

## Electricity Market Group

### *Status of harmonisation in the Nordic electricity market*

2008

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## Abbreviations

DSO	Distribution System Operator
EMG	Electricity Market Group
ERGEG	European Energy Regulators
ISO	Independent System Operator (system operation)
NCM	Nordic Council of Ministers
Nordel	Organisation for the Nordic TSOs
NordReg	Nordic Energy Regulators
NISO	Nordic Independent System Operator (system operation)
NTSO	Nordic Transmission System Operator (grid- and system operation)
RIO	Regional Independent system Operator = NISO
TSO	Transmission System Operator (grid- and system operation)

## **Introduction**

The Nordic electricity market is the most harmonized cross border electricity market in the world. Through several important milestones, the market has grown from four national markets, to becoming one, common Nordic electricity market. Though there are still issues to be resolved, it should be acknowledged that the Nordic electricity market actually serves as an example for other regional actors such as the EU.

The Nordic Council of Ministers for Energy underlined the importance of the Nordic electricity market in their 2007 declaration from Helsinki. This note summarises the Electricity Market Groups follow-up efforts to that declaration.

The objective of the Nordic electricity market is to maximise social welfare in the Nordic region. The basis for participating in trade is long-term gains for all countries. A prerequisite for good cooperation is a common understanding of the main objectives. A joint understanding of the fundamental objective would ease the achievement of agreement on sound principles to attain the goals.

Nordic market integration then is based on the principle of overall gains for all countries.

## **Background**

The Nordic Council of Ministers' (NCM) vision is for "a free and open market with efficient trade with neighbouring markets" (Louisiana 1995), and further, for the Nordic electricity market to be "a strong and active force in forming energy policy in the Nordic region and in Europe" (Akureyri 2004).

Whereas there is a long tradition and strong political support for the Nordic energy co-operation, there has not been a legal basis for it; the cooperation is based on consensus and common understanding. With the increased regional co-operation in the EU there is now a legal obligation to cooperate and harmonise in the Region Northern Europe (as defined in the Congestion management guidelines by the Commission) according to Regulation 1228/2003.

The Electricity Market Group (EMG) is responsible for following through resolutions from NCM, coordinating the work through the year and preparing background documents for the Ministers' annual meetings. The members of EMG are:

- Flemming G. Nielsen, Danish Energy Authority (Chairman)
- Peder S. Bjerring, Danish Energy Authority
- Petteri Kuuva, Ministry of Employment and the Economy, Finland
- Arto Rajala, Ministry of Employment and the Economy, Finland
- Kjell Grotmol, Ministry of Petroleum and Energy, Norway
- Cathrine Holtedahl, Ministry of Petroleum and Energy, Norway
- Christina Simon, Ministry of Enterprise, Energy and Communications, Sweden (from 1 June 2007)
- Magnus Blümer, Ministry of Enterprise, Energy and Communications, Sweden
- Vivi Mathiesen, Nordic Energy Research (Secretary until 31.12.07)
- Amund Vik, Nordic Energy Research (Secretary from 01.01.08)

Milestones in the harmonisation process:

- 1993 Introduction of a common spot market between Norway and Sweden, removal of border tariffs
- 1995 Louisiana declaration by NCM – on a free and open market
- 1996 Nordpool is established as the first international power exchange (Norway – Sweden)
- 1998 Finland joins the Nordic spot market (Nordpool)
- 1999 West-Denmark joins the Nordic spot market (Nordpool)
- 1999 the first agreement on "Systemdriftavtalet" was signed between the (at that time) five TSOs within Nordel. (Updated continuously).
- 1999 Extended intra day market, Jylland
- 2000 East Denmark joins the Nordic spot market (Nordpool)
- 2000 Extended intra day market, Sjælland
- 2000 CfD trading launched in Nord Pool
- 2002 Common Nordic regulation power market
- 2004 Nordel agreement on the first package of five prioritised Nordic grid enforcements
- 2004 Akureyri declaration by NCM - deepened integration of the TSOs
- 2005 NordReg announces vision of one common retail market within 2010
- 2006 Bodø declaration by NCM - strengthening vision of the Nordic electricity market as one efficient liberalised market
- 2007 Nordel agreement on further common principles for Balance management.
- 2007 Helsinki declaration – focus on TSO services.
- 2008 Market Coupling DK/DE

