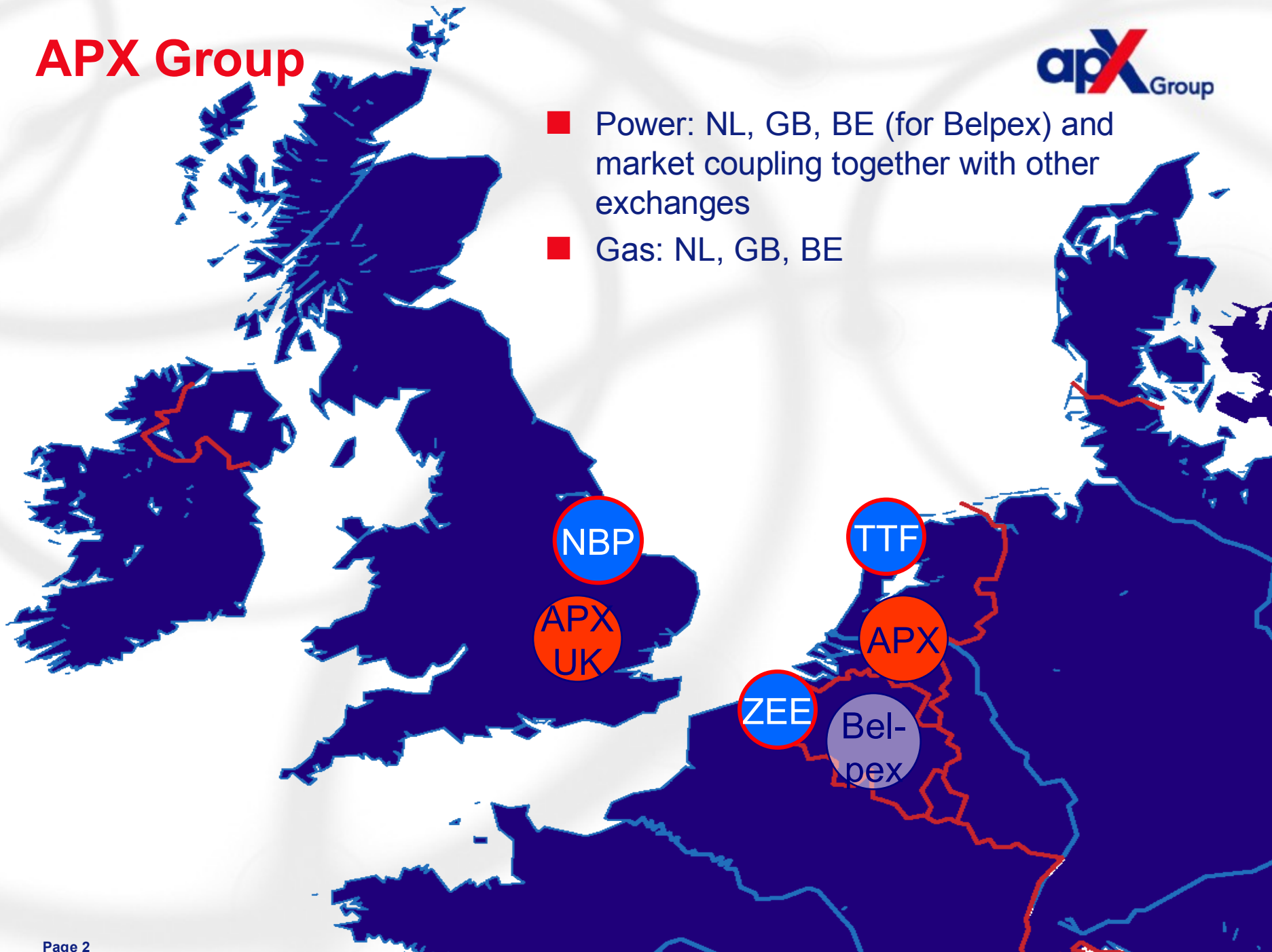
5 December, 2007

Warsaw

Andrew Claxton

apx Group
A VITAL LINK IN
ENERGY TRADING

- Power: NL, GB, BE (for Belpex) and market coupling together with other exchanges
- Gas: NL, GB, BE



Themes for today

- Why regional (or even European) markets?
- Why implicit auctions, such as market coupling?
- What does it involve?
- What next?

Why Regional/European markets?

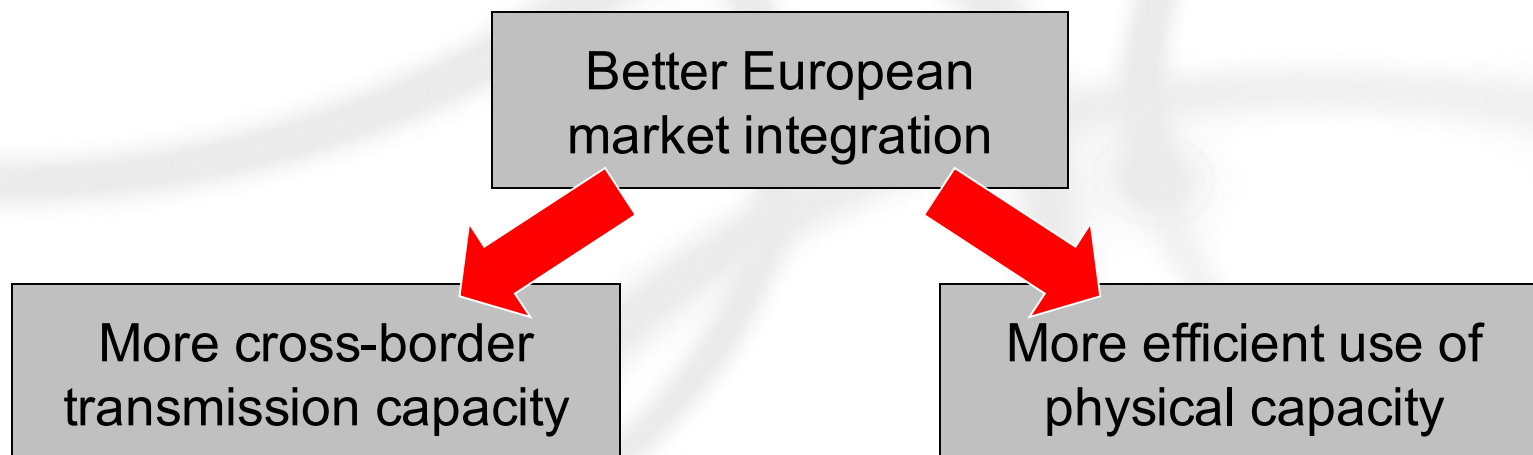
■ European scale issues

- Emissions: same atmosphere
- Generation-demand balance: same price and security
- Operational security: same network
- Fuel supplies: same sources

