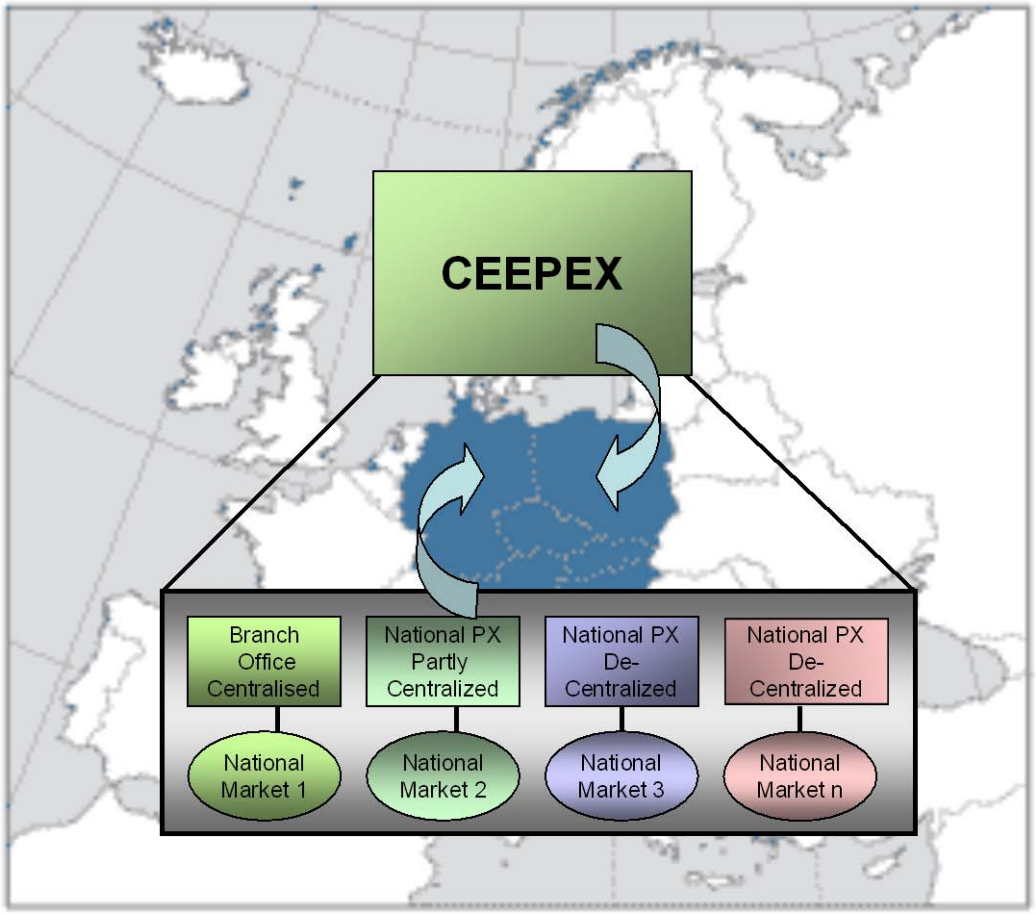
CEEPEX Regional Power Exchange

Final Report

July 29th 2009



A Study on the Organized Electricity Market in the Region Central East Europe

Conducted by Nord Pool Consulting AS - Norway and Accenture – Hungary

1 Project Information

Project	CEEPEX Business Plan	Consulting Services
Beneficiary	E-Control, HEO, World Bank	
Consulting Consortium	Nord Pool Consulting (main consultant) Accenture, Hungary	Vollsveien 19, P.O. Box 373 NO-1326 Lysaker, Norway
	Nord Pool Consulting	Lysaker Norway Mr. Hans-Arild Bredesen, Managing Director
Date	May 05th 2008, Initiation date for the study	

List of Figures and Tables

TABLE OF CONTENT

2 Background and Terms of Reference

The background and the ToR for the study, as described in the tendering document, are summarized below in terms of the following points:

- The background for the assignment
- A list of aspects to consider for implementation
- Assignment tasks
- Expected deliverables from the Consultant

" *The liberalization of the European electricity markets has lead to the so called electricity regional initiative*[1] *(ERI) of ERGEG addressing regional markets as an intermediate step towards the one efficient, truly integrated, single Internal Electricity Market (IEM) of the EU. This intermediate regional approach resulted out of the fact that the present electricity markets in Europe are still national in many aspects. Moreover, the actual control area borders (TSOs) impose the "practical limits" to the electricity markets in the EU in many important aspects.*

In order to overcome this situation enhanced market integration has to be achieved. In that context efficient power markets shall emerge not only on a national level but also on the regional scale, involving a number of countries and control areas. One of the key obstacles to that emerges from the limited transmission capacity that is unable to meet the present requirements of market and trade. These limitations lead to congestion and congestion management at the interconnections and within the single TSOs. Since building new grid infrastructure in Europe today is a lengthy and not sufficiently efficient process, congestion and congestion management (CM) will remain present in the electricity market.

Efficient and market conformant congestion management has been identified as the crucial issue for the EU electricity market to develop. Therefore the European Commission (EC) has developed the Regulation (EC) 1228/2003 on Cross Border Exchange of Electricity and the Guidelines on Congestion Management according to the Article 8 of that Regulation. The Regulation and CM Guidelines are legally binding in all Member States and foresee a market based capacity allocation (explicit or implicit auctions) in case of congestion. This framework influences strongly the geographical dimension of the wholesale electricity market.

The CM Guidelines define seven geographical regions (each consisting of several countries), within which coordinated and coherent CM solutions shall be developed. Whereas a coordinated CM system shall be applied within each region, no "Chinese walls" between the regions shall result from this regional approach either. Therefore the development of a coordinated CM system within one region shall consider the compatibility with systems in other regions in order to facilitate the ultimate objective of a single Internal Electricity Market of the EU. These regions correspond also to the ERGEG ERIs mentioned above.

One of the regions from the CM Guidelines is Central Eastern Europe consisting of Austria, Czech Republic, Germany, Hungary, Poland, Slovakia and Slovenia.

The ERGEG ERI has created a dedicated CEE Regional Market project, within which the key issues for regional market integration – including also congestion management – are addressed. The details are continuously updated at the ERGEG website www.ergeg.org. Within this framework the TSOs of the CEE region are intensively working on the establishment of a common Auction Office (AO) for coordinated congestion management.

The CEE region is currently characterized by different levels of market maturity in the different countries. Austria and Germany have experienced market evolution since 1998 (full market opening in Germany) and 2001 (full market opening in Austria), but both countries remain still with a high concentration in generation, with insufficient transmission capacities and not enough efficient retail markets. The electricity markets in other CEE countries have seen intensified development over the past 2-3 years, in particular since joining the EU in 2004, with promising results (e.g., 35% of the

eligible consumers switched the supplier in the liberalised market in Hungary).

Case for Regional Power Exchange

In that situation, the need for efficient, liquid and well organized electricity markets – power exchanges (PEX) – especially where they do not exist yet, has grown significantly. Experiences (e.g. Nord Pool, EEX) show that an increasingly high share of electricity trade is being conducted via PEXs on a short-term basis, typically on the day-ahead and in more mature markets also on the intra-day basis.

Currently, five PEXs are operating in the CEE Region: EEX (Germany), Polpex (Poland), EXAA (Austria), Operátor trhu selektřinou, a.s. (Czech Republic) and Borzen (Slovenia).
With the exception of EEX, these national power exchanges typically experience low trading volumes and thus low liquidity.

Such a weak performance is in contrast with the regionally oriented PEX of Northern Europe Nord Pool that currently serves four countries / TSOs. For example, Nord Pool Spot profitably transacts more than 70% of the combined electricity generation of the four Nordic countries. For a complete picture, it must been mentioned that such a high portion is partly resulting from a monopoly on cross border trade *given to Nord Pool in order to be able to conduct implicit auctions ("*market splitting*") successfully. In addition to the short-term market, Nord Pool Spot trades in forward financial contracts and recently also in the ancillary services with balance power contracts. The already mentioned EEX of Germany is another fairly liquid power exchange, involving about 150 trading participants from a dozen of countries. In addition to a physical spot market, EEX also operates a financial derivatives market for electricity and CO2 emission allowances. Recently EEX started operating gas exchange too, however with a low liquidity for the time being.*

*The experience of the above mentioned two power exchanges shows that the liquidity of the power exchange depends highly on the size and other characteristics of the related electricity market. Bearing this in mind within the context of the CEE region, it seems reasonable to assume that a power exchange covering more than one country and "*connecting*" the related control areas efficiently (including also market oriented and efficient congestion management) will offer an effective solution for a number of issues:*

(i) Transparency, market confidence, reliable price signals to the market players

(ii) Integration of national into regional markets, allowing also to deal more easily with other priority issues in the future (e.g. market design, integrated balancing markets, etc.)

(iii) Efficient and market oriented congestion management

(iv) Dealing appropriately with dominant incumbent players, too big for a single national market and fostering thus competition

Furthermore, whereas it is generally considered that the development of organized markets / PEX shall remain driven by the free market forces and actors, it is also widely understood that concentration, compatibility and harmonization of PEX operations at the regional and possibly even global European level will deliver higher efficiency and benefits for all involved actors and for the market as a whole.
Against the background described above, it shall be investigated if and how a Regional Power Exchange or a close Cooperation between existing Power Exchanges in the CEE region could contribute to the development of the targeted regional market, bearing in mind the ultimate objective of the single Internal Electricity Market in the EU.

This work shall build on a conceptual study which was initiated and financed in 2006 by the World Bank along with the Hungarian Energy Office, to explore a regional PEX alternative to the inefficient national power exchanges. The study, prepared by Nord Pool Consulting, is accessible electronically at:
http://www.eh.gov.hu/publications/relevantpublications. The study proposes the establishment of a Central European Power Exchange (CEEPEX) with the following main functions: day-ahead and intra-day trading, forward/futures market and ancillary services (including balancing) market covering a number of control areas (trading hubs) in the region. The main technical and organizational

prerequisites for the regional PEX were outlined, but no detailed business/operational model was elaborated.

Against this background, the key objective of the subject assignment is to propose a detailed implementation model and associated Action Plan for CEEPEX, building on the above-mentioned conceptual study. The specific core tasks are outlined below.

Aspects to Consider for Implementation

Legal aspects

- *Existing and potential forthcoming (notably "3rd Package") EU legislation on*
- *Internal Electricity Market (Directives, Regulations, Guidelines)*
- *Relevant EU legislation on financial markets (if needed)*
- *Existing and potential forthcoming national legislation on electricity markets in the CEE region*
- *National legislations regarding stock exchanges of relevance for power exchanges*

Market aspects

- *The plans and strategies of the EU / EC regarding the regional electricity market*
- *Different market maturity and level of competition within the CEE region*
- *Generation pattern and price situation (including CO2) within the CEE region*
- *Problems with the transmission lines, congestions in the CEE region as barriers to the market development*

Operational/organizational aspects

- *Existing Power Exchanges (drawing on the Nord Pool conceptual study)*
- *Existing level or market integration between the countries in the CEE region*
- *Market models & operations applied in the countries of the CEE region (balance groups, etc.)*
- *Planned regional AO of the involved TSOs in the CEE region*

Key documents to be considered

- *Study: "Analysis of opportunities of the establishment of the organised electricity market in Hungary or in the region, and of the purchase of ancillary services" prepared by Nord Pool Consulting AS http://www.eh.gov.hu/publications/relevantpublications*
- *Relevant EU regulatory framework*
- *Relevant national regulatory framework in the CEE region*

Documentation for the detailed understanding and knowledge on the existing power exchanges in the CEE region will be provided by E-Control and HEO.

Tasks

1. Examining in detail the possibility to build a solution with the regional CEEPEX relying on the existing entities:

- *Legal issues*
- *Regulatory framework*
- *Organisational and economic conditions*

2. Examining also the possibility for the creation of a completely new regional organised energy market / PEX in the CEE region on a conceptual level:

- *Legal issues*
- *Regulatory framework*
- *Organisational and economic conditions*

3. Considering the different levels of detailed elaboration contrasting the two approaches from 1and above with demonstration of advantages and disadvantages, including an evaluation obstacles resulting out of current legislation, market models, etc.

4. Possibility and conditions of extending the activities to include procurement of ancillary services, including (but not limited to) load-frequency control and reserve power

5. Impacts of the planned regional CEE Auction Office to the possible approaches from 1. and 2. above, including cooperation with the PEXs.

6. Recommendations with detailed business model and implementation strategy including description of necessary changes to be done by the related national regulators, governments, TSOs.

Expected Deliverables

The Consultant shall deliver:

- *Draft and final reports in English (the text source in MS® Word and source of all figures and tables produced accordingly)*
- *Intermediate discussions and progress reporting*
- *One 1-day Workshop for exchange of views with relevant external stakeholders (the support, logistics and organisation by the project owners will be ensured)"*

3 Executive Summary

In designing a regional power exchange for the Region Central East Europe (CEE) (CEEPEX), a combined top-down and a bottom-up approach is used. Top-down approach is characterized by analyzing the relevant EU directives and national frameworks which influence the design and operation of a regional power exchange (regional organized electricity market). Bottom-up approach is characterized by interacting with stakeholders in the CEE Region and obtaining inputs and comments to the actual design of alternatives for a regional power exchange (regional organized electricity market) via a questionnaire.

This questionnaire was sent out to key stakeholders in Austria and Hungary. The results are presented in Annex 4.

(Chapter 5) stipulates certain frameworks and objectives in order to succeed with the implementation of a regional exchange for the CEE Region**. The focal points are transparency in all aspects of the market operation, and support from key stakeholders in the CEE Region**.

(**Chapter 6)** contains a discussion about current and future relevant EU directives that determine framework but also create incentives to how a regional CEE organized electricity market can be established and operated. **It is evident from this analysis that full support can be expected from the EU in the establishment of a regional power exchange for the CEE Region.**

(Chapter 7) provides a comparison regarding obstacles to trade across the national markets in the CEE Region. **High national market concentration and a lack of transparency with respect to market information are the two major obstacles that must be dealt with to secure an efficient operation of the regional power exchange CEEPEX**.

(Chapter 8) outlines the general requirements for a regional power exchange and a recommended market model. **It is concluded that the initial focus for CEEPEX must be a day-ahead market with cross-border capacities allocated from the CAO in Freising in coordination with national TSOs. However, based on the experience from organized electricity markets elsewhere, it is of paramount importance that CEEPEX offers medium and long-term financial electricity contracts as soon as the market participants have gained confidence in the CEEPEX Day-Ahead system price, being set in a liquid market.**

(Chapter 9) describes various key elements related to the operation of a regional power exchange and to how the execution of operational tasks will differ depending on whether a “greenfield” approach or alternatively an approach based on utilizing some of the existing infrastructure in each of the national electricity markets is chosen. **With the aid of a decision matrix it is concluded that a regional power exchange built on cooperation with existing national power exchanges and partly operated by the assistance of facility management services is the recommended alternative. This solution provides more flexibility for the existing PXs in the region.**

(Chapter 10) describes a financial analysis done for the two alternatives presented in Chapter 9 and pros and cons for each alternative are listed. **It is evident from this analysis that a regional power exchange using facility management services is by far the most viable solution from a financial point of view.**

(Chapter 11) contains a business / implementation plan for the recommended alternative based on cooperation between a new regional power exchange, CEEPEX and existing national power exchanges. **Based on the previous experience, such an exchange project could be executed over a period of two years, if the stakeholders' support and financial background are ensured.**

(Chapter 12) gives conclusions and recommendations, in the form of a roadmap for the implementation and the operation of the CEE power exchange.
The advantages of a regional power exchange for the CEE Region are evident. Hence the final conclusion and strategic recommendation is to start the implementation project in close cooperation with key stakeholders including the CAO in Freising as soon as possible.

(Chapter 13) contains a list of references used for the study.

The following annexes are added at the end:

Annex 1: Glossary and Abbreviations
Annex 2: Legal Arrangement Governing Nord Pool Operations
Annex 3: General Description of a Competitive Electricity Market
Annex 4: Questionnaire and a Summary of the Responses from the Stakeholders in Austria and Hungary
Annex 5: Explanatory Note from Nord Pool ASA on Insider Trading

4 Introduction

Nord Pool Consulting and Accenture-Hungary (in further text: Consultant) have been commissioned by the World Bank, E-Control and HEO (in further text: Customer) to conduct a study on designing an organized electricity market (power exchange), CEEPEX for the CEE Region.

The key objective of the study was to propose a regional market design and a roadmap for implementation of the CEEPEX.

The study elaborates on the following issues:

- An analysis of the current and forthcoming directives and regulations in the EU
- A brief review of the current state of market opening in the CEE Region
- An examination of the barriers to further market liberalisation and integration in the CEE Region
- A description of the model for the organized electricity market in the CEE Region
- An analysis of governance structures for the regional power exchange
- A detailed financial analysis of CEEPEX
- A roadmap for implementation of the recommended solution

The initial focus of the study is on the electricity market in Austria and Hungary. However, the creation and success of a regional power exchange will naturally span a broader geographical area. It is anticipated that this would eventually span the whole CEE Region, with further development (not elaborated in detail in this study) towards integration with CWE (Central West Europe) and SEE (South East Europe) Regions on the long-term time perspective.

To be able to meet the requirements outlined in the Terms of Reference the Consultant has chosen a combination of a top-down and a bottom-up approach. Top-down approach is characterized by analyzing the relevant EU directives and national frameworks which influence the design and operation of a regional power exchange (regional organized electricity market).

Bottom up approach is characterized by interacting with stakeholders in the CEE Region and obtaining inputs and comments to the actual design of alternatives for a regional power exchange (regional organized electricity market) via a questionnaire.

The two approaches were combined together with the views of the stakeholders from the entire CEE Region, at the CEEPEX workshop in Budapest on February 9th 2009.

4.1 European Electricity Market Development

The development of the European Internal Electricity Market (IEM) has been ongoing for at least two decades. Over the last few years, a considerable move towards achieving the goal of one unified, common and competitive IEM of Europe can be observed.

Some major developments contributing to this are e.g.:

- The cooperation of French and German power exchanges (EEX and PowerNext) in the new company for the Day-Ahead Market (DAM) [1]
- A market coupling system between Germany, Belgium, Netherlands, Luxembourg and France (under development, [2])

Furthermore, in the third quarter of 2009, a market coupling system between the German and the Nordic market at the Danish border will be introduced [27].

Finally it is worth noting that new organized electricity markets / power exchanges are emerging in the eastern and south eastern parts of Europe, like e.g. OPCOM (already in operation from 2005) in Romania and a possible opening of the wholesale market in the SEE Region.

Considerable volumes are traded over DAMs in Europe. In the figure below, the DAM volumes traded at the major power exchanges in Europe in 2007 and 2008 are shown [3].

Spot market volumes, TWh		
	2008	2007
NP, Nord Pool, Nordic countries	298	292
EEX, European Energy Exchange, Germany	146	124
APX NL, Amsterdam Power Exchange, Netherlands	25	21
APX UK, Amsterdam Power Exchange, UK	14	11
EXAA, Energy Exchange Austria, Austria	3	2
PNXT, PowerNext, France	52	44
OMEL, Spanish Power Exchange, Spain	222	179
POLPX, Polish Power Exchange, Poland	2	2
BELPX, Belgian Power Exchange, Belgium	11	8
IPEX, Italian Power Exchange, Italy	233	231

Table 4.1: Traded DAM Volumes in 2007 and 2008 at the major European power exchanges

It is important to note that in the emerging European Internal Electricity Market, it is not desirable to have one common price for all hours in all markets, for economical reasons. For example in 2007, only 29% of the time, bidding areas in the Nordic electricity market had the same price, but the Nordic electricity market is nevertheless considered to be the best integrated and liquid of all European regional markets.

In the figure below average DAM (spot) prices at the major European power exchanges are shown for 2007 and 2008 [3].

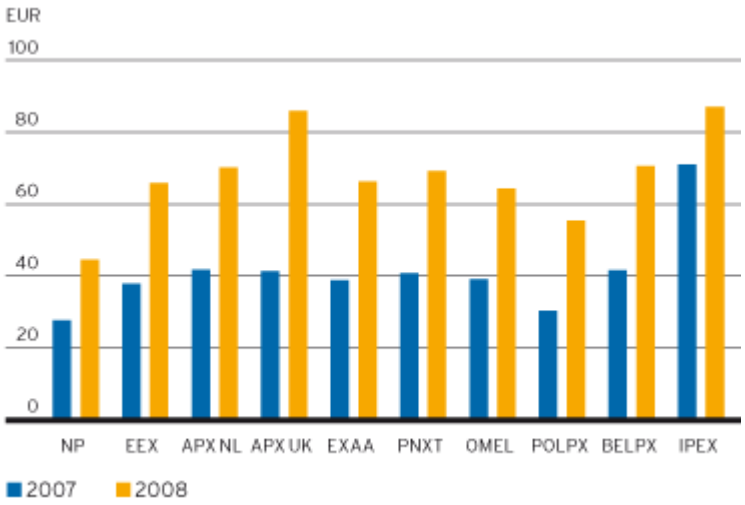


Figure 4.1 Prices of European Day-Ahead Markets for 2007 and 2008

These regional power exchanges serving different parts of the European electricity markets organize implicit or explicit auctions of transmission capacity, in cooperation with TSOs, at the congested interconnections (between the control areas) or “intra-connections” (within the control areas).

The calculation methodology to determine the active power (MW) capacities to be offered at these auctions is a major challenge, especially since it is closely related to the operational security of the transmission network. Resolving this challenge is one key pre-condition for the regional markets to function effectively.

This challenge is illustrated in the figure below especially for the so called “loop-flows” which appear in the highly meshed transmission networks of the synchronously operated control areas [4].

THE CHALLENGE

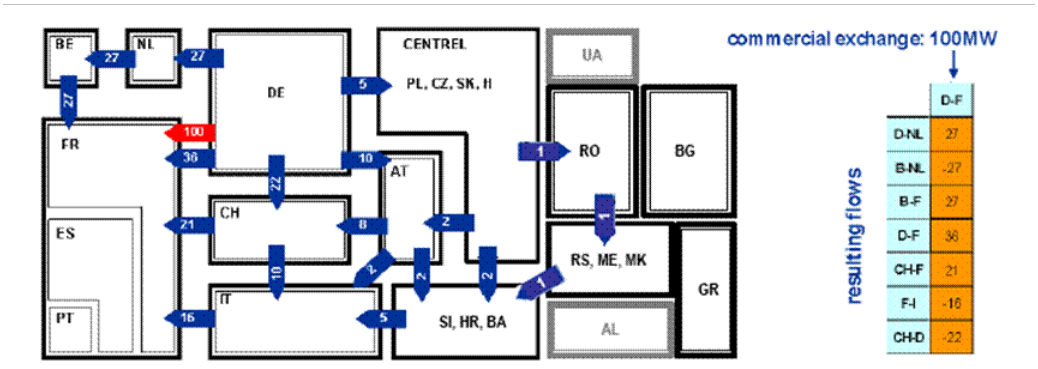


Figure 4.2 Commercial, physical and “loop” flows

In the illustration above, a commercial contract of 100 MW is executed between a German supplier and a French consumer. The blue arrows indicate how the actual physical flow of electricity would take place if the German supplier increased the generation by 100 MW and the French consumer increased the load by the same amount. (Grid losses are omitted for simplicity of considerations.)

This example illustrates also the background behind the strategic decision in the CEE Region to go for the flow based calculation of interconnection capacities (instead of the ATC/NTC (Available Transfer Capacity / Net Transfer Capacity) [28] approach) with the objective of resolving the “loop flows”, while complying both, with the market demand for maximizing capacity and the TSOs responsibility for secure operation.

The detailed analyses and simulations conducted by the TSOs and consultants in the CEE Region have in the mean time shown that Flow Based Allocation (FBA) provides better overall welfare not just for the day-ahead, but also for the longer-term allocation (e.g. monthly, yearly) in the meshed networks.

For a reference, details are contained at www.ergeg.org → Regional Initiative → Electricity → Region Central East Europe (especially the letters from the CEE Regulators from 2006 and September 2008, to the CEE TSOs, requesting the TSOs to develop and implement the FBA in the CEE Region).

With the flow based capacity calculation applied on an adequate common grid model, it can be expected that congestions will be observed not only on national borders (interconnections), but also at the critical transmission lines within the control areas (TSOs). This will in turn result in the evolution of the European Internal Electricity Market from a nationally fragmented “patchwork” towards an integrated market with price areas reflecting the reality of the grid and market, delivering ultimately the optimal welfare and benefits for the customers. It is also clear that the national borders will tend to play less important role in this development.

5 Framework for the Implementation of CEEPEX

As a minimum, general support from the CEE Region's stakeholders for the proposed solutions must be obtained before a successful implementation of a regional power exchange can be carried out.

The stakeholders can be subdivided into various groups, each providing different types of support in the implementation and subsequent operation of a regional power exchange:

Regulators: Propose necessary amendments in regulatory frameworks which represent obstacles to trade of electricity nationally and in a region-wide market.

Transmission System Operators (TSOs): Support the establishment of a regional power exchange by calculating daily border capacities which can at least partly be used for implicit auctions and provide full transparency in all areas of TSO operation, especially with regards to maintenance plans for transmission lines, unplanned outages and other issues of importance for transparent and well functioning market with special regard to the security of the network operations

Market participants (Traders, Generators, Customers/Consumers and Suppliers): (will develop) their willingness to trade at the regional exchange and to provide full transparency especially with respect to maintenance plans and sudden outages of generation units.

Power Exchanges (PEXs): Need to cooperate closely with the CEEPEX.

(Central Allocation Office) CAO: Supports the CEEPEX by calculation of the day-ahead transmission capacities.

Governments: Are needed to support the process especially in terms of adapting the national legislations where it is necessary to remove barriers to market integration.

6 Description of Existing and Forthcoming EU Legislation on IEM

6.1 Introduction

Ever since the first Electricity Directive 96/92/EC was launched in 1996 the EU has aimed at establishing a competitive and harmonised Internal Electricity Market (IEM) where national borders have low significance.

The political willingness to liberalize the electricity market of many European countries was rather low when the Commission launched its proposal for the first Electricity Directive. This situation limited the Commission, the Parliament and the Council in how far to go with liberalisation in 1996. In addition, many electricity companies, professional and industrial bodies were against the liberalization at the beginning. This has made a “stepwise” approach the only feasible option to proceed.

However, even with more willing and positive national governments and electricity undertakings, it would have been hard to open the European electricity market completely in one step. This is due to the fact that the full and common market liberalization would have required making (at that time) 15 national legal frameworks for electricity supply highly coherent and compatible. Simply constructing the necessary physical cross border infrastructure with major actors having different views on how this should be done and utilized, would have been a rather challenging measure.

It became soon clear that Directive 96/92/EC was far from sufficient to establish a competitive European Internal Electricity Market. A wide range of issues were not treated and various Member States (MS) did not act according to the fundamental intentions of the first electricity Directive, namely to establish a liberalized electricity market. Instead, and contrary to this intention, many MS rather reluctantly implemented the minimum requirements of the directive. In the years that followed the European Commission revised and made amendments to the first Electricity Directive. In 2003, the second energy legislative package was launched. The 2003/54/EC directive was developed further in addition the Regulation on Cross Border Exchange in Electricity (EC) 1228/2003 was launched. The regulation was eventually amended with the Congestion Management Guidelines 2006/770/EC.

The Third Energy Legislative Package is the latest step in the process towards the European IEM, this time with 27 EU Member States. Details on the ongoing discussions and the latest versions of the related Directives and Regulations can be found at the EU Commission’s webpage EU–DG TREN [16].

The most relevant articles in the relevant EU Directives and Regulations, with respect to the future CEEPEX project (including also the points from the Third Energy Legislative Package), as well as the most relevant legislation regulating competition and the financial markets, are summarized below.

6.2 Relevant EU Legislation for the Internal Electricity Market

The most relevant legal framework in force for the EU IEM includes:

- *Directive 2005/89/EC of 18 January 2006 concerning measures to safeguard security of electricity supply and infrastructure investment*

  The Directive establishes measures aimed at safeguarding security of electricity supply so as to ensure the proper functioning of the internal market for electricity and to ensure a) an adequate level of generation capacity b) an adequate balance between supply and demand; and (c) an appropriate level of interconnection between Member States for the development of the internal market

- *Directive 2003/54/EC of 26. June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC*

  The electricity directive establishes common rules for the generation, transmission, distribution and supply of electricity. It lays down the rules relating to the organization and functioning of the electricity sector, access to the market, the criteria and procedures applicable to calls for tenders and the granting of authorizations and the operation of systems

- *Regulation (EC) 1228/2003 of 26. June 2003 on conditions for access to the network for cross-border exchanges in electricity*

  The Regulation aims at setting fair rules for cross-border exchanges in electricity, thus enhancing competition within the internal electricity market, taking into account the specificities of national and regional markets. This will involve the establishment of a compensation mechanism for cross border flows of electricity and the setting of harmonized principles on cross-border transmission charges and the allocation of available capacities of interconnections between national transmission systems. The Regulation was amended with the Congestion Management Guidelines 2006/770/EC in December 2006 (For information on additional relevant EU legal documents see also [14])

In the Third Energy Legislative Package, a new component is the Regulation which sets the framework for the European Agency for Cooperation of Energy Regulators (ACER).

In addition there are proposals to replace the existing Electricity Directive 2003/54/EC and the Regulation (EC) 1228/2003[15].

The most important amendments to the present framework for the EU Internal Electricity Markets are summarized below:

Unbundling (new Electricity Directive § 10 and § 15).

The existing claim on legal unbundling for Transmission System Operators (TSO's) affiliated with supply and/or generation activities has proved not to be sufficient to achieve a competitive and non-discriminatory market.

Hence, the Commission proposed to induce full ownership unbundling for TSOs which no longer could be affiliated with a part of an integrated company which is also active in supply and generation.

Alternatively, the ownership of supply, generation, and transmission network could stay within the same company but the network operation must both legally, technically and commercially be put in an independent company. This is the so called Independent System Operator model.

Finally, a so called "third option" for an "ITO" ("Independent Transmission Operator") is possible too, where both the assets and operation of the transmission undertaking are not ownership unbundled from the common holding company, but are a subject of more scrutinized regulatory supervision and respective measures.

Cooperation among European TSOs (Cross Border Regulation § 2a-2h)

European Network of Transmission System Operators for Electricity (ENTSO-E) has been set up.[29] Through the establishment of ENTSO-E, the TSOs are obliged to strengthen their cooperation in a number of key areas like e.g. coordinated congestion management, detailed technical codes on operational security, 10 year network development plan, etc.

Regulators (Electricity Directive § 22 a-f)

All Member States are already obliged to have an energy regulatory authority. However, in many cases the regulators do not have sufficient powers and / or independence to regulate the market properly. To obtain regulatory power and independence it is foreseen that regulators should be fully independent from both industry and governments. In addition the regulators' statutory powers and duties will be strengthened in a wide range of issues. The Member States shall ensure that the regulators are granted the power and means that enable them to act as an efficient watchdog to secure a liberalised and competitive electricity market.