The following key actors are involved in the harmonisation process:

- Nordel, the organisation of the Nordic Transmission System Operators (TSOs) at least until the end of 2008
- NordReg, the cooperation body of the Nordic energy market regulators
- Nordenergi, the cooperation body of the Nordic energy industry associations
- Nord Pool, the Nordic power exchange
- The Electricity Market Group (EMG) as coordinators of the harmonisation process on behalf of the Nordic Council of Ministers

The objective of the Nordic energy co-operation is to create the best possible framework for the development of the Nordic electricity market, and therefore to serve as a model for the rest of Europe (Action Plan for Nordic Energy Co-operation 2006-2009). The annual meetings of the Nordic energy ministers set the course of the cooperation.

This note is EMG's input to the Nordic Council of Ministers meeting in Umeå in September 2008, summarising key elements in the harmonisation process for the Nordic electricity market.

## **The Helsinki declaration**

*“The development towards a borderless Nordic energy market is to be furthered. Grid investments should increase, and further harmonisation of rules and regulations for TSOs and market actors shall be prioritised to increase trade and establishment of new actors. The Ministers ask the Committee of Senior Officials to investigate if and how a Nordic Independent System Operator, with responsibility for operation, development and investment planning may be established.”  
(Nordic Council of Ministers, Helsinki 2007)*

The Nordic Council of Ministers (NCM) for Trade, Energy and Regional Policies met in Helsinki in September 2007. Their common declaration (hereby referred to as the Helsinki Declaration) has laid the foundation for the work of the Electricity Market Group in 2007/2008.

In their declaration the ministers focused on the Transmission System Operators (TSOs) in the Nordic Electricity Market.<sup>1</sup> Many of the crucial remaining issues in the market are related to the system operation. The ministers decided in Helsinki that the Committee of Senior Officials for Energy should investigate the possibilities for creating a common Nordic System Operator. The ministers wanted to know *if and how*, a Nordic System Operator could be established. The Committee for Senior Officials then delegated this task to the EMG.

The declaration also underlined the importance of furthering the harmonisation process – towards a borderless Nordic electricity market, and that the Nordic grid investments should be increased. The furthering of the Nordic electricity market should be seen in context of the increased European harmonisation efforts.

## **Helsinki declaration follow-up**

The Electricity Market Group (EMG) has focused on the following tasks from the Ministers' declaration, and has asked Nordel, NordREG, Nordenergi and Nord Pool respectively to suggest solutions to tasks with the following headlines, 1- 5.

1. Investigating if and how a Nordic Independent System Operator could be established
2. Congestion management
3. Peak Load arrangements
4. Balance management
5. Common end user market

Beyond these specific tasks, EMG is responsible for overseeing the functioning of the market in general and monitoring consequences of policy instruments for the Nordic electricity market, such as:

- EU ETS (Emission Trading Scheme)
- The market for green certificates in Sweden and other incentive schemes for green electricity
- EU directives / EUs third energy market package

In following up the Nordic Council of Ministers declaration, the EMG has had meetings with the relevant stakeholders in the process. In March 2008 the EMG had meetings with Nordel and NordREG where their responses and reports were presented.

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<sup>1</sup> The Nordic TSOs are: Statnett (NO), Svenska Kraftnät (SE), Fingrid (FI) and Energinet.dk (DK). The TSOs are organised through Nordel.

The EMG has in 2007/2008 received the following reports from NordReg and Nordel:

NordReg

- *Harmonised Supplier Switching Model*
- *Harmonised Nordic Balancing services*

Nordel

- *Description of Balance Regulation in the Nordic Countries*

Related to task 1, investigating if and how a Nordic Independent System Operator could be established, the EMG has received position papers from Vattenfall, NordReg and Nordel.

In addition, Nordel published its *Grid Master Plan* in March 2008.

For task 2, Congestion management, the EMG has received Ea Energy Analyses, Hagman Energy and COWI's report

- *Congestion Management in the Nordic Market - evaluation of different market models*

The consultant report was commissioned by the EMG in autumn 2007.

For task 3, Peak Load arrangements, representatives from the EMG participated at a workshop about this subject, organised by NordREG.

These reports will be presented in more detail later in the text.

