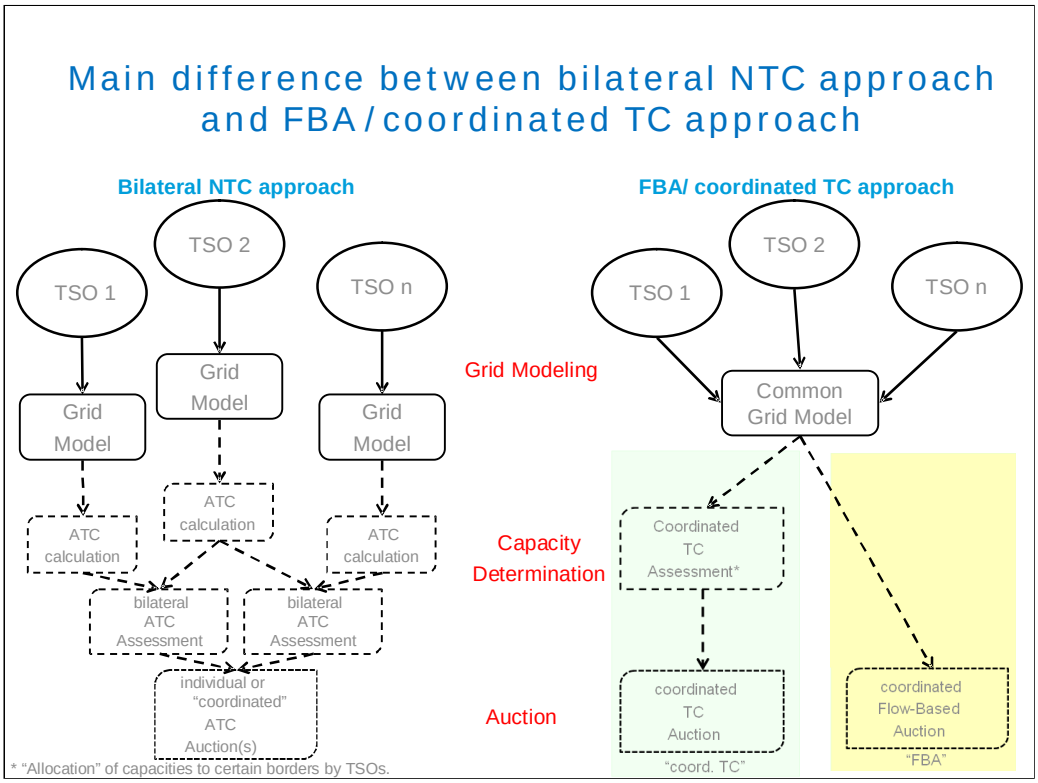
A PCG Report to the XVIIth Florence Forum
10&11 December 2009, Rome

PCG Proposal for Target Model and Roadmap for Capacity Allocation and Congestion Management

2nd of December 2009

PCG Proposal for Target Model and Roadmap for Capacity Calculation

2nd of December 2009



The vision and target model for capacity calculation is “Extended Improved Flow Based Capacity Calculation”, which will serve as the basis for the implicit allocation (market coupling) by the year 2015.

Capacity calculation – key is increased level of coordination and cooperation

- Establishment of a European-wide common grid model (EU-CGM), consisting of the same level of information
  - Coordinated RM (reliability assessment) based on the EU-CGM
  - Coordinated security analysis (capacity assessment) based on the EU-CGM
  - Coordinated curative redispatch measures based on a EU-CGM to guarantee firmness

In practical terms, the target model will be based on the common grid model, which is a set of coordinated processes characterized by tight cooperation and coordination of the TSOs that will deliver a European view of the power system.

Criteria for Capacity Calculation

- Efficiency
  - Social welfare
  - Level of commercial capacities
  - Effective network use
  - Redispatching actions & costs
- Security
  - System security
  - Compliance with N-1 security
- Feasibility

The criteria for the method of capacity calculation are the following:

•improving and maintaining maximum social welfare for the customers

•maximizing level of commercial capacities in order to ensure effective network utilization for trade, while at the same time complying with all relevant (e.g. (n-1), voltage / reactive power constraints, etc.) operational security criteria in the electricity grid

•feasibility of the point of allocation with taking into account the so called “pre-congested cases”

Next steps - Proposal

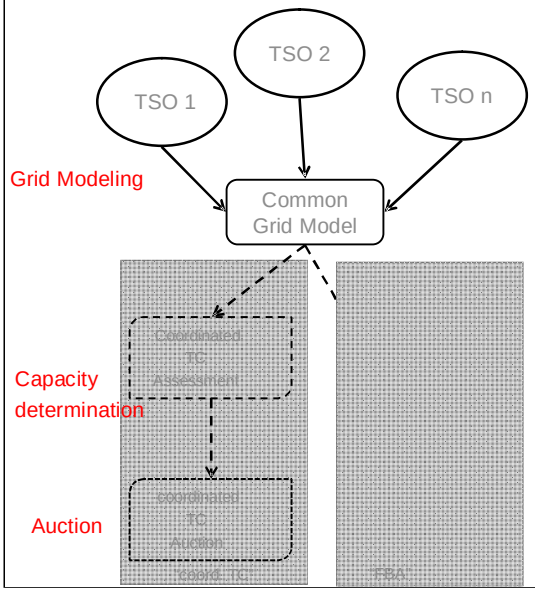
- Design:
  - Design of a Common Grid Model (CGM)
  - Coordinated capacity assessment and/or flow-based allocation
  - Regional application of coordinated capacity assessment and/or flow-based allocation
  - Interregional application of coordinated capacity assessment and/or flow-based allocation
- Project structure:
  - Implementation Project to be set up and lead by ENTSO-E
  - As Capacity Calculation is one of the core businesses of TSOs, ENTSO-E will define and set up the project structure
  - There will be appropriate involvement of the other stakeholders into the project to ensure transparency and to guarantee that regulatory and market requirements are adequately considered under the condition of safeguarding security of supply
- Timing:
  - Set up project structure in beginning of 2010
  - CGM and coordinated capacity assessment rules (ca. 1 year)

è concrete and clear mandate expected and needed!

ANNEX

Notes: FBA vs. coordinated TC approach

FBA/ coordinated TC approach



- Both approaches rely on the same principles:
  - Deep coordination amongst TSOs
  - Common Grid Models for capacity assessment
- Main differences:
  - Within the coordinated ATC case, TSOs have to assess where (which border) to put the available capacities. Hence, market assumptions have to be made by TSOs without knowing the markets preference. As an example the 'enhanced NTC' method (ETSO/EuropeX).
  - Within the FBA approach, the market determines at the time of allocation where to use the available capacities.
  - The FBA approach provides better transparency.