■ Inadequate national markets

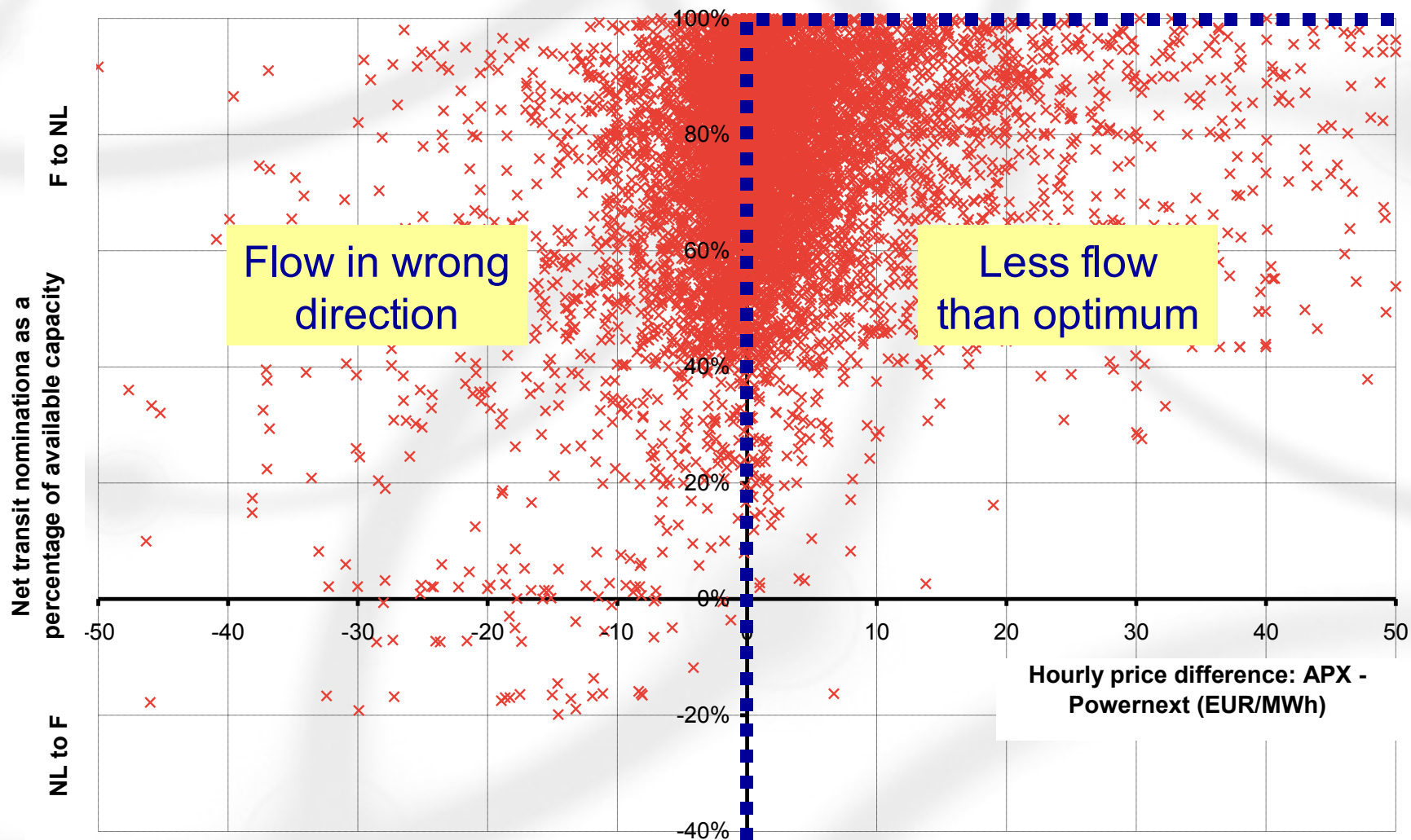
- Small physical size
- Unfavourable industry concentration/structure
- Susceptibility to nationalistic policies and regulation

Removing the physical barriers to a European electricity market



- **New investment**
 - Sub sea cables
 - System reinforcement
 - System planning
- **Market-based mechanism**
 - minimise risk
 - maximise accessibility
 - prevent hoarding
 - enable netting
- **Flow-based capacity model**
- **Intraday access**

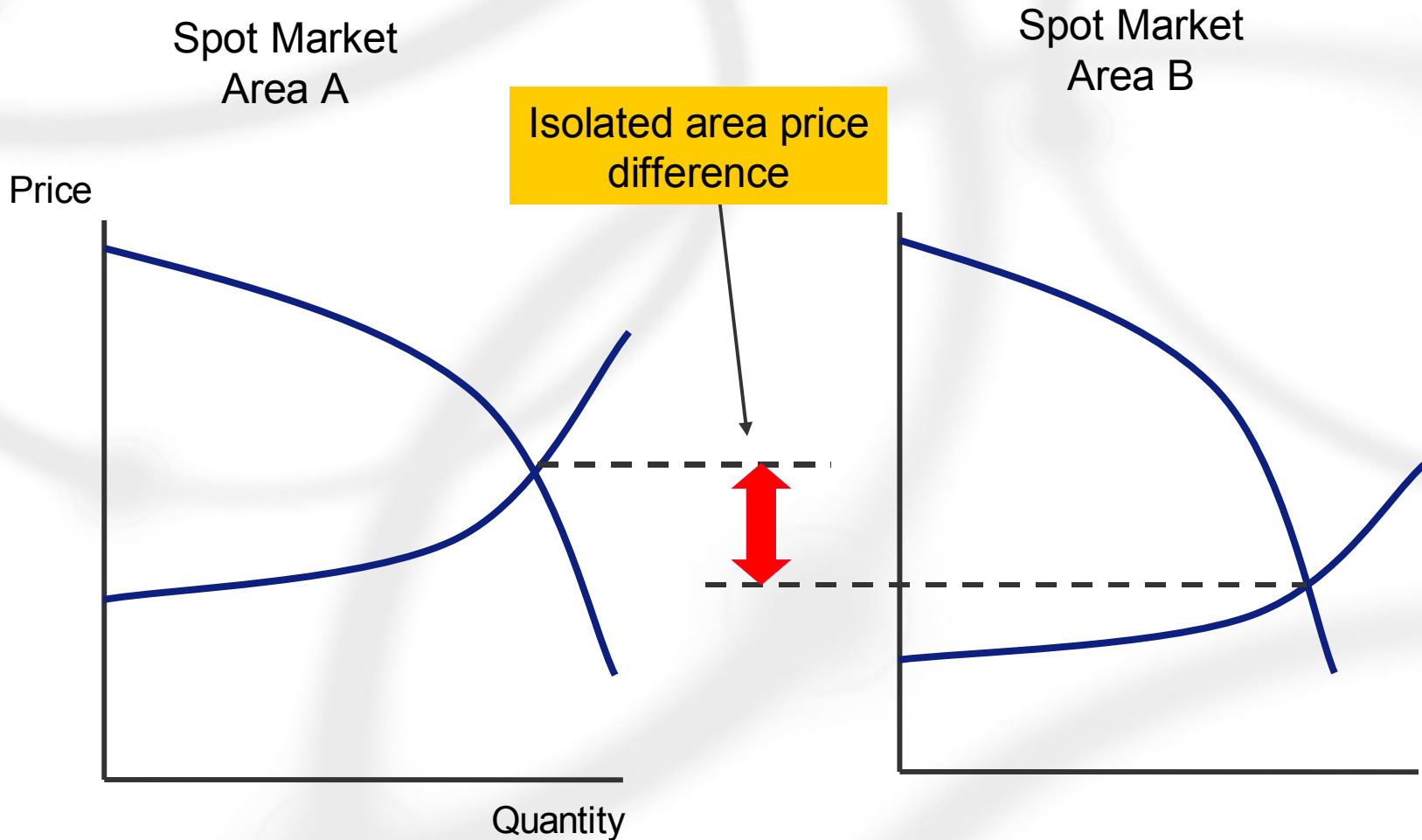
Inefficiency of day ahead explicit auctions