## **Nordic action**

The tasks and the EMGs recommendations are summarised below. Where the EMG finds it appropriate, new actions are recommended.

### **Task 1: Investigating if and how a Nordic Independent System Operator may be established**

*The Ministers ask the Committee of Senior Officials to investigate if and how a Nordic System Operator, with responsibility for operation, development and investment planning may be established."*

The background for the initiative of the Nordic council of ministers in Helsinki 2007 was to accelerate the harmonisation process in the Nordic electricity market as regards investments and regulatory frameworks. The key challenges today are system investments and planning in a Nordic perspective and agreement on harmonised principles for congestion management. Further, a harmonised Nordic balance management, common Nordic peak load arrangements and a common Nordic retail market has been discussed as challenges that still exist today. Apart from this, future influx of renewable energy and the further development in the EU has been discussed.

In an evaluation of whether a change in the organisational structure of the TSOs is needed, the question of whether such a change would facilitate solutions to the key challenges in the market today should be assessed.

It is obvious that several of the key challenges can be solved without a company- based integration. Further, it can be advocated that these challenges must be solved before the countries would be willing to give up some of the sovereignty over the company and national energy policy, and establish a Nordic TSO (NTSO) or a Nordic ISO (NISO).

With the current EU discussions as a backdrop, and emphasising the need for transparent and effective operation and grid expansion, a Nordic TSO alternative seem more appropriate for the Nordic market than an ISO. To separate the grid ownership from the system operation need not to be the best way of attaining more Nordic grid investments. There are benefits of having the system operator organised as a TSO, as this e.g. promotes an efficient operation and maintenance of the grid and gives incentives for investments. If a Nordic ISO was to be established, this body would be the overall system planner, but would not complete any grid investments, as the investment decision would lie with the grid owner. This could lead to inefficiencies, and is why the ISO- model by many stakeholders is regarded as less optimal than the TSO-model. In the consideration of whether or not to establish a Nordic ISO, the disadvantage of *not* having a TSO should be weighed against the benefits of having a system operator with a Nordic perspective.

It seems to be decisive that the mandates given from the national authorities are strong in the establishment of a NTSO/NISO. If not, there would be a high probability of interference from the national governments that would hamper both the efficiency of the NTSO/NISO, and in worst case also the security of supply. Hence, the governments must be willing to give up some sovereignty in order to achieve a well-functioning Nordic system operator, something that demands strong political commitment from the four countries involved. This applies for both the establishment of a NTSO and a NISO. However, if a Nordic system operator also should own the grid (NTSO), the need for political commitment is even more crucial, as this

would imply giving up the ownership to the grid assets for the national TSO. As the grid is often considered as critical infrastructure, this can be quite a challenge.

The obstacles connected with choosing a NISO or NTSO for further harmonisation is identified as being among others; ownership issues, tariff harmonisation, regulatory challenges and willingness to give up sovereignty. These factors constitute severe challenges and costs. As the TSO-organisation we have in the Nordic region today is well-functioning, there should be considerable benefits involved with a Nordic ISO in order to "make it worth" changing the today's structure. There are considerable uncertainties when it comes to the benefits of creating a Nordic ISO and there is lack of experience from other regions.

EMGs view:

In EMGs view, a Nordic ISO is not assessed as being "the tool" to solve the problems at hand in the Nordic electricity market today. Further, the EMG assess that going in the direction of a Nordic ISO would *not* make the Nordic electricity market better suited to tackle the challenges that lie ahead. Separating the grid ownership from the system operations is *not* perceived as a step in the right direction. Regarding grid investments and system operation, it is EMGs view that other measures could prove more fruitful for the Nordic electricity market.

It can also be argued that before going to the step of establishing a Nordic transmission system operator, the TSO's should reach a higher degree of harmonisation based on co-operation. Common playing rules would facilitate an eventual creation of a Nordic transmission system operator at a later stage and would be crucial with regards to the strength of the mandate given from the governments to such an organisation.

In dialogue with and between the Nordic TSO's and NordReg, the following measures could contribute to untangling some of the issues raised by stakeholders in this process.