Common Grid Model

- The Common Grid Model (CGM) is the basis for the coordination of the capacity calculation
- The Common Grid Model will provide
  - Increased level of coordination/cooperation amongst TSOs
  - Establishment of a European-wide model consisting of the same level of information
  - Coordinated RM (reliability assessment) of TSOs
  - Coordinated security analysis (capacity assessment) of TSOs
  - The basis to develop coordinated curative redispatch measures
  - The basis for the coordinated capacity calculation and capacity allocation (in case of flow-based approaches)
- Time frames and resolutions:
  - Usually for each time horizon (e.g. yearly, monthly, daily, Intraday) own common grid models have to be generated
  - In general: the closer to real time the higher the level of detail

Notes: Coordination requirements of an EU-Common Grid Model for DA

•Base case assumptions

- Load information
- Exchange programs information
- Expected generation information
- Expected wind information
- Grid topology, technical grid constraints
- D-2CF
- à EU-CGM

• Common capacity assessment:
• GSK information
• WSK (Wind Shift Keys) information
• Critical branches/ critical outage information based on TSO experience
• à Capacity available to the market (e.g.: AMF+/- ; PTDF Factors)

Additional Issues to be discussed

- Discussion on base cases
- Discussion linked with GSK
  - Size of zones
  - Underlying model (GSK in combination with D-2CF, shadow market model, security constrained unit commitment) and implication for the role of the TSOs/NRAs
- Preventive redispatching (for maximising the global social welfare)
  - \+ Proactive maximisation of the global social welfare by taking into account redispatch measures (and costs) at the allocation process
  - \- ex-ante definition of cost expenditures has to be agreed on
- (dynamic*) cross-country zonal / nodal models
  - \+ further maximisation of social welfare independent of political borders
  - \- existing market structure (e.g. involvement of local PX) needs to be investigate

* changing the size of zones according to markets need

Regional Comments I / III

- Capacity Calculation:
  - Consistency of the capacity calculation methodology amongst different time frames is needed.
  - Flow based capacity calculation is needed only for highly meshed regions and loop flow problems
  - NTC based approach in particular for intraday is seen as sufficient
  - Improved intraday capacity calculation deemed as necessary (updated calculation during the day)
  - Higher transparency needed
  - Flow based approach may delay the general market progress because of higher level of complexity
  - Nodal approach preferable; aggregation of nodes into zones only if not jeopardizing the system security
  - ATC approach preferred for SWE
  - Graphical representation which approach is deemed as most useful for each region
  - Concrete implementation plan is missing

Regional Comments II / III

- Redispatch:
  - Preventive redispatch is seen as critical as it could jeopardize the network security
  - Preventive redispatch needs to be further analysed
  - Enhanced use of counter trading by TSOs

Regional Comments III / III

- Other influencing factors:
  - Size of the zones needs to be analysed from political and technical and socio-economic perspective
  - Discussion on minimum capacity requirements
  - Regional coordination centres (Coreso, SSC, TSC,…) are necessary to reach the target
  - Being less prescriptive for target model
  - Bigger bidding areas are seen as better for the market
  - Regional/interregional governance regarded as important
  - More regional focus (step by step approach)
  - Capacity calculation needs to be done on a pan European perspective
  - Remaining need to invest into grid infrastructure and to shorten permit procedures to enforce the transmission network
  - Increasing transparency and coordination between TSOs
  - Firmness of allocated capacities (full market spread compensation without caps)

PCG Proposal for Target Model and Roadmap for Day-Ahead Market

2nd of December 2009

Definition of the DA Target model

DEFINITION:

- The Target Model (TM) is to implement Single Price Coupling (SPC) all over Europe
- In the TM, one single matching algorithm is able to establish prices and volumes across all borders between the "PX market areas" and/or bidding areas compatible with capacity calculation

IMPLICATION:

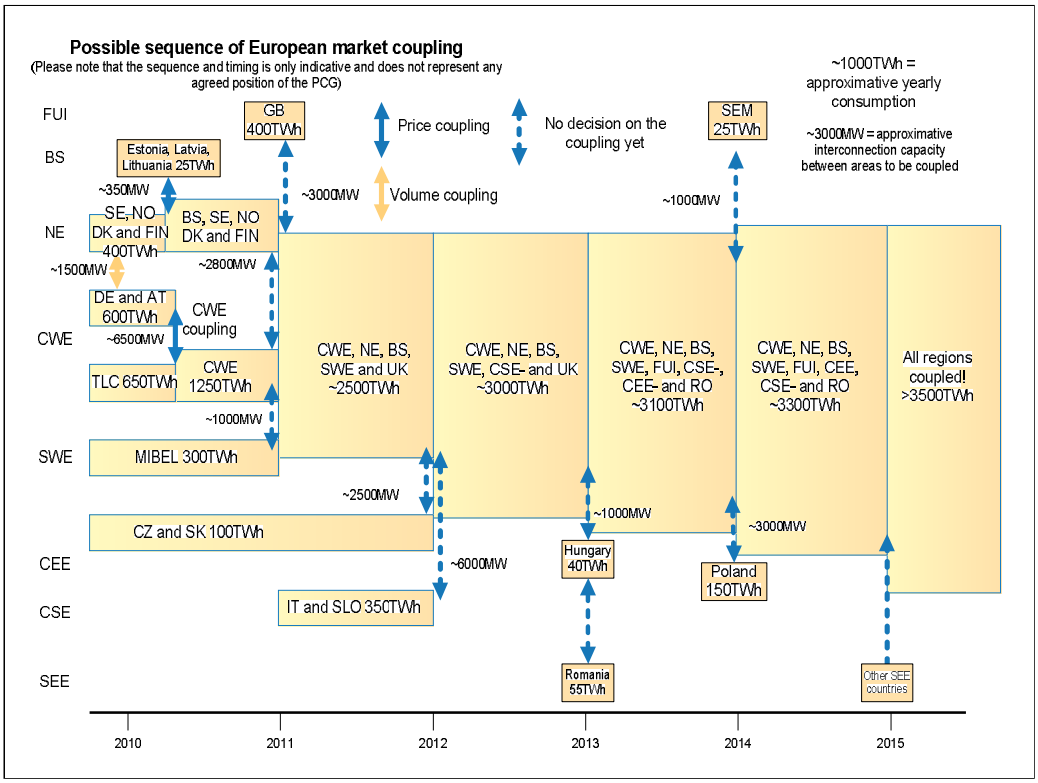
- Pan-European Price Coupling (the TM) implies that a single algorithmic solution is used by all the Power Exchanges responsible for the matching
- All day-ahead bids and offers information necessary for the Pan-European Price Coupling need to be matched with this single algorithmic solution, jointly with all the cross-border capacity information across Europe
- Such bids and capacity information must thus be fully and equally available to the matching algorithm

Target model - key issues

- The design prerequisites for price coupling can be partly identified /foreseen currently; however, this identification is not comprehensive since the technical challenges naturally emerge as markets are gradually coupled
- The algorithm can be updated/reviewed from time to time according to market needs/requirement/extensions
- The high level design prerequisites currently identified illustrate that it is not necessarily the implementation of the design prerequisites that will be the main challenge, but the governance issues associated with the design prerequisites
- High level governance arrangements require identifying roles and assigning responsibilities between parties, in order to facilitate the realization of design prerequisite

Design prerequisites for price coupling and associated governance issues

Price coupling prerequisites	Possible governance-related issues (see notes)
Implementation of a single algorithmic solution by the PXs, and full availability and use of all bids and capacity information required for the Pan-European Price coupling	Which arrangements required between all the PXs involved? Between the PXs and the TSOs ?
Power exchange operating a hub in each market	Some markets still without a PX. How is this to be achieved?
Algorithm should support all current PX products	What if it can't – e.g., infeasibilities, long processing times? Could imply reducing range of products/greater standardisation in this case: - Who decides? - On what basis? (criteria)
Algorithm shall support additional new functionalities e.g. new products due to increased wind	How can local market parties, TSO and PXs influence design decisions?
Algorithm should support geographic extension, geographic extension may imply new types of products.	What if it doesn't? If impossible, see 1. If possible: - Who pays for changes? - Who determines sequencing/timing of extensions? If algorithm is not as flexible as promised, what are the consequences (finding a replacement, sunk costs)
Optimal trade-off between flexibility (functionality), cost, time to implement, processing time/performance	Who decides? On what basis? Who pays? Need for formal governance processes (e.g., full arm's length) vs greater reliance on mutual interest, partnership
Necessary harmonisation (e.g., critical procedures/deadlines)	How to enforce harmonisation obligations?
Discretionary harmonisation (e.g. min/max prices)	What freedoms should individual markets/TSOs have? How is this controlled? Who pays for extra functionality?
Handling different currencies	Responsibility of central algorithm or local markets? Who bears currency risk?