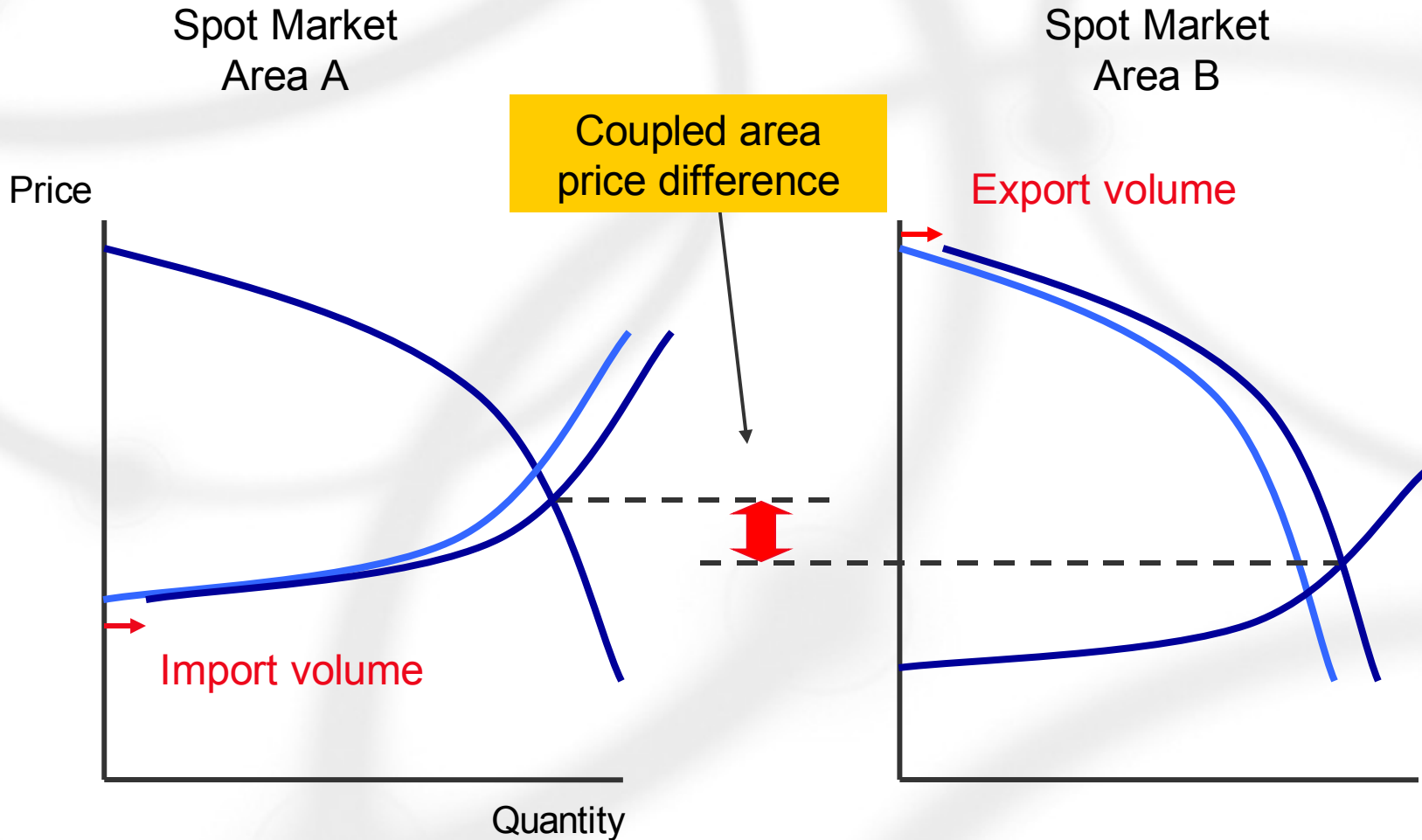
Implicit Auctions

- Transmission capacity allocation is integrated with the energy market (“explicit auctions” sell capacity separately)
- Separate bidding areas are linked using available cross-border transmission capacity
- Energy markets are single clearing price, auction-style
- Price differences between each area are minimised, with convergence at times when there is sufficient capacity
- Can be operated by one exchange (“**market splitting**”) – e.g., Nordic, Iberian markets; or, across several independent exchanges (“**market coupling**”) – e.g., TLC in Netherlands/Belgium/France