The role of ACER will be, among others, to provide a framework for national regulators to cooperate, to take decisions on cross-border issues, to develop Framework Guidelines, to issue opinion on the codes and rules prepared by the ENTSO-E and their adherence to the Framework Guidelines, to

monitor the TSOs and to act as an advisory body towards the Commission. ERGEG's (European Regulators Group for Electricity and Gas) role in this aspect will be transferred to ACER.

Transparency

Current requirements on transparency focus on publication of tariffs, capacity and terms and condition for connection and access to national networks (Directive 2003/54/EC § 23-2). However, in the explanatory memorandum of the various legislative proposals included in the Third Package the Commission states that the internal electricity market suffers from lack of transparency. Following the XIII Florence Forum [17], where the ERGEG Guidelines of Good Practice on Information Management and Transparency have been presented a dedicated Working Group on Transparency established by the EU Commission and ERGEG was operational in 2006 and 2007. The issue of transparency has been dealt with consequently in detail within the regions of the Electricity Regional Initiative, hence also in the CEE Region [18] This has resulted in the detailed implementation plan and roadmap for fulfilment of transparency requirements in the CEE Region, to which all the relevant stakeholders have committed [19].

6.3 EU Internal Electricity Market and the CEE Region

While considering whether IEM and CEE Region objectives are contradictory in some points, the three key issues need to be taken into account:

1.) The concept of "Regions" has been first introduced in the XI Florence Forum in 2004 (see [17] for further information) with the main objective to deliver coordinated and coherent Congestion Management. This "regional" approach has then been further developed and reflected among others also in the Congestion Management Guidelines 2006/770/EC, where also the CEE Region has been defined as it is today.

2.) The ERGEG Electricity Regional Initiative has been started in 2006 in order to pave the path towards the IEM via the regional development; this means that all the Regions are to be seen as an intermediate step serving the purpose of the IEM in the end.

3.) Finally, the development of the CEE Region has as key objectives (similarly as the other regional developments): effective market integration, removal of trade barriers, reliable and liquid prices fostering maximum welfare and, as a strong driving force for achieving of those objectives also effective and efficient congestion management. The CEEPEX as such would be a substantial contribution to those strategic goals.

Concluding, it is clear that there is full consistence and coherence between the objectives of the European IEM and the CEE Region (and consequently also the objectives of CEEPEX).

The work on market integration and effective congestion management in the CEE Region and in that context also this study and the recommended way forwards in relation to the CEEPEX, are important and highly beneficial for the IEM and ultimately also for the European customers and society.

6.4 Relevant EU Legislation Regulating Competition

From a legal point of view, an integration of two or more national markets could be in conflict with the EU rules on competition (refer to the consolidated version of the EU Treaty [20])[1] and / or national competition laws.

In Article 101 (ex. article 81) of the EU Treaty it is clearly specified that all agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition within the internal market is prohibited.

In Article 102 (ex article 82) of the EU Treaty various forms of abuse of dominant positions by one or more undertakings are listed and stated as prohibited and incompatible with the internal market.

However, in Article 101 Paragraph 3 of the EU Treaty it is stated that the provisions of Article 101 can be declared inapplicable if agreements between undertakings:

"… Contributes to improving the generation of goods or to promoting technical or economic progress, while allowing consumers a fair share of the resulting benefit…"

There is no legal framework in EU today that provides appropriate regulations or directives to the principles set out in article 101 and 102, hence it is stated in article 104 (ex article 84) that until this legal framework is in place:

"… The authorities in member States shall rule on the admissibility of agreements, decisions and concerted practices and on abuse of a dominant position in the internal market in accordance with the law of their country and with the provisions of article 101, in particular paragraph 3, and of Article 102."

This means that the developers of the CEE market not only must relate to the EU legal competition

[1] Consolidated version of the treaty on European Union on the functioning of the European Union article 101-106 of 09.05.2008

regime but also to the regimes in each of the countries involved.

Seen in light of the positive signals and active participation from both the EU Commission and the EU Parliament in the establishment of regional markets it is reason to believe that the Commission will give its tribute to the CEE regional market integration project. It is also reason to believe that possible negative effects for the internal European electricity market as such will be acceptable in accordance with article 101 Paragraph 3.

However, to make sure that the elaborated articles in the proposed agreement between the countries involved are not in conflict with either article 101 or article 102 the European Commission should on a regular basis be consulted and informed about the development of the project.

A potentially greater obstacle can be the national competition laws. The establishment of a regional market will obviously affect the competition in each of the countries involved and therefore be an object for approval by National Competition Authorities. This means that it may be even more important to consult the National Competition Authorities about the project from the beginning.

6.5 Relevant EU Legislation on Financial Markets

The main legislative financial act with relevance for the European Power exchanges and their members is Directive 2004/39/EC on markets in financial instruments (MiFID). This directive provides a harmonised regulatory regime for investment services across the EU. MiFID establishes the framework for a regulatory regime (level 1). The details of this framework directive regarding organizational requirements and operating conditions were given in the Directive 2006/73/EC and in the Regulation (EC) 1287/2006, and should be applied from the 1st of November 2007.

How to interpret and how to implement the various provisions in MiFID into national legislation is to some extent a national affair and there can be variations from country to country. In Norway for example, the industry argues that currency hedging should not be a subject for license. This argument was turned down by the Ministry of Finance, but it might be found acceptable in other countries.

In general the provisions in MiFID include commodity derivatives for all commodities including electricity (1287/2006 § 2-1). This excludes the spot market which is a physical market, but includes all contracts at the financial market and all actors participating in this market (see annex 1 of 2004/39). This means in principle that all actors at European power exchanges need a licence/concession to trade at the financial market. This again means that these companies must comply with a comprehensive set of rules treating issues from the way the company is organized, to capital endowment, transaction reporting, relations with clients etc.

However, in Directive 2004/39 § 1a-n exemptions for certain kind of undertakings listed in annex 1 are given. In the foreword (point 22) to the MiFID regulation (EC) 1287/2006 it is stated that these exemptions could be expected to *"Exclude significant numbers of commercial generators and consumers of energy and other commodities, including energy suppliers from the scope of the directive*. …"

In short, the power exchange itself will have to comply with the provisions in MiFID, but its members will in most cases not be a subject of the provisions in MiFID.

6.5.1 Future Revisions of MiFID

There is no guarantee that the exemptions valid for most electricity undertakings will continue to persist in the future. In October 2008 the Commission started its work on a report to the Council and the Parliament on whether the exemptions should be continued or not (2004/39 § 65-3). §40 in the regulation opens up for revisions of MiFID. Article 38 and 39 shall be re-examined which can lead to physical contracts that are cleared, no longer will be exempted from the provisions in MiFID. The Commission's work was launched with a public hearing regarding what issues in MiFID that should be revised. The public hearing and the results of the hearing give no indication that the exemption for physical cleared contracts in MiFID will be abolished in the current and ongoing revision of MiFID.

7 Status of Electricity Market Development in the CEE Countries

In this Chapter the status of the electricity markets in terms of features of the existing power exchanges in operation in the CEE-countries (table 7.1) as well as the relevant parameters for implementing the trade (table 7.2) is given. Moreover, the main obstacles for the further development and market integration in the CEE Region are summarized in Chapter 7.1.

7.1 Comparison of Power Exchanges in the CEE Region

The Table 7.1 gives an overview of the key features of the presently existing power exchanges in the CEE Region, including: gate closure times, kinds of markets, etc.

	Exchange	Gate Closure DAM	DAM	Forwards	IDM[2]	BM[3]
Austria	EXAA	10:12	Y	N	N	Y
Czech R	OTE	12:00	Y	Y	Y	N
Czech R	PXE	12:00	N	Y	N	N
Germany	EEX	12:00	Y	Y	Y	N
Hungary*	HUPX	NA	2009	2009	N	N
Poland	GIELDA	12:00	Y	N	N	N
Poland	POEE	12:00	Y	Y	N	N
Slovakia	None	NA	NA	NA	NA	NA
Slovenia	BORZEN	12:00	Y	N	N	N

Table 7.1 Comparison of existing exchanges in the CEE Region

*HUPX has got the license from HEO and is under establishment, but no actual information is available yet regarding details.

The Table 7.2 gives a comparison of relevant parameters for implementing trade.

	Business Language	Explicit Auction	Import/ Export Tariffs*	Ownership Unbundling TSOs	HHI Index**	Transparency
Austria	G/E	Y	0	N	high	N
Czech R	E	Y	0	Y	high	N
Germany	G/E	Y	0	N	medium/high	N
Hungary	E	Y	0	N	high	N
Poland	E	Y	0	N	medium	N
Slovakia	E	Y	0	Y	high	N
Slovenia	E	Y	0	Y	high	N

Table 7.2 Comparison of important trade parameters across the CEE region

The comparison above clearly indicates that market concentration in generation measured in a national context and lack of transparency are the greatest obstacles to trade in the CEE Region.

* according to ETSO: "*Regarding import/export transmission tariffs, they have been abolished among all parties and are thus null.*"

**HHI" means the Herfindahl-Hirschman Index, a commonly accepted measure of market

[2] Intra-Day Market
[3] Balancing Market

concentration. It is calculated by squaring the market share of each firm competing in the market and then summing the resulting numbers. For example, for a market consisting of four firms with shares of thirty, thirty, twenty and twenty percent, the HHI is 2600 ($30^2 + 30^2 + 20^2 + 20^2 = 2600$).
The HHI takes into account the relative size and distribution of the firms in a market and approaches zero when a market consists of a large number of firms of relatively equal size. The HHI increases both as the number of firms in the market decreases and as the disparity in size between those firms increases. Markets in which the HHI is between 1000 and 1800 points are considered to be moderately concentrated and those in which the HHI is in excess of 1800 points are considered to be concentrated. Transactions that increase the HHI by more than 100 points in concentrated markets presumptively raise antitrust concerns under the Horizontal Merger Guidelines issued by the U.S. Department of Justice and the Federal Trade Commission. See *Merger Guidelines § 1.51* ref.: [21]

7.2 Summary of Key Obstacles Identified by ERGEG

In ERGEG's "Status Review of the Liberalisation and Implementation of the Energy Regulatory Framework" published in December 2008, ERGEG has analysed impediments for the electricity market in many areas including the following: [22]

1) Ownership Unbundling

ERGEG states in the review "*there are no major improvements with respect to unbundling for electricity TSOs in Europe*." (p. 73)

This is widely perceived as a major obstacle to developing a fully functioning competitive electricity market, also in the CEE Region.

For the TSOs in the CEE region, ERGEG has listed the following status:

	Number of TSOs	Number of ownership unbundled
Austria	3	0
Czech Republic	1	1
Germany	4	0
Hungary	1	0
Poland	1	1
Slovakia	1	1
Slovenia	1	1

Table 7.3 TSO Unbundling in the CEE Region

Referring to the Table 7.3, the fact, that the most mature electricity markets of Germany and Austria are still without ownership unbundling, is not necessarily an obstacle for the evolution and integration of the CEE regional market as such. However, this situation may give a negative signal to the other countries in the region about the importance of unbundling as well as Austria's and Germany's willingness to act as catalyst to establish a fully competitive market.

2) Transparency

ERGEG states further in [22] that some progress has been made regarding transparency in the national markets but expresses concern that most operators do not meet their statutory transparency requirements and duties of disclosure satisfactorily.

This lack of transparency is one of the major obstacles to trade in the CEE Region and must be resolved.

3) Security of Supply

ERGEG raises concern over two main issues:

- Increased investment in renewable electricity generation such as wind, which requires high capacity grid infrastructure.

The fact that new power generation is mainly based on gas, requiring strengthened gas infrastructure. Delays in the latter will therefore also affect security of supply in electricity.

Further details on national situations can be found in the ERGEG 2008 Status Review [22].

In the following chapter, a summary of key issues with an indication of relevant obstacles from the CEEPEX perspective is given.

7.3 Summary of Key Identified Obstacles

In the national replies in the ERGEG Report of 2008 the following features appear as the main challenges to cope with in order to establish a functional and competitive CEE regional market [23].

A regional market in the CEE Region could have positive effects on competition in the entire CEE Region as the national champions, which are dominant in most CEE countries with extremely high market shares, will lose market power in a CEE regional market. However, simply to introduce a regional market “by declaration”, without establishing mechanisms that ensure that it is properly integrated and operational will not solve this problem.

Another obstacle for a successful regional market is that in several countries regulated user prices exist side by side with the competitive market. In theory, the competitive market of all the CEE countries combined will ensure that these two markets could exist side-by-side simply because of the huge size of the market. However, in practice the regulated market which normally offers electricity at prices below the market price for selected customers, which will undermine the market and could, put the entire competitive market in vain.

Hence, it is important to create a master plan that gradually phases out the regulated market and to strictly follow this plan.

Also plans for the phasing out of long term contracts of electricity at reduced prices are important to establish and to follow.

Another problem that will not be solved by a regional market alone is the independence and strengthening of the regulator function. In many countries the reports clearly indicate that their power to act in accordance with their formal position is limited. If the development of the market is decided by the government that is in charge for the time being, the electricity market development will suffer. The independence and clear role of these regulatory functions are in particular important to establish in a regional market in order to create confidence, structure and predictability among all the national partners.

All countries are concerned about the transparency issue. A regional market that can contribute to enhanced transparency requires that all relevant countries establish similar standards on what kind of information that should be provided to the market and how and when to release this information. A regional market will increase transparency as all countries seem to be positive to an increased degree of transparency.

Security of supply is another important issue that is discussed all over Europe. There are reasons to believe that a regional market is less vulnerable than a strictly national market as the electricity will flow to the area where the price is high. This means that an area that for some reason is short of electricity from national sources can be supported by neighbouring countries. However, this is again dependent upon that all countries in common take responsibility to develop and maintain the necessary electricity infrastructure to secure a reliable electricity system. On the other hand however, the regional market development shall not lead to deterioration or drawback of the already achieved benefits and integration stages obtained in a European IEM perspective.

In short, a regional market could contribute to an improved security of supply, provided that the right framework is set and implemented, and roles and responsibilities of each relevant stakeholder are fulfilled.

To conclude: The success and effectiveness of the regional market integration are dependent upon all countries being committed to cooperation, to implementing all the necessary arrangements as agreed and most notably, to always act in line with these arrangements.

8 CEEPEX Power Market

This Chapter is the central one of the whole study. It contains the following elements:

- An overview of the characteristics of the generation resources in the CEE Region
- Transmission capacities for cross border exchange
- Proposed market model
- The framework required to implement and operate a trading platform supporting such a market model

8.1 General

Enabling a liquid regional trade with compatible rules between the national CEE electricity markets will secure an optimal use of the generation and transmission resources.

One of the main features of CEEPEX is in that context to provide a transparent day-ahead reference price of electricity and to enhance the trade across the national borders.

8.2 The CEE Generation Capacities

The table below gives an overview of the total installed net generation capacity (GW) in the region as of December 2006.

Country	Total net installed capacity of electricity generating power plants (GW)[4]				
	Thermal	Nuclear	Hydro	Renewable wind	Total
Austria	5.9	0	11.3	1.0	18.2
Czech R	10.6	3.5	2.2	0.1	16.4
Germany	70.3	20.3	9.1	24.4	124.1
Hungary	5.3	1.8	0.0	0.4+(0.7)	8.2
Poland	29.8	0	2.3	0.2	32.3
Slovakia	2.3	2.2	2.4	(0.7)	7.6
Slovenia	1.3	0.7	0.9	0	2.9

Table 8.1 CEE Generation capacities

The generation mix in the CEE Region (including thermal (conventional / nuclear), hydro generation) can be utilized in a more efficient manner if an open and well integrated regional market is offering day-ahead hourly contracts with full price transparency. This will give both, sellers and buyers the opportunity to fine-tune their power portfolios reducing unbalances and hence financial risks in real-time operation. Establishing a trusted day-ahead price index to be used for settlement of forward financial contracts will also be beneficial for investors in new generation.

[4] Source: UCTE Transmission development plan 2008. Numbers in parenthesis is not clearly defined resource

8.3 The CEE Transmission Capacities

The Figure 8.1 below [25] displays computed physical flow for a reference case for 10:30 Jan. 21st 2009.

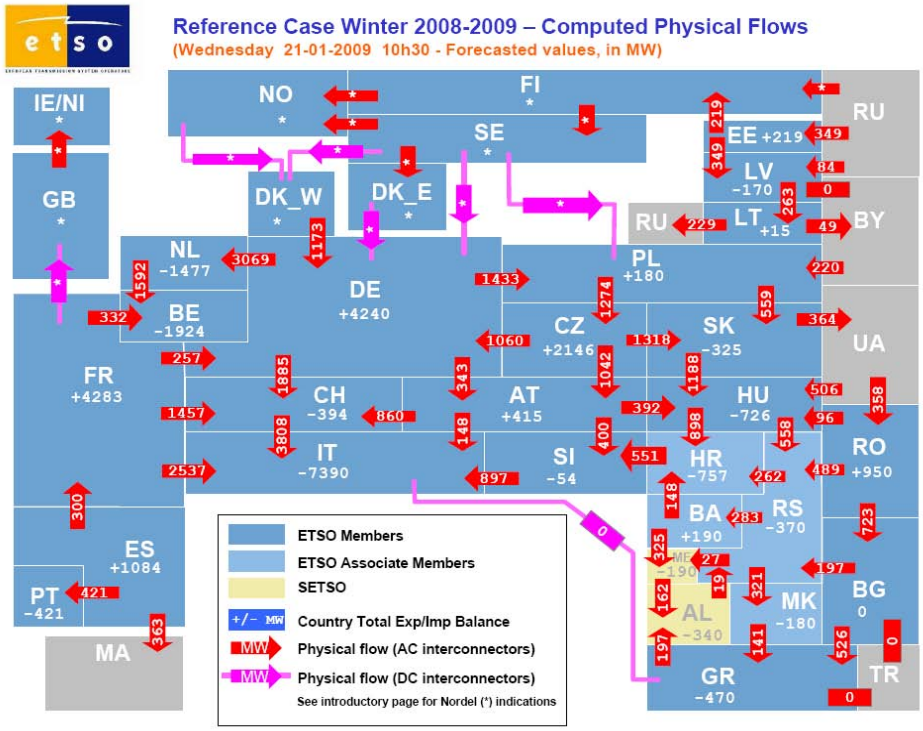


Figure 8.1 Physical flows - Reference Case 10:30 January 21st 2009

In the reference case above, within the CEE region, DE, PL, AT and CZ have a net export while HU, SI and SK all have a net import. The exchange values are an indication of potential exchange volumes at winter peak load for each CEE country, both within the CEE Region and with neighbouring countries outside the CEE Region.

By comparing these exchange values to the total capacity for the major incumbent generators in the region it is evident that the interconnection capacities might not be sufficient to create the necessary level playing field with respect to competition.

If in addition the majority of the interconnection capacity is auctioned off explicitly, the regional competition effect is further reduced.

For the reasons above, a full coordination between the CAO in Freising and CEEPEX is needed. This is one of the key prerequisites for enabling a liquid regional CEE market.

8.4 Grid Tariffs

The preferred grid tariff system to facilitate bilateral trade or trade on a power exchange should be characterised by principles that treat all participants on equal terms.

Most important features are:

- Market participants should know the transmission costs at their grid connection point by a tariff set by the grid owner or system operator
- No bilateral negotiations and agreements should be required
- Transmission cost should not be dependent on location of a trade counterpart

Grid tariffs across the region should be compared and harmonized to the necessary extent and as possible, to avoid distortions in the markets. Of special concern is if the variable cost varies between the countries and how these variable costs are allocated to either consumers or generators.

The variable cost element in transmission tariffs should be added to the marginal cost for generation when a supplier/generator is setting up their supply bid to a day-ahead market. Similarly for a demand bid the variable transmission cost element should be subtracted from the benefit value.

In some cases there is a variable cost element used as a locational signal.

Although the tariffs and locational signals (if any) are under national legislation, with the transition from the national to regional market, both the tariffs and especially locational signals will need a certain degree of harmonization.

Another example for a possible adverse effect on the market integration is environmental fees that might be placed either on the consumer or producer side in different countries. To avoid market distortion this should ideally (i.e. if a political will and consensus can be achieved) also be harmonized across the CEE Region member countries.

With a reference to the ETSO report [26] (ETSO Overview of transmission tariffs in Europe: Synthesis 2007) the following differences among CEE countries are documented with respect to:

1) Split between power-related components and energy-related components in the transmission tariff:
2) Sharing of TSO charges between Generation and Load.

Country	Power Part	Energy Part	Generation	Load
Austria	18%	82%	15%	85%
Czech R	15%	85%	0%	100%
Germany	90%	10%	0%	100%
Hungary	0%	100%	0%	100%
Poland	28%	72%	0,60%	99,4%
Slovakia	10%	90%	0%	100%
Slovenia	32%	68%	0%	100%

Table 8.2 Comparison of Transmission tariff splits and sharing

The differences observed in the table above might lead to market distortions, and should be investigated further by the regulators in the CEE region in order to identify a feasibility of possible improvements in compatibility.

8.5 Transition towards CEEPEX

Principles and key factors that will influence the development of a liquid, common and liberalized electricity market should be based on a common understanding in the industry for a need to reform the existing electricity market and its trading regulations nationally and regionally.

This means that a new framework has to be set by the responsible authorities (both law makers and regulators) in the CEE Region where the following issues are considered:

- The national energy legislation must support or at least not impede the formation of a regional power market
- The grid should be recognised as a monopoly and unbundled from the generation
- The large dominant national generation companies will meet challenges in a new competitive regional power market
- Regional market will reduce the dominance of these large companies

Energy legislation

The establishment of a regional power exchange requires the support from the national electricity acts and the responsible authorities in each country. This will be the overall framework the exchange will operate under.

The following items are of crucial importance in this context:

- Unbundling of transmission and supply/generation
- Full transparency requirements regarding essential market data
- Allocation of at least part of the cross-border capacities to the regional exchange
- Details regarding operational procedures for CEEPEX should be handled by the exchange in close cooperation with market participants, and not formally regulated in the related Electricity Act

National Generators

Large dominant generators will be important participants in a regional market. They will normally secure their position and further develop their competitive ability inter regionally. An important prerequisite is full competition with respect to allocation procedures of cross-border capacities so that both incumbent and new entrants in generation have equal non-discriminatory access to transmission.

The Framework for the CEEPEX

At its establishment, the CEEPEX will need to be assigned the permission (or license) for operation, in line with the relevant legal framework of the country of location and complying with the regulatory framework set by the EU and the CEE national regulators.

8.6 Roles and Responsibilities of Key Players

For the operation of a regional power market, a number of key players should work very closely together, including:

- the TSOs
- the CAO
- the CEEPEX
- Market participants
- the National Power Exchanges

These players along with the regulators will have clearly defined roles and responsibilities.

Since TSOs are monopolies, their performance and business activities must be monitored by the responsible regulators.
TSOs responsibilities as owner of the transmission grid are:

- Implement the provisions and rules for operational security, under the consent of the regulators
- Provide routines to maintain short term power reserves (balancing)
- To comply with the tariffs as approved by the regulator
- Manage real time operations and handle unpredictable imbalances and unexpected events
- Cooperate with TSOs of neighbouring (to the CEE Region) interconnected grids
- Manage transmission capacity on the interconnections for the power exchange
- Manage imbalance clearing, settlement and billing
- Build, operate and maintain the grid within their control area
- Collect and report metered values on interconnections
- Purchase electricity to cover transmission grid losses

The TSOs play a key role in the liberalized power markets. The TSOs' responsibility to securely operate and maintain the functioning power system will always set the basis for the daily framework for the market operations.

Regulators determine guidelines and bylaws for the regulation of monopolies within the power market. Normally this will cover issues as:

- Defining regulatory framework for power system operation
- Defining market rules for metering
- Setting grid tariffs
- Monitoring the grid owners' and power exchanges' (the later possibly in cooperation with other relevant authorities) costs and profits

Regulators' responsibility for guidelines, standards and regulations of the power system and the power market may include a service to supervise the conduct of market participants.

With reference to chapter 6 page 17 of this report, it is outlined from the Third Energy legislative Package implementation a closer cooperation between TSOs in the new ENTSO-E organization, and similarly a strengthening of the regulator functions via the formation of ACER.

The Regional Power Exchange, CEEPEX will operate as a common market place for the whole regional market of the CEE Region and provide services to the TSOs and to the market participants, such as generators, consumers and trading companies.

The core responsibilities of the CEEPEX include:

- Operate a Day-Ahead Market and other related electricity markets
- Provide a reference price for the financial power electricity market
- Use the price mechanisms to alleviate grid congestion through optimal use of available transmission capacity; for transmission capacity calculation and related activities also cooperate closely with the CAO (Central Allocation Office)
- Act as a reliable counterpart
- Report to TSOs, participants and publicly the required information and data

CEEPEX will further facilitate trade, the transparent handling of price sensitive information and support market competition and building up of market liquidity.

Market Participants are legal entities that operate in the wholesale and/or retail markets. They can play multiple roles consisting of one or a combination of the following: generator, consumer, trader, or a retailer.

CAO is the entity in charge of calculating (and while explicit auctions are in place also allocating) the capacity.

When the CEEPEX is established, the CAO will have the following duties among others:

- Ensuring coherence and consistency of the data reported by TSOs for capacity calculation
- Calculating the capacities and delivering the results to the CEEPEX
- Allocating a share of the available capacities in yearly and monthly explicit auctions (as long as explicit auctions are used)
- Maintaining and developing further the capacity calculation methodology and solutions

8.7 Market Structure

8.7.1 General

It is vital that the regional market integration creates added value, supports the customers, and fosters competition in the electricity sector. All market participants shall be able to benefit from regional market integration with an equal share of opportunity.

It must be emphasized that only participation by all parties will enable a reliable and trusted business platform that can build liquidity.

The services offered by CEEPEX must add value and incentives to the individual participant.

The following objectives are essential for the creation of an efficient regional electricity market:

- To achieve market liquidity
- To increase efficiency within the power industry
- To achieve the required balance between power generation capacity and power demand both in the short and long term
- To reduce regional differences in electricity prices (although price differences would always exist between the areas delimited by e.g. grid bottlenecks, in the electricity market) and to provide a clear price signal for the market players in the region

To summarize, whereas the different size of the national markets in the CEE Region cannot easily meet the objectives above, the regional market integration offers much higher chance and opportunity for achieving all the benefits which the electricity market should provide to the customers and society.

8.7.2 Requirements

The general requirements for market integration are as follows:

- All participants trade on sufficiently compatible terms
- Market transparency providing the same information at the same time to all participants
- A proven, effective and legally compliant method for congestion management
- A balancing market which is as integrated as far as possible across borders
- Acceptable level of market concentration in a regional context, if necessary through the introduction of VPP (virtual power plant) auctions
- Efficient market settlement and reporting

Further details on the major requirements above are summarized below:

Participants trading on equal terms mean a common book of rules and that all relevant information as transparent market information and available transmission capacities are available for all market participants at the same time.

Congestion Management is conducted by CEEPEX by using an implicit auction on the day-ahead basis which integrates capacity allocation and energy trading in one calculation where flows on the interconnections are determined.

In a transitional period it might be necessary to execute congestion management by both implicit and explicit auctions. In the long-run the explicit auctions for annual and monthly capacities can be developed towards financial transmission rights. This interim period can be facilitated by allocating a fixed percentage of cross border capacities, e.g. 50%, to the regional exchange for implicit auction, and an equal part for monthly and yearly explicit auctions via the CAO.

Balancing Market provides an opportunity for market participants to self-adjust the balance close to real-time operations in order to reduce required balancing actions by the TSOs.

VPP (Virtual Power Plant) auction is a tool to achieve more competition by offering trade of generator capacity to the market from large generation units. It could be an additional service offered by CEEPEX, in order to reduce a dominant market position of large generators, which might not be reduced sufficiently through only regional market integration.

Settlement and Reporting means flexibility in the reporting, settlement and billing process to handle local requirements for balance responsible parties, TSOs, and banks.

8.8 CEEPEX – a Proposed Market Model for the Day-Ahead Market

The main proposed market model for the CEEPEX regional market is the Day-Ahead Market.

The first important element is the physical Day-Ahead Market. In the Day-Ahead Market hourly power contracts are traded daily for physical delivery the next day 24-hour period. The Day-Ahead Market handles bids for purchase and sale of power contracts of one hour duration in the defined bidding areas in the region as it is already performed by the existing Power Exchanges in the CEE Region. The price is determined as the balance between the bids from all market participants at the intersection point between the accumulated market supply and demand curves.

The market model supports cross border trade by integrating capacity allocation and energy trading in an implicit auction. Thereby the market model sets a framework adding services to both the TSOs and the market participants in the region. By using a regional exchange with these features all parties can operate more efficiently an hourly portfolio and doing this with less resources and costs. With one active trading period a day the whole portfolio for the next 24 hours will be determined. This will be an efficient tool for the participants to balance their individual portfolio and hence manage risks.

It means that the buyers and the sellers in the regional electricity market benefit automatically from cross border exchange without the need to explicitly buy the required transmission capacity. Advantages of this mechanism are to maximize the total economic surplus of all participants and adjust prices across the national borders.

Compared to explicit auction of transmission capacities, the market model with implicit auction offers advantages to the participants and is recognized as the best platform for building liquidity in a regional market.

The participants trading will generate a common regional physical market for the countries involved and will define a common market clearing price.

The common market clearing price (system price index) can be used as a reference for medium and long-term financial electricity contracts. The trade of such contracts should be offered to the market participants by CEEPEX when confidence is established in the price formation of such an index.

8.8.1 Legal and Regulatory Framework

The participants in the region will be given access to the regional power exchange on two levels:

1.) One level is through the formal agreements including an acceptance of the book of rules
2.) Another level is through the technical interface provided by the CEEPEX

All participants who meet the legal and formal requirements set by the CEEPEX and the TSOs can access the regional Day-Ahead Market. The formal requirements will be such as agreements with the TSO for establishing a trading HUB and collection of meter values in the area.

As far as the exchange is concerned, the participants will have to accept the book of rules, sign the participant agreement and to document an approved bank account with the required collateral.

Trading on CEEPEX will also require that the market participants have a balancing agreement with the respective Transmission System Operator or through a Balance Responsible Party for each bidding area where the participants are actively buying/selling. Such an agreement regulates the compensation requested for having an imbalance in the real-time operation by each balancing party. The latter are already in place in the CEE countries.

8.8.2 Business Processes

The day-ahead market and the longer term contracts will be managed by the CEEPEX operating the centralised tasks for the regional market. In each national market, a branch office or an already established national power exchange supports the regional power exchange by performing tasks i.e. training national participants, marketing, collecting bids, and settlement of trade.