This illustrates a possible roadmap, but it is only indicative. There are other potential variants, for example:

- CEE countries may establish a regional market coupling solution which well subsequently be integrated with the main solution, rather than individual countries joining the solution over time as shown

- Italy, which already operates a market splitting internally, could be integrated with CWE, Nordic and Mibel at the same time

It is important that the roadmap be used flexibly. All progress towards the target model should be encouraged, and the timings/sequence should adapt accordingly.

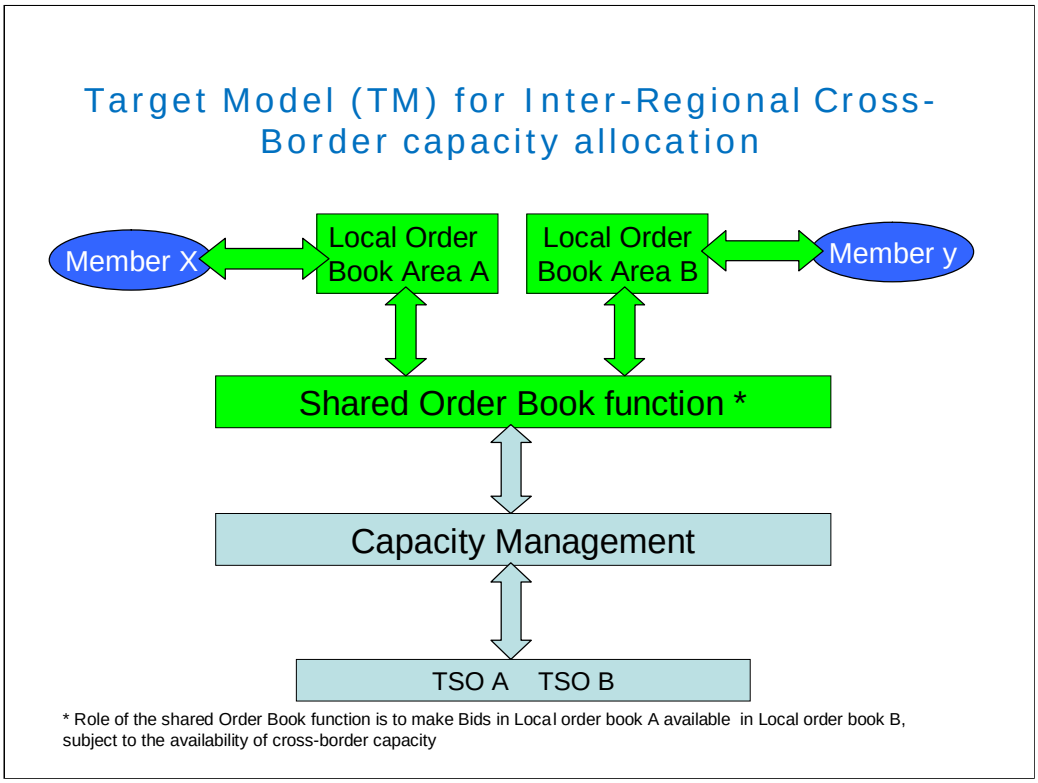
PCG Proposal for Target Model and Roadmap for Intraday Market

2nd of December 2009

Summary of the Target Model

- The Target Model (TM) for Inter-Regional Cross-Border capacity allocation is implicit continuous allocation (continuous trading)
- Where appropriate, specific National/Regional ID trading solutions may be developed
- A specific National/Regional ID trading solution is not obligatory. The Inter-Regional Target Model mechanism can be used as the National/Regional solution
- Any specific National/Regional ID trading solution must be compatible with the Inter-Regional Target Model

The target model consists of two-layer approach for the intra-day allocation. The first layer includes interregional cross-border trade applying continuous implicit allocation and second optional layer may include national/regional solutions.



In the continuous implicit allocation the market participants can bid continuously for those offers in the market, where no congestions across the interconnections exist. Every successful bid has an effect on the remaining transmission capacity allocated to the intra-day market. The available transmission capacity will be updated after every successful bid. Intra-day transactions are possible as long there is transmission capacity across the interconnection. After this such offers that need transmission capacity will not be anymore available, i.e. offers will not be shown to market participants bidding on electricity energy deals

The intraday platform should include hourly and block products from H+1 until the end of the rolling D+1 timeframe.

Features of the Target Model for Inter-Regional Cross-Border capacity allocation

- Target Model must allow block bids
  - Users will therefore be able to execute through the platform deals which would otherwise be concluded on a bilateral basis
- When significant additional capacity becomes available this capacity should be allocated using a market based mechanism
  - The definition of significant additional capacity will have to be developed
  - There are several possible market based mechanisms to allocate significant additional capacity (e.g. auctions)
  - It is not necessary to have finalised this to implement Target Model

Market participants have requested that the platform should accommodate also OTC trades. This is made possible by the use of block bids. OTC offers are thus published on the platform and traded as any other deal.

Continuous implicit allocation may be complemented, where appropriate, with market-based methods (e.g. some implicit auctions during the intra-day timeframe) if significant additional transmission capacity becomes available.

Roadmap

	Description	2010	2011	2012	2013	2014	2015
Stage 1	Common principles + compatibility Requirements for ID trading						
Stage 2	Centralized capacity management and shared order book function						
Stage 3	ID National/Regional development°						
Stage 4	Stepwise implementation of TM						
End	EU wide trade (target model)						

°new development or copy/paste

PCG Proposal for Target Model and Roadmap for Balancing

2nd of December 2009

Definition / Focus

Whereas

the balancing markets and balancing process include a number of interrelated components,

this work is mainly focusing on the:

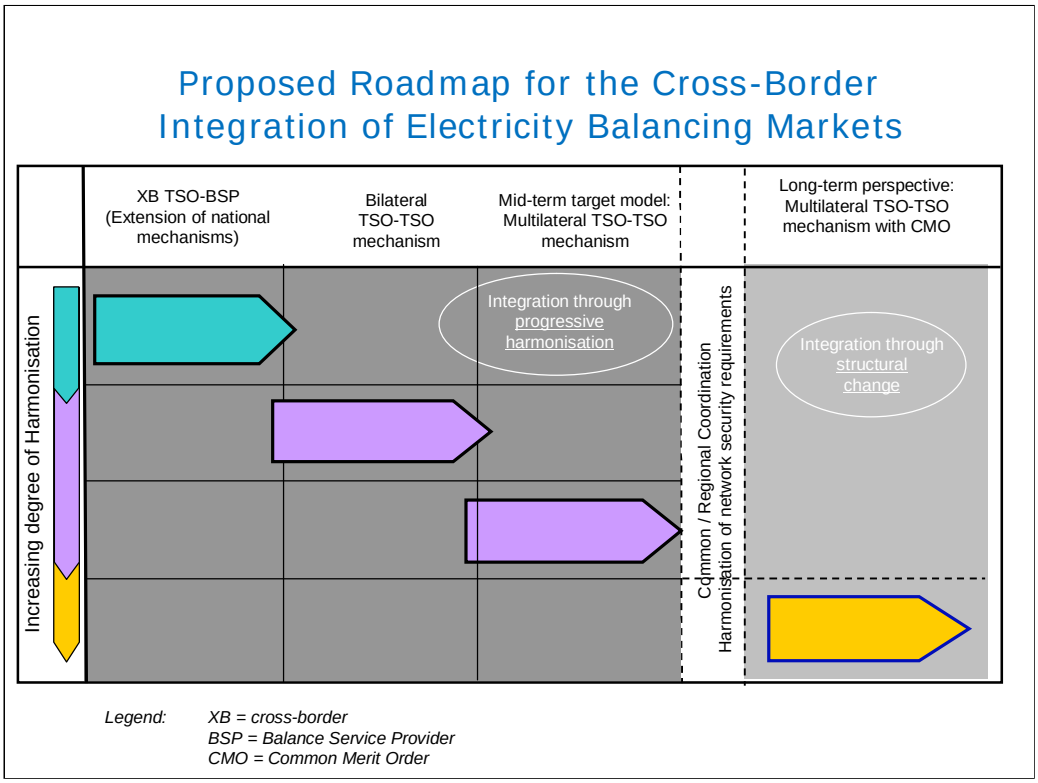
manually activated reserves and cross-border electricity balancing market integration in that sense

Identification of integration stages
and prerequisites

Roadmap - Principles

- Full harmonisation of balancing markets is not a prerequisite for cross-border balancing
- Pragmatic approach is important
- Major steps:
  - Pilot projects (Social welfare gains – demonstrated in cost-benefit analyses)
  - Harmonisation of gate closures and technical characteristics (+ roles and responsibilities of all major parties)
  - Introduction of cross-border intraday supports progress in cross-border balancing
  - Case by case (in a feasible “area”) development of multiple TSO cooperation (ending in coordinated system operation)

The strategic objective of the PCG target model for integration of electricity balancing markets is to define the final “vision” for and specify the path/roadmap towards the cross-border balancing markets expansion and integration in Europe, which will eventually encompass at least the geographical/electrical area of the (large parts of) the presently existing synchronous areas.