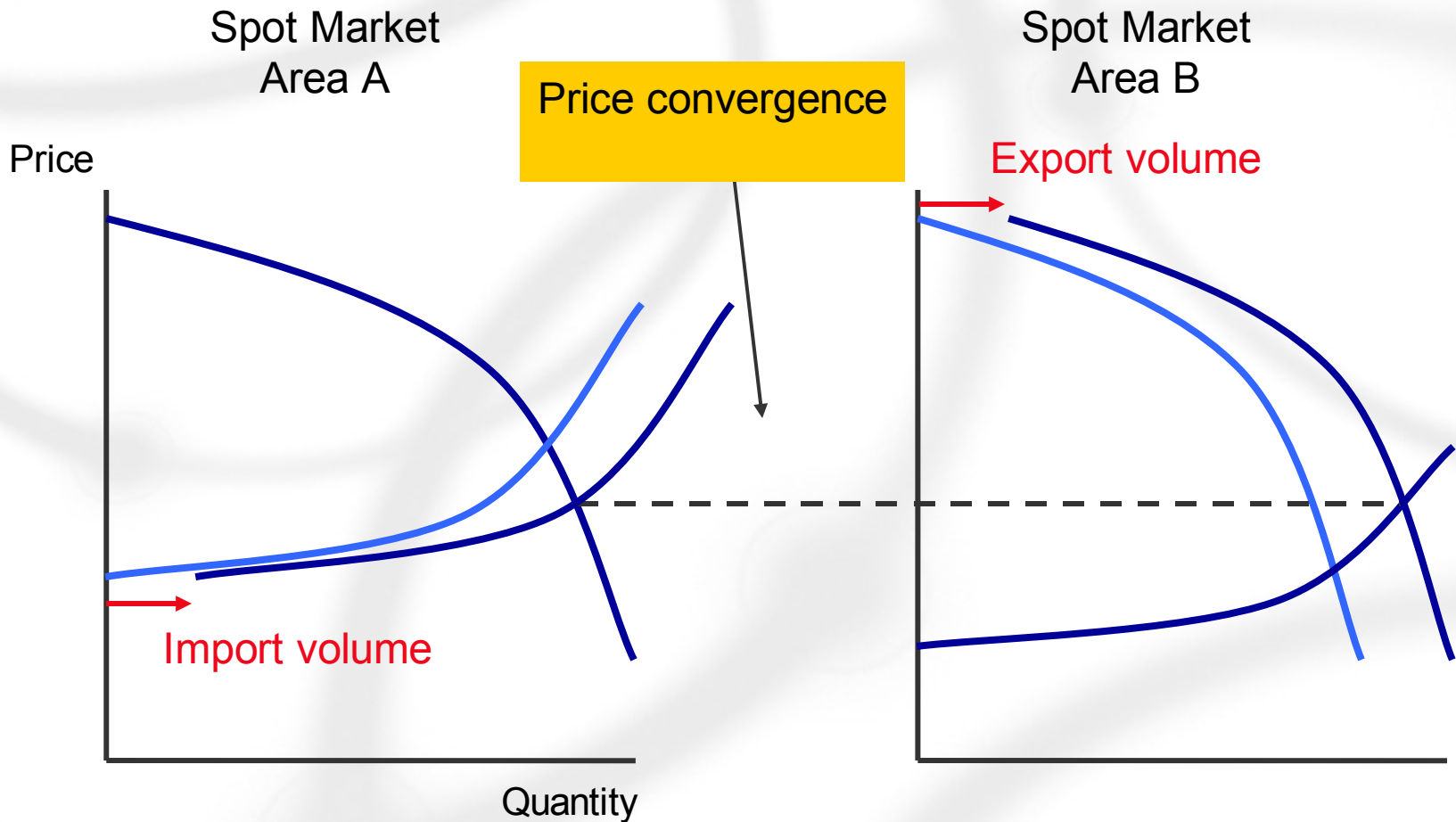
Isolated spot markets



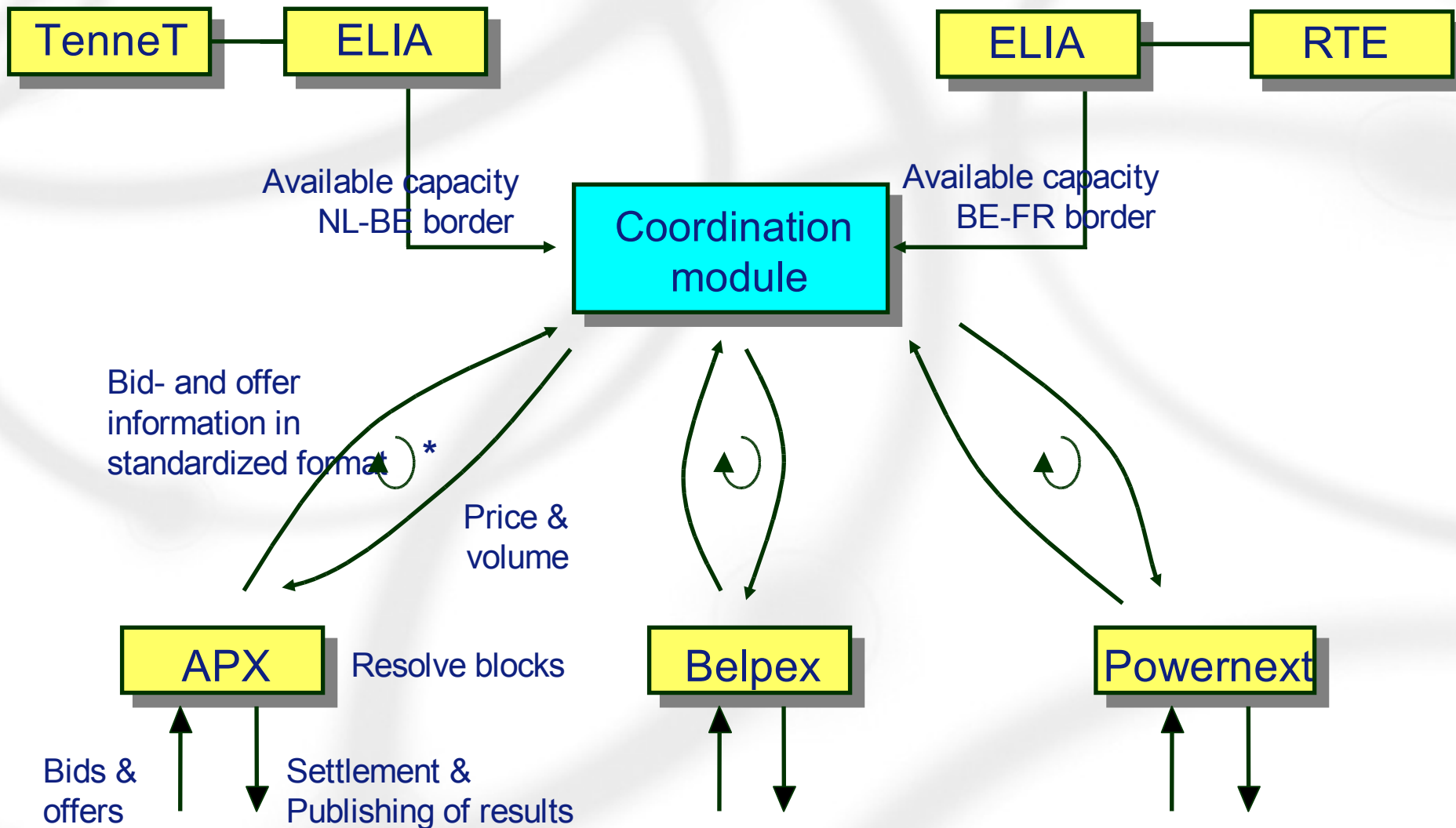
Impact of cross-border flows



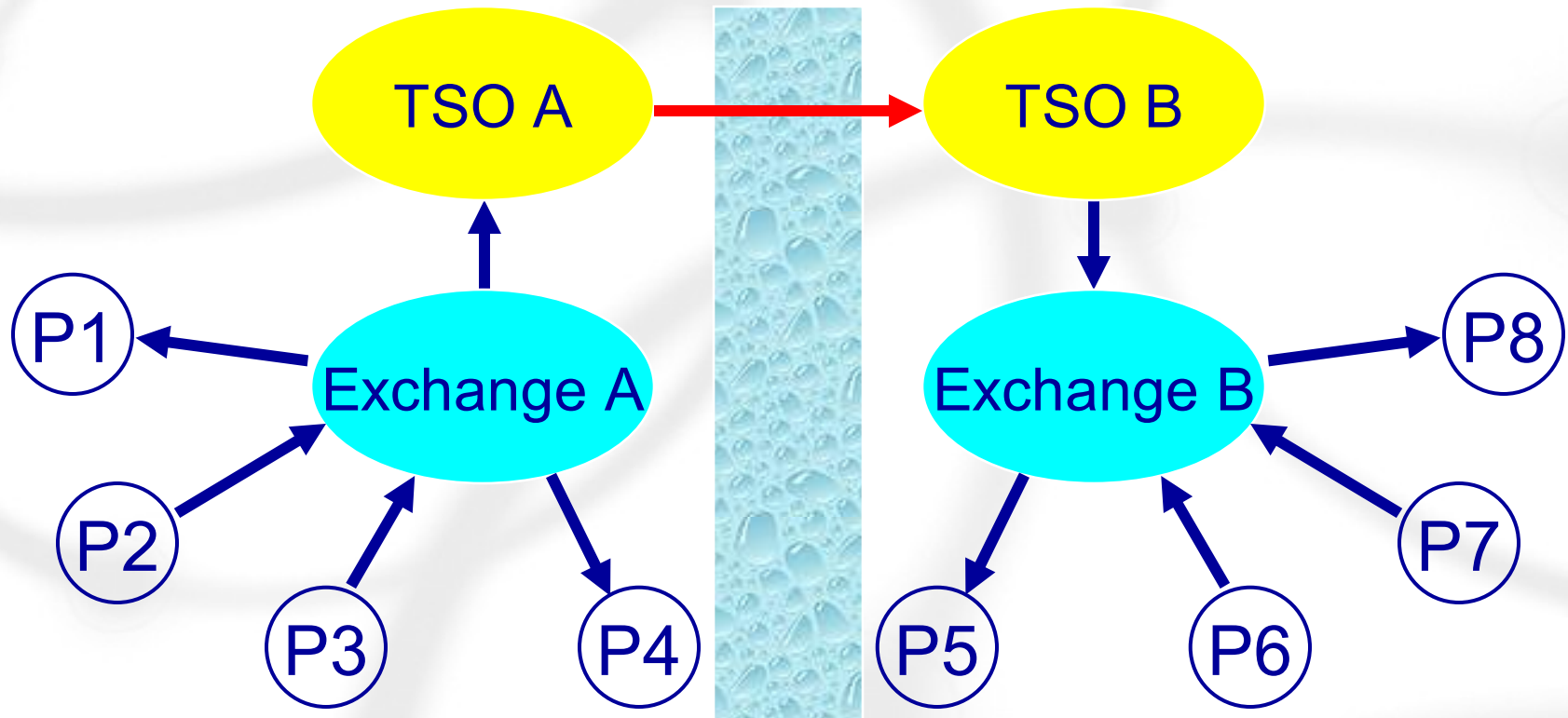
More flow eliminates price differences



TLC technical solution



Energy contracts under TLC



- TSOs become participants on the exchanges
- Exchanges balance and settle locally
- Congestion revenue appears as profit on TSO-TSO transaction