The logical business process between the regional power exchange and a branch office with local operation or an existing national power exchange is displayed in Figure 8.2 below:

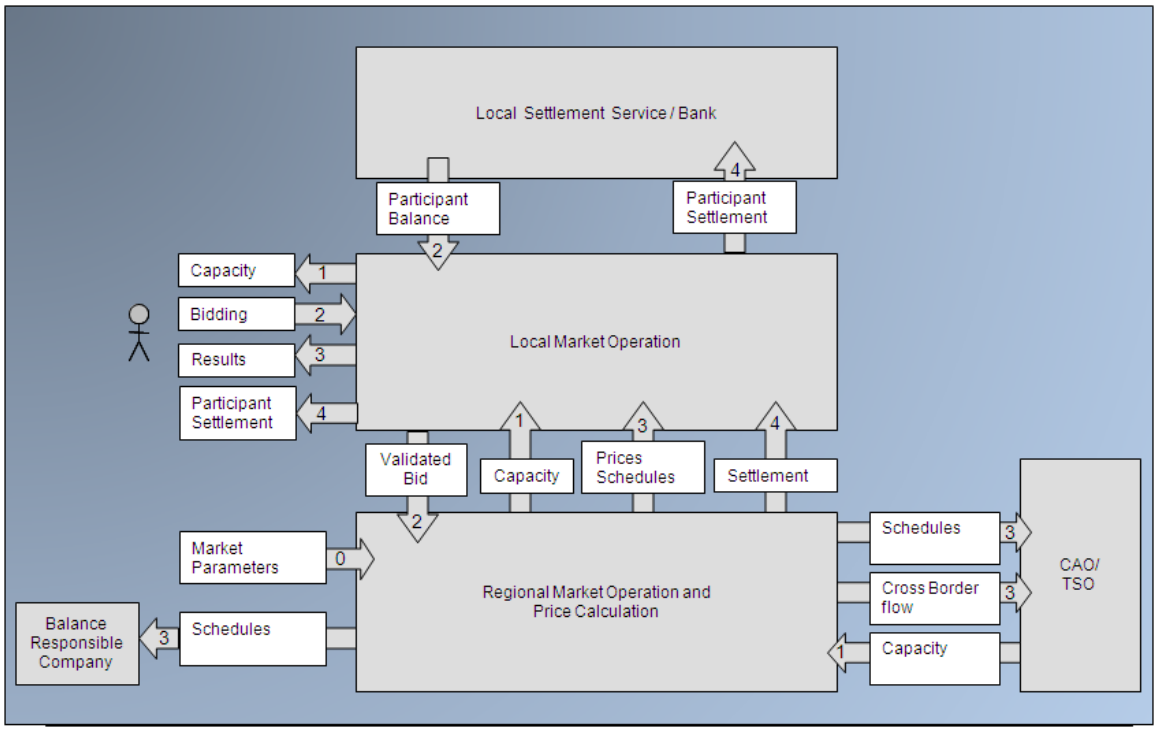


Figure 8.2 Business Processes

8.8.2.1 Business process Overview

The business process in the displayed figure above is an example with defined local operations.

The order of events during a daily operation is numbered from 1 to 4.

A CEEPEX should be flexible in business processes and in the IT-Infrastructure to facilitate various degrees of local operations. This can be required due to local legislation, local bank infrastructure and requirements from the local TSO.

In this example a local branch office is handling local marketing, clearing and bank services, while TSO communication and data integration is handled centrally.

8.8.2.2 Description of the Main Entities in the Business Process

Local Clearing and Bank Services
The business solution proposed is open for local clearing and bank services both for a branch office and for a national exchange. It is important that both the business process and the IT-Infrastructure are flexible in this respect to handle local legislation and currency.

Local Market Operation

Local market operations include handling of all functions that will integrate directly with the participants, TSO, and local authorities. It is vital that these functions are facilitated by the regional exchange due to different languages, currencies and local legislations.

Regional Market Operation

Regional market operations cover all the common operations required to build the regional exchange, market liquidity and establishment of market framework for further business development. The regional operation will deliver services to branch offices and/or national exchanges after individual agreements.

Regional market operation and business processes are based on an agreed harmonised market framework.

TSO and Balance Responsible Party

The TSO and the Balance Responsible Party are integrated with the regional exchange directly or through the national exchange. The TSO is submitting the available transmission capacity (from the flow-based calculation) and is receiving the flow and participants schedules, both individual values as well as aggregated values. The TSO will use these values for planning the daily hour by hour operation.

CAO

The CAO is responsible for calculation of capacities and for the auction of the long-term physical rights.

8.8.3 Possible Obstacles

The proposed market model is dependent on support and commitment from the industry (TSOs, market participants, etc.) and the stable legal and regulatory framework. It is the market participants by using the market services that will build liquidity. This means that the regional power exchange must be attractive to all participants by adding value, saving cost and thereby open for new services. Market evolution is an important activity and this process must be based on local and regional requirements.

Possible obstacles that can prevent the success of the CEEPEX include among others:

- No TSO involvement in or coordination with CEEPEX.
  Phase 1 operation of CEEPEX will be focused on physical markets as day-ahead and balancing markets which are both very closely linked to TSOs system operations. Strong involvements of TSOs in the CEE Region are therefore seen as a precondition for the success of a CEE regional exchange
- Low level integration and agreements between the TSOs and the regional exchange
- Lack of harmonisation of rules for market operation can lead to market distortions and prevent the necessary build up of confidence in the system price index
- High investments and operational costs for the regional exchange. In Chapter 10 the financial aspects of different models for CEEPEX are analyzed in detail. Securing financial viability of CEEPEX is vital to attract the necessary investments required to launch and operate the regional exchange
- Non-transparent calculation of capacities or systematically erroneous algorithms in place by CAO

8.8.4 Market Harmonization Parameters

The following market harmonization features are required to facilitate the market model.

- Time zone
- Rules for handling daylight saving time
- Gate closure times
- Master currency
- Upper and lower price limit for bidding (these are technical limits not regulatory price ceilings/floors)
- Allocation of transmission capacity for the interconnections made available to the power exchange

With a centralised solution these features will be harmonized automatically in the configuration of the market model. With a decentralised or partly decentralised solution these features have to be agreed.

8.8.5 Market Timeline

The following gives an overview of how a daily market timeline can look like for the proposed CEEPEX market model: Numbers are with reference to Figure 8.2

For the CEE Region the day-ahead market time is GMT+1

Daily DAM Operation: (Times indicate deadlines):

- The TSOs are delivering capacity input data for the calculation to the CAO - 08:00
- (1) Calculation of PTDF matrix with capacities by CAO to be sent to CEEPEX - 09:30
- (2) Market gate closure - 12:00
- Market price calculation time - 12:00
- (3) Market result distribution time - 12:15 to 12:30
- Market dispute time - 12:30 to 13:00
- (3) Reports to the Balance Responsible Parties - 13:30
- (3) Reports to the TSOs - 13:30
- (4) Market data transfer to settlement - 14:00
- Market data transfer to Clearing house - 14:30
- Delivery start for day-ahead contracts for hour 1 - 24:00

Running all days (365/366) and hours (23/24/25) a year

The Intra-Day Market would normally open in the afternoon after the Day-Ahead Market is settled. Contracts to be traded would be for the rest of the day and for the next day for 24 hours. This is an hourly market closing one or two hours before physical delivery.

Calculation of capacities to be used for implicit auction will have to take place before the bids in the Day-Ahead Market are known.

8.8.6 Bidding and Price Areas

The regional market will initially be configured with the defined network topology and the fixed bidding areas.

A bidding area in the market can be a whole, a part of, or more than one control area. This means that a control area can also be split in two or several bidding areas if permanent grid constraints require this. The current trend in the European market is to define countries as bidding areas, apart from Italy or Norway which operate with a number of bidding areas.

The price areas are a result of the daily implicit auction. A price area can either be the same as the bidding area (e.g. if the grid constraints / bottlenecks between the bidding cannot be resolved), or two or more bidding areas can have the same price and hence belonging to the same price area. On the other hand, a bidding area cannot be split into more price areas.

8.8.7 Bidding Process

The following products are normally defined in a Day-Ahead Market:

- Single bid
- Block bid
- Flexible bid

These products are not related to any specific physical resource. All products are related to a defined bidding area by a defined trading HUB. All bids have the same priority.

The single bid must be monotonously increasing. Each price must be higher than the previous price. The first bid price must be equal to the minimum price limit, and the last bid price must be equal to the maximum price limit.

The block bid for sale or purchase shall contain the same quantity for several hours. The sale bid will contain a price that indicates that if the average market price over the period (block) is lower than this level, the bid is not accepted. The purchase bid will contain a price that indicates the maximum price the purchaser is willing to pay. If the average market price in the period (block) is higher than this price, the bid is not accepted.

The flexible bid is relevant in potential peak-load hours, where power shortages cause high prices. Flexible bids are available for power sales only. Flexible bids consist of a price and a volume; hour is not specified in the bid. The price indicates the lowest sell price, and if any hourly market price exceeds the bid price, the flexible bid will be accepted in the hour with highest price.

For forward products continuous trading is the norm. A bid and ask price is quoted for each product, which might have day, week, month, quarter or year duration. Each of the products can be offered as base-load or peak-load. The bid and ask price is often supported by market makers to secure a smaller gap between best buyer and best seller, which should promote liquidity.

8.8.8 Implicit Auction by CEEPEX

Features of the implicit auction are:

- Participants in DAM represent both the demand side and supply side
- It allows for a maximum utilisation of available capacity on interconnections
- Implicit auction include netting of trade contracts. It is the netted contract volume that determines whether the transmission capacity is fully utilized, not the gross volumes
- Implicit auction will always lead to contractual flows in direction towards high price area
- Negative impact of bilateral contracts in the opposite direction is reduced through increased capacity in the correct direction
- Implicit auction will reduce the need for wheeling of bilateral contracts through different control areas. Without implicit auction the number of cross-border bilateral contracts may be very large and involve a considerable volume of data to be exchanged between control areas. Bilateral contracts should as far as possible be financial only
- Implicit auction is flexible and can easily take care of capacity rights not used by the participants. The TSOs involved must decide on how to manage capacity rights that is not used by the holder of the rights
- The principle of “use it or lose it” may be applied. This means that capacity rights not used should be given to the Day-Ahead Market
- For procured capacity rights the principle of “use it or get paid for it” may be applied

  This means that the holder of the capacity right is paid a share of the capacity income in case the capacity rights were in direction towards a deficit area. If the direction of the rights is in the opposite direction there will be no payment

Thus there are arguments that support implicit auction and the allocated capacity for this auction should include a sufficient volume (if available) that would contribute to efficient levelling of price differences in the region.

Furthermore, in the CEE Region, the capacity calculation will be done by the CAO.

8.8.9 Price Determination

All the accepted bids are used in the price calculation. The price calculation will follow directly after the market gate closure time.

All the market parameters and the bids for each of the 24 hours determine the market clearing price, the area prices, total sale and purchase volumes and each participant's schedules.

8.8.10 System Price

All bids will be added to an accumulated curve for purchase and for sale. The intersection of these curves will define the equilibrium price where the purchase and sale balance. This price is the unconstrained Market Clearing Price (MCP) and will be the official reference price for all traded contracts in the auction in case of no congestion. The MCP will be calculated for each hour and also published as an un-weighted average price for the 24 hours day-ahead market.

The day-ahead index (unconstraint market price) can be published both for specific countries and for the whole CEE-region. Alternatively it can be specified one index only for the CEE region complimented by CfDs (contract for difference) between this CEE index and different hubs in the region.

8.8.11 Area Price

If the transmission capacity between bid areas for the Day-Ahead contracts is not sufficient, congestion management in the implicit auction will be performed in the defined meshed network. If congestion is detected between any areas, the price calculation will continue and compute local prices to relieve detected congestions.

8.8.12 Market Reporting

When the price calculation has been conducted, the CEEPEX publishes the results.

Automatically the IT system shall extract the necessary participant information (electronic address, etc) and transmits the prices, the total sale and purchase volumes, and the schedules to the participants.

The prices and the individual schedules will be published to the participants. The general prices and market turnover is public, while the individual schedules only are sent to the individual participant.

Participants traded schedules will be accumulated by the regional exchange per Balance Responsible Party and reported to the Balance Responsible Party and to the TSOs. The Balance Responsible Party and the TSOs will get the individual and the accumulated values. Each participant will get his own schedule only.

The TSOs will also get an exchange report for the commercial exchange on each interconnection.

8.8.13 Settlement, Billing and Collaterals

The CEEPEX operation shall include a settlement process. The settlement process will read the participants schedules, prices and configuration data and perform a central settlement calculation. Based on this calculation the model will open for a decentralized reporting, billing and credit checking process.

The primary tasks of the settlement process are:

- Calculate amounts to be transferred between the Power Exchange and the members, including all trades, fees and VAT
- Calculate security requirements
- Generate and distribute settlement details and invoices that specify in detail the volumes, amounts and fees of each member
- Generate result files to be used for clearing services
- Store information from the settlement process for archiving and auditing requirements
- Interface to a bank

The IT system shall keep all required settlement data for audit trail and as long as required for storing of financial data.

8.8.14 Market Information

All relevant market information must be available to all market participants at the same time.

The regional power exchange in cooperation with system operators, generators and other power industry associated companies, collects and distributes price sensitive market information based on the following principles:

- The information comprises data from events that can influence prices
- The information shall be aggregated and be presented in a way for everybody to read and understand. For CEEPEX this might mean that distribution of market information must be published in both the chosen official business language and also the local language
- The information must be distributed at the same time and with same method to all participants

8.8.15 Market Surveillance

To build trust in the market model as well as in CEEPEX and to develop a good functioning power market in terms of size, liquidity and transparency, the participants must have confidence in the markets price mechanism, its integrity and the market information transparency.

Market surveillance continuously monitors the behaviour of the trading participants, and investigates possible breaches of the trading rules or applicable laws. It has therefore an important role in establishing and maintaining this confidence and integrity by having a strong and visible presence in the market.

To illustrate different types of behaviour that would constitute a breach on market rules, a Nord Pool explanatory document describing various forms of market manipulation and insider trading is enclosed in the Annex 5.

The CEEPEX will be under the jurisdiction of the country of location. Market surveillance issues reported to the national authorities of location should therefore be discussed in a formal forum where regulators from the CEE Region are participating. A surveillance of the CAO should also be the responsibility of the CEE regulators.

8.9 Other Power Market Services

A short description of other services besides the Day-Ahead Market, which would add value for the market participants, for the improved functioning of the market (reducing the need for balancing power) and for maximizing welfare, are summarized below.

8.9.1 Intra-Day Market

An Intra-Day Market provides a service to market participants to adjust their balance before the operational hour. This can help to reduce the balancing actions to be carried out by the system operator in real time.

Intra-Day Market can be used to re-balance a portfolio:

- If there is deviation between predicted forecasts and current loads
- If there is a technical event causing imbalance after the Day-Ahead Market is closed
- To avoid paying a high penalty for having imbalance in the real time balancing market

For a regional power exchange the Intra-Day Market should include cross border trade. This will allow enhanced competition in the balancing market Regulation (EC) 1228/2003 [7].

8.9.2 VPP Auction

When purchasing a Virtual Power Plant (VPP) capacity, the buyer has the right, but not the obligation to purchase power at a fixed price. The company that buys VPP capacity obtains the right to deliver power as if it were the owner of the plant. The purchased generation capacity is “virtual” because the original generation company still owns the “hardware” (i.e. the plant) and is responsible for the operation of the physical generation.

The purchase of VPP capacity represents a supplement to the purchase of power on power exchanges or from OTC suppliers.

The VPP capacity is sold for predetermined periods at an "option price" for capacity (power). The option price is set in an auction prior to the period. For each hourly period in which the option is exercised, a pre-determined fixed "energy price" is paid for the actual quantity of energy sold. The total payment for the use of the virtual power plant thus consists of an option price plus and an energy price.

The VPP auction can reduce the dominance of large generators and open up the market for increased competition.

The conditions where the VPP might be used are described in chapter 8.7.2 above

8.9.3 Inter-Regional Market Coupling

The market model, market management and the IT-Infrastructure should facilitate an Inter-Regional market coupling to utilise the transmission capacity between neighbouring regional exchanges.

The following figure describes the concept.

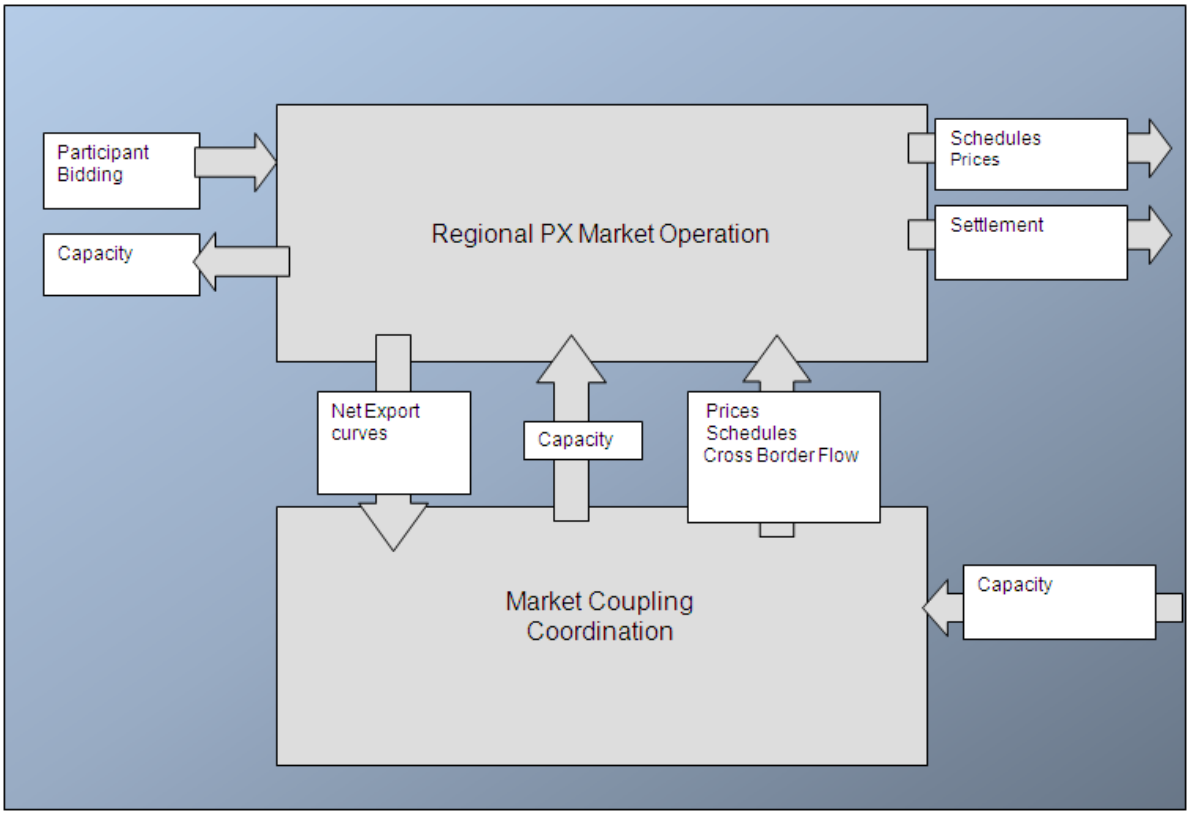


Figure 8.3 Inter-Regional Market Coupling

The business process for Inter-Regional market coupling is based on exchange of bids defined as Net Export Curves (NEC) and the individual block bids.

The following market harmonization rules are required to facilitate the inter-regional market coupling:

- Choice of time zone
- Rules for handling daylight saving time
- Gate closure
- Master currency
- Upper and Lower price limit for bidding
- Decimals represented in transmission capacity and flows on the interconnections

Any deviation from these rules can create price differences in the market result.

The business process is based on one common calculation of the flow between the regions and local calculation of prices and participants schedules.

8.10 Organisation of a Regional Power Exchange

8.10.1 The Power Exchange Concept

The CEEPEX organisation must have flexibility and a structure to facilitate cooperation across regional and national borders. The regional power exchange will be the body for development of the regional market concept. This requires an organisation that is able to include in the business process national features and requirements adapted and harmonized to the regional concept. It is vital that regional agreements related to ownership, legal framework, localization and harmonization issues are developed in close cooperation between all the parties involved.

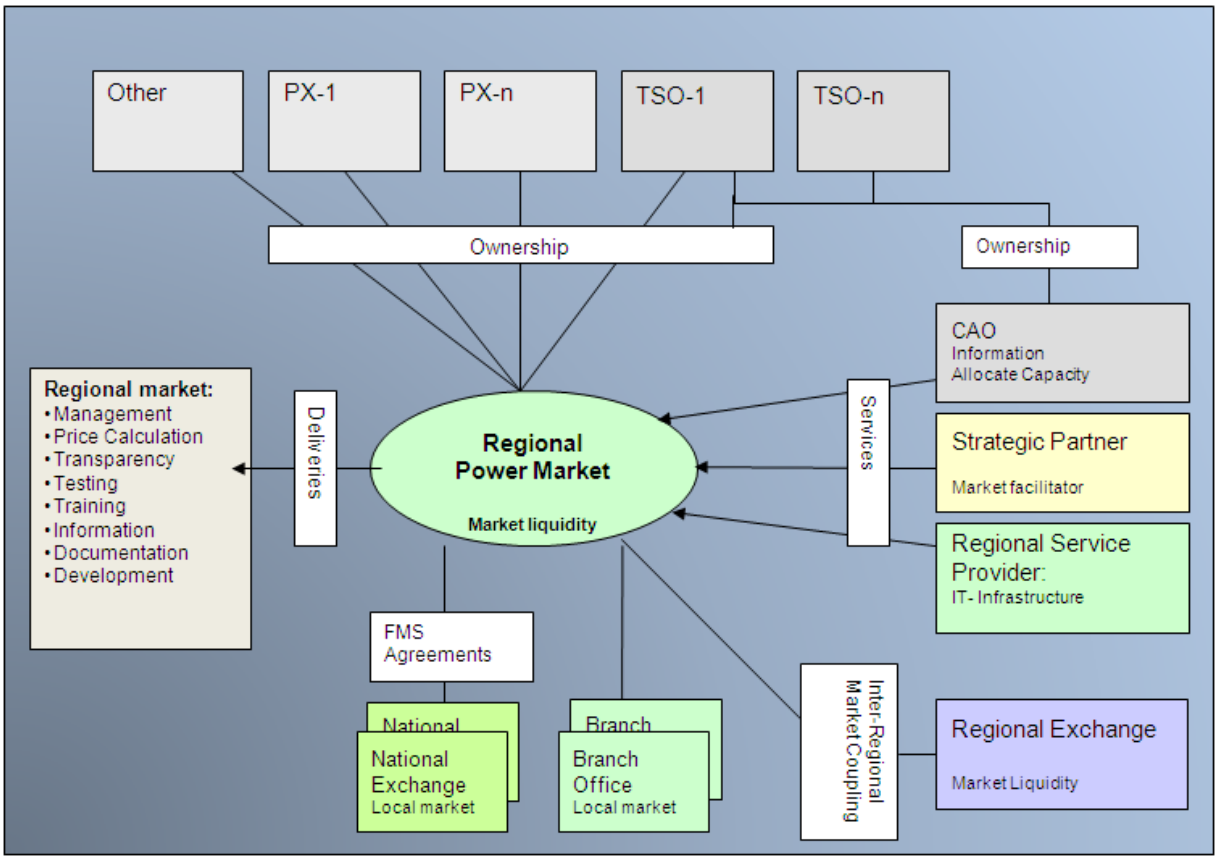


Figure 8.4 Regional Power Exchange Concept

8.10.1.1 Organisation and Supporting Roles

Ownership

In the first phase of the CEEPEX establishment it is vital that the TSOs in the region play an active part in the regional power exchange's business processes. The CEEPEX business processes will provide services for the TSOs and the TSOs will define important elements of the framework for the exchange. The interest for both parties can best be executed by the TSOs taking an equity share. This should be an option for all the TSOs in the region.

Ownership should also be open to national PXs in the region ensuring that framework for CEEPEX is supported by all parties.

Strategic Partner

In the starting phase it will be recommended that an experienced market operator with competence regarding the market concept, market operation and market IT-Infrastructure is playing an active part in

the process. It will shorten the time to introduce CEEPEX into the market to have this support from an experienced partner.

Facility Management Service Provider

The FM service provider can deliver IT-Infrastructure and other services as distributing market information, training and technical IT-Infrastructure development in the region.

It will be an advantage for the regional market development that this provider is located in the region. This will build competence and know how in the region and set a good platform for market evolution and development.

It can also be considered that a Strategic Partner and a Facility Management Service Provider may be one entity.

8.10.1.2 Central Auction Office (CAO)

Calculation of the capacity for the CEEPEX will be provided by the CAO as an entity running and coordinating services for the TSOs in the CEE Region.

8.11 Technical IT-Infrastructure

8.11.1 General

It is important for a regional power exchange to have access to an efficient IT-system that must facilitate the basic needs and have the features to adapt to the future business requirements. Proven technology, system modularity, parameterization and low costs are key factors that should be considered for a modern day-ahead IT-System.

The displayed figure gives an example for IT-infrastructure required for a regional exchange to run a regional Day-Ahead Market. Internal data integration is based on a standardised messaging service in the local area network. Communication to the participants should use the public internet over an https protocol. The system should be able to handle users and countries (areas) in a meshed network to cover the requirements in the CEE Region. The participant client system should cover functions for participant roles as TSO, Balance Responsible Party, traders and public information.

Inter-Regional Market Coupling with import/export of net export curves should be facilitated. A principal system overview is displayed in the Figure 8.5 thereafter.

8.11.2 System Overview

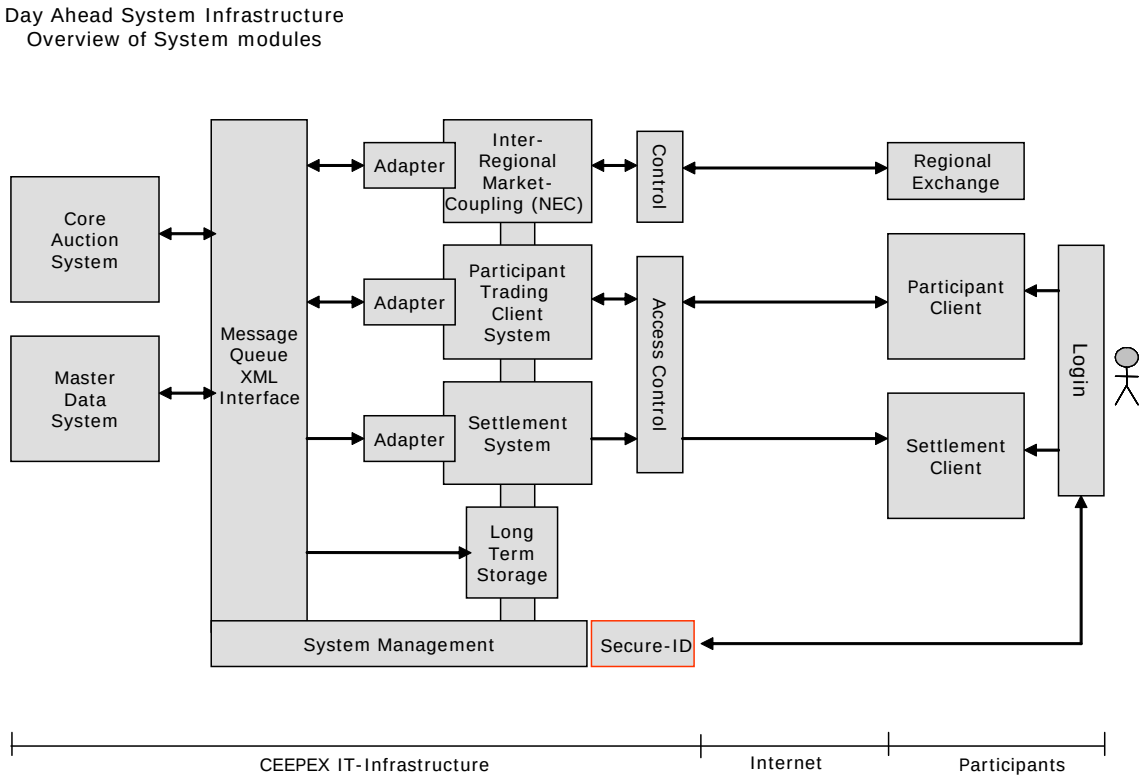


Figure 8.5 CEEPEX IT – Infrastructure

8.11.3 *System Modules*

Master Data System

This module holds all master data required for configuration and operation of the regional market. This includes participant data, participant role, master data relations, harmonisation parameters etc.

Core Auction Trading System

This is the main module of the system where the core operations are performed. This includes validation of bids, price calculation with implicit area congestion management, calculation of flow on the interconnection and the participant's schedules.

Message Queue

This is a transparent transport layer for data between the core trading systems and the different middleware functions. This technique opens among other for a more efficient change requests management.

Participant Trading System

The participant client system will provide the participant interface to submit bids and available capacity and to receive the distributed market result after the market is determined. The participant's access to the system is defined by roles set in the master data system. The system must provide functions for all market roles.

Settlement System

The after trade settlement system will be operated centrally by the regional exchange to calculate the participants traded amounts, fees, VAT, security requirements and will provide billing instructions.

Inter-Regional Market Coupling

This is a market module that will open up for market coupling with a neighbouring regional exchange. The module must be able to handle import/export of net export curves and eventually block bids for one common calculation of flow between the areas.

Long Term Storage

This is the historical database that must hold market data, settlement data and invoices for as long as required by the authorities.

9 Implementation of a Greenfield Regional Exchange (GRE) vs. Utilizing Existing Infrastructure in the Region (REE)

9.1 General

The general market concept and market model are described in Chapter 8 within the context of the proposed solution for CEEPEX. This chapter evaluates the two different alternatives for the regional power exchange solution:

- The first alternative is based on a Greenfield approach (GRE), where the exchange and all its infrastructure is established from scratch such as selecting a location, organisation, staff, office facilities and IT-applications
- The second alternative (REE) will be based on cooperation with existing infrastructure represented by the national power exchanges already established in CEE countries

In this evaluation the following key elements of operating a regional power exchange are considered:

- Organizational issues and ownership
- Legal Infrastructure
- Market Operation
- Interface to the TSOs
- Settlement and Billing
- Transparency
- Market Surveillance
- Trade Systems
- Finances (discussed separately in Chapter 10)

To support the decision making process for choosing one of the two alternatives as a basis for an implementation plan (chapter 11), each of the above elements is given a weight from 0 to 100, with respect to importance for success of the development and operation of the regional exchange. Furthermore, the degree to which each of these elements may be best executed via either the GRE or the REE alternative is given a score from 0 to 10.