The vision is the common cross-border balancing market, with full harmonization of technical and organizational aspects. The target model to deliver the vision relies on the TSO-TSO model with the Common Merit Order (CMO) by the year 2015. The roadmap towards this vision is shown schematically in the figure above.

XB Balancing Models: pre-requisites and harmonisation requirements

Basic compatibility | Harmonisation by TSOs | Central governance

	Cross-border extension of national balancing mechanisms	Bilateral TSO-TSO exchanges (without c.m.o.)	Multilateral TSO-TSO exchanges (without c.m.o.)	TSO-TSO exchanges with c.m.o
Prequalification criteria (technical requirements for suppliers)	Not harmonised, but TSO arrangement to ensure the same product quality	Not harmonised, but TSO arrangement to ensure the same product quality	Not harmonised, but TSO arrangement to ensure the same product quality	Harmonised
Delivery mechanism (technical mode of activation)	Not harmonised, but TSO arrangement to ensure the same product quality	Not harmonised, but TSO arrangement to ensure the same product quality	Not harmonised, but TSO arrangement to ensure the same product quality	Harmonised
Bid construction process	BSPs according to BM rules of corresponding TSO	TSOs on the basis of bilateral rules	TSOs on the basis of multilateral rules	BSPs on the basis of common rules
- Product features (size, activation time, duration of activation)	Not harmonised	Exchanged products are tailor-made by TSOs	Exchanged products are tailor-made by TSOs	Harmonised
- Payment schemes	Not harmonised	Pricing of exchanged products tailor-made by TSOs	Pricing of exchanged products tailor-made by TSOs	Harmonised
- Shared volumes (in all cases, "surpluses" beyond each TSO's security reserve requirement)	Some surpluses offered by BSPs willing to participate	All surpluses of 2 TSOs (combined in offers by the TSOs)	All surpluses of involved TSOs (combined in offers by the TSOs)	All offers direclty put together
Implementation of exchange	BSPs offer whenever possible (depending on availability of capacity, intraday and national balancing markets), each TSO approves and activates according to security and interconnection situation	Each TSO offers and activates according to security and interconnection situation	Each TSO offers and activates according to security and interconnection situation	TSOs share all offers - regional process of activation on the basis of common security and interconnection situation
- Gate closure time of cross-border intraday market	Not harmonised, BSPs offer whenever possible	Not harmonised, TSOs decide when to share offers	Not harmonised, TSOs decide when to share offers	Harmonised for products to be shared
- Security criteria	Not harmonised	Not harmonised	Not harmonised	Harmonised
Governance	contractual arrangements (coordination limited to involved BSPs and TSOs)	contractual arrangements (bilateral coordination between TSOs with ad-hoc rules for exchanges)	complex contractual arrangements (extensive multilateral coordination between TSOs with ad-hoc rules for exchanges)	central governance with common rules for exchanges and security management
TSO involvement	low (information exchange)	increasing	high	very high

Colour coding on this slide reflects the topics in previous slide.

Comments

- Specific projects don't have to go through all steps, theoretically you could go to a common merit order in one step
- Intra-day harmonisation isn't a prerequisite, but there are technical interdependencies. Hence, a well functioning integrated intra-day market will increase the efficiency of the balancing market
- Each step brings additional benefits, but requires:
  - Legal and regulatory changes
  - Greater harmonisation of Balancing Mechanisms
  - Practical changes (coordination, IS changes)
- Need of a careful analysis before each step can be implemented:
  - Analysis of impacts on system safety
  - Economic cost/benefit analysis
- Implementation of TSO-TSO with common merit order requires
  - Supranational control process
  - centralised governance process
  - Harmonisation of security criteria
  - Harmonisation of intra-day gate closure times
  - → these structural changes will take time

Integration Road Map
Regional Dimension

(Pilot Projects)

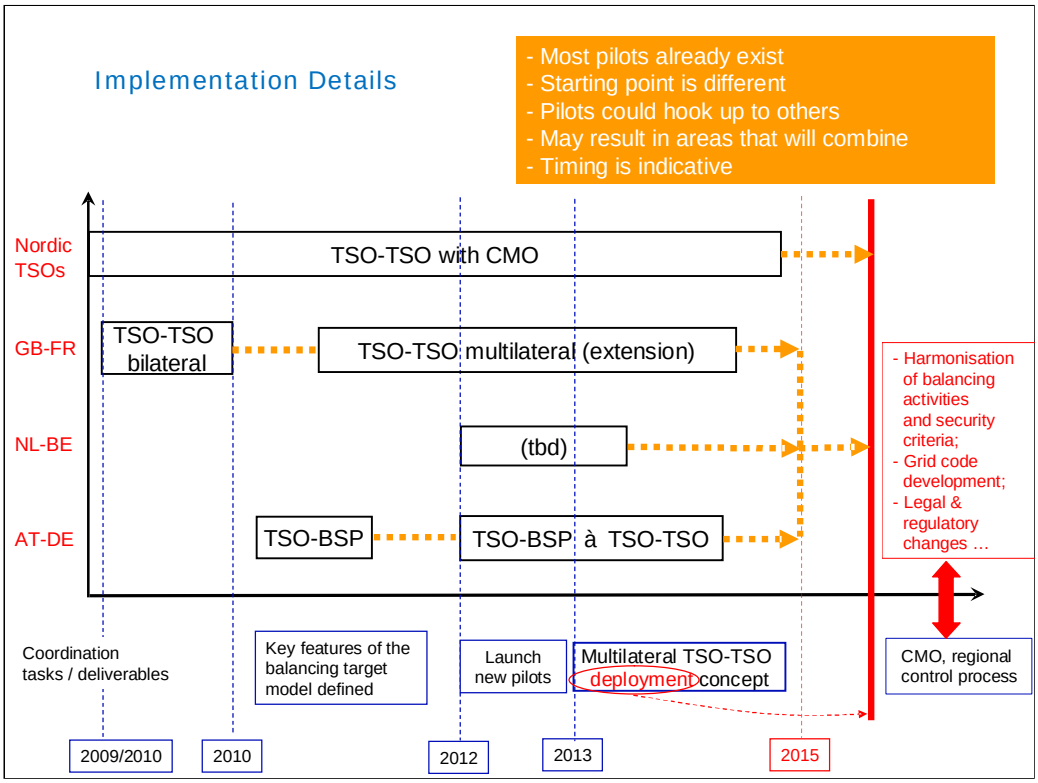
List of identified pilot projects

- Projects already implemented:
  - Nordic area
  - German & Swiss actors bidding in the French Balancing Mechanism
  - France/UK TSO-TSO (interim phase started in 03/09, in progress)
- Projects not implemented, planned or in discussion:
  - France/Spain TSO-TSO => discussions starting
  - Germany/Austria: Hybrid (TSO-Market Participants and TSO-TSO)
  - Belgium/Netherlands (academic suggestion)
- Other identified projects:
  - German TSO-TSO (inside Germany started in 12/08, in progress)