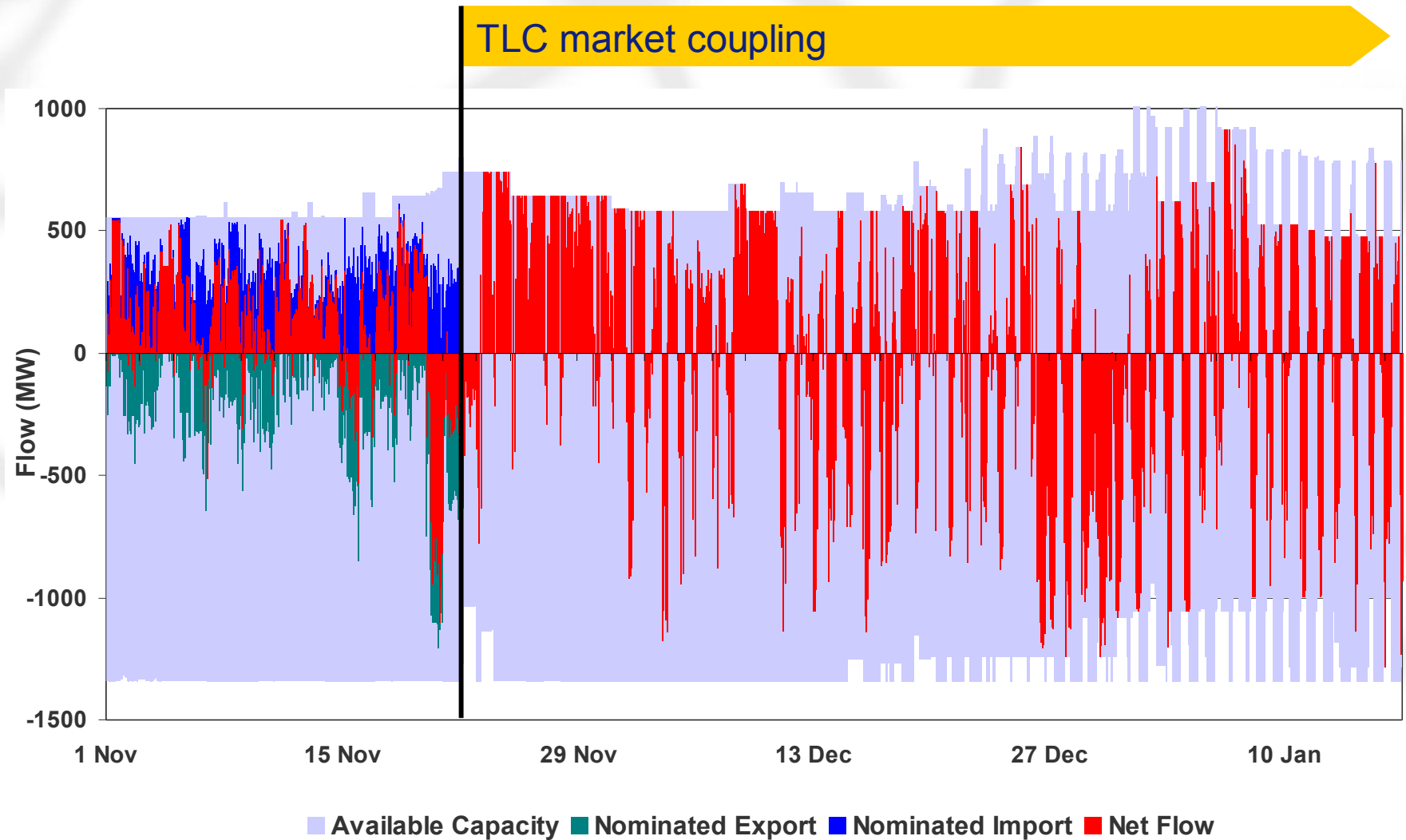
Advantages of Market Coupling

- Removes unnecessary risks of trading short-term transmission capacity and energy separately
- Enables netting of schedules
- Less prone to market abuse since capacity cannot be hoarded
- All market participants benefit from cross-border capacity
- Encourages liquid, robust spot markets – launching new spot markets and promoting indices and derivatives

A large, solid red arrow pointing from the list of advantages on the left towards the box on the right.

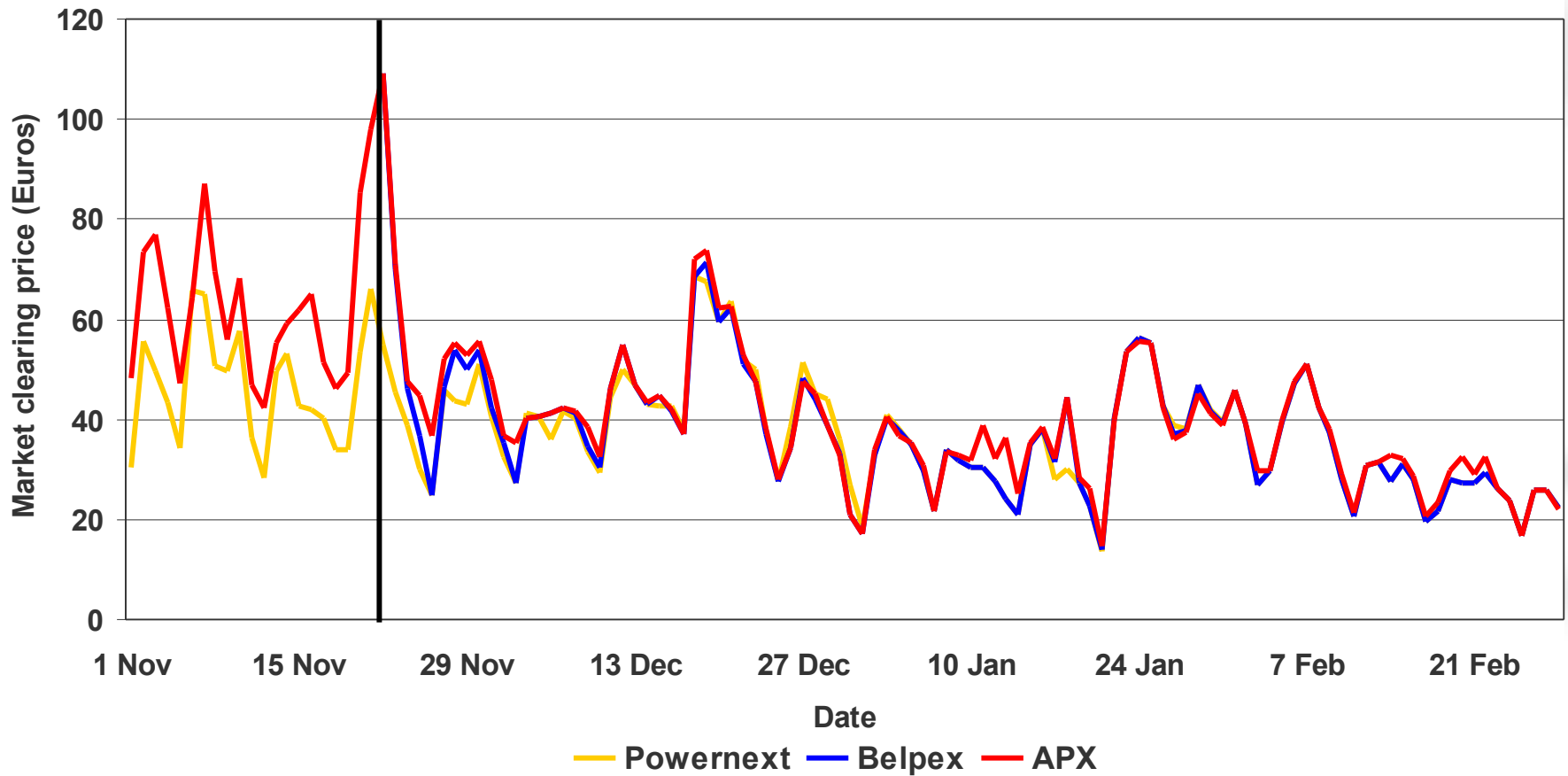
Optimal use of capacity
Maximum welfare gain
Single energy market