Based on these evaluations a decision matrix is formed to evaluate which alternative is best suited for the successful operation of a regional exchange for the CEE Region.
There is no regional market operation in the CEE region today, but at present EEX is offering day-ahead services to an isolated Swiss market, and to part (APG Austrian Power Grid) of the Austrian market. EXAA is similarly offering day-ahead services to part of the German market.

Several national power exchanges are in operation today in the CEE Region. Most of them are characterised by limited liquidity and only a few percent of the country's consumption is traded over the exchange.

The exemption is EEX, which has built up a successful exchange operation in Germany extending into cooperation with PowerNext as of 2009.

There is no significant percent ownership of the PXs by the TSOs in the area. Most of the PXs have been in operation for some years. They have fairly effective organisations; skilled and competent staff, but have not been able to attract many participants and they are not facilitating cross border trade via implicit auction.

9.2 Organizational Issues and Ownership

Greenfield (GRE)

The Greenfield solution is based on a central operation with an ownership of all legal entities, including the branch offices in each country.

As a new country joins the CEEPEX, a branch office can be set up to accommodate the different national requirements for market operation. This branch office is a wholly owned unit by CEEPEX. This is illustrated in the figure below.

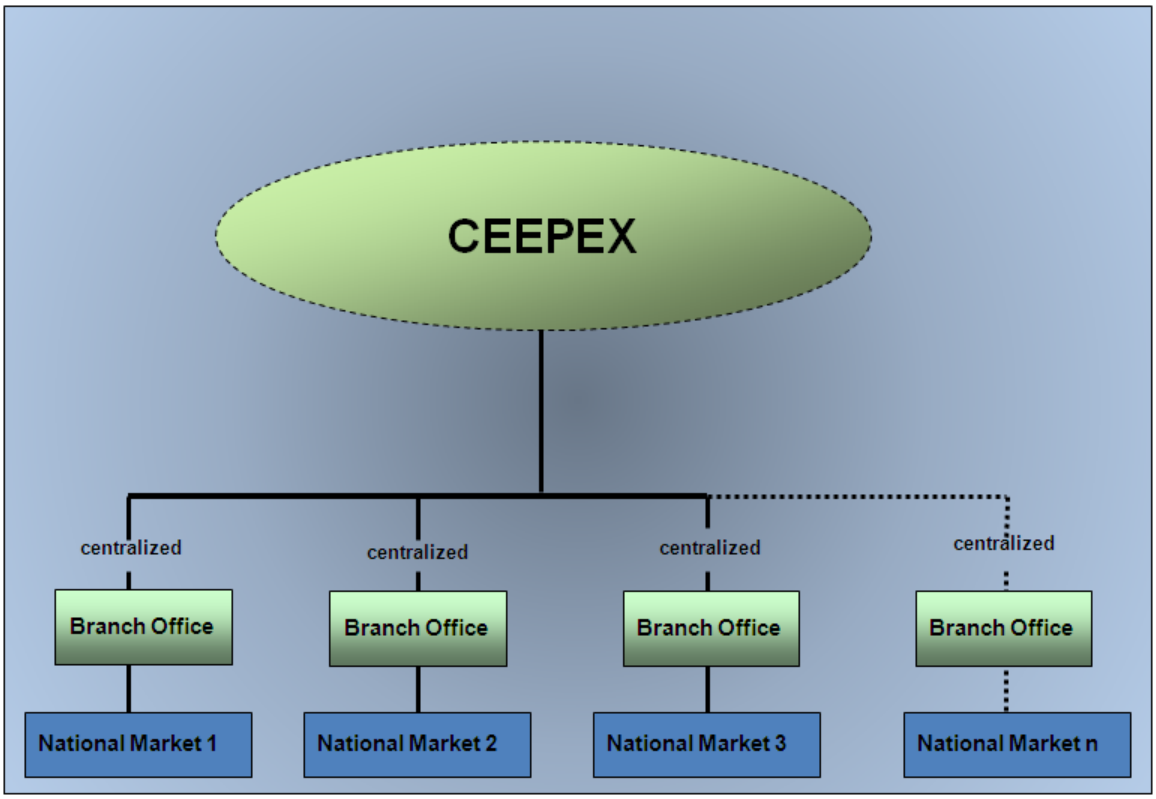


Figure 9.1 Greenfield Concept

The question could be raised if a centralized Greenfield solution really requires a branch office establishment in each participating national market. As an example, the expanding regional reach of the German power exchange EEX could be referred to, where this exchange offers DAM services to both Austria and Switzerland without a local presence represented by a branch office or a similar service.

This is, however, an exchange operation that does not offer a market coupling or market splitting implicit auction of border capacities. The Austrian electricity market is fully integrated into the German bidding area, and no area price for Austria is ever quoted. In the case of Switzerland a totally separated DAM operation and a separate price (Swissix) is quoted on an hourly basis.

In the Nordic market, Nord Pool Spot AS has established a subsidiary both in Finland and Sweden and a branch office operation in Denmark to take care of various activities linked to each national market.

For the trilateral market coupling between France, Belgium and the Netherlands each national market is being served by the national power exchanges PowerNext, BelPex and APX respectively.

Another example is the regional operation for the Iberian electricity market. The operation of the market has been divided between Portugal and Spain. A regional day-ahead market with implicit

auction/market splitting is operated by Spain, while the trade in electricity derivatives is executed from Portugal. This ensures a local presence in both countries.

The CEEPEX national markets are characterized by:

- Local regulatory framework to hold and operate a license
- Different languages apart from Germany and Austria
- Different degrees of maturity with reference to market development

It is therefore recommended that for a Greenfield alternative a branch office is established in each national market performing at least the following services:

- Customer support in the bidding process
- Arrangement of required training seminars in the national language
- Sales and marketing of power exchange services
- Settlement of DA contracts in cooperation with local banks
- Providing all relevant market information in the national languages securing full transparency

These branch office activities will require a minimum of staff. In the financial analysis in chapter 10 it has been stipulated that 3 employees for each branch office are needed.

Existing (REE)

The alternative based on using some of the existing infrastructure in the region in cooperation with a regional exchange will also be based on a central operation but ownership of the various legal entities will not necessarily be held by the regional CEEPEX unit. This is illustrated in the figure below where connection flexibility is the focal issue.

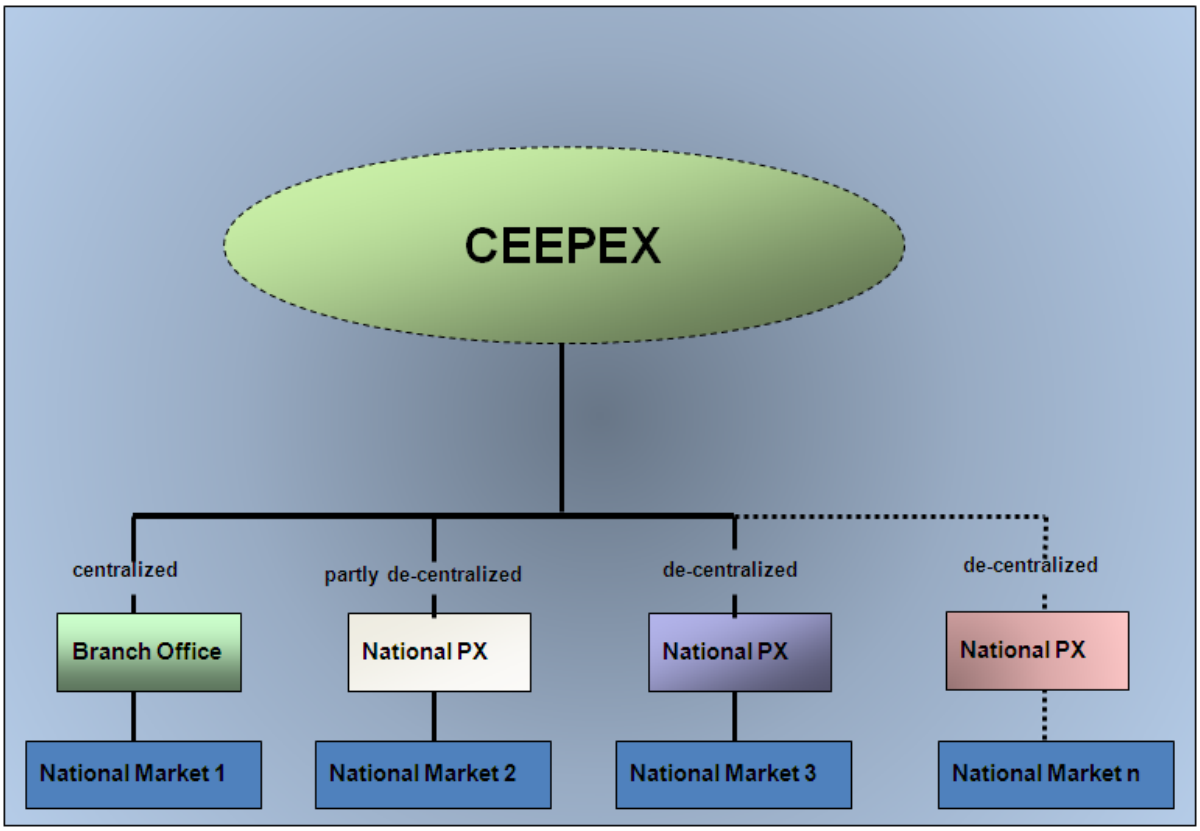


Figure 9.2 Connection flexibility

The question might be raised if such cooperation will enable a sufficient increase in liquidity, since after a few years of independent operation most of national exchanges have not been able to establish the required trading volumes. However, by connecting the national markets through implicit auction and increasing the potential trading volumes, the regional cooperation should yield the necessary increase in liquidity to establish a system price (index) in which participants have the necessary confidence.

Regarding **ownership** it must be underlined that for both alternatives the regional exchange may in its first mode of operation be covering only the physical short-term markets. This will be very closely linked to the TSOs real-time market operation.

It would be an advantage for the market development that the TSOs play an active part in setting the required framework. It is therefore recommended that the TSOs can execute this both by a direct ownership in the exchange and also as being active in the management for both the GRE and the REE alternative.

With a reference to the REE alternative, it should be noted that within the CEE area there are already some national power exchanges established. It is assumed that in at least some of the national markets it is required to operate activities locally to serve national market participants. The level of services may differ. Therefore there must be some flexibility to decentralise market operations to national levels in line with the need of the market participants.

There may be national markets that only require a small office dealing with market operations to maintain the required minimum communication with the national market participants. This alternative is referred to as “centralized operation”, and is being applied to all national markets for the GRE alternative.

It is assumed that most national market will require some activities allocated to the national level. This alternative is referred to as “partly de-centralized operations”. In the fully de-centralized operation all activities that are possible to de-centralize are moved to the national power exchange.

It is at this stage further assumed that most of the national markets within the CEEPEX region will operate as decentralized markets. The national markets will in this alternative to a large extent operate as an independent national power exchange and interface the CEEPEX only in issues necessary to form one common regional market. This alternative is referred to as “de-centralized operations”.

There are some tasks that must be carried out on regional level or for practical reasons should be carried out on regional level. These activities are:

- Operation of the trade system
- Calculation of unconstrained regional market clearing price and area prices in case of congestion and calculation of trade schedules for all regional participants

Tasks that can be de-centralized are mainly:

- Marketing on national levels
- Support and service to national participants
- Monitoring bid collections and validation of bids for both DAM and ID
- Dispute Management for trade notifications
- Financial settlement of traded contracts and risk management (collaterals)
- Training of participants
- Entry of new participants
- Exit of participants

Centralised Market Operations

In this alternative no national organization is required. All communication on market issues will be between the regional power exchange and national market participants. It is assumed that national authorities and the regional power exchange will prefer in most cases to establish a small unit (a branch office) to take care of marketing, communication with local authorities and general distribution

of information.

For all participants the cash flow will be between the participants' accounts and an account owned by the regional power exchange.

Partly De-Centralised Market Operations

Partial de-centralization can include de-centralization of all tasks that can be characterized as service tasks and tasks that do not require any activities during holydays or stand-by arrangements.

The main tasks that remain as centralized operations are spot price calculations, operation of the trade system, and operation of the settlement system.

Also in this system all cash flow will be between the participants' accounts and an account owned by the regional power exchange. E.g. the present Nord Pool Model may be characterized as a "light partially de-centralized" model.

De-Centralised Market Operations

In de-centralized market operations the participants will communicate with the national power exchange in all daily operations. Monitoring of bids, control of trade notification, risk management and financial settlement of physical contracts will be carried out by the national power exchange.

The national power exchange must operate on all calendar days and have stand by arrangements. The cash flow in the settlement will in this case probably be between the participants' accounts and an account owned by the national power exchange in cooperation with a local bank.

There will be an additional settlement between the national power exchange and the regional power exchange that involves the net trade surplus/deficit between the national power exchange and the remaining part of the regional market. Hence in a de-centralized operation the risk management (calculation of collaterals, invoicing, settlement etc.) can be carried out separately for each country.

Evaluation

Weight:
Organizational issues and ownership are regarded as essential for enabling a successful development of CEEPEX, especially for the first years of operation. It is therefore given a weight in the decision matrix of 80, on the range from 0 to 100.

GRE Score:
The GRE alternative is involving fewer legal entities and will have a simpler governance structure than a fully centralized operation. However, the acceptance from a regional spread of market participants might not be satisfactorily for building up an efficient operation of the regional exchange. Score is set to 5 on the range from 0 to 10.

REE Score:
This alternative is more complex with respect to governance structure, but should yield a high acceptance from all parties involved throughout the CEE region. Score is set to 8 on the range from 0 to 10.

9.3 Legal Infrastructure

The two following figures are displaying the difference between the two alternatives regarding the required legal infrastructure.

Greenfield (GRE)

As this is a centralized solution the legal infrastructure will be harmonized and equal for all market participants.

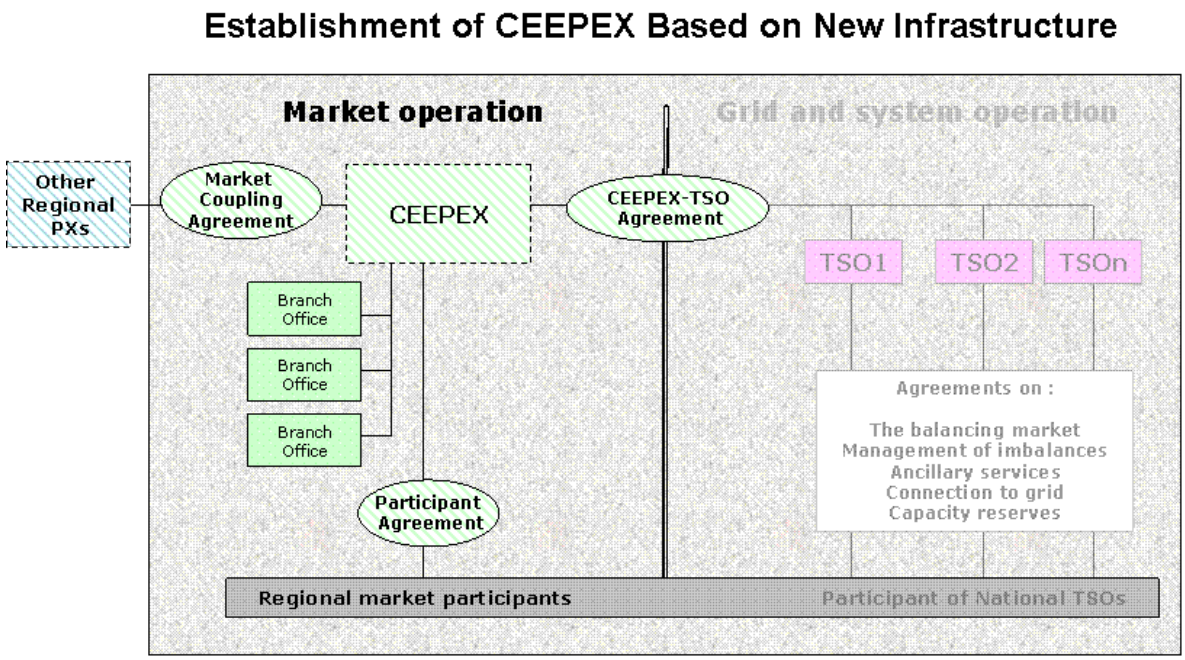


Figure 9.3 Legal Infrastructures for Greenfield

Cooperation with Existing Infrastructure (REE)

As this is a more decentralized solution the legal infrastructures will be slightly different and more complex compared to the GRE solution, but harmonized and equal for all market participants, as illustrated in the figure below:

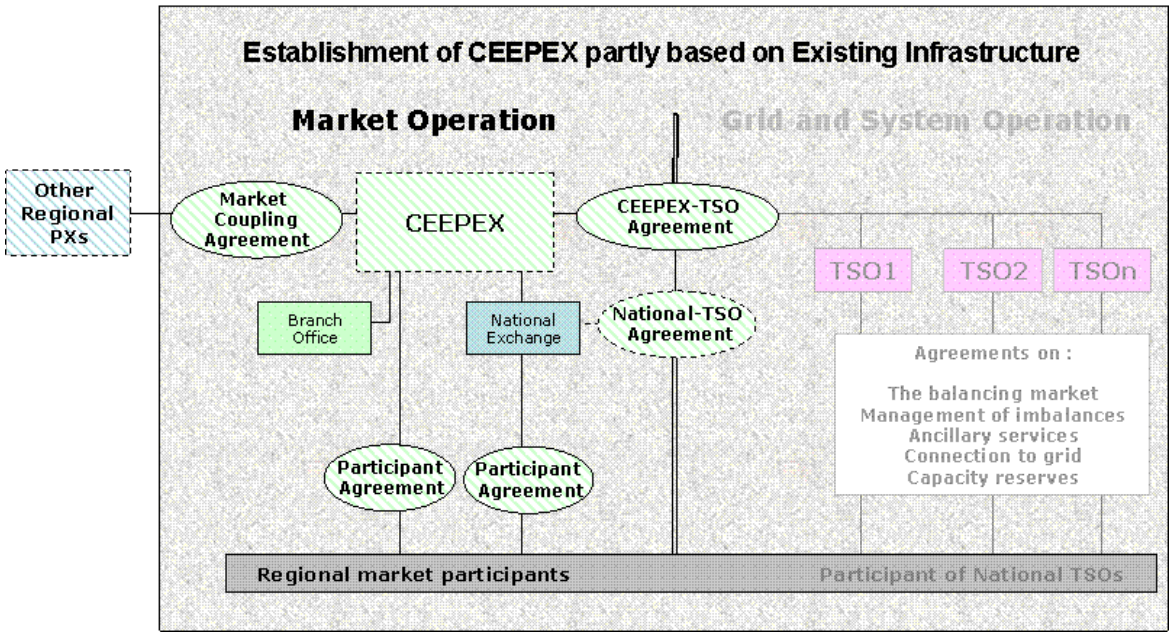


Figure 9.4 Legal infrastructures for REE

With a reference to the two illustrations above, the main agreements for market operation are:

- Participation Agreement
- CEEPEX - National PX Agreements
- CEEPEX – TSO/CAO Agreement
- National PX -TSOs Agreement

The Participation Agreement

All market participants within the CEEPEX area shall trade on equal terms. If there are minor differences in the rules between the national markets these differences must be transparent and included in attachments to the regional spot rules.

The agreement includes:

- All detailed activities related to bidding, price determination, verification of trade schedules, and submission of trade schedules to TSOs
- Commitments by the parties related to collections and distribution of neutral market information
- Time line for all settlement activities of spot contracts and requirements regarding security amounts and accepted collateral types

The above rules are often included in one agreement and referred to as Accession Agreement, Participation Agreement or The Rule Book for Spot.

The CEEPEX – National PX Agreements

These agreements will vary depending on the degree of integration. In the most de-centralized alternative the agreement will include nearly all issues related to trade and financial settlement:

- Careful specification of the share of responsibility between CEEPEX and the national PX
- Full de-centralization will require a financial settlement between the national power exchanges and the regional power exchange. Rule for this settlement have to be defined in the agreement
- Format for bid-data
- Procedures and timeline for submission of bid-data

The only process that will be fully centralized in all forms for integration is the process of price determination, calculation of trade schedules and distribution of neutral market information.

The CEEPEX –TSOs/CAO Agreement and the National PX-TSO Agreement

The two agreements will cover much the same issues and may be replaced with one agreement between the parties: CEEPEX, National PX, and TSOs/CAO.

The agreements regulate all mutual responsibilities and information flow between the CEEPEX and the respective TSOs/CAO. One identical agreement towards all interconnected TSOs is to be preferred. However, there will probably be required to diversify on some issues. This can be made in attachments for each TSO concerned incorporated in the agreement. Only one agreement with attachments for each TSO makes a transparent agreement where diversified rules are easy detected for all.

For all TSOs the agreement must include:

- Daily reports to CEEPEX/national power exchanges on allocation of capacity on interconnections to be used for implicit auction. In the first phase of operation of CEEPEX, only a part of the available capacity might be given to the exchanges for implicit auction, the remainder part might be offered on monthly and yearly capacity contracts for explicit auctioning

- Defining the role of CAO and describing the information exchange processes
- Reports to the TSOs on traded spot contracts
- Acceptance of the principle of self dispatch of traded spot contracts
- The CEEPEX should serve as a platform for collection and distribution of relevant neutral market information. TSOs are important sources for such information. The agreement must include the parties' commitments in distribution of information
- Principles for collection and distribution of information
- Acceptance by TSO to consider traded spot contracts as firm contracts that cannot be changed or curtailed after the trade is terminated. This means that contracts that are not delivered in the internal national market are handled as imbalances by TSOs. Non-delivery caused by default on interconnections is managed by the TSOs involved in their respective balancing mechanisms
- Management of imbalances caused by default in trade operations made at the CEEPEX

Market Coupling Agreement

The regional power exchange CEEPEX will interface other Regional Power Exchanges through separate agreements.

Evaluation:

Weight:
For both alternatives it is a clear requirement that all legal agreements must be in place to fully secure an efficient and transparent operation of the exchange, and a level playing field for all participants. This element is therefore given a top weight of 100.

GRE Score:
Legal infrastructure is quite simple in the Greenfield alternative. Score is set to 8 on the range from 0 to 10.

REE Score:
Requires negotiations and amendments of existing agreements. Score is set to 5 on the range from 0 to 10.

9.4 Market Operation

Market operation is the sum of daily operations and routines to determine the day-ahead market and settle the market result. This includes interaction with all participants, balance responsible parties, TSOs, clearing services and banks. When the market is closing its operation on a trading day all the power- and economical transactions have to be settled.

Agreements and detailed daily routines have to be specified and settled.

Greenfield (GRE)

CEEPEX will define the book of rules, daily routines and agree this with the TSOs and market participants performing different activities in the market area.

This will require detailed knowledge centrally at CEEPEX to handle local agreements with the authorities and regulators in the different countries in the market area.

Existing (REE)

Even with this solution CEEPEX must set up the same framework for operation. Some of the regulatory issues can be handled locally by the local exchange. This may speed up the process.

For the local exchanges already in operation some of the routines and infrastructure must be changed to be adapted to the requirements for cooperating with CEEPEX. These requirements regarding implementation of CEEPEX utilising present infrastructure will include changes within the following areas:

- Role of national power exchanges or national market operators
- Harmonization of operational agreements and procedures
- Interface towards TSOs
- Trade system and products
- Transparency and distribution of market information
- Management of capacity on interconnections

Evaluation

Weight:
Market Operation is at the core of operation for the regional exchange. Weight is set to 100.

GRE Score:
Centralized operation requires detailed knowledge at the CEEPEX level about national rules and regulations which might be delaying time to market for the establishment of a regional solution. Score is set to 5 on the range from 0 to 10.

REE Score:
Cooperation with local entities and utilizing existing market rules which do not require harmonization may speed up the process.
Score is set to 8 on the range from 0 to 10.

9.5 Interface to the TSOs

TSOs have a natural role by initially registering new participants for trade in the day-ahead market concerning agreement for a Balance Responsible Party and signing of necessary legal documents.

The interface to the TSOs for the daily operation includes the following tasks:

- The TSOs submitting available capacity on the interconnections to the power exchange
- In the CEE region the CAO already established will offer transfer capacities on national borders explicitly and according to a flow-based method
- Facilitation of regional power exchange operations requires that the TSOs give some or all of the capacity to CEEPEX. The split of capacity between the CAO (for yearly and monthly allocation) and CEEPEX (for daily allocation) should therefore be part of the interface arrangement with each TSO

The CEEPEX will deliver the outcome of the daily implicit auction to the TSOs. The exchange of data will normally be based on XML files and structured according to the ETSO standard.

Greenfield (GRE)

This will be a centralised function operated by CEEPEX handling the TSO communication for all the countries integrated in the regional exchange.

Existing (REE)

For this solution the TSO interface function can be split between the central CEEPEX operation and the national exchange operation. This will be agreed between the parties.

Independent of routines agreed; the overall responsibility will stay with the central CEEPEX organisation as the formal regional exchange.

Evaluation

Weight:
The interface to TSOs is an integrated part of the regional operation. Weight is set to 75 out of 100.

GRE Score:
A centralized operation handling the data and market information between all TSOs and the exchange has a clear advantage in terms of standardization of procedures.
Score is set to 8 on the range from 0 to 10.

REE Score:
As this will entail towards most participating countries, a de-centralized operation it will have a disadvantage in terms of duplication of interfaces, i.e. interface TSO – National PX, and National PX – CEEPEX.
Score is set to 5 on the range from 0 to 10.

9.6 Settlement and Billing

This is the final settling of all the trades in the regional day-ahead market. The settlement with calculation of the traded amounts and fees is a daily operation, while invoicing and billing should be open for configuration for a certain period.

To reduce requirements for collaterals, invoicing both for power and fees should be done on all open banking days.

Settlement and billing is a central operation calculating all the settlement data, while reporting, invoicing and credit checking can be a central or local operation.

Invoicing and billing require an electronic interface to the bank infrastructure sending a file with all billing instructions and receiving from the bank a file with the account balance.

Greenfield (GRE)

For this solution all settlement operations, bank interfaces and credit checking is done centrally. The regional exchange must either set up an interface to a central bank that can handle all account transactions for all currencies or set up an interface to all local banks operating with participants' accounts in the market area. This requires that the exchange centrally holds all detailed information concerning the different local bank procedures.

Existing (REE)

Basically this will include the same set of functions, but each local exchange or branch office will normally handle the local bank interface either directly or using a local clearing house.

The regional exchange will centrally only distribute an electronic file built on the same format.

Evaluation

Weight:
Settlement and Billing is an administrative function given a weight of 70 out of 100.

GRE Score:
A centralized solution will be quite complex as it has to handle a number of currencies, bank interfaces and banking procedures in different CEE member countries.
Score is set to 6 on the range from 0 to 10.

REE Score:
This alternative will take advantage of already established banking procedures run by national power exchanges. Implementation will be less time consuming, and current market participants can utilize current accounts and procedures.
Score is set to 9 on the range from 0 to 10.

9.7 Transparency of Relevant Market Data

Market transparency is a required part and a prerequisite of the market integration whatever market design is chosen.

The number of participants at the power exchange, and traded volumes, can only grow if existing and potential members feel secure that all relevant market information is given to all participants at the same time and to the same cost.

As a minimum, real time access for all participants to prices, operational data, and grid maintenance information in the power market must be provided. In markets where hydro power constitutes a significant share in the energy mix, as in Austria, reservoir data should be provided. To further increase the transparency, frequent reports containing operational and physical market data as well as a statistical database could be developed.

To secure that relevant market information is provided to the market participants at the same time a system for short term information release must be developed. The information published in such a system is based on information provided by the system operators and the participants in each participating country to CEEPEX.

All aspects regarding disclosure of information should in the case of the TSOs be regulated by a unified publication agreement between the various TSOs and CEEPEX, and in the case of the market participants in the rulebook(s) for trading.

Greenfield (GRE)

For the information disclosure, it makes no significant difference whether CEEPEX is built from scratch or based on existing infrastructure.

To reach all participants, the information tool should be available as a Web based system of CEEPEX with an interface for entering information and viewing information and data. All information must be displayed at least in English, but preferably also in the local language of the country from where the information is originated.

The rule book should address routines for information disclosure in the market.

Existing (REE)

The same solution as for the GRE alternative can be applied.

The information disclosure procedures must be addressed and harmonized in each local PX's rule book.

Evaluation

Weight:
Full transparency regarding disclosure of relevant market information is one of the most important elements for a well-functional market place. Given a top weight of 100

GRE and REE Scores:
For both the GRE and the REE alternative, transparency of relevant market information has to be a part of the market design and fully functional from the day one of the market operation of CEEPEX.

Score is set to 10 on the range from 0 to 10 for both alternatives.

9.8 Market Surveillance

The market surveillance function will in principle be identical independent of the two alternatives. Basically this is a centralised function operated by the regional exchange in a separate department, reporting not only to the top management of CEEPEX, but also to regulatory authorities in each of the member countries in CEEPEX. The latter might require harmonization across the region, legal and operational basis for data submission and full compliance with EU directives related to market conduct.

Market surveillance has an important role in establishing and maintaining confidence and integrity by having a strong and visible presence in the market. Market surveillance continuously monitors the market behaviour of trading participants, and investigates possible breaches of the trading rules or applicable laws.

Greenfield (GRE)

The function will be operated as a separated department within the CEEPEX organisation. In the first phase it is important to establish this function as a legal body. The objectives will be to establish the department with the required rules, procedures and most importantly sufficient authority given by the regulators in each of the countries allowing a well-functioning market surveillance role.

Existing (REE)

Also for this alternative the surveillance function will be established as described above as an independent department within the central regional exchange with the same reporting requirements as for the GRE alternative.

Evaluation

Weight:
An effective market surveillance function as a base for confidence in the market price mechanism is a decisive factor in a successful development of the CEE market. Weight is set to 100 out of 100.

GRE and REE Scores:

With similar reasoning as for transparency, both alternatives will have to establish a well functioning market surveillance function for CEEPEX to gain support, develop liquid operations and be a trusted market-place.

Score is set to 10 on the range from 0 to 10.

9.9 Trade System

As previously discussed it will be vital for CEEPEX to implement a system that in the first phase must facilitate the basic needs and have the features to adapt to future business requirements by use of configuration and system parameters. Proven technology, system modularity, parameterisation and low costs is key factors that should be considered for a modern day-ahead market IT-System.

For both the GRE and using existing infrastructure solution the trading system must hold the same functions, but implementation and functionality may differ for the two solutions.

Greenfield (GRE)

This will be a centralised implementation were all data processing and system interfaces is done centrally.

Existing (REE)

This is an implementation were all data processing is done centrally, but includes functions that open up so local exchanges or branch offices, which can handle interfaces to the participants, balance responsible parties, TSOs, clearing houses and local banks.

Evaluation

Weight:
To evaluate and choose a trade system will be a key part of the implementation process. Weight is set to 60 out of 100.

GRE and REE Scores
A centralized system will require fewer interfaces than the alternative working with existing national power exchanges. Score is set to 8 for GRE and to 7 for REE on the range from 0 to 10.