Whereas the target model is rather ambitious and would require substantial adjustments and evolution of many aspects of the European electricity market(s), the practical steps towards implementation shall be pursued as soon and as efficient as possible. This means among others:

Relying on experiences and “lessons learned” from the already implemented cross-border balancing projects throughout Europe: Nordic area (NO, SE, FI, DK) and GB/F balancing system;

Initiating and developing fast further practical projects where conditions and framework are appropriate: AT/DE where BSP-TSO model can be user already now and the future BE/NL development as it is currently being investigated;


Implementation Details
- Most pilots already exist
- Starting point is different
- Pilots could hook up to others
- May result in areas that will combine
- Timing is indicative
Nordic TSOs
TSO-TSO with CMO
GB-FR
TSO-TSO bilateral
TSO-TSO multilateral (extension)
NL-BE
(tbd)
AT-DE
TSO-BSP
TSO-BSP à TSO-TSO
- Harmonisation of balancing activities and security criteria;
- Grid code development;
- Legal & regulatory changes …
Coordination tasks / deliverables
Key features of the balancing target model defined
Launch new pilots
Multilateral TSO-TSO deployment concept
CMO, regional control process
2009/2010
2010
2012
2013
2015

Feedback from the

Consultation of Regions

(Summary)

General Considerations and Deployment Strategy

- A clearer and more detailed definition of balancing is needed, with more clarity also of the roadmap and more details on which products are actually to be included
- Although the timeline is quite ambitious, it is important to have clear goal and start the deployment and practical work ASAP to the benefit of IEM
- Top down approach will foster integration and implementation and is therefore mandatory, even there will be regional deployment differences (different paces / speeds for example)
- Cross-border intraday market shall be considered in parallel

It is important to consider in parallel the development of the intraday markets and – particularly important – compatibility and coherence of different inter- and intra-regional approaches.

Technical Issues and Details

- TSO-TSO with CMO accepted and acknowledged as the target model, whereas top-down approach will foster integration and implementation and the TSO-BSP model can be used as soon as possible as the first step (e.g. DE/AT)
- ENTSO suggestion to rephrase bullet point above in order to align it with agreed changes in the WS slides: “TSO-TSO with CMO is accepted and acknowledged as the long-term target model. In the mid term, initiatives (preferably TSO-TSO model, but also TSO-BSP in some cases) should be encouraged and developed in order to implement as many exchanges as possible, whilst encouraging that they do not impede long-term convergence to the ultimate goal”
- Moreover, besides DE/AT, the further practical steps could include the work on NL/BE and further development of Nordic system and FR/UK
- Common definitions of technical properties and commercial products are essential; to that matter it is important to distinguish clearly what is meant by “balancing market” and how is that related to “reserve energy product” shall be included

Harmonisation & Compatibility

- Elements of harmonization
  - Harmonization of gate closures and technical characteristics is an important ultimate goal
  - Some basic coherence / compatibility steps are needed even before the full harmonization (see also ERGEG GGP)
  - Imbalance payment shall be also addressed within that scope(it is an important component of the balancing market)

The harmonisation includes stepwise harmonization of gate closure times and technical parameters, aiming at target model but at the same time going for “the best effort” approach, since the full harmonization is by no means a pre-requisite for all ways / degrees of the cross-border balancing markets.

PCG Proposal for Target Model and Roadmap for Forward Markets

2nd of December 2009

High level objectives

- Create competitive and integrated European markets
- Provide a level playing field across Europe
- Stimulate market entry and lower entry barriers

- **Practical means to achieve these objectives**

- Efficient long term price signals (forward markets)
  - Incentives for efficient investment
  - Long term hedging and risk management

- Competition across borders (forward transmission markets)
  - Incentives for efficient investment
  - Long term hedging and risk management between market zones

- Efficient linkage of forward market with short term price signals (market splitting/coupling)
  - Optimal use of network capacity
  - Optimal use of generation capacity

The high level objectives of the PCG proposal on forward markets are to create competitive and integrated European electricity markets. At the same time they should provide for a level playing field across Europe and stimulate market entry and lower entry barriers.

In order to achieve these objectives, forward markets should give efficient long term price signals and facilitate cross-border competition through forward transmission markets. Moreover, efficient linkage of forward markets with short term price signals, i.e. market splitting or market coupling, should be in place. Efficiently functioning forward transmission markets may serve market participants for the purpose of long term hedging against short term price volatility in day-ahead markets.

Proposed target model for the primary forward transmission market (1/2)

- TSOs should sell/offer/issue transmission capacity on a forward basis
  - The amount of sold/offered/issued capacity should reflect the available physical capacity
  - The amount of capacity should be maximised across all timeframes (as required by Reg. 1228/2003)
  - TRs are Use It Or Sell It (UIOSI)

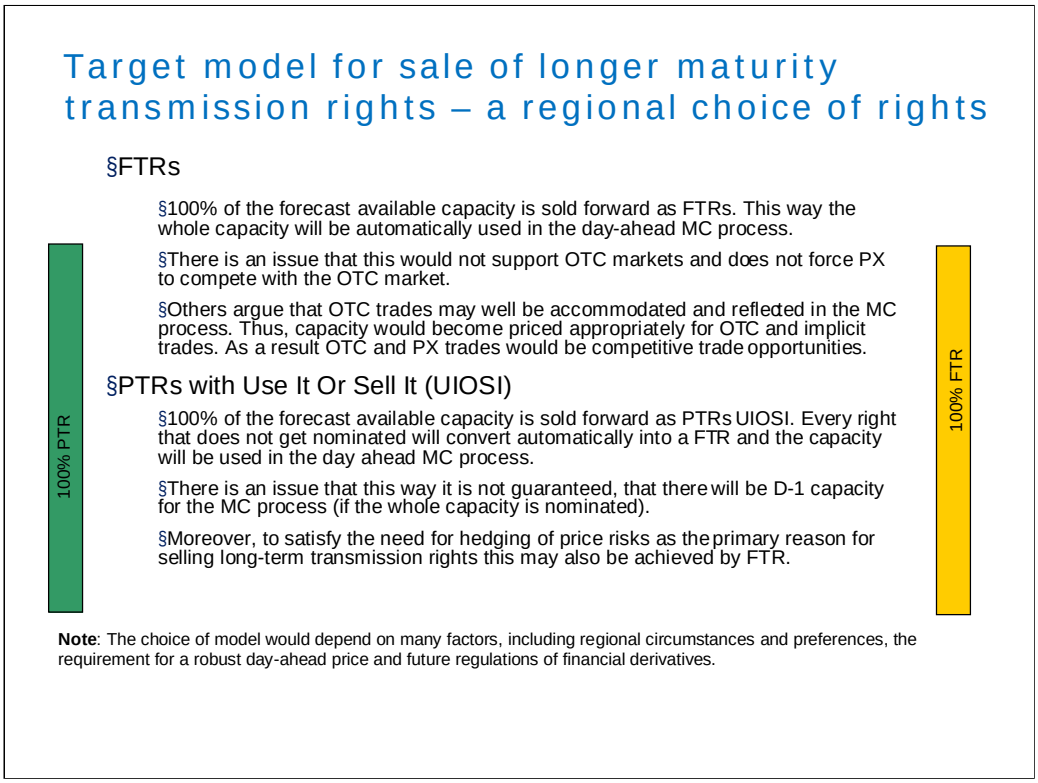
The target model for the primary forward transmission market implies that TSOs should sell/offer/issue transmission capacity on a forward basis. Accordingly, the amount of capacity sold/offered/issued should reflect the available physical capacity. The amount of capacity should be maximized across all time frames. Transmission rights could be sold/offered/issued on a regional basis with minimum level of compatibility - either between bidding areas or between a reference system area and a bidding area. Transmission rights could be either physical (Physical Transmission Rights - PTR) or financial (Financial Transmission Rights – FTR) and be either options or obligations. In case of physical rights they should be granted as options and in case of financial rights they can be either options or obligations.