Use of Capacity: NL-BE



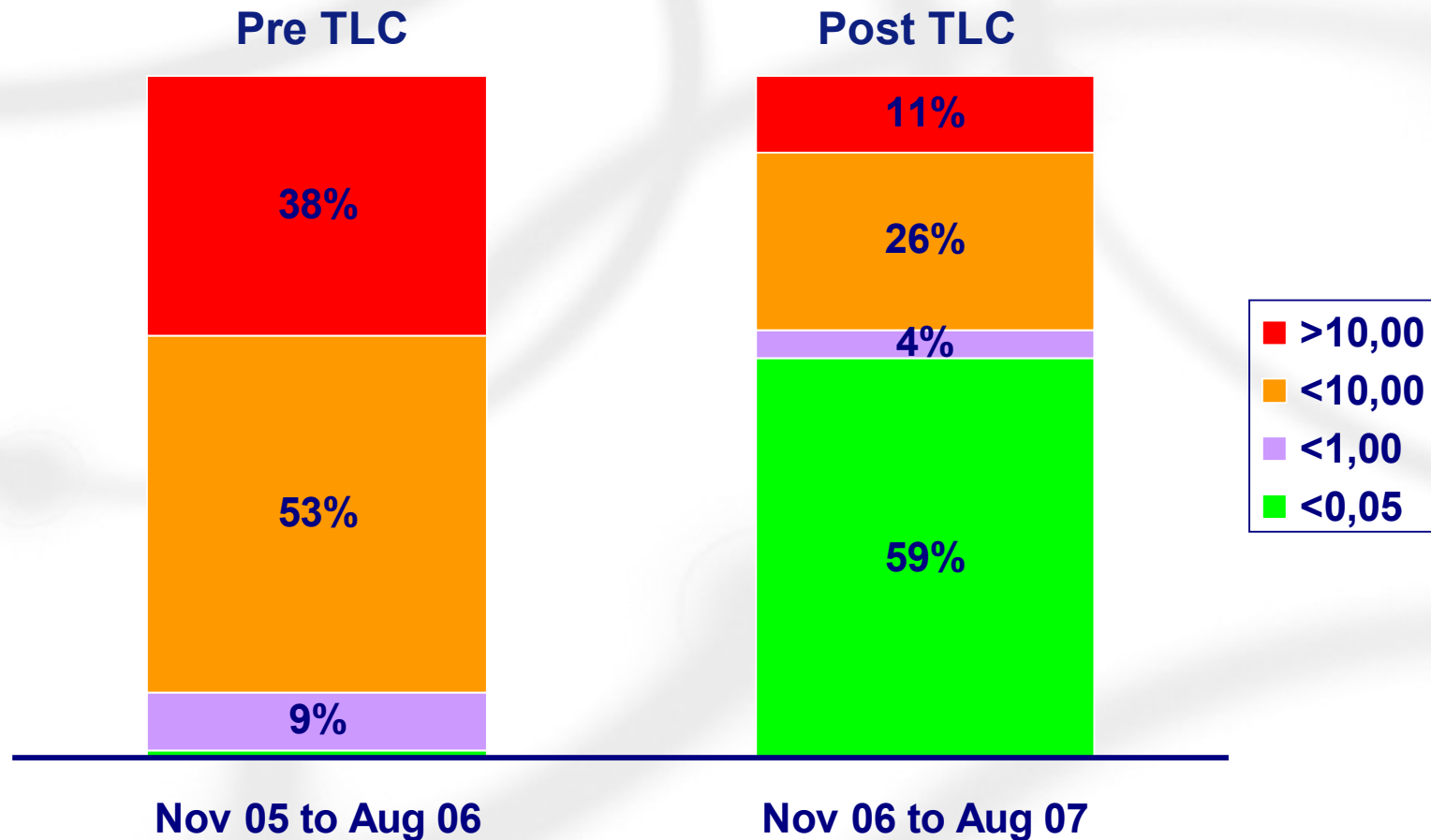
Average daily prices

TLC market coupling



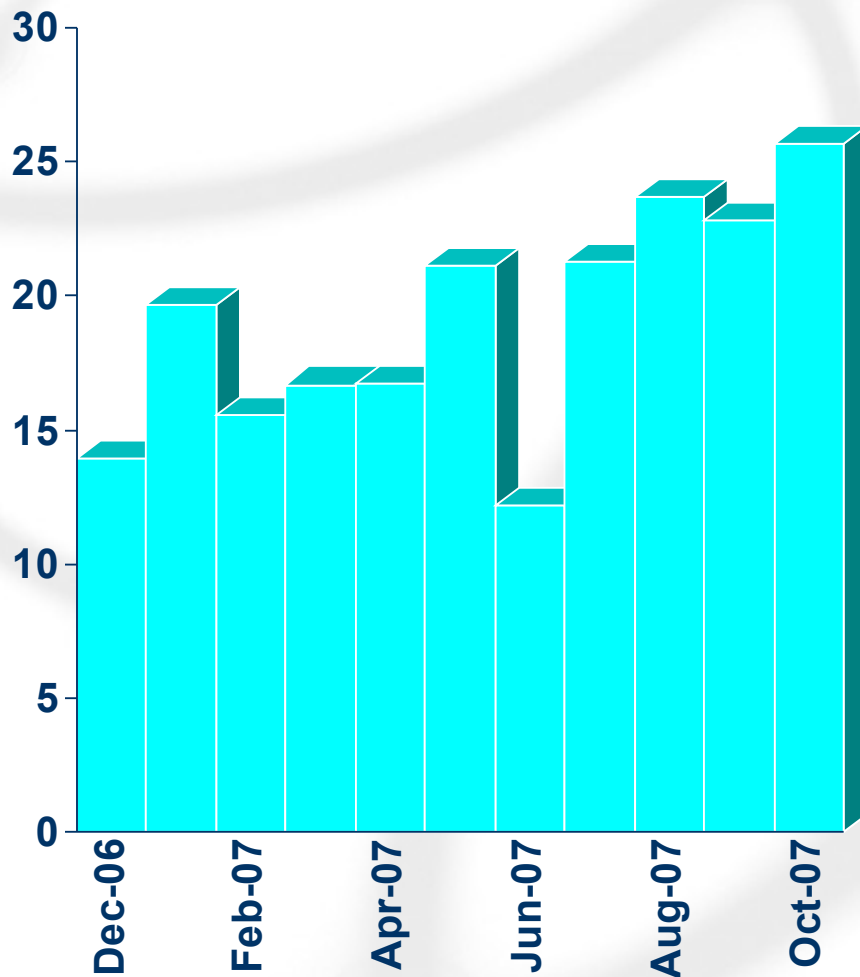
Price convergence: Netherlands - France

Hourly price difference, €/MWh



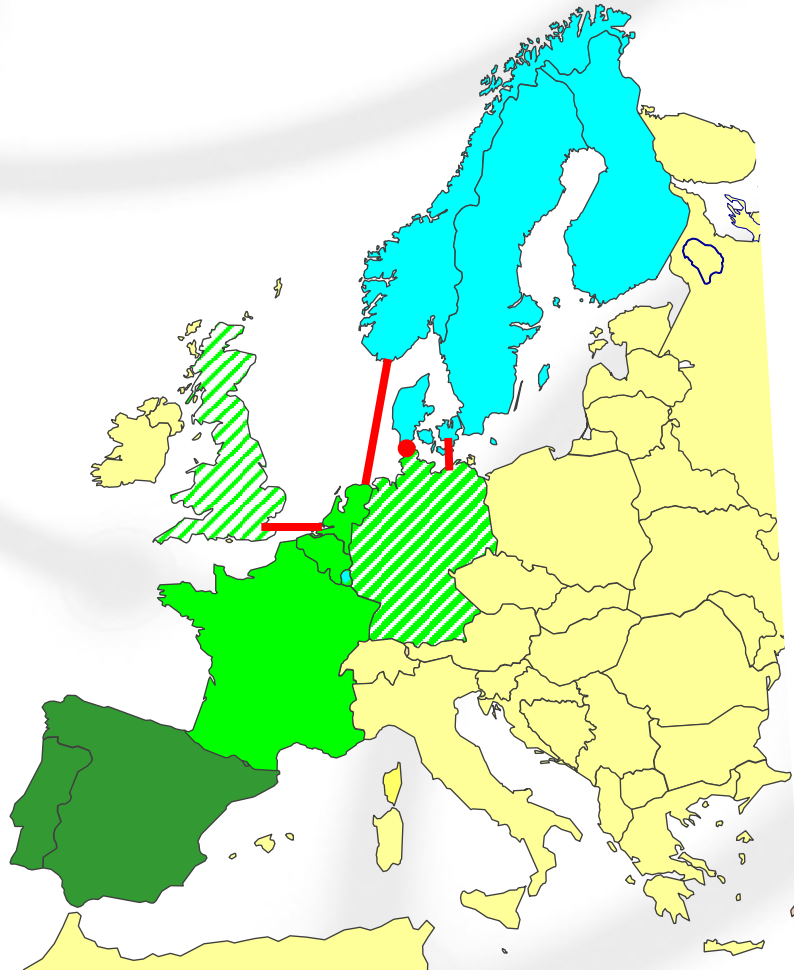
Belpex development

Average Daily Volume, GWh



- Approx 11% of consumption (higher than most European markets)
- Key factors for success:
 - Robust price and market depth due to market coupling
 - Strong political and regulatory commitment to establishing a spot electricity market, VPPs
 - Active support from key market participants

Current/planned regional implicit auction initiatives



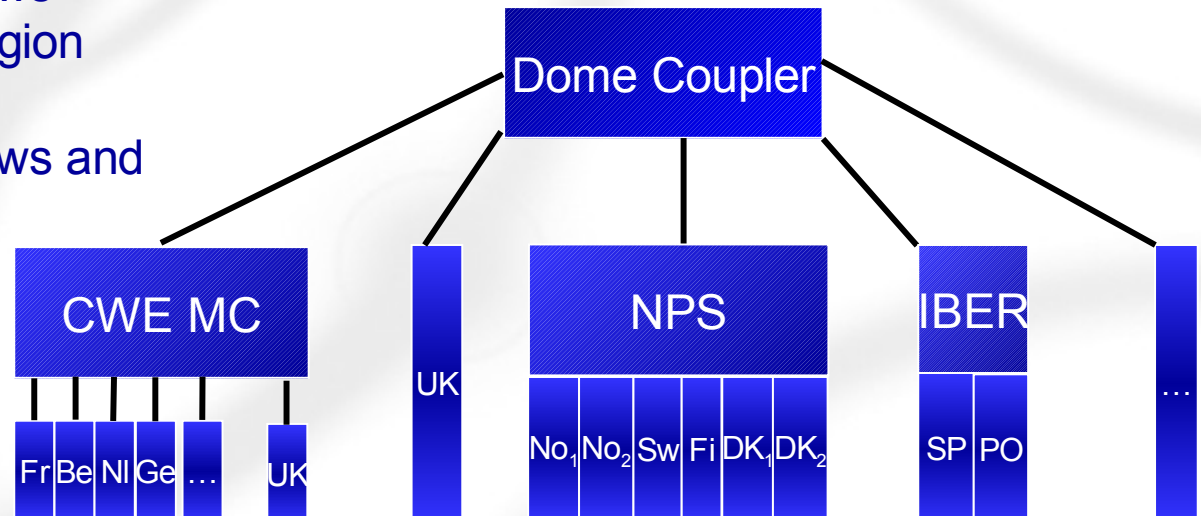
- Nord Pool (intraregional market splitting, NTC-based)
- Iberian market (intraregional market splitting, NTC-based)
- TLC: France, Netherlands, Belgium (intraregional market coupling, NTC-based)
- Denmark – Germany (interregional market coupling, NTC-based) *planned 2008*
- Netherlands - Norway (interregional market coupling, NTC-based) *planned 2009*