A detailed **financial analysis** is carried out in chapter 10 for both the GRE and the REE alternatives, without and with Facility Management Service Provider – the summary of the outcome and figures are presented below.

The weight for this element is set to 100, and scores are given based on the Net Present Value estimated over a 10 year lifespan.

GRE without FM: -11.5 mill. € (score 2)

GRE with FM: -1.8 mill. € (score 7)

REE without FM: -7.1 mill. € (score 4)

REE with FM: 1.1 mill. € (score 10)

Evaluation of the two Alternatives in Quantitative Terms

To support the decision making process on which the right alternative should be chosen, a decision matrix is presented below.

Weights are specified in the range 0 to 100, and each alternative can score 0 to 10 on suitability, value added etc.

Based on this analysis, the REE alternative utilizing existing infrastructure and a facility management arrangement with a regional service provider gets the highest score.

This alternative is used as a reference for the implementation of the CEE regional power exchange.

		GRE 1 Invest	GRE 2 FM	REE 1 Invest	REE 2 FM	GRE 1 Invest	GRE 2 FM	REE 1 Invest	REE 2 FM
	Weight	Score	Score	Score	Score	Total	Total	Total	Total
	0 - 100	0 - 10	0 - 10	0 - 10	0 - 10				
Organizational issues and ownership	80	5	5	8	8	400	400	640	640
Legal Infra structure	100	8	8	5	5	800	800	500	500
Market Operation	100	5	5	8	8	500	500	800	800
TSO Interface	75	8	8	5	5	600	600	375	375
Settlement and Billing	70	6	6	9	9	420	420	630	630
Transparency	100	10	10	10	10	1.000	1.000	1.000	1.000
Market Surveillance	100	10	10	10	10	1.000	1.000	1.000	1.000
Trade System	60	8	8	7	7	480	480	420	420
Finances	100	2	7	4	10	200	700	400	1.000
Grand Total						**5.400**	**5.900**	**5.765**	**6.365**

Table 9.1 Decision Matrix

10 Financial Analysis Contrasting the GRE and REE Alternative

Two main alternatives for implementing a regional power exchange for the CEE Region have been evaluated as described in Chapter 9. Both alternatives will support all the functions outlined in the general market model and concept outlined in Chapter 8.

- First alternative is based on a **Greenfield (GRE)** concept where a **centralized regional exchange** operates all the national markets via a branch office in each country.

- Second alternative **(REE)** is similar, but **existing exchanges** e.g. OTE, Gielda, Borzen, and EXAA **cooperate with CEEPEX** which in turn sells services to these exchanges covering some or all of the functions required to operate the physical national electricity markets. Since EEX is now merging with PowerNext and it is assumed that EEX is focusing on the development in the CWE Region it cannot be assumed that EEX would be the driving force in realising the REE solution at present. The new PowerNext-EEX company (EPEX) which is located in Paris for DAM operation might however be considered to be a strong candidate for supplying Facility Management Services to CEEPEX.

It is further assumed that none of the other national exchanges in operation today in the CEE region can offer area price calculations and congestion management for implicit auctions. Therefore the same investment costs are added for the core infrastructure for both the REE and the GRE when establishing these alternatives without buying facility management services. The total investment costs for establishing branch offices will however be reduced in the REE alternative, as existing exchanges will cover this function.

The two alternatives have fundamentally different **revenue models:** GRE collects commission and membership fees from CEEPEX participants (e.g. traders, generators, etc.) while REE collects service fees from partner national exchanges (who in turn collect commission and membership fees from participants at the national level).

Two **cost models** have been evaluated for both GRE and REE alternatives. The main difference in the two models is the approach to the setup and management of the necessary infrastructure:

- **Build up own infrastructure** (e.g. IT platform, software), resulting in high initial CAPEX and a significant annual IT support operational expense

- **Facility management service** agreement. These providers already have the needed infrastructure in place thus only the marginal costs (and additional profit) will be charged to CEEPEX. Through this model economies of scale can be exploited to attain a lower overall TCO (Total Cost of Ownership)

A visual interpretation of the structure of the different scenarios is shown in the figure below:

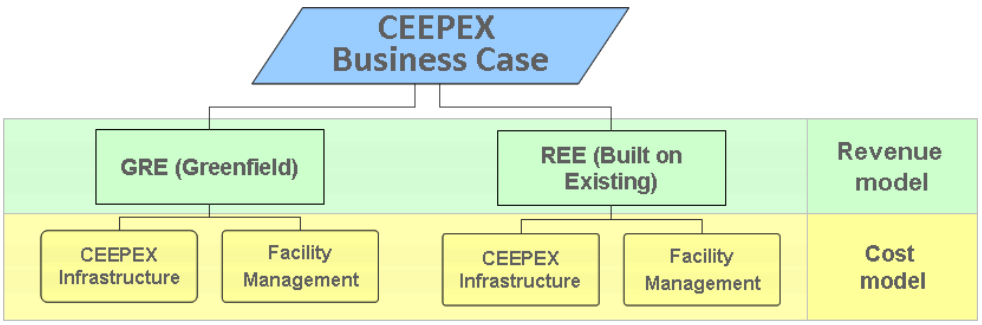


Figure 10.1 CEEPEX Business Cases

10.1 Financial Analysis of the Alternatives

10.1.1 Revenue/Cost Analysis for a Greenfield Regional Exchange (GRE) is based on the Following Revenue and Cost Items:

Revenue:

There are two main revenue streams calculated in the GRE (centralized) alternative:

- **Trading commission fee** based on trade volume, collected from both sellers and buyers: This fee is set at a level comparable to current fees charged by EEX (0.09 €/MWh exchange fee and 0.01 €/MWh clearing fee) and Nord Pool Spot (€0.03 / €0.13 for trading and clearing combined with / without fixed annual fee), ***i.e. €0.06 per MWh***
- In addition to the volume based commission fee each CEEPEX market participant pays an **annual membership fee** of ***€2,000***

Related assumptions:

- **CEEPEX country consumption forecast** is based on data from the UCTE study "UCTE Transmission Development Plan, 2008 Edition"
- **Power exchange market penetration evolution** (i.e. the percentage of the participating countries' total electricity traded through CEEPEX in every year) is based on weighted average historical data for EEX, Nord Pool Spot AS and PowerNext
- **Number of participants** is based a gradual increase to an estimated maximum number of participant per country (the maximum number of possible participants is estimated through the data available from the national TSOs)

Cost:

The costs for the GRE version have been estimated using the two cost models:

1. **CEEPEX Infrastructure**:
   - Initial CAPEX investment into necessary IT (Hardware, Software platforms) is estimated to be **€6 million**. A Headquarters office has to be set up (500,000 EUR) along with the Branch Offices (300,000 EUR each) in each of the participating countries when they join CEEPEX
   - Annual Operational expenses are specified for IT support, staff, renting HQ/office space, external communications, travel/promotion/sales, legal expenses and a miscellaneous cost item

2. **Facility Management**
   - Initial **IT related CAPEX investment is not needed**, only the Headquarters (350,000 EUR) and Branch Offices (300,000 EUR each) have to be set up
   - Annual Operational expenses are specified for IT support, staff, renting HQ/office space, external communications, travel/promotion/sales, legal expenses and a miscellaneous cost items and Facility Management
   - The annual fee paid to the **Facility Manager** is threefold: a base fee, an additional fee for each country being served by the regional exchange, and a volume fee according to the trading volume for each national market. The latter acts as a risk sharing mechanism between the provider and CEEPEX

For all four alternatives, (Two in GRE and two in REE), the costs for translation services to/from the chosen business language from/to any national language have not been considered in the financial analysis of a CEEPEX establishment. It has been assumed that these costs must be carried by entities in the country members of the regional exchange.

GRE Model with CEEPEX Investment:

NPV: *-11,5 m EUR* ***Payback:*** *10+ years* ***IRR:*** *N/A*

The Greenfield model clearly highlights the potential a regional power exchange can offer to investors in the long run. As trade volume – and liquidity – increase in the market, commission type revenues have a huge potential uptake: by 2019 estimated revenues reach almost 9,9 million EUR annually. However the build-up of revenue is relatively slow, resulting in the first 5 years being significantly in the red, and only reaching break-even by 2016. The significant revenue increase in later years is offset by the relatively large discount factor, making the model more sensitive to the losses of earlier years.

This scenario is also hampered by the initial investment of 6 million EUR into the IT systems, since this investment has to be made in the beginning, when the volume based revenue is still marginal. The in-house IT support is also a big burden on CEEPEX, increasing the annual recurring OPEX to very high levels.

From a financial standpoint this scenario is unsustainable.

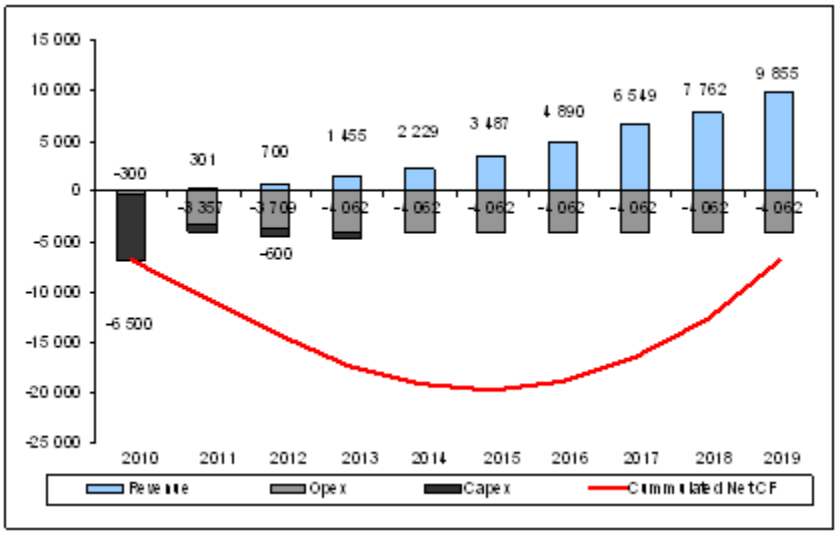


Figure 10.2 GRE alternative without FM

GRE Model with Facility Management:

NPV: *-1,8 m EUR* ***Payback:*** *9,1 years* ***IRR:*** *7,89%*

As in the previous scenario, it is also clearly visible that the Greenfield revenue model (collecting volume based commission fees from exchange participants) has a huge potential on the long run. From the revenue side this scenario offers the same potential as the one with own CEEPEX investment, but due to the lower cost levels attainable through Facility Management the break-even is reached by the 2015. However it still holds true, that the significant revenue ramp-up of latter years is discounted heavier, thus making the relatively fix annual cost of earlier years hard to offset.

From a financial standpoint this scenario is plausible, but barely sustainable; on Net Cash Flow basis the project has positive return, but the Net Present Value calculation is negative due to the different timing of costs and revenues as mentioned above. However it has to be stated, that on the longer run this version has the most positive upside with the revenues increasing linearly with the traded volume.

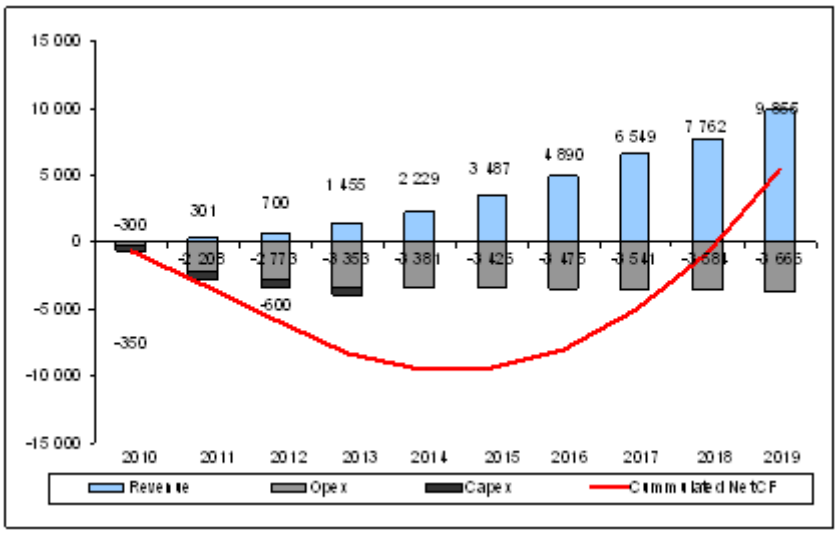


Figure 10.3 GRE alternative with FM

10.1.2 Revenue/Cost Analysis for the Alternative where CEEPEX utilizes some of the existing Infrastructure (REE) in the national CEE Markets contains the following Elements:

Revenue:

3 alternative sets of services are specified that can be bought from CEEPEX by each national entity:

1. Centralized

The Centralized version is used even in REE model when the country has no operating PX for CEEPEX to partner with. This version is exactly the same as specified above where CEEPEX enters the country via a branch office and provides all the market functions required. Revenue is collected as transaction volume fee and an annual membership fee. Additional CAPEX is needed to setup Branch Offices in every centralized country.

2. Partly De-Centralized

CEEPEX provides some of the market function and cooperates with an existing power exchange. These functions are price calculations for system price and area price calculations/implicit auction of transmission capacity when congestion occurs. In addition, CEEPEX publishes market information to all market participants to ensure full transparency.

Revenue collected is €300,000 for calculation services and congestion management, €125,000 for license fees paid for facility manager partner and €75,000 for consulting, training, publishing of market information, etc. A small commission fee is also collected (0.01 EUR / MWh) so that CEEPEX also benefits from the growing liquidity of the market and cover the variable cost of the facility manager.

3. De-centralized

CEEPEX provides price calculations for system price and implicit auction of transmission capacity when congestion occurs. Revenue collected is €250,000 for price calculation service, €125,000 for license fees paid for facility manager partner and €50,000 for consulting, training, publishing of market information, etc. A small commission fee is also collected (0.005 EUR / MWh) to cover the variable cost of the facility manager.

Cost:

The costs for the REE version have been estimated using the two cost models:

1. CEEPEX Infrastructure:
   - Initial CAPEX investment into necessary IT (Hardware, Software platforms) is estimated to be **€6 million**. A Headquarters office has to be set up (500,000 EUR) along with one Branch Offices (300,000 EUR each)
   - Annual Operational expenses are specified for IT support, staff, renting HQ/office space, external communications, travel/promotion/sales, legal expenses and a miscellaneous cost items

2. Facility Management
   - Initial **IT related CAPEX investment is not needed**, only the Headquarters (350,000 EUR) and Branch Offices (300,000 EUR each) have to be set up
   - The annual fee paid to the **Facility Manager** is threefold: a base fee, an additional fee for each country being served by the regional exchange, and a volume fee according to the trading volume for each national market. The latter acts as a risk sharing mechanism between the provider and CEEPEX
   - Other annual OPEX is specified for staff, renting HQ/office space, external communications, travel/promotion/sales, legal expenses and a miscellaneous cost items

REE Model with CEEPEX Investment:

NPV: *-7,1 m EUR* ***Payback:*** *10+ years* ***IRR:*** *N/A*

The REE model utilizes the already existing infrastructure of the national power exchanges; however a significant investment of 6 million EUR is necessary into the price calculation and congestion management system.

Annual Operating Expenses are somewhat lower than the GRE option; mainly due to the processes and tasks performed by the partner national exchanges.

The forecasted revenue stream is based mainly on a “flat-fee” model, where every joining national power exchange pays an annual fee for Price calculation and Congestion management; for Software Licensing; and for Consulting Training services.

To supplement the flat fees, a minor volume based revenue stream is introduced, to provide revenue growth for CEEPEX over the fixed annual fees.

In case a joining country doesn’t already have an operating power exchange, the centralized model has been used (with transaction and membership fees as mentioned above).

This scenario is made unsustainable by the high initial investment and the relatively flat revenue estimate. Even though break-even (on an annual level) is reached relatively early in 2013, the flat revenue stream (that grows only marginally with the increase in trade volume) is not able to amend the early CAPEX investment necessary, thus making this alternative’s NPV the lowest of the four.

From a financial standpoint this scenario is unsustainable due to the high initial investment,

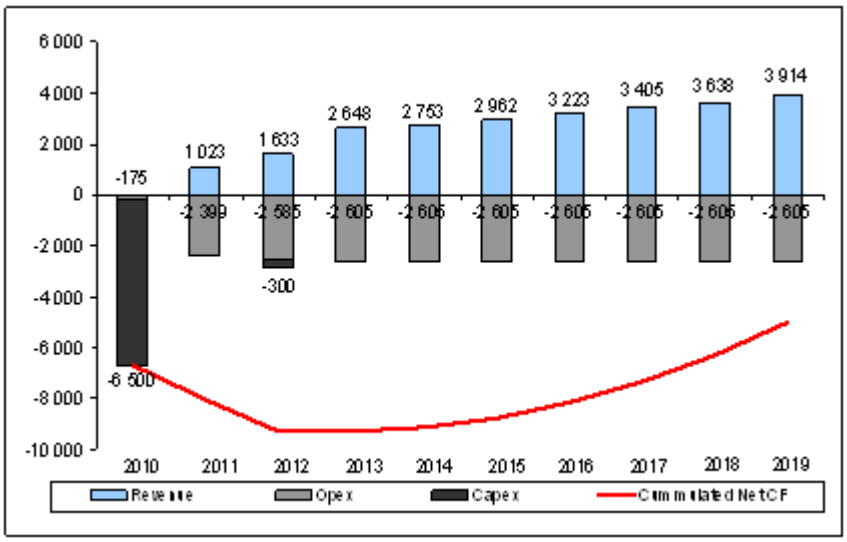


Figure 10.4 REE alternative without FM

REE Model with Facility Management:

NPV: *1,1 m EUR* ***Payback:*** *6,0 years* ***IRR:*** *28,17%*

The REE model utilizes the already existing infrastructure of the national power exchanges; in this scenario we evaluate how the Facility Management version, where the initial CAPEX investment in substituted by an annual fee paid to the partner providing the service.

Annual Operating Expenses are somewhat lower than the GRE option; mainly due to the processes and tasks performed by the partner national exchanges.

The forecasted revenue stream is based mainly on a “flat-fee” model, where every joining national power exchange pays an annual fee for Price calculation and Congestion management; for Software Licensing; and for Consulting Training services.

To supplement the flat fees, a minor volume based revenue stream is introduced, to provide revenue growth for CEEPEX over the fixed annual fees.

In case a joining country doesn’t already have an operating power exchange, the centralized model has been used (with transaction and membership fees as mentioned above).

The coupling of the flat-fee model (with the relatively fast ramp-up in revenues) with the substitution of large initial CAPEX investment makes this scenario the most viable solution for CEEPEX from a financial standpoint. Break-even (on an annual level) is reached already in 2013, and the revenue stream (that grows marginally with the increase in trade volume) is able to sustain the annual operating expenses thus making this the only alternative with positive NPV.

From a financial standpoint this scenario is the most lucrative from the four.

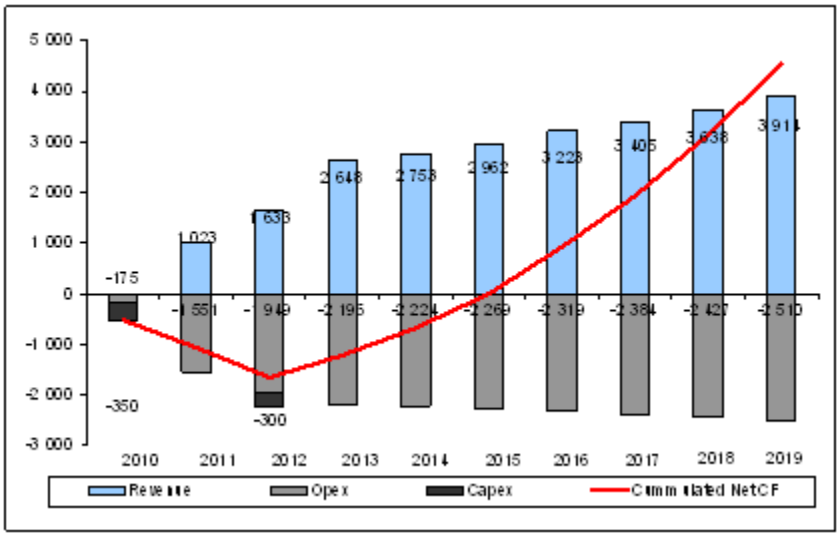


Figure 10.5 REE alternative with FM

Revenue assumptions	GRE (centralized)	GRE - FMS (centralized)	REE			REE - FMS		
			Centralized	Partly De-cent	De-centralized	Centralized	Partly De-cent	De-centralized
Membership fee (EUR '000)	2	2	2			2		
Transaction fee (EUR / MWh) - both buy/sell side	0,12	0,12	0,12			0,12		
Price calculation and congestion management (EUR '000)				350	300		300	250
License fee (EUR '000)				150	150		125	125
Consulting Services and Training (EUR '000)				75	50		75	50
FMS variable fee (EUR / MWh)				0,010	0,005		0,010	0,005

Table 10.1 Revenue assumptions for all 4 alternatives

Annual OPEX	GRE	GRE - FMS	REE	REE - FMS
IT Support cost (EUR '000)	900	0	900	0
Staff Cost	Varies by # of countries			
HQ (EUR '000)	1 500	800	1 000	600
Branch Office (EUR '000)	150	150	150	150
Rent	Varies by # of countries			
HQ rent (EUR '000)	34	24	34	24
Branch Office (EUR '000 per country)	16	16	16	16
External communication (EUR '000 per country)	10	10	10	10
Travel/promoting/training (EUR '000)	270	270	270	270
Legal expenses (EUR '000)	275	275	150	150
Miscalleneous (EUR '000)	25	25	25	25
FMS annual fixed fee (EUR '000)	0	250	0	250
FMS license fee (EUR '000)	0	100	0	100
FMS variable cost (EUR / MWh)	0,000	0,005	0,000	0,005

Table 10.2 Annual OPEX for all 4 alternatives

10.2 Sensitivity Analysis of the CEEPEX project

This sensitivity analysis focuses on the Facility Management (FMS) solution and of the Built on Existing infrastructure (BoE) scenario of the CEEPEX business case.

Table 10.3 The variables and the charts of the simulation

Assumptions (Input variables)	Mean	Confidence interval (~95%)	Distribution
WACC	13,49%	12% - 15%	normal
Volume growth %	Base assumption	+25% / -25%	normal
OPEX	Base assumption	+15% / -10%	beta
Fixed annual revenues	Base assumption	+10% / -15%	beta
FMS variable revenues	€ 0,010	€ 0,005 - € 0,02	beta
FMS variable costs	€ 0,005	€ 0,0025 - € 0,01	beta

Forecasted variables
Annual net cash flow
10 year NPV
IRR

Charts	Output	Explanation
Trend chart	net cash flow	Trend of yearly net cash flows
Tornado chart	NPV	Standard and expected impact on the NPV
Forecast chart	NPV, IRR	Distributions of NPV, IRR

Distribution of yearly cash flows

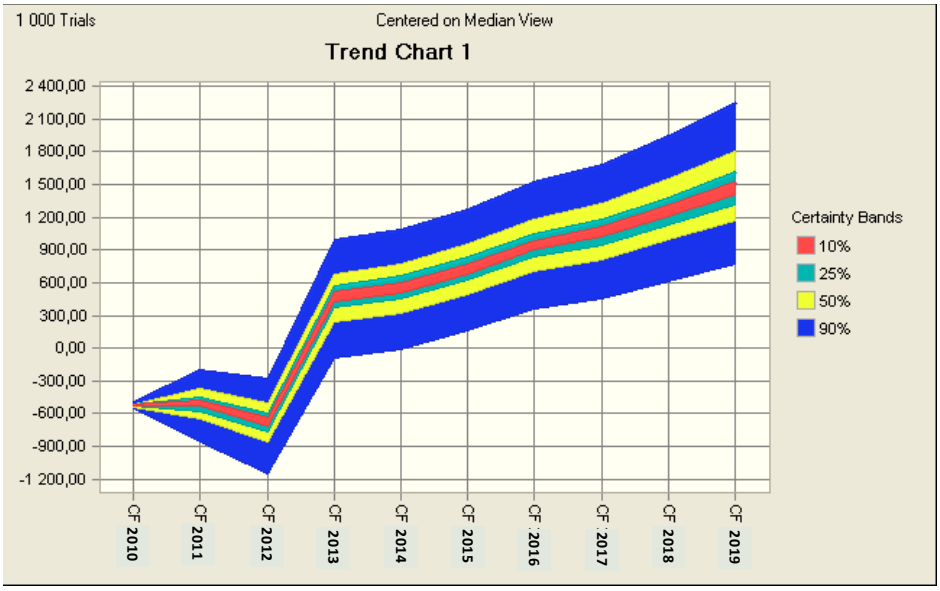


Figure 10.6 Trend Chart of the Yearly Cash Flows

The model has a quite accurate forecast for the distribution of cash flows in the early years. Most probably the yearly net cash flow will become positive in the 4th year (2013). The maximum negative yearly cash flow will occur in the 3rd year, but it is not expected to be greater than € 850,000. In the later years the net cash flows increase continuously with greater uncertainty. However, the expected minimum of the cash flows also increase constantly. In the final year of the analysis the yearly net cash flow is expected to reach € 1-1.5 million.

Standard sensitivity of the inputs

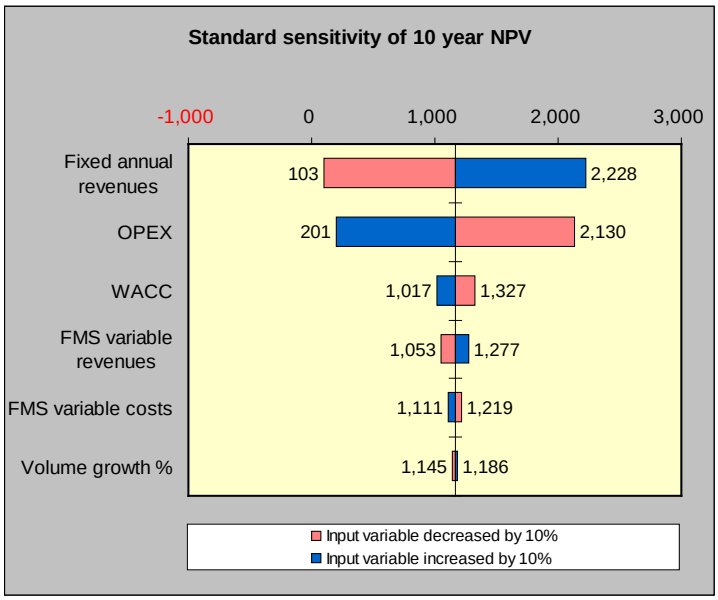


Figure 10.7 Tornado Chart[5] NPV standard sensitivity of the inputs

	10 year NPV			Input		
Variable	*t the maxim*	*t the minim*	*Range*	*Downside*	*Upside*	*Base Case*
Fixed annual revenues	103	2,228	2,125	90%	110%	100%
OPEX	2,130	201	1,929	90%	110%	100%
WACC	1,327	1,017	310	12.15%	14.83%	13.49%
FMS variable revenues	1,053	1,277	224	0.009	0.011	0.010
FMS variable costs	1,219	1,111	108	0.005	0.005	0.005
Volume growth %	1,145	1,186	42	90%	110%	100%

The chart indicates that the model in general is quite sensitive for the fix parameters (OPEX and fixed annual revenues) and less sensitive for the variable parameters and WACC, and almost insensitive for the volume growth.

The reason for the high dependence on the fix annual revenues/costs is that they occur early in the project, while variable factors only occur with the volume traded which increases only in the later years. A 10% increase of the operating costs would result an NPV close to zero or a 10% decrease would more than double up the NPV from € 1.2 million to € 2.2 million. Different fixed annual revenues have similar but slightly lesser impact on the project in the opposite direction.

The impact of the FMS variable parameters (revenues and costs) is low since they represent only a small part of the total revenues and costs in the Built on existing infrastructure scenario. Also, the volume traded increases significantly only in the later years which make this impact even smaller on the NPV.

The sensitivity of WACC is low since it has only an indirect effect on the net cash flows. 10% relative difference of the WACC has an impact of only 1.1% on the discount factor and so the same on net cash flows.

[5] The tornado chart shows the ceteris paribus impact on the output of the simulation of the parameters increased (blue area) or decreased (red area) 10%.

The impact of the volume growth is almost irrelevant due to the low dependence on the volume data. As the yearly load is relatively easy to forecast, so we only assumed an indirect variation through the growth factor which made the variation of the yearly load data much lower. For example a relative growth increase of 10% causes a load increase of around 1.3% after ten years.

Expected sensitivity of the inputs

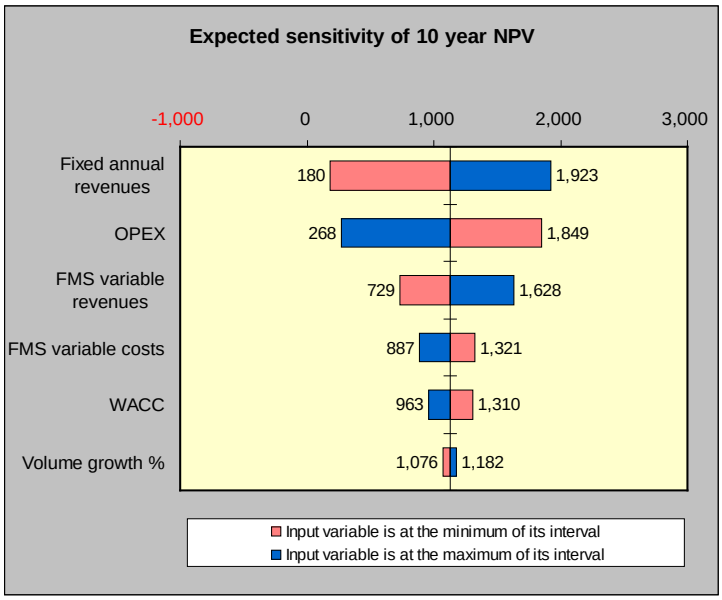


Figure 10.8 Tornado Chart[6] NPV, expected sensitivity of the inputs

	10 year NPV			Input		
Variable	*Downside*	*Upside*	*Range*	*Downside*	*Upside*	*Base Case*
Fixed annual revenues	180	1,923	1,742	91%	107%	100%
OPEX	1,849	268	1,581	93%	109%	100%
FMS variable revenues	729	1,628	899	0.007	0.015	0.010
FMS variable costs	1,321	887	433	0.003	0.007	0.005
WACC	1,310	963	346	11.99%	14.99%	13.49%
Volume growth %	1,076	1,182	106	75%	125%	100%

The main difference from the standard analysis occurs at the cost and revenue inputs as we have assumed a conservative distribution for these variables. We have given somewhat greater range the variables to decrease than to increase within the beta distribution.