In markets where trustworthy day-ahead prices exist and/or long-term trading/hedging mainly is handled via derivatives this may mean that TSOs provide all physical capacity day-ahead implicitly and sell the financial product linked to available capacity long term.

CfDs can co-exist with other financial products

Proposed target model for the primary forward transmission market (2/2)

- These transmission rights could be sold/issued/offered on a regional basis with a high level of compatibility
  - Either between bidding areas or between a reference system area and a bidding area
  - Either as options or obligations
    - In case of physical rights (PTRs), they should be granted as options
    - In case of financial rights , they can be either options (e.g. FTR) or obligations (e.g. CfD)
  - Either as physical or financial
- In some markets, where long-term trading/hedging mainly is handled via derivatives, this may mean:
  - TSOs give available physical capacity for utilisation in the D-1 MC process, while TSOs are selling in advance longer maturity financial instruments reflecting 100% of forecast available capacity between bidding areas



There are two alternative target models for the forwards market of transmission rights: 100% of the forecast capacity is sold forward as financial transmission rights or 100% of the forecast capacity is sold forward as physical transmission rights with UIOSI (Use It Or Sell It). In the case of 100% FTRs, the whole capacity will be available for the day-ahead market coupling process. However, there is a concern whether this model supports the OTC markets. In the case of 100% PTRs with UIOSI, the issue is whether this model guarantees that there will be enough capacity for the day-ahead market coupling purposes.

Trading of transmission capacity in the secondary market (I)

- Establishing a secondary market for trading transmission capacity rights is a very high priority
- Transmission capacity should be able to be split and sold without constraints – down to individual hours and in 1 MW units
- For PTRs trade should be able to take place until the deadline for exercising the option (i.e. the nomination deadline)
- FTRs could be traded until D-1 PX gate closure, and that is conceptually true also for CfDs

Trading of transmission capacity in the secondary market (II)

- Transmission capacity transfer to take place by full assignment of rights and obligations to new owner of capacity
- If PTRs, TSOs are required to operate a registry against which all transactions need to take place. If FTRs, another entity could be responsible for the registry.
- Credit and approval by TSO that transfer of the capacity rights can occur must ultimately take place at the cut off time of trade.
  - Such technology is already widely available and used for trading Energy
  - Independent platforms can be used to establish such a service, e.g. by using auction offices
- Exchanges and clearing houses can also offer clearing service to facilitate credit risk management

Firmness is an important issue for the forward transmission market

- Transmission capacity should be sold (financially) firm in order to hedge cross-border positions
  - Subject to standardized European definition of force majeure
  - The price payable by a TSO as compensation for capacity curtailment needs to be market-linked, predictable and standardized
- (Financial) firmness of capacity rights is an essential feature to make secondary capacity markets work properly (à without firmness, title tracking is a high administrative burden)
  - Essential for well functioning secondary market
  - Required by XB regulation 1228/2003
- The costs of guaranteeing firmness should be met from TSOs' allowed revenues with appropriate incentives

Financial firmness is an important aspect regarding transmission rights in order to hedge cross-border trading positions. Also a standardised definition of Force Majeure may be appropriate within the European context. Both are essential features which may help secondary markets for forward transmission capacity to function properly.

Roadmap for the implementation of the Target Model options (I)

- The target model options shall be implemented across Europe as soon as possible and by year 2015 at the latest
- Key criteria for successful implementation of the target model
  - Forward sale of all capacity to ensure economic efficiency across Europe's borders
  - Reliable and robust day ahead spot market prices
- These two criteria may conflict during the implementation of the target model
  - If TSOs sell all capacity forward, there may be a risk of insufficient capacity to allow robust day ahead prices
  - If TSOs sell insufficient forward capacity, the economic efficiency across Europe's borders could be decreased

Explanation for 'when and if certain for conditions are in place', see annexes.

Financial derivatives not linked to transmission rights can co-exist.

Roadmap for the implementation of the Target Model options (II)

- As a result of this potential conflict, the following may be required in the regions as part of the roadmap for implementing the target model during an interim phase:
  - That some defined part of the total forward capacity sale is used through market coupling (to ensure efficient price formation).
  - This may in turn mean that TSOs reserve some day-ahead capacity for market coupling use, or TSOs sell it in such a way to ensure it is used for MC (e.g. as FTRs - or CfD's)
- There is also a possibility that the PTR/UIOSI part of the model may over time emerge towards an FTR model

Explanation for 'when and if certain for conditions are in place', see annexes.

Financial derivatives not linked to transmission rights can co-exist.

Roadmap for the implementation of the Target Model options (III)

- There is further a need for increasing harmonisation of product access rules, interfaces and IT exchanges to take place on a regional basis as follows
  - By 2012/13: Harmonisation on a regional basis based on the applicable product(s) chosen
  - By 2015: Harmonisation across European based on the two options defined in the Target Model

Roadmap example

(Note: Dates, products for illustrative purposes only)

- Capacity sales take place further into the future
  - Today, capacity has been sold for months, quarters, 2010, 2011, 2012, etc
  - The capacity can be traded freely, like energy, in secondary markets
- For PTRs, at/before the PXes close, the owner of the capacity will either:
  - Nominate physical use of the capacity, or
  - Relinquish the capacity through the market coupling process and receive cash if there is a spread for that capacity
  - In the case the FTR target model is adopted, nomination is unnecessary, all capacity will be used for market coupling with a cash payment to the capacity owner
- As required, this model makes impossible for owners to hoard capacity – the capacity rights are either used or relinquished for utilisation in the D-1 MC process

Annex 1.1: Description how forward market in Energy is operating

Forward market in Energy

- Energy is most frequently traded as the following products
  - Baseload
  - Peaks
  - Offpeaks
- Energy is traded in (roughly) the following timeframes
  - Calendar years forward to Y+3 or Y+4 (2010, 2011, etc)
  - Quarters
  - Months
- The forward market for trading energy works well nationally and has evolved over many years
- However cross-border energy trading is limited by transmission capacity constraints between markets

Annex 1.2: Detailed examples of sale of forward transmission capacity rights of longer maturities

TSOs should sale primary transmission capacity or related relevant products in line with energy markets

- Annual capacity sold in line with energy trades (e.g. sale of 2010, 2011, 2012, and 2013 baseload cross border capacity in 2009)
- Ultimate goal
  - Sell available forecasted capacity in line with what is traded in Energy market
  - Remaining capacity sold as it becomes available/known (e.g. at D-1 stage)
  - Precondition: A liquid market for transmission exists. This is likely to take several years to achieve once trading starts
- Indicative percentages (until sufficiently liquid secondary market exists)
  - 10% of capacity has been sold for Y+3
  - 20% of capacity has been sold for Y+2
  - 40% of capacity has been sold for Y+1
  - 70% of capacity has been sold after Months or Quarters
  - 100% of capacity has been sold at D-1
- Percentages can differ regionally but should relate to the TSOs best estimate of the forward capacity available
- Further investigate multi-annual allocation process in order to optimize allocation

Example of proposed process for selling capacity (transition period)

- As an example, a forecast 1000MW of capacity for 2010-2013 may be sold in in auctions every quarter as follows:
  - Q1: 25MW 2013, 25MW 2012, 50MW 2011
  - Q2: 25MW 2013, 25MW 2012, 50MW 2011
  - Q3: 25MW 2013, 25MW 2012, 50MW 2011
  - Q4: 25MW 2013, 25MW 2012, 50MW 2011
- Totals
  - 100MW 2013 and 2012 (10%)
  - 200MW 2011 (20%)
- Likewise, in 2011, the sales would be
  - Q1: 25MW 2014, 25MW 2013, 50MW 2012
  - Q2: 25MW 2014, 25MW 2013, 50MW 2012
  - Q3: 25MW 2014, 25MW 2013, 50MW 2012
  - Q4: 25MW 2014, 25MW 2013, 50MW 2012
- New totals sold to date
  - 100MW 2014 (10%)
  - 200MW 2013 (20%)
  - 400MW 2012 (40%)