- CWE: Germany, France, Netherlands, Belgium (intraregional market coupling, flow-based) *planned 2009*
- Britain – CWE (BritNed) (CWE extension or interregional market coupling) *planned 2010*

Options for Regional integration

1. Single European Solution
 - Computes all flows, prices
 - Europe-wide (merge the regions)



2. Sequential Solution
 - Step 1: Dome calculates interregional flows
 - Step 2: each region computes their intraregional flows and prices

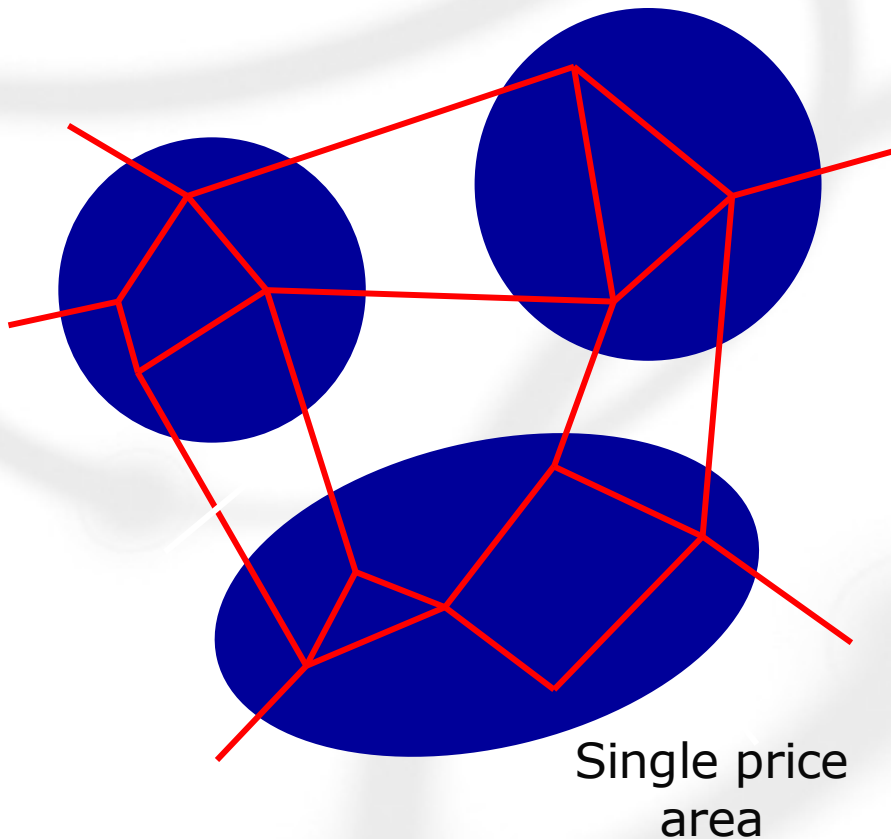


Implicit auctions in immature markets



- Ability to forward contract for energy and transmission capacity is critical for new entrants – explicit auctioning of forward transmission rights needed
- Why is having a liquid PX a prerequisite for an implicit auction?
 - Even if there is no local matching, an implicit auction is equivalent to an explicit auction
 - With support of incumbent (or VPPs), local matching will take place and an energy market will develop
- Problems with explicit day ahead auctions are amplified in immature markets
 - Lack of transparency
 - Lack of liquid intraday adjustment market