For the fixed parameters (OPEX and fixed annual revenues) the chart indicates lesser positive impacts on the NPV but otherwise similar data to the standard sensitivity for since its range was assumed close to the standard +/-10% range.

The expected impact of the variable costs and revenues has significantly increased as we assumed that we can determine these fees differently for the PX-s as well. This option lets CEEPEX to move revenues from fix to variable. A wider range of +/-50% has been assumed, which causes differences of several € 100,000 on the NPV.

The distribution of WACC has also been adjusted close to the standard range, so it maintained its low impact on the NPV. A wider range of +/-25% was given to the volume growth but as its standard impact was almost irrelevant it still remained very low.

The reason for the high dependence on the operating costs is the distribution of the costs in time. Operating costs occur early in the project so it has greater impact. The impact of the FMS variable

[6] This tornado chart shows the ceteris paribus impact of the different parameters on the output of the simulation at the maximum and minimum value of a certain confidence interval based on the assumed distributions. In this case the confidence interval is 95% which represents parameter changes as described in the introduction table.

revenue (similarly to the variable revenue) is low since the volume traded is increases significantly only in the later years.

Distribution of NPV

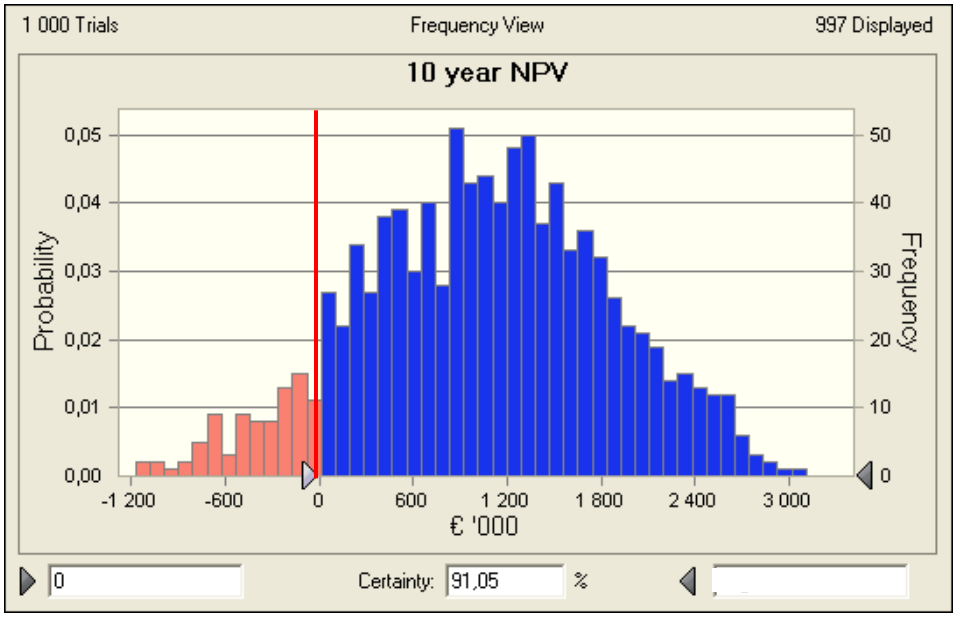


Figure 10.9 Distribution of NPV

This chart shows the discrete distribution of NPV based on assumed input parameters. It tends to be a symmetric distribution between € -1 million and € +3 million with 1000 trial runs. The highest frequencies occur around the standard value (€ 1,165,000) in the model between € 900,000 and € 1,5 million.

The simulation results very favourable chances of profitability: there is a more than 91% chance that the 10 year NPV of the project will be positive even based on our conservative assumptions.

Distribution of IRR

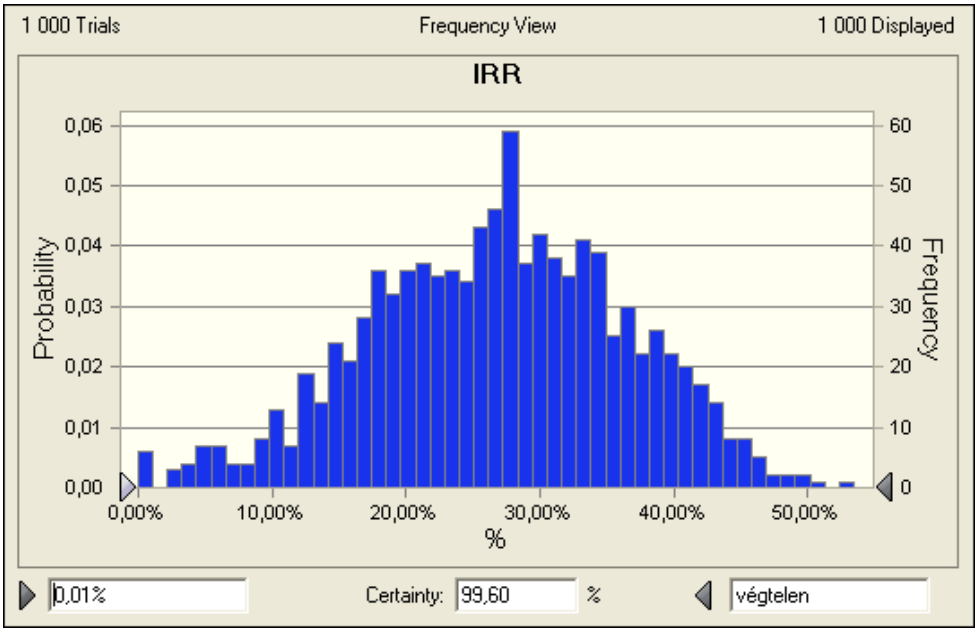


Figure 10.10 Distribution of IRR (végtelen = infinity)

The distribution of the internal rate of return also tends to be an approximately symmetric distribution with highest frequencies very close to the standard IRR (28.17%) between 26% and 30%.

It is important to note that the simulated project is practically always going to have a positive IRR (99,6% probability). The possible rates vary between 0% and 45%.

11 High Level Implementation Plan for the Chosen Alternative

For performing an implementation as complex as the setup of CEEPEX, it is essential to take a holistic look at the major levels of a company's operation.

The BI (Business Intelligence) blueprint is a proven framework to map the major areas of focus in a Company setup, which consists of five major parts:

- Business Strategy
- Business Processes
- Human Performance
- Technology
- Business Outcomes

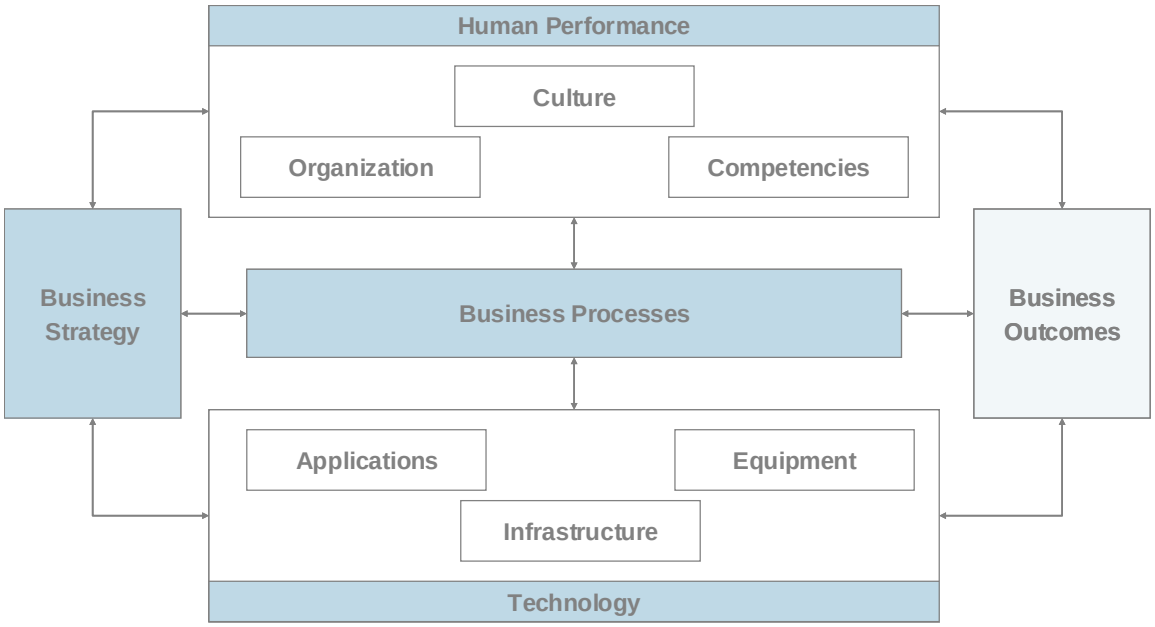


Figure 11.1 – BI Framework
(Highlighted in blue are the proposed work-streams)

During the CEEPEX setup program we propose to structure the work according to the four identified major work streams, and an additional strong Program Management stream, to monitor the results and intervene if necessary.

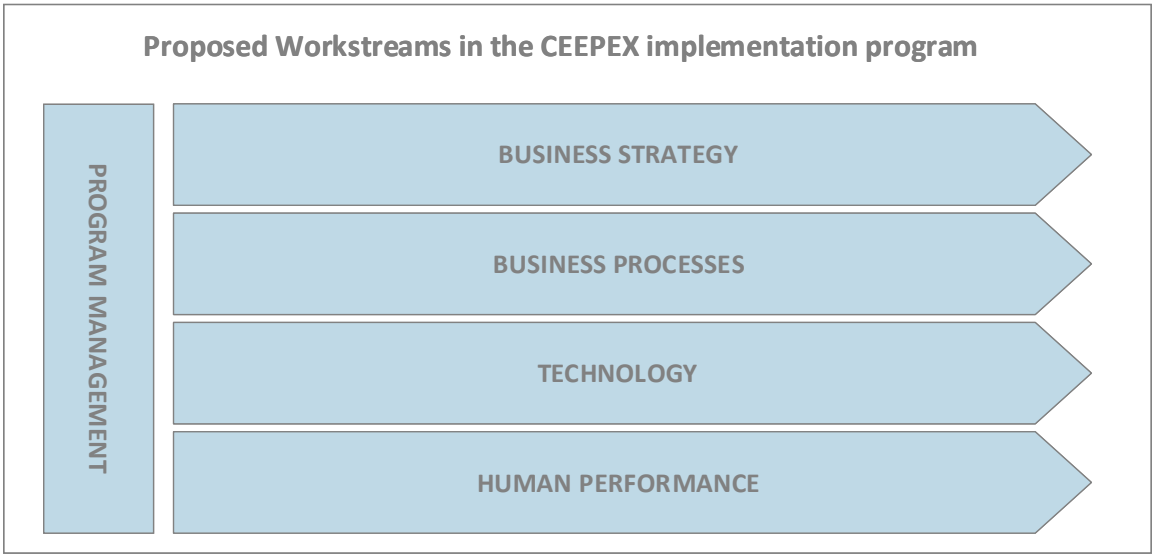


Figure 11.2 – Proposed CEEPEX setup program structure

11.1 Business Strategy

11.1.1 Setup and Mobilization

Top priority questions that need to be answered before project can actually be launched

- *Gather support from national authorities*. The success of CEEPEX relies on the rollout of its services in the CEE countries as fast as possible, and ramping up trade volumes by connecting national markets. Any delay in this rollout due to concerns from national authorities could present a roadblock in the fulfillment of the CEEPEX vision of a common, liquid regional power exchange. It is important to evaluate whether changes in Energy Acts of the participating countries are required before joining CEEPEX.
- *Gather investors, identify source of investment.* The startup of CEEPEX requires significant resource investment (CAPEX and OPEX). The preferred circle of investors has to be identified, and contacted to discuss specifics. According to the Responses in the Questionnaire, 23% of respondents prefer that TSOs and 18 % that Power Exchanges should be involved in the startup of CEEPEX. This exercise might be handled in a separate project with expert financial support if the circle of investors will be wide.
- *Home location of CEEPEX.* Reach a consensus on where the home of CEEPEX (Headquarters) is going to be located. This decision will drive several key processes in the setup of CEEPEX: legal procedures during company setup, legal environment, regulatory approvals, etc.
- *Involve strategic implementation partner.* To maintain the momentum of the CEEPEX implementation the experience and expertise of a strategic partner should be utilized. This will enable the avoidance of common pitfalls and provide best practices during the implementation. The scope of involvement of the partner should be defined as a first step by the stakeholders.
- *Rollout Strategy.* One of the key drivers of the establishment of CEEPEX is the goal to provide market liquidity through the interconnection of national markets to gather scale. Thus the rollout strategy has to be precisely defined: when does CEEPEX expects to penetrate each of the CEE countries' markets, what countries will be included in the first wave, and when will others join.

11.1.2 Legal Registration of CEEPEX

After the decision has been made on the home location of CEEPEX, the next step would be to apply to court of registry for registration according to the legal process within the country.

Management of CEEPEX should be selected and appointed (the appointment of a key responsible – CEO – is essential from the very beginning of the program).

11.1.3 Decide on Resources for the Project

Decide which parts of the program require external professional support. During the start-up of such a complex regional PEX operation, the expertise of an experienced market operator with competence regarding the market concept, market operation and market IT-Infrastructure will significantly decrease time-to-market and reduce risks during the implementation.

11.1.4 Negotiate Partnership with Existing National PXs

In the accepted REE operating model it is assumed that most of the national markets within the CEEPEX region will operate as decentralized markets. The national markets will in this alternative to a large extent operate as an independent national power exchange and interface the CEEPEX only in issues necessary to form one common regional market.

It is necessary to negotiate the general concept and involvement but also details of the partnerships with each participating national PX.

11.2 Business Processes

11.2.1 Define Operational Processes and Procedures

The following main corporate processes need to be set up and elaborated for CEEPEX:

- Operation of Regional Power Exchange (operate selected power markets, provide a reference price for congestion management, provide information to TSOs, participants and to the public in business language as well as in local language at the same time)
- Strategy (market research, strategic planning)
- Regulation (coordination with government, public and professional relations, domestic and regional regulatory affairs, delivery of information to the authorities, regulatory compliance management)
- Legal Services
- Human Resources Management (workforce management, payroll, training)
- Accounting (book keeping, reporting, tax)
- Business Planning and Controlling (planning and detailed plans, analysis of plan and actuals, investment planning, financial analysis, costing)
- IT (IT investment, IT development, IT operation)
- Procurement
- Security (security management, security control, security examinations)
- Marketing, Product Management (marketing strategy, product development, product management)
- Customer Relations (account management, trainings, service provisioning, helpdesk, troubleshooting)
- Billing (billing system, complaints management)
- Market Surveillance

11.3 Technology

11.3.1 Design Products and Services

Detailed functional design of the service portfolio and the proposed rollout schedule is necessary in this phase. Since the REE model utilizes the already operating functions of regional PXs, the two main functionalities that have to be designed are

- Operation of the trade system
- Calculation of unconstrained regional market clearing price and area prices in case of congestion and calculation of trade schedules for all regional participants

It is necessary to gather inputs on requirements regarding the above mentioned functionalities:

- Create the application design from the requirements, use cases, etc.
- Adapt the design to address quality requirements and technical constraints, designing for performance

In addition, it is necessary to create an application architecture specification to drive the identification and definition of the application, data, and user interface classes and components. It needs to be ensured that technical environment constraints are taken into account in the design.

11.3.2 Design Supporting Infrastructure

A service company that by definition operates across several countries in the region, needs to have a reliable and efficient supporting infrastructure to ensure seamless operations.

CEEPEX will be physically present in the participating countries through Branch Offices, and will also have to set up a Headquarters Office. According to the accepted model CEEPEX will have to set up the HQ and Branches in countries where the “Centralized” model will be used.

To enable the operation of CEEPEX, the necessary telecommunication capacity needs to be installed between the locations (phone, data connection). The solution should be robust and redundant in order to allow 24/7 availability.

To reduce initial investment into IT systems and software, the “Facility management” model has been selected, where these services will be obtained from providers through a facility management agreement. These providers already have the needed infrastructure in place (possibly with the need for certain modifications) thus only the marginal costs (and additional profit) will be charged to CEEPEX. However the exact IT needs of CEEPEX (server capacity, SLAs) have to be specified before such a “Facility Management” agreement can be signed.

11.3.3 Contract with Facility Management (FM) Service Provider

The FM service provider will deliver IT-Infrastructure and other services (e.g. distributing market information (in business language as well as in local language), training and technical IT-Infrastructure development in the region.
It is further necessary to specify and document the list of services (with related) SLAs (service level agreements) that the FM partner should fulfil. Ideally the FM partner should already have a presence in the region, thus ensuring that competence and know how is already present in the region and set a good platform for market evolution and development. Key point is that the FM partner should provide such a system, which enables an easy connection to the other regions’ systems as the final goal is a single common European energy market.

A tender needs to be issued, to identify and evaluate the potential FM partners.

11.3.4 Test Application

The V-Model is a proven, industry standard framework that defines the standard development life cycle (see Figure 1).

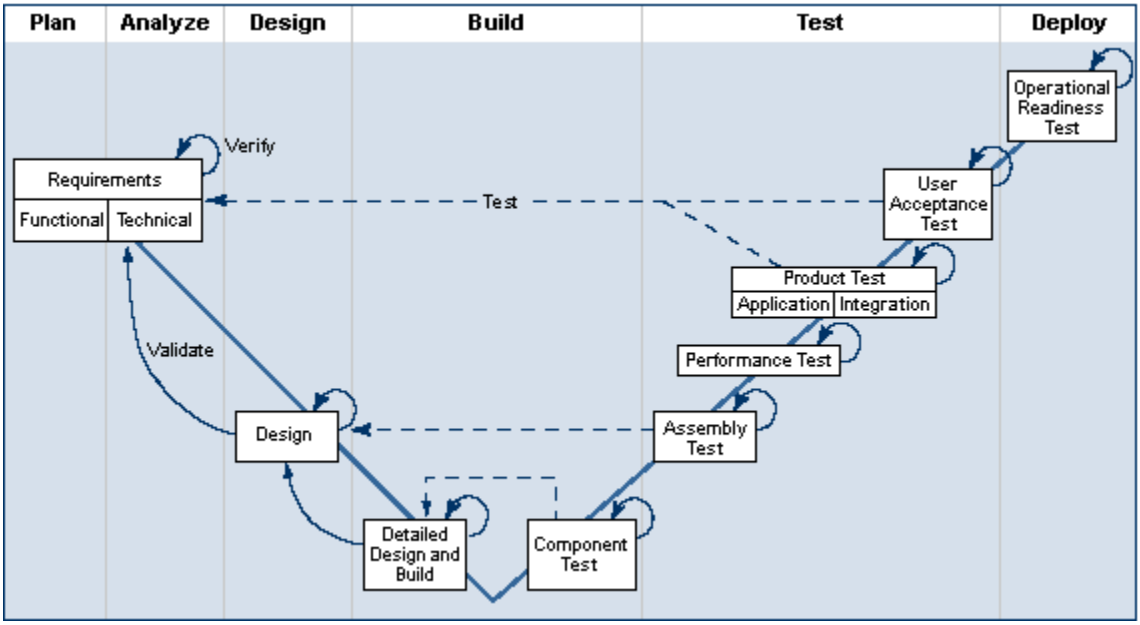


Figure 11.3: V-model concept

The V-Model requires that each major deliverable is verified and validated in an attempt to identify problems as early as possible and ensure that specifications are complete, correct, and adhere to relevant standards. Testing ensures that the specifications are properly and correctly implemented and that the solution meets the business and performance requirements.

11.3.5 Deploy Application

Since the application will be built and tested at the CEEPEX HQ location, and rolled out in the participating countries, extensive efforts are needed to ensure readiness of the application and technical infrastructure.

The local partner (PX in case of de-centralized operation) responsible for deploying the application and technical infrastructure may not be as familiar with the application and technical infrastructure as the team who built and/or tested them. Sufficient time shall be allowed to transition and test the application deployment and operational readiness.

11.4 Human Performance

11.4.1 Recruiting

CEEPEX will have a compact amount of headcount in order to operate efficiently. According to the selected operating model part of the main process (deployment and operation of trading platform) will be managed by the Facility Management partner.

However the staff employed should be highly trained and adept at working in international environment. Expert knowledge of English is required, and being fluent in one/more CEE countries' language is highly recommended for everyone.

To enable the governance to run smoothly with responsible leaders the Chief Executive Officer, Chief Finance Officer and Chief IT Officer should be identified and recruited as soon as possible.

11.4.2 Training

The scope of the training curriculum should be set as early as possible:

- Define the training scope, audience, objectives, approach, development timelines, and milestones
- Define training schedule for all target audiences (CEEPEX internal staff, sellers, buyers and traders) based on the logical sequence of how the content should be delivered, availability of the participants and deployment timing
- Detail the training materials/deliverables, technical environment, dependencies, milestones, assumptions, risks, work plan estimates, and project controls

A training strategy shall be created as early as possible in order to:

- Provide a comprehensive approach to deliver training and performance support associated with the implementation an application(s)
- Define the detailed requirements for training and performance support
- Determine the delivery vehicles that are most appropriate for the scope and type of target audiences
- Define the instructional strategies that are most appropriate given the detailed training objectives

It is important to start building up training materials in the business language as well as in the local language at the launch of the project so that the necessary online support can be a part of the application design, and any necessary training to be developed can become part of the overall project work plan.

11.5 Program Management

11.5.1 Program Management Office Setup

Setting up an effective Program Management Office will enable the program to set a detailed baseline (work stream definitions, work plans, reporting tools), and follow up with the constant monitoring and reporting of the program. Through the early identification of risks and issues the seamless implementation can be assured.

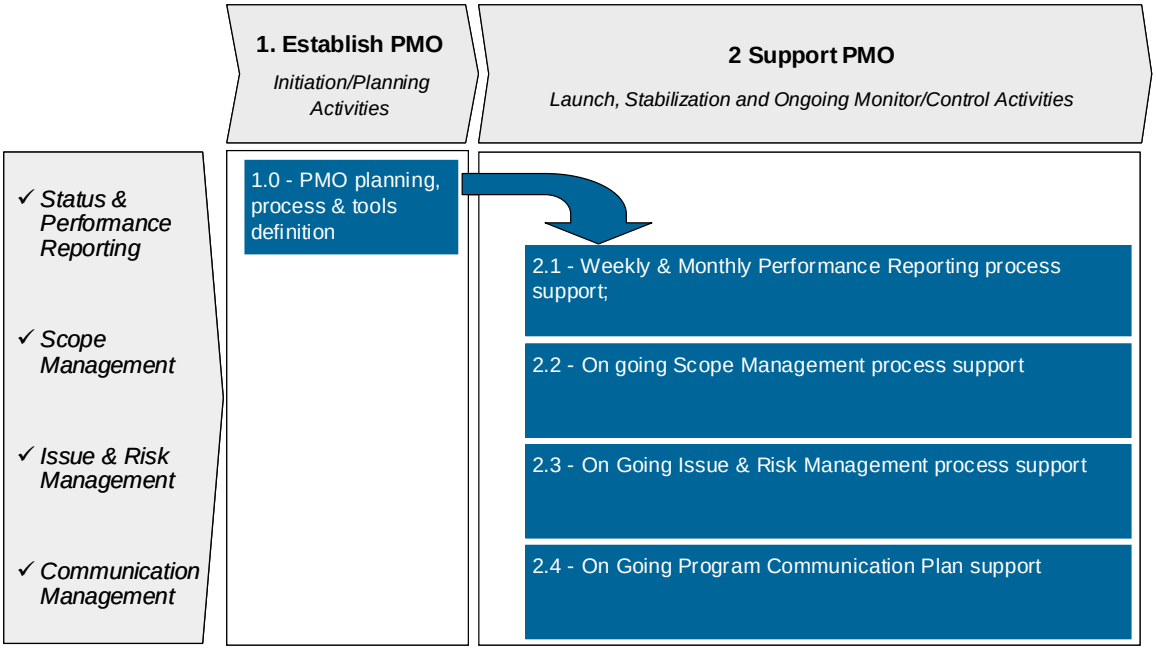


Figure 11.4: Suggested PMO approach and scope

11.5.2 Interim Governance Setup

Governance is the hierarchical structure (governing body), process, roles and responsibilities established to provide direction and decision making for CEEPEX.

An interim governance plan should define the structure, roles and responsibilities, and processes that support quick and efficient decision-making during the **CEEPEX setup program**.

The governance plan for the CEEPEX implementation should be prepared through the following steps:

- Identify the stakeholder groups to represent in the governance organization
- Define decision making authority, and determine who makes what decisions. Document the decision making authority and decision making process
- Communicate the governance model

A governance plan should include an escalation process for program issue and risks. The escalation process includes the types of issues that are escalated to the management committee, and the program sponsors. It contains the processes for escalation, escalation resolution times and roles and responsibilities during the escalation process.

11.6 High Level Implementation Plan

Based on previous experience it is a fair assumption to make that the full establishment of CEEPEX could be facilitated over a 2 year period.

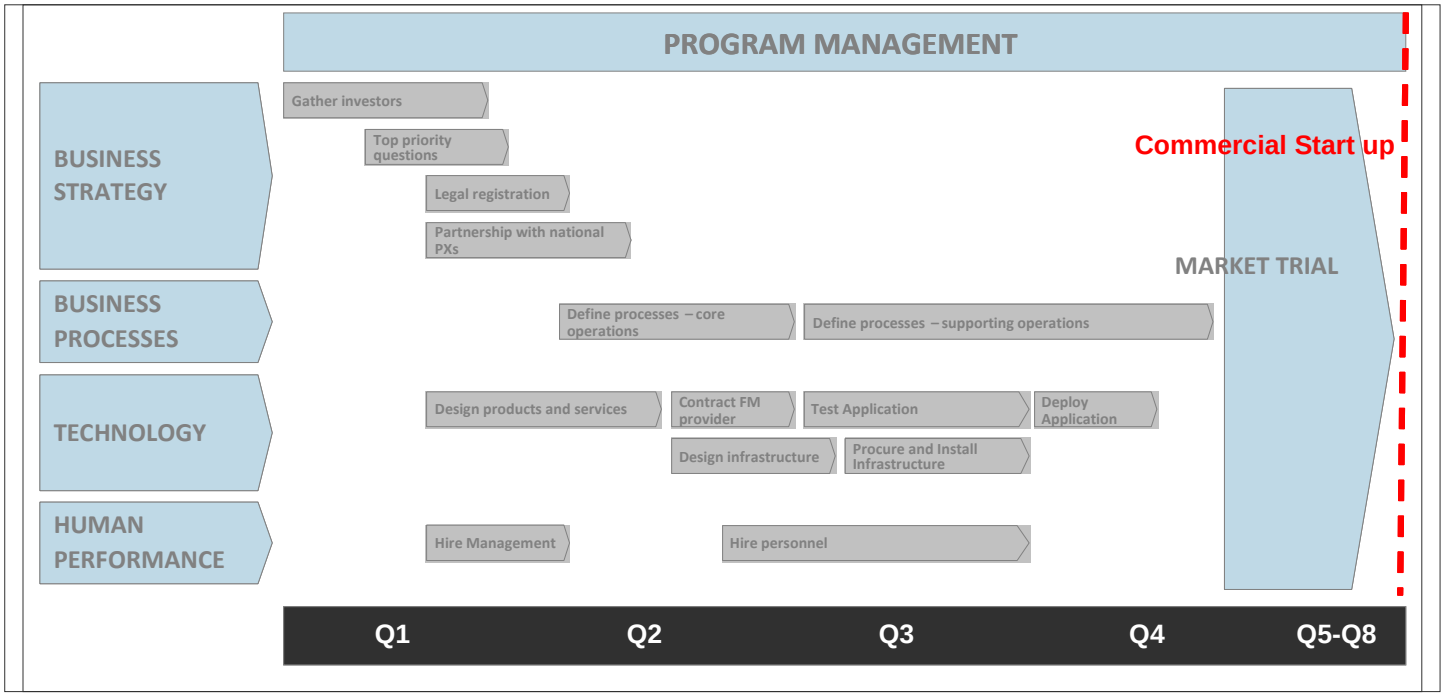


Figure 11.5 High Level Implementation Plan

12 Conclusions and Recommendations - Roadmap

Based on the evaluations in this report and the responses from stakeholders to the questionnaire, the following conclusions and recommendations are elaborated:

- It is concluded with a reference to the responses to the questionnaire (see Annex 4), that the majority of stakeholders in Austria and Hungary welcome the establishment of a regional power exchange for the CEE Region
- It is concluded that EU supports in general the establishment of a regional power exchange as a step towards achieving an internal market for electricity in Europe (reference to Chapter 6)
- It is recommended that HEO / E-Control invite all stakeholders that have expressed an interest in supporting the implementation of CEEPEX to an incorporation meeting (see response to questionnaire Annex 4)
- It is recommended that a project-team with representatives from committed stakeholders should be established and given a mandate to start the implementation process. The necessary resources should be ensured by the stakeholders
- It is recommended that the countries constituting the base for phase I of CEEPEX will be as many as possible of the CEE Region countries, but also including other countries if feasible and beneficial for the operation and development of the liquid regional market
- It is recommended that CEEPEX will be based on a Facility Management Service Provider Model, and seeking a cooperation with existing power exchanges in CEE countries

13 List of References

[1] Tendering document from EEX and PowerNext:
http://www.eex.com/en/document/35082/20080730_Ausschreibg_Spotmarkt_Auktionssystem.pdf

[2] Tendering document from EEX and PowerNext:
http://www.eex.com/en/document/34987/20080725_Ausschreibg_MCSystem.pdf

[3] Vattenfall annual report 2008
http://report.vattenfall.com/annualreport2008/Menu/Wholesale+prices

[4] ETSO Report “Regional Flow- based allocations - state of play”:
http://www.etso-net.org/upload/documents/ETSO%20_flowbased%20allocation_final12Mar2007.pdf

[5] ERGEG 2008; Regional Initiatives Annual Report
www.ergeg.org

[6] Europex/ETSO 2008: Development and Implementation of a coordinated Model for Regional and Inter-Regional Congestion Management www.europex.org

[7] EU Treaty 2008: Consolidated version article 101-106 of 09.05.2008

[8] COM (2007) 528: Proposal for amendment to directive 2003/54/EC concerning common rules for the internal market in electricity

[9] COM (2007) 531: Proposal for amendments to regulation 2003/1228/EC on conditions for access to the network for cross-border exchanges in electricity

[10] COM (2007) 530: Proposal for regulation establishing the EU agency for the cooperation of National Energy Regulators

[11] COM (2006) 841: Communication; prospects for the internal gas and electricity market

[12] COM (2004) 39: Markets in Financial Instruments (MiFID)

[13] ETSO: Overview of transmission tariffs in Europe: Synthesis 2007

[14] The decision No 1229/2003/EC which sets out a series of guidelines for Community on Trans-European Energy Networks, and the Congestion Management Guidelines 2006/770/EC

[15] The amendment to the Electricity Directive COM (2007) 528 and the amendment to the electricity regulation COM (2007) 531

[16] http://ec.europa.eu/energy/index_en.htm

[17] http://ec.europa.eu/energy/gas_*electricity*/forum_electricity_florence_en.htm.]