Annex 1.4: Example process at forward/D-1 switchover

- For illustrative purposes only to show how the forward target model fits in with the day ahead process – times indicated are not suggestions

Example process at forward/D-1 switchover

(for illustrative purposes only to show how the forward target model fits in with the day ahead process – times indicated are not suggestions)

Before 10.45 D-1:	Cut off for secondary trading of PTRs
11.00 D-1:	Nomination of whether PTRs used physically or sold in day ahead process/MC (UIOSI) as an FTR (nominated PTRs are now obligations)*
11.15 D-1:	Auction office publishes total available capacity, including amount of capacity used as PTRs and to be included in MC as FTRs
11.45 D-1:	Cut off for secondary trading of FTRs (if only FTR)
12.00 D-1:	Bids and offers due on DA Spot Exchanges
12.15 D-1:	Exchange results published
12.30 D-1:	Intraday market starts

* Option to use physically to be exercised at a nomination deadline as close as possible to the PX gate-closure to allow TSOs to compute and publish final ATC for implicit allocation in the D-1. In cases where all capacity is offered DA due to for ex. existing financial solution, via among others CfDs, this check point is irrelevant.

Annex 1.5: Definitions

- **Financial Transmission Right (FTR):** Financial product which entitles its owner to receive at maturity a price spread - i.e. the difference between two exchanges prices or between an exchange price and the system price - if positive. Therefore, FTRs are often referred to as "options"
- **Physical Transmission Right (PTR):** tradable product which entitles the owner to nominate a cross-border flow if exercised. Therefore, PTRs are often referred as options (Unlike for FTRs, the decision to exercise the option belongs to the right's owner – the exercise is not automatic). With Use-It-Or-Sell-It (UIOSI), if PTRs are not exercised at a given deadline, they convert into FTRs.
- **Swap or obligation or contract for differences (CfDs):** (Financial) product which entitles its owner to pay or receive a negative or positive price spread – i.e. the difference between two exchanges prices or between an exchange price and the system price - at maturity (and/or delivery period).
-
- **Primary market:** market where transmission rights are sold forward via transmission rights or obligations and for which a congestion revenue is collected or obligations purchased.
- **Secondary market:** market where transmission rights are exchanged between market participants
- **System price:** reference energy price used for the settlement of financial products

Primary market: CfD's can also be settled using the actual DA congestion rent, as is the case for the product introduced by OMEL on ES-PT border

Secondary market: possibly, a secondary market can exist without primary market, as is currently the case for CfD's in Nordic region

System price: In the Nordic context, refers to a virtual price computed as if there was no network limitations, but can be computed differently in other contexts, for ex. volume weighted average of included DA Area Prices, etc

PCG
Governance

2nd of December 2009

Prerequisites for a Target Model for Governance

- A “governance framework” is vital for the good operation and development of regional/ interregional solutions
- Need to address a number of challenges:
  - Important European “public interest” goals
  - Multiple national jurisdictions
  - Involvement of a number of different parties - power exchanges, TSOs and merchant interconnectors – operating under a variety of regulatory and commercial structures

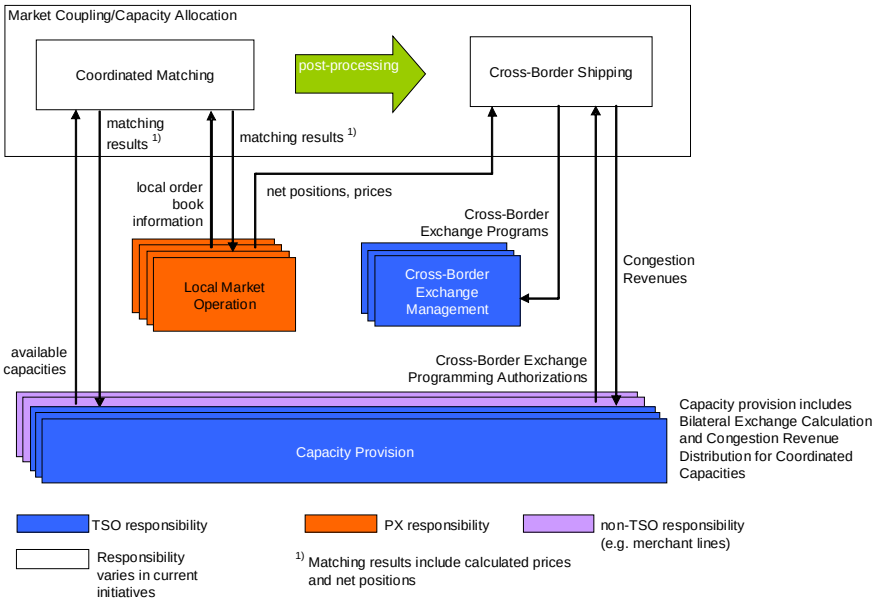
The way forward with Governance

- Focus on the governance of the key functions that need to be undertaken
- Obligations on parties assigned to do functions:
  - Comply with necessary harmonisation requirements
  - Coordinate with other parties on joint functions
- The governance work has started with the governance issues related to day-ahead market
- The plan has been to look at the governance needs for price coupling solution with coordinated matching

Requirements for price coupling & coordinated matching arrangement

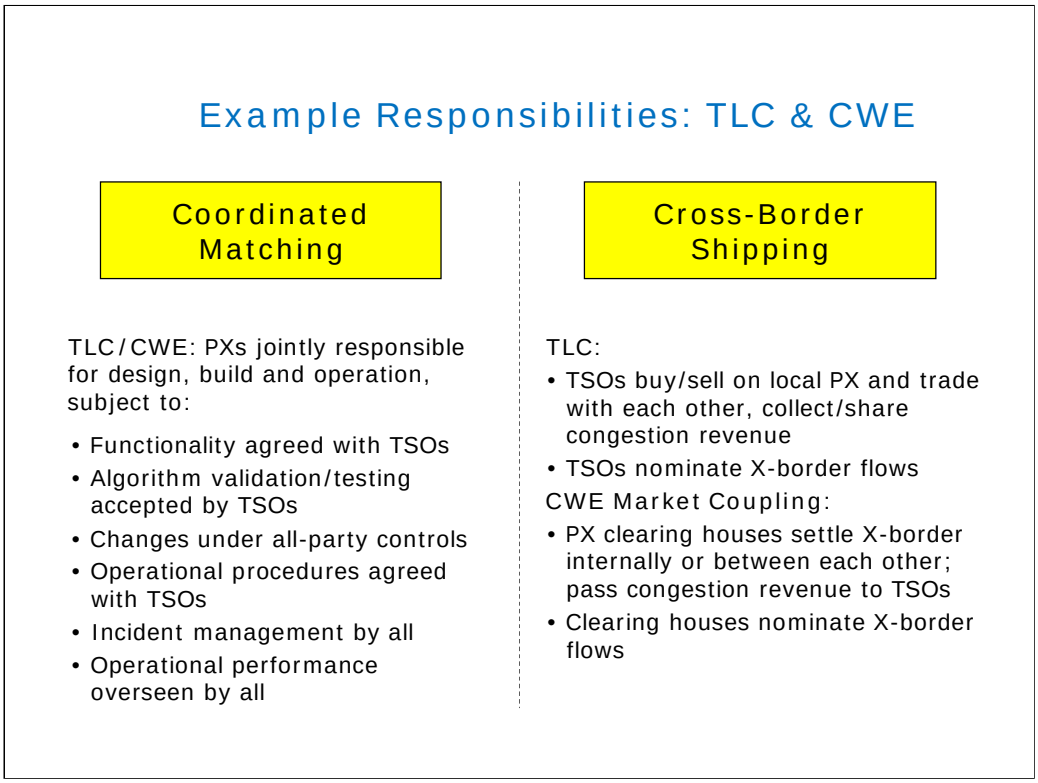
- Sustainability - enable the achievement of an European wide solution
  - The scope and pace of geographical extension
  - Openness (easiness of entering or leaving the arrangement), non-TSO capacity
- Level of subsidiarity (does not impose unnecessary changes at local level)
- Timely, good quality, fair and transparent decision making/dispute resolution
- Transparency of coordinated matching