Flow-based transmission solution

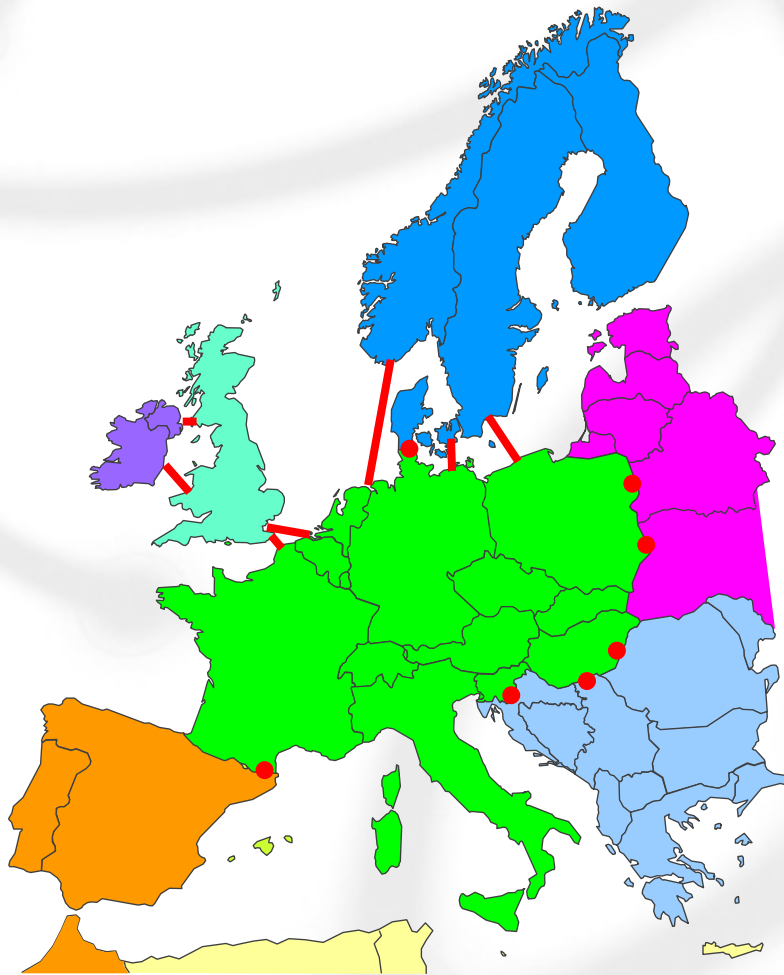


- Real network capacities and flows modeled using PTDFs
- Physical electrical flow paths taken into account (loop flows), not point-to-point “contract path”
- Potential to better optimise use of inter-area transmission capacity

But ...

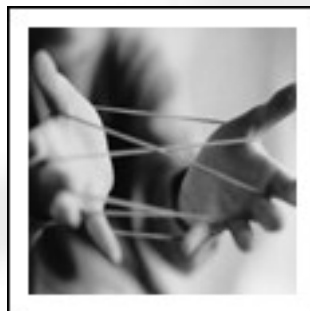
- Level of detail? Internal constraints? n-1 scenarios?
- Allocation/use of revenue?
- Geographic scope of congestion management solution needs to correspond to meshed network
- Transparency issues

Sequential, multiregional model

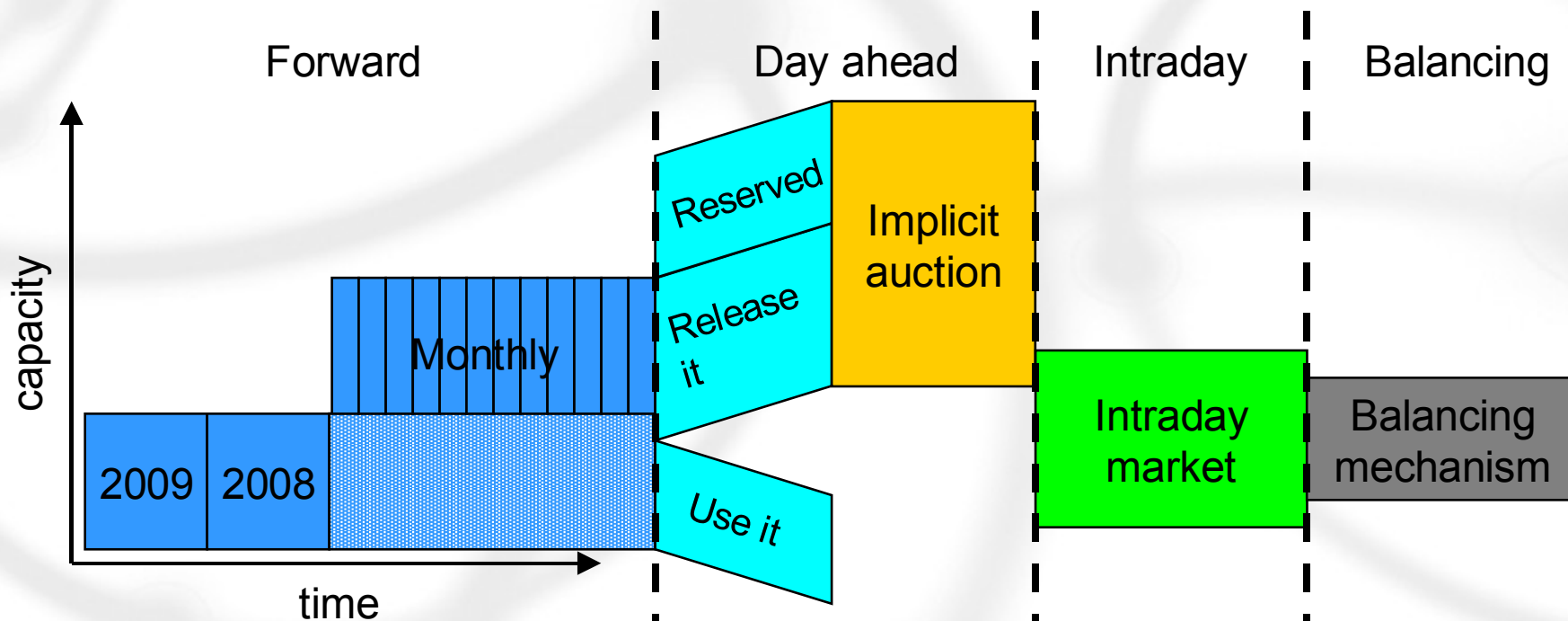


- Regional market clusters based on meshed networks/simple system boundaries
 - Central Europe
 - UK
 - Ireland
 - Nordic
 - Iberia, etc...
- “Seamed” together under an interregional “Dome” coupler
- What are the implications for the exchanges, TSOs and regulators?
- What are the implications for the current regional initiatives?

A VITAL LINK IN ENERGY TRADING



EFET Market Model



Transmission rights (options)

- Primary auctions (annual, monthly)
- Secondary market with central registry
- Financial rights preferred; physical rights with UIOGPFI as interim

Transmission and energy contract firm obligations
Flow-based market coupling/splitting

Tradable transmission obligations

TSO controlled, location specific