[18] www.ergeg.org

[19] http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_INITIATIVES/ERI/Central-East/Final%20docs

[20] http://eur-lex.europa.eu/en/treaties/index.htm

[21] http://www.usdoj.gov/atr/public/testimony/hhi.htm

[22] http://www.energyregulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/NATIONAL_REPORTS

[23] http://www.energyregulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/NATIONAL_REPORTS/National%20reporting%202008

[24] Europex – ETSO report "Development and Implementation of a Coordinated Model for Regional and Inter-Regional Congestion Management" http://www.europex.org/default.asp?kaj=news&id=277

[25] www.etso-net.org

[26] http://www.etso-net.org/upload/documents/11.a.%20Final_Synthesis_2007_18-06-08.pdf

[27] http://www.marketcoupling.com/document/895/20090306%20PR%20Relaunch%20Process%20well%20Advanced_final.pdf

[28] http://www.etso-net.org/upload/documents/Transfer%20Capacity%20Definitions.pdf

[29] http://www.etso-net.org/upload/documents/Press%20Release_creating%20ENTSO-E_CEOmeeting-final.pdf

ANNEXES

Annex 1: Glossary and Abbreviations

Acronym/Abbreviation	Definition
API	Application Programmers Interface to be used for developing systems for importing or exporting data.
Area Price	Is the price per hour calculated for bidding areas defined by TSOs, when transmission constraints are likely to occur towards other bidding areas,
ATC	Available Transmission Capacity
ATS	The After Trade System
Available Transfer Capacity (ATC) [24]	Is the part of the Net Transfer Capacity (NTC; see below) that remains available, after each phase of the allocation procedure, for further commercial activity.
Bidding Area [24]	A geographically limited part of the HV-grid in which market bids are placed and in which a single market price can be determined per time unit.
Bidding Currency	The currency used in a participant's bid; it will be converted to master currency.
Bilateral Trading	Direct trading between individual market parties, without involvement of Brokers or a Power Exchange.
BI	Business Intelligence concept / blueprint
Block Bid	Bid addressing pre-defined series of hours and limited volume.
Border Capacity (BC) Model [24]	Model for the capacity determination and allocation using a simplified flow based network representation where each control area is described by a single node.
Control Area (Reference: UCTE Operation Handbook)	A CONTROL AREA is a coherent part of the UCTE INTERCONNECTED SYSTEM (usually coincident with the territory of a company, a country or a geographical area, physically demarcated by the position of points for measurement of the interchanged power and energy to the remaining interconnected network), operated by a single TSO, with physical loads and controllable generation units connected within the CONTROL AREA. A CONTROL AREA may be a coherent part of a CONTROL BLOCK that has its own subordinate control in the hierarchy of SECONDARY CONTROL.
Counter Part	The entity buying all from sellers, selling all to buyers.
Critical Branches (CB) Model	Flow based model for the capacity determination and allocation using a detailed transmission model and including an explicit treatment of security constrained scenarios by introducing critical branches, the network elements which could become overloaded as more energy is exchanged

	between the hubs of a region.
Day-Ahead Market [24]	Market conducted a day before delivery day/hour, operated by power exchanges, based on sealed bid double auction and market (equilibrium) price principles.
Delivery Day (D)	The day for which the schedules traded on D-1 is delivered
DMS	The Data Management System.
Dome Coupling [24]	An overarching coupling system that coordinates two or more underlying coupling systems and/or markets, using volume coupling (see volume coupling).
Energy Derivatives [24]	Financial contracts for forward (possibly long term) delivery periods that derive their value from an underlying reference price, such as a spot price or the difference between spot prices in two different market (bidding) areas or between a regional reference price and a market (bidding) area price.
Explicit Auction of Rights [24]	An auctioning system where (normally) TSOs sell cross border capacity rights with differing maturity for nomination ahead of operation day/hour, and those auctions are independent of energy trading in the respective areas on each side of the border.
Flexible Bid	1 hour sale bid for the hour with the highest price within the day-ahead auction
Contractual Flow on Individual Interconnector	The Day-Ahead exchange between two neighbouring areas.
Forward Market [24]	Market that operates the buying and selling of energy related products, physical or financial, with maturity dates longer than a day, typically monthly, quarterly, and yearly.
Gate Closure	The time from which bids are no longer accepted for the next delivery day. This might differ from the TSO gate closure.
Hour	Hour 1 means Time from 00 to 01, Hour 24 means time from 23 to 00.
Hourly Bid	One hourly interval bid.
Hub	(See bidding area).
Implicit Auction [24]	Combines the sale of energy and utilization of cross border capacity in one process, thus establishes prices in each involved Bidding Area and planned flows between all areas.
Intra-Day Market [24]	A market offering trading for the current day and after closing of the Day-Ahead Market also for the following day. There are auction based Intra-Day markets, similar to the Day-Ahead Market, or continuous energy trading including cross border bids
IRR	Internal Rate of Return
Market Coupling ref.:[24]	Is the process of joining market areas managed by different power exchanges with the purpose of determining day-ahead volumes of exchange by implicit auctioning between the market areas, and in the case of Price Coupling (see below) also prices, based on an algorithm that utilizes bid/offer information acquired from each market and cross

	border capacities.
Master Currency	The currency for which the price calculation is done
Market Splitting [24]	Is the process of determining day-ahead volumes of exchange by implicit auctioning, with splitting up the bidding areas managed by one power exchange into two or more price areas, while utilizing the available capacity between the congested areas
MCP	Market Clearing Price is price per hour calculated for the bids in defined areas
Net Exchange	Difference between purchases and sales for an area
Net Transfer Capacity (NTC) [24]	Possible exchange program between market (bidding) areas, compatible with the operational security standards applicable in each area
NPV	Net Present Value
Organic Process [24]	(See horizontal process)
OTC (Over-the-counter) [24]	Trade between market participants via a broker, without involvement of a power exchanges.
Price Area [24]	A geographic area, consisting of one or more Bidding Areas, which has a common price in a given time period. Thus in case of several Bidding Areas forming a Price Area it reflects that no congestion exist between those Bidding Areas.
Price Calculation	The matching of bids and offers.
Price Coupling [24]	A coupling system, which in one step establishes both prices and volumes for each coupled market, and where all bids/offers from all market. (bidding) areas are considered in an anonymous manner in the coupling system. Market splitting is a form of price coupling, where all bids/offers; pricing per bidding area and settlement is handled by one power exchange. A price coupling system can be placed in a unique legal entity or can be a unique system that is shared by the local power exchanges.
PTC	The Participant Client System.
Region [24]	ERGEG Region: one of the seven Regions originally defined in the Congestion Management Guidelines 2006/770/EC. Market region: cluster of market (bidding) areas that share a unique price coupling system, which generates both prices and volumes.
SLA	Service Level Agreement.
Trading Day (D -1)	The day the DAM auction price is calculated for the next Delivery Day (D)
TSO	Transmission System Operator.
Volume Coupling [24]	A coupling system that partly or fully replicates the matching rules of each coupled market and utilizes indicative or actual anonymous bid/offer information. The algorithm determines

	the volume of exchanges between the underlying regions/markets. The local power exchanges utilize the generated cross-border volumes to locally determine their bidding area(s) prices and volumes.
Loose Volume Coupling [24]	The volume coupler uses partially indicative bid/offer information and might not fully replicate the local matching rules.
Tight Volume Coupling [24]	The volume coupler replicates the local matching rules and uses more precise bid/offer information than in the loose volume coupling case.
WACC	Weighted Average Cost of Capital

Annex 2: Example with the Norwegian Legislation in use to regulate Nord Pool

Most PXs will, in addition to MiFID that is implemented in national legislation, be subject to national acts and regulations that put various requirements to the way they are organized and in their daily operation.

A summary of the most relevant legislation valid for the daily operation of Nord Pool will be given as an example:

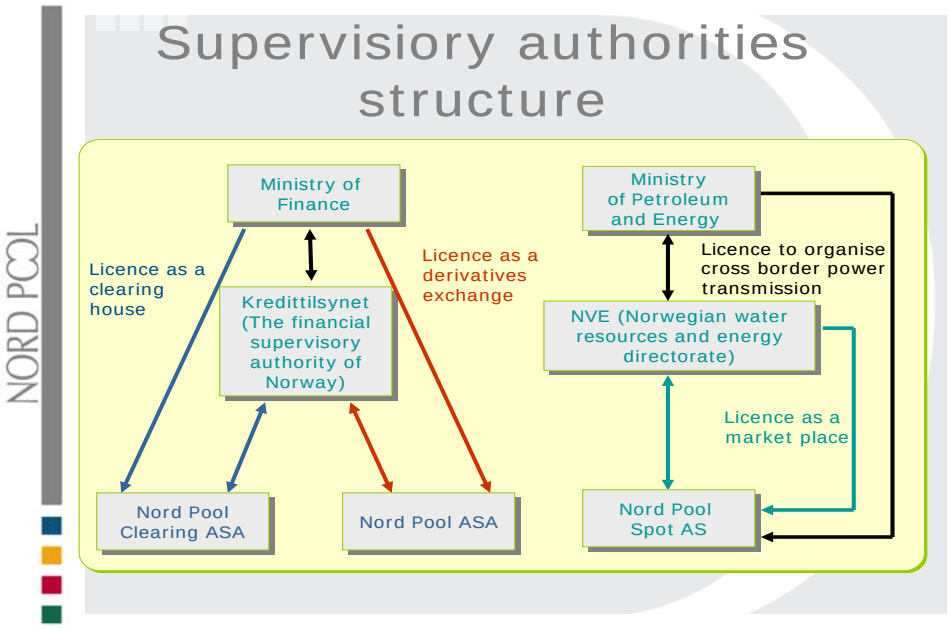


Figure A2.1 Regulation of Nord Pool companies

Regulation of Nord Pool ASA

The Nordic financial market is organized under Nord Pool ASA which is owned 50/50 by the Norwegian and the Swedish TSOs; Statnett and Svenska Kraftnett.

Nord Pool ASA holds a license as a derivatives exchange under the Exchange Act (2000). The license is granted by Ministry of Finance. In addition Nord Pool Clearing holds a license as a clearing house from the Ministry of Finance. Derived from the Exchange Act (§5.11) which requires that exchanges has established a market surveillance function, the Ministry of Finance has issued an exchange regulation ("Forskrift om markedsovervåkning") which further regulates the tasks of the market surveillance function.

The market conduct of market participants in the financial markets operated by Nord Pool ASA is regulated by the Securities Trading Act (2005). The rulebook at Nord Pool ASA and the rulebook at Nord Pool Clearing ASA regulate the obligations and rights of the market participants in trading and clearing/settlement. Together with the Norwegian law, it constitutes the rules that the market participants have to comply with. The market conduct rules in the rulebooks govern i.e. reporting of non-exchange trades, disclosure of price relevant information, misuse of insider information and market manipulation.

Regulation of Nord Pool Spot AS

The spot market is organized under Nord Pool Spot AS which is owned by 30% each of the Norwegian and Swedish TSO and 20% each of the Danish and Finish TSO. Nord Pool Spot is supervised by the Norwegian regulator Norwegian Water and Energy Resources Directorate (NVE) which again is fully owned by the Norwegian Ministry of Petroleum and Energy.

Nord Pool Spot holds a license under the Energy Act (2003) of Norway.
The license is granted by the Ministry of Petroleum and Energy to operate an organized marketplace for trade in physically delivered power contracts. The license requires that a market surveillance function is established. Nord Pool ASA and Nord Pool Spot have agreed that the market surveillance team monitor both the physical and the financial market.

The rulebook for Nord Pool Spot regulates the obligations and rights of the market participants in trading and settlement, and constitutes the rules that the spot market participants have to comply with.
Chapter 10 in the Rulebook for trading at Nord Pool Spot regulates the market conduct in the physical market in relations to disclosure of price relevant information, misuse of insider information and market manipulation.

Supervision and ownership of Nord Pool Spot and Nord pool ASA

Regarding the supervision of both Nord Pool ASA and Nord Pool Spot neither Kredittilsynet nor NVE is actively involved in the daily operations. Besides annually reports they are informed and consulted in cases that regard their supervisory role and they also meet Nord Pool ASA and Nord Pool spot on a regular basis. Neither Kredittilsynet nor NVE are represented in the Board of Directors.

The owners of Nord Pool Spot and Nord Pool ASA are all represented in the Board of Directors. However, they do not interfere in the daily operation of Nord Pool.

Annex 3: The Competitive Electricity Market

In this annex the main features of a competitive electricity market are described. It starts with the physical electricity market and describes the Day-Ahead Market, the Intra-Day Market and the Balancing Market. Related topics as the Physical Forward Market, Demand Side Management, Congestion Management and Clearing and Settlement are treated too.

In the second section the same structure for the financial market is used, before the carbon market is described in the following section.

In the end of the annex the importance of Market Surveillance and the markets' need for information and transparency are shortly presented.

The approach in treating these topics is to a large extend general and gives references to various markets all over the world. However, in many cases the Nordic power market Nord Pool is used as an example, partly because this is the market known best by Consultant, partly because this is one of the major markets in the world and serves as a reference market in the establishment and development of new and existing power exchanges in Europe in general.

The Physical Electricity Market

Description of a competitive physical electricity market

A competitive electricity market requires some key elements in place:

- Separation of monopoly activities and those exposed to competition
- Regulated Third Party Access (rTPA)
- A transparent tariff system
- A system to manage transmission grid energy losses
- A system for avoiding / managing grid congestion
- A real-time market or rules for maintaining the real-time balance between generation and demand
- A system for handling imbalances between metered data and contractual commitments
- Financial incentives for maintaining reserve power generation capacity

However, when it comes to design of a market there are various options. Among the liberalized electricity markets in the world, there is a clear distinction between single-market and two market concepts and between auction and continuous trading spot trade systems. As a point of departure, the features of these four systems are shortly presented.

Single Market Model

In a single market all electricity transactions are executed in real-time, often with ex-post pricing and parameters and load replaced by bids from market participants. Normally, prices are defined in a large number of nodes in the grid. The model balances generation to demand in real time and all market participants who have placed bids in the market are committed to follow system operator's instructions regarding dispatch. Since it is a real time concept, prices are defined in rather short interval of times and average values for each 30 or 60 minutes from the official spot prices.

The single-market models are well known by generators, but normally not by participants on the demand side. The demand side fears that the supply side has a better understanding of the price determination algorithm and is in a better position to predict the prices. The result is rather poor demand side participation in the market. However, the single-market system may have the advantage of higher degree of utilization of the transmission resources.

Two Market Concept

The two-market concept includes a day-ahead spot market and a real time market. The contracts traded in the day-ahead market are based on price/volume bids from market participants and are reported to system operator for dispatch without any curtailment or changes. This is referred to as de-centralised dispatch or self-dispatch. The real time market is based on bids of increments and decrements of generation and load. The market is an important tool for system operator to balance the system during real time and provides the basis for market pricing of participants' imbalances.

Compared to a single market model prices in the day-ahead spot market correlates better with the predominant fuel applied in generation and are therefore a more appropriate reference for derivatives and cross-trade between electricity and other energy carriers like oil and gas. The prices in the real time market indicate the capability of the power system to balance the system in real time. Price level and volatility may be very high but involves minor volumes. With a well functioning spot market the volume in the balancing market is experienced to be less than 4-5 % of total annual generation.

To achieve competition equal terms for demand and supply side are required. The simple price/volume bids in the spot market with no technical parameters involved in the price determination is for both, the supply side and the demand side an understandable and transparent price determination algorithm.

In Europe, the most common market model is a two-market model consisting of a contractual day-ahead markets and a centralized balancing market also globally the two-market concept seems to be preferred in all emerging markets where a PEX is established.

Auction Trade System

An auction trade system is based on pairs of price/volume bids that are submitted to the PEX. Each participant's bids form a stepwise linear bid curve. A bid should be considered as a price-differentiated plan for how the participant will dispose to the spot market and is a result of the participant's evaluation of prices and risk in the market. Normally, separate bids for all 24 hours the next day are submitted. The PEX accumulates all demand bids and all supply bids and form a total demand curve and a supply curve for each hour. A Market-Clearing Price (MCP) and corresponding volume is determined for each hour at the intersection of demand and supply curves.

Except for UKPX and to some extent Borzen in Slovenia and the Intra-Day Market at Nord Pool – Elbas, all major spot market exchanges in the world are based on the auction concept.

Continuous Trade System

In a continuous trade system participants may place orders/ bids on purchase and sale of spot contracts continuously throughout the opening period each day. A trade agreement is made whenever two participants meet on price. Unlike an auction trade where all trades are based on the same price, trades in a continuous trade system are based on different prices for each trade. The official price is in most cases based on an average price of the last traded volumes before the PX closes down.

An electronic continuous trading system is widely applied in some commodity markets and financial markets. It is not widely used as trading system in an electricity spot market.

In the following we will focus on a two market auction trade system as this is the most common concept for power exchanges throughout the world, and more important, in line with the systems already established in Europe. Hence, a two-market auction trade system will secure a smoother integration towards a single European electricity market.

The Day-Ahead Market

In a day-ahead auction both the supply side and demand side submits offers to sell and bids to purchase power for a given time period the following day. The PX collects all bids and offers and calculates a price and associated transaction volumes that clear the market – e.g. the price at which the supply offers exactly matches the demand bids.

The market participants are bidding for purchase or sales of power at various prices. The bids and offers represent net positions, and are not directly associated with physical units. This allows the market participants, both generators and consumers, to have both positive (purchase) and negative (sales) positions, even opposite positions during one day.

Typically the market contracts are one-hour-long physical power (delivery or take-off from the grid). Which means that 24 price calculations has to be made.

In theory there are no limits to the kind of contracts that a PEX can offer its participants. At Nordpool also Bloc Bids which is an aggregated bid for several consecutive hours with a fixed price and volume and Linked Block Bids which give the possibility to link a number of blocks together is offered. The latter is e.g. useful when the cost of starting one generator depends on whether another generator is already started or not.

Another option in the Nordic market is Flexible Hour Bids. This is exclusively a sales bid where you put a certain volume for sale at any of the single 24 hours available the next day. The bid will be accepted in the hour with the highest price, but has priority after hourly bids and block bids.

In order to maintain a secure and reliable power supply a real-time market and ancillary services must be in place. In the Nordic countries these tasks are taken care of by the Nordic Transmission System Operators. The real-time market is a tool for the five Nordic system operators to balance generation to match power consumption during all hours of operation. Also Elbas which is described below serves as a balancing market.

The Intra-Day market

When the day-ahead market closes there is a lengthy time span (24 hours the day of delivery + the hours between the time for price fixing and 24 00 the trading day), when participants no longer can improve their physical electricity balance. An Intra-Day Market is an after market to the Day-Ahead Market that enables actors to refine their wholesale power portfolios up to a point closer to real time. For Hydro power generators where variable costs for increasing or reducing their output is limited a Intra-Day Market is not as critical as it is for e.g. combined heat and power plants which face high variable costs.

The Nordic ELBAS–market is a market for power trading that leads to physical delivery. It enables real time trading around the clock every day of the year, covering individual hours up to one hour before delivery. The product characteristic of Elbas is quite simple. For each and every hour of the day there is one power hour contract quoted. Minimum contract size is 1 MWh/h.

The Elbas trading System automatically control the interconnection capacity, which is given when the deadline for filing complaints on the Elspot market has elapsed and the cross border capacity that is left after Elspot is known. For example if there is no capacity from Finland to Sweden the participants in the Swedish and the Eastern Danish market area cannot see the sale bids placed by participants in the Finnish market area in their Elbas price information window. If the bids are inside the given interconnection capacity the different market areas are treated as one.

The Balancing and Ancillary Service Market

There are different models for balancing mechanism at the various global energy markets.

In centralized dispatched markets, the balancing mechanism is integrated in the real-time dispatch. The participants may submit day-ahead offers and real-time offers, or the market/system operator may use the day-ahead offers for the real-time dispatches.

In decentralized dispatched markets, a subset of the market participants – the *Balance Responsible Participants* – submits offers for increment and/or decrements of their generation and/or load capacity. It is, furthermore, possible for the System Operator to procure or tender out requirements for balancing power on a bilateral basis and not expose these and other ancillary services to a competitive bidding market. In some markets, there is an operating reserve market, which provides the System/Market Operator with a capacity reserve for contingencies.

Balancing markets based on competitive bidding opens after the Day-Ahead auction has been closed. The TSO receives bids and offers for decrements and increments in the evening after the Day-Ahead auction is closed. To avoid arbitration between the Day-Ahead Market and balancing market, the balancing market rules typically stipulates that offers for increments must be priced to the spot price or a higher and bids for decrements must be priced to the spot price or a lower. The TSOs are single buyers or sellers for the volumes they need for balancing the system, and the costs for these procurements, i.e., cost for balancing the market is passed on to participants through Transmission Tariffs or similar fees.

In regional markets with multiple TSOs, each TSO is responsible for the balancing of its control area. However, TSOs may cooperate and “share” balancing power and other ancillary services. The inter-TSO agreement in the Nordic region is a great example of this.

It should be observed that the pricing mechanism in the balancing markets differ very much within the EU and otherwise in the world.

The Physical Forward Market

A forward contract is an agreement between two parties to buy or sell a specified quantity of electricity at a pre-agreed future point in time. Therefore, the trade date and delivery date are separated. It is used to control and hedge risk, for example currency exposure risk or commodity prices (e.g., forward contracts on oil or electricity).

In a forward transaction, no actual cash changes hands. If the transaction is collateralized, exchange of margin will take place according to a pre-agreed rule or schedule. Otherwise no asset of any kind actually changes hands, until the maturity of the contract. To exit the commitment prior to the settlement date, the holder of a futures position has to offset their position by either selling a long position or buying back a short position.

The forward price of such a contract is commonly contrasted with the spot price, which is the price at which the asset changes hands. The difference between the spot and the forward price is the forward premium or forward discount.

In a physical forward contract the contracted amount of electricity will be delivered in the contracted delivery period.

At Nordpool the forward market is strictly financial and does not include physical delivery of electricity.

Demand Side Management

Demand-Side Management refers to consumers' response to price signals, both long and short term. Depending on flexibility and elasticity of the demand side segment (industrial, commercial and residential), the forward price signals from the market will drive decisions to reduce load at high price periods. Load reduction in this case, is not dispatched from the System Operator (although one may construct mechanisms for centrally dispatched load reduction), but rather self-dispatching.

Demand-Side Management is not unique to competitive electricity markets. Energy saving and fuel-switching programs is implemented among the industrial and larger commercial consumers, and to a limited degree among suppliers to residential consumers in most countries. However, the drivers for these programs have been to reduce the *electricity volume*, more than to avoid high *electricity prices.*

In order to encourage demand side participation it is *important that the market structure exposes the end users to the wholesale prices*, but also gives the demand side access to appropriate risk mitigation functions; e.g. access to the electricity markets.

Congestion Management, Market Splitting and Market Coupling

Congestion management within national energy markets – whether they are national or regional - is mainly carried out in the following manners.

Auction of transmission rights. This method is applied on interconnections between national markets in Europe and within US/Canadian control areas. It is typically not applied on congestions within national markets.

Congestion Management by Market Coupling. The coupling of markets between BELPEX in Belgium, APX in The Netherlands and PowerNext in France is an example of this method. It can also be used if there exists many PXs within the same country.

Congestion Management by Market Splitting. This method is applied on interconnections in the Nordic market and within the Norwegian market. It is mainly suitable for handling substantial and consistent bottlenecks between well defined areas.

Counter Trade or Re-Dispatch. This method is applied in all markets both on interconnections and between internal congested areas in real time, mainly based on bid in the real time market.

Auction of Transmission Rights

The Transmission System Operators (TSOs) on both sides of a congested transmission path co-operates to establish the auction and estimate in advance the total volume to be auctioned. Auction is carried out for both for long-term transmission rights and short-term rights.

The financial incentives for a market participant to join the auction and transmit power are possibilities to profit on price differences between the areas.

If low price differences are predicted then the interest to move power on the connection concerned are low and the auction prices will be close to nil. On the other hand, if the price differences are predicted to be high the auction prices will increase.

Participants must report planned use of their transmission rights in schedules well in time prior to delivery. Not used transmission rights are then made available for participants in a last auction of short-term transmission rights. Participant can, therefore, not procure transmission rights for the purpose of hindering exchange on the connection. This principle is often referred to as “use-it-or-lose-it”.

A capacity auction generates an income to the auctioneers, the TSOs. The auction costs for the market represents a capacity fee.

Auction of transmission capacity rights satisfies the EU-requirement of access on non-discriminatory basis. This method is also largely used in the US and Canada.

The experiences with this method for congestion management are mixed. The method is applied in Denmark on the interconnections between the Nordic market and the German market. A perfect auction should ensure that contracted flow is from low price area to the high price area. However, on the border between Denmark and Germany, it is often experienced that the flow is in the opposite direction.

Congestion Management by Market Coupling

Market coupling is a method for integrating electricity markets in different areas. With market coupling the daily cross-border transmission capacity between the various areas is not explicitly auctioned among the market parties, but is implicitly made available via energy transactions on the power exchanges on either side of the border (hence the term implicit auction).

It means that the buyers and sellers on a power exchange benefit automatically from cross-border exchanges without the need to explicitly acquire the corresponding transmission capacity.

The main purpose of this mechanism is to maximize the total economic surplus of all participants:

cheaper electricity generation in one country can meet demand and reduce prices in another country. Prices will equalize across adjacent countries where there is sufficient transmission capacity. Coupling the three exchanges also leads to a more efficient use of the daily capacity of the interconnections.

The market coupling is designed to enable different power exchanges to be coupled in a manner that requires them to make minimal changes to their market rules. For the members of the individual power exchanges, bidding methodologies remain practically unchanged. The involved Power Exchanges continue to exist as legally separate markets, with their own clearing and settlement arrangements.

This method is successfully used and planned used between various markets in Europe. A comparable system has also been in use in Scandinavia for many years, under the name "market splitting".

Congestion Management by Market Splitting

Day-ahead market splitting makes use of the price flexibility of both power supply and power demand and is applied by power exchanges to relieve the major of congested volume prior to delivery.

Assume the total market is split in two areas with limited transmission capacity between. In the total market, there is a balance between power supply and power demand for a specific hour of the next day.

First step is to calculate the unconstrained Market Clearing Price (MCP) and the contracted flow between the two areas at price equal to MCP. Contracted flow is the difference between demand and supply in each area at prices equal to MCP. If the contracted flow across the congested section exceeds the available capacity determined by the system operator, then the market has to be split into two price areas. One of the areas is a deficit area and the other a surplus area. Contracted flow direction is always from the surplus area to the deficit area.

For the surplus area the price is lowered to reduce generation and increase consumption. For the deficit area price is lifted to increase generation and reduce consumption. This will reduce the contracted flow between the two areas and the exercise is carried out stepwise until the flow matches the maximum allocated capacity

In case of more than one congestion in the total area, there will be calculated the necessary number of area prices to relieve all congestions.

Market splitting implies an income to the system TSOs involved equal to allocated capacity multiplied with the difference in area prices. This is the capacity fee paid by the market participants and can be compared with the auction costs of market participants in auction of transmission rights.

Congestion Management by Counter Trade

Counter trade is based on principle of re-dispatch during real time operations and is well known in all power system where generation is ordered to be changed to maintain the instantaneous balance in the market. In restructured markets this re-dispatch are based on a market concept and therefore referred to as counter trade.

In the real time market bids are unit-bids. Bids are submitted for each generation unit. If several units are connected to the same connection point in the grid, bids can normally represent the sum of all units. Demand side can also submit bids.

The bids placed in the real time market are referred to as price and volumes for increments and

decrements of generation or consumption. In the following only bids from generation is described.

Whenever there is a need to change generation caused by congestion that occurs during real time, the system operator activate the generation units that imply lowest costs. He will call for increased generation on the deficit side of the congested section and reduced generation on the surplus side.

Counter trade implies a cost for system operator equal to the re-dispatched volume multiplied with the difference in price for increased generation and decreased generation. These costs will be recovered from the grid company. The grid company will then have a financial incentive to invest in reinforcement of the grid to reduce counter trade costs. The costs can be high in markets with low transmission capacities and poor competition in the real time market. In comparison: When applying auction or market coupling/splitting the market participants pay the costs through different spot area prices. This is an income to system operator that should justify reduced transmission tariffs.

It should be observed that in an ideal competitive market with no abuse of market power the cost for the total market is to a large extent the same regardless of methodology.

Clearing and Settlement for the Physical Electricity Market

The trades conducted in the Power Exchange are for the commodity only and are binding contracts. The settlement of the PEX transactions is for the contracted volumes and agreed prices, independent of whether the electricity is delivered or consumed in real-time. Deviations from contracted amounts are subject to the balancing mechanisms of the System Operators, and are subject to imbalance prices/tariffs.

The PEX is the counterpart to all trades, and is therefore subject to counterpart default risks. To alleviate this risk, a proper risk management system based on collaterals and margin calculations must be in place. The details for a proper risk policy and system depend on the design of the PEX itself and on governing regulations and industry practices.

An effective way of alleviating counterpart default risks is to establish a clearing service, which is an institution that takes over the counterparty credit risk from the PEX and possibly also for bilateral contracts. The clearing mechanism used in e.g. Nord Pool can serve as an example of an effective clearing service set-up.

A clearing institution can be an integrated part of the PEX, with common owners and operators, or it can be an independent institution. In US there are examples of independent institutions – such as Chicago Board of Trade, ICE – Intercontinental Exchange, and NECC – North American Energy Trading Corporation – setting up privately owned clearing “houses”.

Not only the clearing service, but also the settlement process can be outsourced from the Power Exchange. A professional company with systems, experience and personnel for complex settlements of other commodities or equities may be willing and capable of performing these services for the PEX.

The Financial Electricity Market

Description of a Competitive Financial Electricity Market

The financial electricity market refers to trading in electricity-related commercial paper and derivates for which electricity is the underlying commodity. Electricity derivatives are used primarily by companies that conduct electricity trading and mainly to hedge against price movements.

Legally, trade in electricity derivatives is defined as financial trade. This implies that the laws and regulations that apply to other financial trading must also be applied to this market.

To secure competitive financial electricity market the single most important factor is information. A lack of universal access to the same information at the same time leads to an imbalance that affects the efficiency of the market, which is reflected in the competition scenario and the price trend and in the public's confidence in the market as such. This is probably especially important in the electricity market where the generation companies also are major players in the financial market, and where energy facilities often are owned by several companies. This situation easily creates conflicts of interest which must be identified and communicated to the market.