Functions of Single Price Coupling



Description of Functions

- **Coordinated Matching**
  - Simultaneous matching of local order books using capacities of capacity providers and maximizing economic surplus
- **Cross-border Shipping**
  - Processing of all cross-border transactions on provided capacities equalising local market net positions and collecting congestion revenues
- **Local Market Operation**
  - Receipt and processing of orders from local market participants, clearing and settlement of those orders with local market participants according to coordinated matching results, clearing and settlement of resulting local net position with Cross-border Shipping
- **Cross-border Exchange Management**
  - Operational management of control area exchanges according to agreed TSO rules
- **Capacity Provision**
  - Making capacity available to the market and getting congestion revenues in return, where required in a coordinated way (e.g. multi-path flows between control blocks/areas in a synchronised network)



Currently TLC is the only example of an operational price coupling, but the CWE arrangements due to go live early in 2010 are already well defined and can be described here. Mibel, Nord Pool and Italy are all operational market splittings, and the responsibilities are described on the following slide.

Coordinated Matching

In both TLC and CWE the Coordinated Matching function is the joint responsibility of the PXs. This is also the case in the examples of market splitting (price coupling operated involving just one PX): Nord Pool, Mibel, Italy and Czech-Slovak. This assignment of roles reflects the core competencies of the PXs – i.e., order matching.

In market coupling, the Coordinated Matching function is meeting not only the needs of the PXs and the energy markets they serve but also the needs of the TSOs regarding capacity allocation. Consequently, in all of the implicit auction solutions listed above key aspects of both the design and the operation of the Coordinated Matching function are under all party (TSO and PX) control.

The PXs operate markets under a variety of legal and regulatory frameworks. Common requirements are for transparent, trustworthy price formation, and non-discriminatory access. Exchanges have also developed a variety of product types (such as blocks) to meet local market needs.

The *governance* of any market coupling arrangements is not simply an issue of allocation of roles: these roles are subject to a variety of joint controls. The overall objective of the governance arrangements is to provide assurance to both TSOs and PXs:

- TSOs/capacity owners need assurance that they are able to meet their obligations regarding coordinated capacity determination and allocation under existing legislation and 3rd Package
- PXs need assurance that they are able to meet their obligations regarding price quality and the operation of their markets under participant agreements and energy/financial regulation

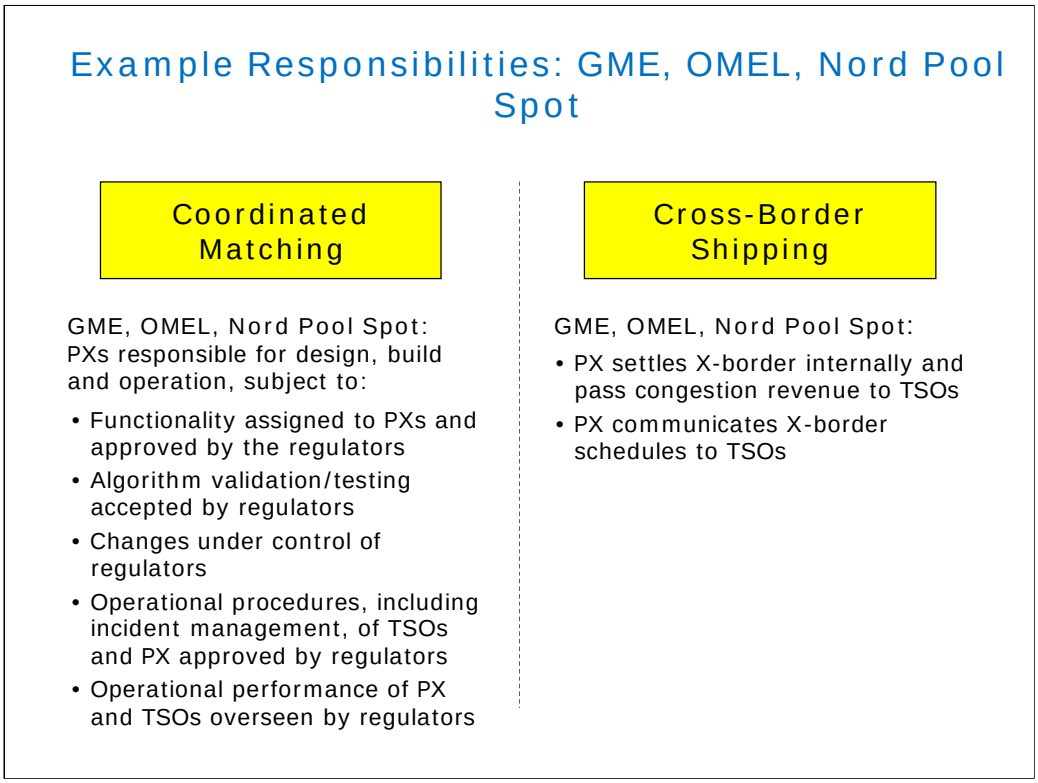
The achievement of the IEM depends not only on the efficient allocation of capacity and security of supply (the TSOs' prime objectives) but also on the provision of efficient energy markets and reliable reference prices (the PXs' prime objectives). The governance arrangements facilitate the meeting of all parties' objectives, including (where they arise) the fair resolution of any conflicts.

Cross-Border Shipping

Cross-Border shipping covers the arrangements for transferring energy from one hub to another. This process is crucial because this is where the congestion revenue is created.

In the examples of market splitting (Mibel, Nordic, Italy), the settlement and notification of the schedules between bidding areas has naturally been the responsibility of the (single) PX involved.

In TLC and CWE more than one PX is involved, and the TSOs have been responsible for determining the overall approach.



Currently TLC is the only example of an operational price coupling, but the CWE arrangements due to go live early in 2010 are already well defined.

Coordinated Matching

In both TLC and CWE the Coordinated Matching function is the joint responsibility of the PXs. This is also the case in the examples of market splitting (price coupling operated involving just one PX): Nord Pool, Mibel, Italy and Czech-Slovak. This assignment of roles reflects the core competencies of the PXs – i.e., order matching.

The PXs operate markets under a variety of legal and regulatory frameworks. Common requirements are for transparent, trustworthy price formation, and non-discriminatory access. Exchanges have also developed a variety of product types (such as blocks) to meet local market needs.

However, in market coupling, the Coordinated Matching function is meeting not only the needs of the PXs and the energy markets they serve but also the needs of the TSOs regarding capacity allocation. Consequently, in both TLC and CWE key aspects of both the design and the operation of the Coordinated Matching function are under all party (TSO and PX) control.

The *governance* of any market coupling arrangements is not simply an issue of allocation of roles: these roles are subject to a variety of joint controls. The overall objective of the governance arrangements is to provide assurance to both TSOs and PXs:

TSOs/capacity owners need assurance that they are able to meet their obligations regarding coordinated capacity determination and allocation under existing legislation and 3rd Package

PXs need assurance that they are able to meet their obligations regarding operation of their markets under participant agreements and energy/financial regulation

There is “public interest” involved not only in the efficient allocation of capacity and security of supply (the TSOs’ prime objectives) but also in the provision of efficient energy markets (the PXs’ prime objective). The governance arrangements should facilitate the meeting of all parties’ objectives, including (where they arise) the fair resolution of any conflicts.