A virtual power plant or a financial market is established to trade financial contracts for delivery of electricity somewhere in the future. However, as the name virtual indicates, a financial contract does not imply a physical delivery of electricity. Thus a financial market serves three main purposes:

- Generators of electricity can close the price for the sale of electricity in a given period in the future
- Purchasers of electricity can close the price for purchase of electricity in a given period in the future
- Traders as e.g. banks and financial institutions which neither produces or need large quanta of electricity speculates in the volatility in the power market in order to gain money on the difference in the price between the actual price in the spot market and the price paid for the financial contract

For generators and the purchasers trade in the virtual market is a tool for risk management. Thus, trading in the financial market can be compared with a consumer that choose a fixed price for electricity the next X years or choose a fixed interest rate for a bank loan. The aim is to give predictability for future costs and income. Neither part in the deal knows if they gain on the contract before the price is set.

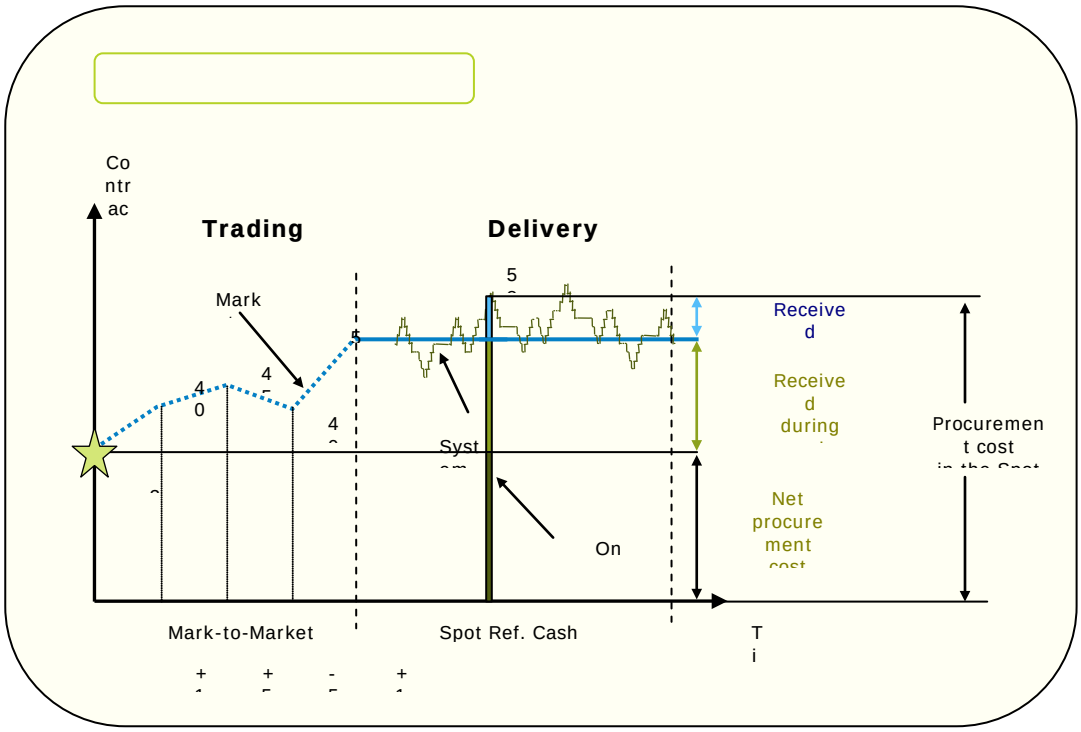
The pure traders also have an important role in the market as they contribute to high liquidity and trade activity.

Nord Pool has step by step developed its financial market since 1993. In 1994 the weekly auction trading system was replaced by a continuous trading system and in 1996 it became fully electronically.

The Financial Futures Market

A futures contract is a standardized contract, traded on a futures exchange, to buy or sell a certain underlying instrument at a certain date in the future, at a specified price. The future date is called the delivery date or final settlement date. The pre-set price is called the futures price. The price of the underlying asset on the delivery date is called the settlement price

At Nordpool financial contracts for the next 6 weeks are called a future and involve base load contracts and peak contracts. Settlement of futures contracts involves both a daily mark-to-market settlement and a final spot reference cash settlement, after the contract reaches its due date.



In the illustration above an Exchange/Clearing Member is assumed to have bought a futures contract at a price of EURO 30/MWh. During the trading period, from the date the contract was bought to the contract's due date, the market price for the contract increased to EURO 55/MWh.

The price EURO 55/MWh is the final closing price prior to delivery. Daily mark-to-market settlement during the trading period credited the member a total gain of EURO 25/MWh (EURO 55-30). (The Exchange Member who sold the contract was debited EURO 25/MWh during the trading period).

Throughout the final settlement period, which starts on the due date, the member is credited/debited an amount equal to the difference between the spot market price and the futures contract's final closing price.

For the specific single hour indicated in the figure, the member has received EURO 25/MWh in daily mark-to-market settlement (during the contract's trading period) and a final settlement amount of EURO (58-55)/MWh = EURO 3/MWh for a total profit of EURO 28/MWh.

If the Exchange Member/Clearing Member in the above example chose to procure the power from the spot market rather than cash in the profit, his procurement cost in the spot market for the specific hour is EURO 58/MWh. However, he has already received a profit of EURO 28/MWh in the futures market. The total cost, with hedging in the futures market and physical procurement in the spot market, is thus equal to the hedging price EURO 30/MWh.

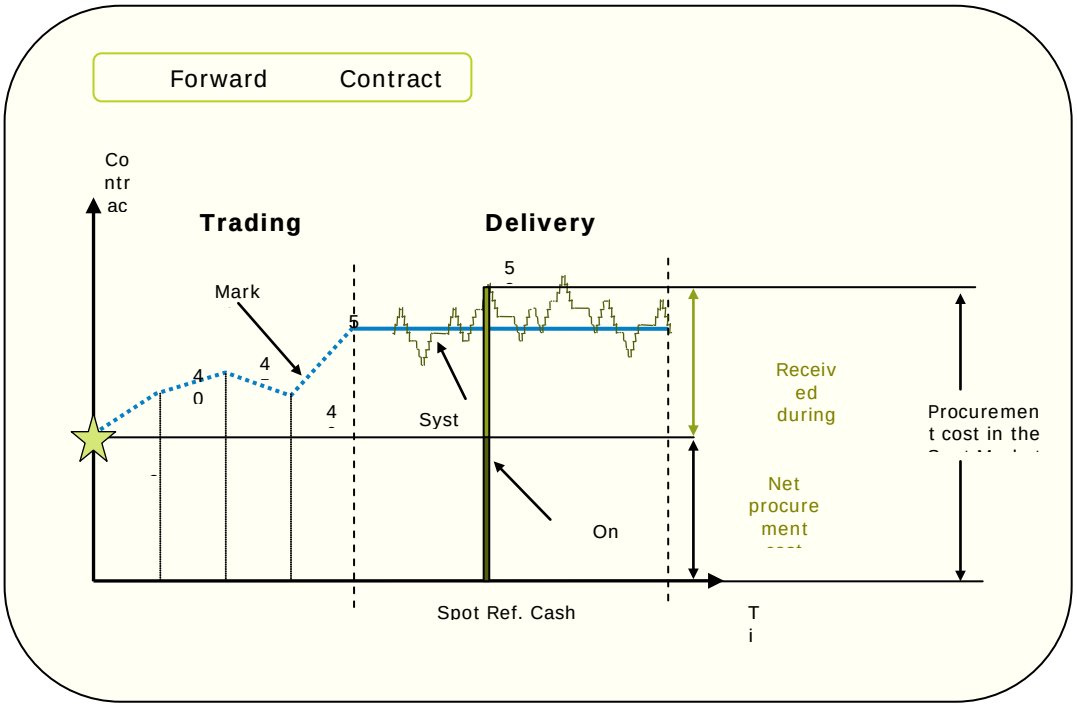
The Financial Forward Market

A forward contract is in the same way as a future contract and obligation to deliver/receive an amount of electricity on a future date at a prearranged price,

Forwards transact only when purchased and on the settlement date. The fact that forwards are not rebalanced daily means that, due to movements in the price of the underlying asset, a large

differential can build up between the forward's delivery price and the settlement price:

At Nordpool the forward contract structure is divided into months, quarters (3 months) and years (up to 6 years ahead). Using the same example as above the forward contract settlement appears as follows:



In the example, an Exchange Member/Clearing Member has purchased a forward at a price of EURO 30/MWh. At the due date, the value has increased to Euro 55/MWh. During final settlement for the hour specified in the figure, the member receives EURO (58-30)/MWh = EURO 28/MWh. This amount is the total of the accumulated value EURO (55-30)/MWh from the trading period (the pending settlement) and EURO (58-55)/MWh from the Spot Reference Cash Settlement. The pending settlement will be realized in the delivery period.

Purchasing the contract's volume in the spot market costs EURO 58/MWh. The total cost of hedging the power purchase through a forward contract followed by a spot market purchase is equal to the hedging price, EURO 30/MWh.

In addition to Futures and Forwards Nord Pool offers Contract for Difference, which was introduced to provide a perfect hedge, even when the markets are split into one or more areas and Options that together with forwards and futures offers a valuable tool for risk management.

Clearing and Settlement for the Financial Electricity Market

Financial electricity contracts traded at Nord Pool are automatically cleared by Nord Pool Clearing. In addition Nord Pool Clearing offers clearing of standardised financial electricity contracts traded in the bilateral market. In clearing financial contracts, Nord Pool Clearing assumes counterpart responsibility vis-à-vis seller and buyer alike.

Futures contract settlement has two components:

Mark-to-Market Settlement: For futures contracts, the value of each clearing member's contract portfolio is calculated daily, based on changes in the market price of the contracts. Daily changes in the value of contracts are settled financially between buyer and seller.

Spot Reference Cash Settlement: Financial settlement in the delivery period means financial settlement of the difference between the contract's last closing price before maturity and the spot reference price for the corresponding hours in the delivery period. Daily settlement is conducted throughout the delivery period.

For forward contracts the spot reference cash settlements are in principle the same as for futures but holders of forward contracts are not credited or debited any change in market value from one clearing day to the next. Unrealised profit or loss (the accumulated pending settlement) from the trading period is realized in the delivery period.

Nevertheless, the trading period profit/loss of forward positions is tracked for final clearing. In the period from the day of trading or registration up to and including the due date, the value of the net position is adjusted to reflect actual market value.

The Carbon Market

Background for Trading of Environmental Emission Certificates

The market for carbon emissions allowances and carbon credits has emerged as a consequence of the Kyoto protocol, and covers both the developed and developing countries. Only industrialized countries (so called Annex 1 Parties to the protocol) have committed to binding emissions targets under the Kyoto Protocol. Collectively, they have undertaken to reduce greenhouse gas emissions by roughly five per cent compared with the 1990 level by end of 2012.

In addition to regional carbon trading schemes The Kyoto Protocol introduces trading opportunities through Joint Implementation (JI) and the Clean Development Mechanism (CDM).

JI permits industrialized countries to finance emission reducing projects in other industrialized countries and countries with economies in transition (mostly Eastern European countries and Russia)

CDM permits industrialized countries to finance emission reducing projects in developing countries.

Credits earned through these mechanisms are known as certified emission reductions (CERs)

In response to this global climate action EU introduced a directive (2003/87/EC) establishing a scheme for greenhouse gas emission allowance trading which was launched 1st January 2005. In short, the scheme introduced obliged companies in a wide range of sectors to keep their emissions below the quota (ton of carbon dioxide) given for free by EU or to purchase the gap between the given quota and the company’s actual emissions. Each ton of carbon dioxide over the given quota meant that the company had to buy European Union Allowances (EUAs) in the market.

The three years trial period of this scheme (2005-2007) has from 1 January 2008 entered into the 5 year Kyoto Period in which the EU countries as a group will have to reduce their emissions by 8 % compared to 1990 levels.

In the learning phase 2005-2007 it became clear that, after the verified emissions report for 2005

were launched in 2006 that the cap had been set to high in relation to actual emissions. The result was that the price of 1000 tons emissions of CO2 dropped from 30 Euro to less than 1 Euro.

In the Kyoto period the cap was set 6% below 2005 verified emissions. This has created a real market for CO2 quotas and encouraged further investments in new abatement technologies.

In the Post Kyoto Phase the EU Commission has in January 2008 presented a new climate and energy package including a review of the existing EU emission trading scheme. The Commission proposed gradual reduction of emission allowances allocated to installations covered by the scheme, EU-wide harmonization of method and limited use of CERs for compliance.

Provided the Commission's proposals are accepted, in the post-Kyoto period power sector will not receive any allowances for free. Auctioning in other sectors covered by the scheme will be gradually increased until free allocation is phased-out by 2020.

Spot and Forward Trade in the Carbon Market at Nord Pool

Electricity generators emit substantial volumes of carbon dioxide, since much of its output is fuelled by coal or gas; consequently, electricity industry is one of the biggest sectors within EU covering more than 50 % of total EU allocation. This situation made it important for NordPool's customers to be offered a marketplace for emissions, and for Nord Pool to provide its customers with this opportunity.

Hence, Nord Pool was a pioneer in the development of emissions trading and was the first exchange in the world to list EUA and CER contracts (in February 2005 and June 2007 respectively).

The products that Nord Pool offer is for:

European Union Allowances (EUA):

- Physical forward contracts for 2008-2012, covering the whole Kyoto period
- Spot contract (Day-ahead EUA)

For Certified Emission Reduction (CER):

- Physical forward contract for 2008-2012. The contract is based on the EUA contract, with the same rulebook and is in accordance with EU ETS directive
- Combination products CER/EUA SWAP and SPREAD for 2008-2012

In the forward emission market there is a physical delivery of EUA and CER to the buyer and financial settlement to the seller, while the financial electricity market has only financial settlement.

In addition Nord Pool also trades green certificates for physical delivery, which are subjects to quotas for Swedish consumers.

Common Tasks in the Physical and Financial Market

Market Surveillance

In order for any market to be efficient and effective, it is necessary to maintain confidence in the pricing mechanisms, in the transparency of price relevant information and in the integrity of the market. Market surveillance (MS) has an important role in establishing and maintaining this confidence and integrity by having a strong and visible presence in the market. MS continuously monitors the market conduct of trading participants and investigates possible breaches of the trading rules or applicable laws.

Essentially MS is looking for any matters related to the market participants' business in the markets that are likely to have a substantial impact on the prices.

The main tasks of MS are to monitor and act if the surveillance team suspect that:

- Any member of the PEX tries to manipulate the market
- Any member of the PEX does not act in accordance with good business conduct
- Any member of the PEX misuse inside information that has not been made public

The Market Surveillance Team shall operate independently of other departments of the CEEPEX. At any time during the working hours of the exchange, at least one person must be charged with monitoring of the market.

Transparency and Market Information

Energy markets are complex because of the inherent interaction of physically traded commodities, highly technical fundamentals and financial contracts. In order to succeed in the market, market actors need access to accurate and reliable market information. Hence, to provide comprehensive market data service (MDS) of high quality is an important task for the market operator and for the TSO. Examples on market information could be:

- Real time feed
  Real-time access to prices and operational data in the power and emissions markets including Urgent Market Messages (UMM)
- FTP statistical database
  Historical database which contains information from the market operator and TSOs
- Reports
  Various weekly reports containing operational and physical market data
- Mobile market data (SMS/WAP)
  Get daily spot price update via SMS text-messaging or WAP

Annex 4: Questionnaire to and Response from Stakeholders in Austria and Hungary

Summary of the Results of the CEEPEX Demand Scoping Questionnaire

The following document contains the summary of the questionnaire about the startup of a new regional power exchange (CEEPEX). The document has been distributed and answered by the key stakeholders of CEEPEX in Austria and Hungary (including power plants, electricity traders, DSOs, etc.).
The first part of the summary highlights the framework, participants and rationale of the questionnaire, as well as the main conclusions derived. The second part contains the actual results and graphical representations of the received answers from the stakeholders.

The Questionnaire

The survey has been conducted between 10th and 17th July 2008 facilitated by the national regulators of Austria (E-Control) and Hungary (HEO). The questionnaire has been distributed to major stakeholders in Hungary and Austria, of which 15 replied.
The questionnaire contains 9 selection questions and an open ended comment space. The goal was to survey the sentiment of the market stakeholders towards the establishment of CEEPEX, and to get a feedback on several important questions about their needs (e.g. type of services/products, volume of trade). The questionnaire cannot be considered exhaustive, but it will serve as a baseline regarding the mentioned questions in the CEEPEX study.

Main Conclusions

- There is a **strong interest** in the setup of CEEPEX, with 64% of the respondents **showing willingness to invest** in the venture. No clear preference was visible regarding the ownership structure
- According to the results there is **equal interest from every type of stakeholders** (generators, DSOs, traders, etc.) to participate on CEEPEX market
- Respondents found the **Day-Ahead** and **Physical Forward** products, and the **Clearing/Settlement** and **Market Information** publishing services the most important for the CEEPEX
- The **volume of trade** on the market according to conservative assumption based on the replies would be upwards of **7 TWh** (it has to be stated that this only includes the Hungarian and part of the Austrian market)
- The following **countries were selected as "necessary"** for the optimal operation of CEEPEX: **Hungary** (93%) **Czech Republic** (86%) **Slovakia** (79%) and **Austria** (71%)
- With regards to **cross-border auction type** it is clear that the **Intra-Day** and **Day-Ahead** product **implicit auction** is preferred, while in the case of **Monthly** and **Annual** trading roughly an **equal** number of respondents preferred **explicit** to **implicit** auctioning
- It is also clear that during the introduction of the CEEPEX, stakeholders **prefer the Physical market** and the financial market is considered a nice to have feature

DEMAND SCOPING QUESTIONNAIRE

Dear Stakeholders!

As part of the "Organized Regional Electricity Market for Central Eastern Europe – Development of Business Model" project (referred to as "CEEPEX" project) a questionnaire is being circulated in order to assess the demands and expectations of major stakeholders.

The CEEPEX project has been initiated by The World Bank, e-control and HEO to develop a study on the proposed operating and business model for an organized regional electricity exchange. The main driver behind the support of the World Bank is the possibility to open a Power Exchange that can reach a sustainable level of liquidity by connecting regional markets. Geographically it covers mainly the Central Eastern European Region as foreseen in the Congestion Management Guidelines. For the optimal performance of a regional power exchange it is imperative to support the stakeholders' business by providing products and services that are both relevant and offer added value to all involved players.
The goal of the questionnaire is to pinpoint the circumstances, under which the major market players would find it convenient to be active on a regional power exchange on either side (seller, buyer, trader, investor).

Nord Pool Consulting AS and Accenture are participating in the project as external independent advisors to prepare the study addressing key factors of this project, like:

- Description of the CEEPEX regional power exchange operating model
- Product / service portfolio offered
- A business plan for the implementation

In order to ensure that the study matches the relevant stakeholder expectations to the highest possible extent key questions and topics were collected and assembled into this questionnaire.

We kindly ask you to fill in the questionnaire (found below) assisting us thereby to attain the above mentioned objectives. Please return the questionnaire duly filled by **17th July 2008 via fax or e-mail** to the following address:
E-mail: peter.b.barat@accenture.com
Fax: (36) 1-266-7709; Phone: (36) 30-827-2954

Should you have any questions in connection with the questionnaire please feel free to contact us at any of the above contact numbers or address.

Your kind co-operation is highly appreciated.

Kind regards:

Péter Barát
Accenture

Guide for filling out*: The questionnaire may be filled out electronically by clicking on and marking the checkbox beside the preferred answers. Please choose the answer(s) best suiting your requirements, save the final version and forward it to us as an attached file via e-mail. The questionnaire may also be printed and completed in paper form. In this case we are looking forward to receiving your answers in such paper form via fax.*

Q1: Stakeholder Information	
Company/Organization:	
Contact person:	
Telephone:	
E-mail:	

Q2: What attributes of a CEE regional power exchange do you consider vital compared to a national PX?	Important	Somewhat important
Liquidity	☐	☐
Transparent regional reference price	☐	☐
Regional market coupling	☐	☐
Adherence to EU regulations	☐	☐
Instant access to regional information	☐	☐
Regional clearing house to ensures secure settlement and to reduce counter-party risk	☐	☐
Efficiency due to economy of scale	☐	☐
CEEPEX would compete with bilateral contracts	☐	☐
Any other factor?		

Q3: What type of activity would you participate in, assuming a liquid CEE regional power exchange?	Buy (e.g.: retailer selling to end user)	Sell (e.g.: power plant)	Trade (e.g.: trading company)	Invest (e.g.: financial /professional)
Participation	☐	☐	☐	☐

Q4: Would you invest in the establishment of a CEE regional power exchange?	
Yes	☐
No	☐

Q5: Is there any preference regarding the owners of a CEE regional power exchange?	Preferred Ownership	Share of Ownership
States	☐	
TSOs	☐	
Power Exchanges	☐	
Other Exchanges	☐	
Generators	☐	
Traders	☐	
Financial Investors	☐	

Q6: Preferred Products and Services[7]	Imperative	Nice to have	Not needed
Products			
Day-ahead	☐	☐	☐
Intra-Day	☐	☐	☐
Virtual Power Plant (VPP)	☐	☐	☐
Balancing	☐	☐	☐
Ancillary Services including reserves	☐	☐	☐
Physical Forwards	☐	☐	☐
Financial forwards and futures	☐	☐	☐
Certificates related to emission reductions and energy efficiency	☐	☐	☐
Services			
Clearing (counterparty risk) and Settlement	☐	☐	☐
Market Surveillance	☐	☐	☐
Publishing of Market Information including UMM (Urgent Market Messages)	☐	☐	☐
Congestion Management via market splitting	☐	☐	☐
Auctioning of cross border capacities	☐	☐	☐
Certification of electricity traders	☐	☐	☐
Training	☐	☐	☐

Q7: Assuming that the CEEPEX is trading at a sufficient level of liquidity, what volume (GWh) would you be able to trade on CEEPEX a year?	
0-25 GWh	☐
25-50 GWh	☐
50-150 GWh	☐
150-500 GWh	☐
500-1000 GWh	☐
More than 1000 GWh	☐

Q8: According to your opinion which of the below listed countries must participate as foundation members of CEEPEX from the beginning?	
Austria	☐
Czech Republic	☐
Germany	☐
Hungary	☐

[7] Please refer to Appendix 1 for definitions

Poland	☐
Slovakia	☐
Slovenia	☐
Other (please specify)	

Q9: Please indicate which cross-border auction type would be attractive to you:	Implicit (Allocation of capacity together with energy trading)	Explicit
Intra-Day	☐	☐
Day-Ahead	☐	☐
Monthly	☐	☐
Annual	☐	☐

Q10: Market Type	Imperative	Nice to have	Not needed
Physical	☐	☐	☐
Financial [8]	☐	☐	☐

Q11: Other recommendations, remarks

Your kind contribution is highly appreciated!

[8] Please refer to Appendix 2 for definition

Annex 5: Explanatory Note on Insider Trading

Prohibitions on Market Manipulation and Insider Trading in Nord Pool's Financial Markets

1. Introduction and Disclaimer

This document provides a brief introduction to the regime on market manipulation and insider trading in Nord Pool's Market Conduct Rules ("MCR"), in light of the Market Abuse Directive with implementing Commission Directives and Regulations ("MAD") and various implementing laws in the EU/EEA area.
As a private-law rulebook sanctioned by Nord Pool, the MCR regime is not subject to a strict compliance requirement with regard to the MAD and national law definitions. Nord Pool has decided to apply the structure and content of the MAD definitions in the MCR regime.
This document addresses the main content of the regime in the MCR.
This document does not constitute professional legal advice and participants are advised to seek legal counsel if in doubt on legal matters.

2. Market Manipulation

The MCR market manipulation definition is – in line with the MAD – divided into four levels; (1) a general prohibition (2) examples of Market Manipulation (3) Accepted Market Practices relevant to Nord Pool and (4) Non-exhaustive signals of Market Manipulation.

(1) General Prohibition

The general prohibition covers two main types of manipulative conduct; (1) by transactions and orders to trade, and (2) by dissemination of information.
The expression "likely to give" means that also attempts are covered by the definition while at the same time qualifying the likelihood for the market being mislead by the relevant actions.
To meet this definition, it is not necessary to prove an actual influence on the price, demand for and supply of for a listed product but that it was more likely than not to give a false or misleading signal as to the price, demand for and supply of for a listed product.

(2) Examples of Market Manipulation

Level (2) in the MCR lists examples of market conduct which always will be deemed to constitute market manipulation. The list is in content corresponding to the examples listed in MAD. The list is not exhaustive, which means that also conduct with no similarity to the examples listed may be considered as market manipulation.
CESR – the Financial Supervisors in Europe - has in an explanatory document in April 2005 listed several other examples of market manipulation. Below please find the following extracts of the CESR list of examples adapted to our market:

False/Misleading Transaction

a. Wash trades. This is the practice of entering into arrangement for the sale or purchase of a listed product where the purpose is not to change beneficial interests or market risk, or where the transfer of beneficial interest or market risk is only between parties who are acting in concert or collusion.
b. Painting the tape. This practice involves engaging in a transaction or series of transactions with the purpose to give the impression of activity or price movement in a listed product.
c. Improper matched orders. These are transactions where both buy and sell orders are entered at or nearly at the same time, with the same price and quantity by different but colluding parties, with the purpose of misleading market.
d. Placing orders with no intention of executing them. This involves the entering of orders which are higher/lower than the previous bid/offer with the intention is not to execute the order but to give a misleading impression that there is demand for or supply at that price. The orders are then withdrawn from the market before they are executed. (A variant on this type of market manipulation is to place a small order to move the bid/offer price and being prepared for that order to be executed if it cannot be withdrawn in time.)

Price Positioning

a. Marking the close. This practice involves purposely buying or selling securities or derivatives contracts at the close of the market in an effort to alter the closing price of the listed product.

b. Abusive squeeze. This involves a party or parties with a significant influence over the supply of, or demand for, or delivery mechanisms for a listed product and/or the underlying product exploiting a dominant position with the purpose materially to distort the price at which others have to deliver, take delivery or defer delivery of the product in order to satisfy their obligations. (It should be noted that the proper interaction of supply and demand can and often does lead to market tightness but that this is not of itself market manipulation. Nor does having a significant influence over the supply of, demand for, or delivery mechanisms for an investment/product by itself constitute market manipulation.)

c. Creation of a floor in the price pattern. This practice involves transactions or orders to trade employed in such a way that obstacles are created to prices falling below a certain level.

d. Excessive bid-ask spreads. This conduct is carried out by intermediaries which have market power – such as market makers acting in cooperation – in such a way intentionally to move the bid-ask spread to and/or to maintain it at artificial levels and far from fair values, by abusing of their market power, i.e. the absence of other competitors.

e. Trading on one market to improperly position the price of a related market. This practice involves undertaking trading in one market with the purpose to improperly influencing the price of the same or a related market. Examples might be conducting trades in the underlying product of a commodity derivative to distort the price of the derivative contract. (Transactions to take legitimate

advantage of differences in the prices of financial instruments or underlying products as traded in different locations would not constitute manipulation.)

Transactions Involving Fictitious Devices/Deception

a. Dissemination or false or misleading market information through media, including internet, or by any other means (in some jurisdictions this is known as 'scalping'). This is done with the intention of moving the price of, a derivative contract or the underlying asset in a direction that is favourable to the position held or a transaction planned by the person disseminating the information.

b. Opening a position and closing it immediately after its public disclosure, with the purpose of manipulating the markets. The practice is typically carried out by portfolio managers and other large investors whose investment decisions are usually valued by market participants as relevant signals of future price dynamics.

Dissemination of False and Misleading Information

a. Spreading false/misleading information through the media. This involves behaviour such as posting information on an internet bulletin board or issuing a press release which contains false or misleading statements relevant to a listed product. The person spreading the information knows that it is false or misleading and is disseminating information to users of a regulated market is particularly serious as it is important that market participants are able to rely on information dissemination via such official channels.

b. Other behaviour designed to spread false/misleading information.
This type of market manipulation would cover a course of conduct designed to give false and misleading impression through means other than the media. An example might be the movement of physical commodity stocks to create a misleading impression as to the supply or demand for a commodity or listed commodity derivatives contract

(3) Accepted Market Practice relevant to Nord Pool
The purpose of the concept of Accepted Market Practices is to define "safe harbours" for potentially misleading market practises provided the participant proves a legitimate purpose.
None such practices are at present identified. Nord Pool will monitor the future development and possibly suggest regulatory acceptance of legitimate practices that would otherwise fall within the scope of the definition of market manipulation.
Participants are advised to notify Nord Pool if they wish a particular practice to be considered.

(4) Non-exhaustive signals
The definition of market manipulation is of a general nature and requires discretionary assessment where several factors may be relevant. The list of non-exhaustive signals in the MCR mirrors the list of signals in the MAD implementing directive and is meant as a tool for the market participant to foresee which factors Nord Pool and national regulators will emphasis on.

To meet one or more of these signals will not as such mean that the behaviour in question is considered as market manipulation.

3. Insider Trading

The Norwegian Securities Trading Act Section 2-2 has implemented the MAD definition of inside information on commodity derivatives, as follows:
Inside information about commodity derivatives means precise information which is not publicly available or commonly known and which directly or indirectly concerns one or more commodity derivatives and which the participants on the market where the derivatives are traded would expect to receive in accordance with what Kredittilsynet deems to be accepted market practice on the relevant market. Information which the participants would expect to receive means information which is normally made available to the participants on the market or information which shall be made public pursuant to statutes, regulations or other rules, including private regulations and past practice on the relevant commodity derivatives market or the underlying commodity market. The ministry may in regulations give further rules regarding inside information in connection with commodity derivatives and accepted market practice.
Consequently, “inside information” is to be defined “indirectly” by the disclosure requirements that are introduced by (i) public law/regulators, (ii) market expectations/market practise and (iii) rulebook/practise by the relevant exchange/market operator.
No public or regulatory laws have been issued with respect to disclosure requirements concerning Nord Pool’s listed products. The MCR disclosure rules annex qualifies as (iii) and consequently, trading with privileged access to inside information as defined by Nord Pool’s disclosure rules annex will qualify as insider trading also under national law (provided further terms and conditions are met)
Nord Pool do at present not see any supplementing “disclosure practice” in its markets, in particular as inside information is defined in the MCR annex to include any matter of material importance. This means that the disclosure rules annex in our opinion is exhaustive as to what constitutes “inside information” in Nord Pool’s listed products and that market participants may rely upon our definition.
“Inside information” is defined in the MCR disclosure rules (enclosure 1) to include any information of a precise nature which has not been made public relating to the Relevant Markets and which, if made public, would be likely to have a significant impact on the prices in one or more Listed Product. The Relevant Markets are the Nordic electricity market, the Nordic financial electricity market, the Nordic green certificate market and the European allowance market. The inside information definition also include specific rules on outages etc.
This definition has not been changed upon MAD implementation.
As concerns the prohibitions on insider trading please note that the MCR prohibit Exchange Members and Trading Clients from registering Orders and entering into Exchange Transactions when holding Inside Information, with the exemption for Exchange Trading where the Exchange Trading operations are separated from the departments where persons employed hold Inside Information.