- Nordels new Grid Master Plan and its new prioritised grid investments is welcomed. These investments and the five previously proposed investments will contribute to increase the power flow and reduce the congestions in the Nordic market.
- The grid planning and strategic work done by the Nordic system operators should be strengthened and continued.
- The national grid investment criteria should be compared, and, on the basis of the identified difference, find room for a more Nordic approach than today's national and local focus.
- Continued focus on congestion management issues.
- Continue and encourage the ongoing work in NordReg regarding harmonising the Nordic regulation.

EMG recommendation:

The EMG does not recommend that a *Nordic Independent System Operator* is established.

The EMG recommends that the current model of TSO cooperation in the Nordic Region be furthered and improved. Taking the step to a more company based harmonisation of this cooperation is not viewed as realistic at the present.

In order to maintain its position as forerunner, the Nordic electricity market needs to improve in several ways. The most crucial aspects in the future harmonisation of the Nordic market will be how to enhance the Nordic perspective within the TSO's grid planning, to facilitate the proposed Nordic investments to be realised. Connected to this is the issue of harmonised principles for congestion management, see task 2.

## **Task 2: Congestion management (including grid investments)**

*"Nordel's work for the Nordel System Development Plan including Nordic grid investments is much welcomed. Nordel is invited to present results as soon as possible."*

*"An independent consultant should be commissioned to further analyse the two approaches for congestion management issues, aiming for an optimal balance between competition issues and efficiency. EMG will commission and co-ordinate the work with such a report."*

In response to this task, Nordel published the report "Grid master plan 2008". Further, EMG commissioned a consultancy study during 2007/2008. The study has resulted in the report "Congestion Management in the Nordic Market - evaluation of different market models" (EA, COWI and Hagman Energy). The results from the two reports will be outlined in the following.

### *Nordic grid investments*

Grid investments improve the function of the Nordic electricity market. To remove structural bottlenecks and to strengthen the Nordic grid is important for the common electricity market.

Nordel agreed on the first package of prioritized Nordic grid investments in 2004. The investments suggested in that report was:

1. Fennoskan II (Decided)
2. Great Belt (Decided)
3. Nea - Järpströmmen (Decided)
4. South Link (Decided)
5. Skagerrak IV (Letter of Intent, concessions applied)

Except the Skagerrak IV link, the previous prioritised package has been decided upon. Regarding the Skagerrak IV link both parties have applied for concession by the regulatory authorities in their respective country. An eventual investment decision will be taken after the concessions process.

In their new Grid Master Plan, Nordel proposes three new links to be strengthened:

1. Sweden - Norway (South): South-West Link
2. Sweden - Norway (North -South axis): Ørskog - Fardal
3. Arctic region: Ofoten - Balsfjord - Hammerfest

According to Nordel, after the five previous links and the three new ones are in place, the Nordic electricity market will have less than 2€ in price difference 79 percent of the time. These calculations are, however, sensitive to other grid expansions being made to the rest of the EU area.

The Nordel Grid Master Plan 2008 together with the previously decided projects is expected to reduce the congestion in critical bottlenecks in the Nordic system by 80 % compared to the current situation and thereby the occurrence of price differences between different areas in the Nordic

electricity market (based on Nordels calculations in the Grid Master Plan 2008).

#### *Harmonised principles for Nordic congestion management*

Congestions in the grid will naturally occur, and must be handled. Transmission investments are resource demanding and the lead times are also long. It is therefore important to have clear principles on how to operate the existing grid in the most efficient way. This is particularly important for so called internal congestions. Efficient handling of congestions will benefit the common Nordic electricity market, Nordic consumers and producers in general.

There are basically **two principal approaches** as to how congestions (of important scale and durability) are dealt with in the Nordic market today. The approaches are:

- Market splitting
- Counter trade

There are different opinions as regards how the market should be split up to achieve an efficient management of congestions. That is to say, how large and small should the Elspot areas be?

To find new solutions to the congestion management issues, the EMG commissioned a consultancy study during 2007/2008. The study has resulted in the report

- *Congestion Management in the Nordic Market - evaluation of different market models (EA, COWI and Hagman Energy)*

Market splitting is a simplification of so-called nodal pricing, where adjacent nodes, which are perceived to be connected by a strong grid, are aggregated into zones. The market splits into price zones (or areas) when the power flows between zones reach the capacity between the zones. This does not, however, resolve congestion within a zone nor strictly adhere to electrical laws.

Counter trade traditionally takes offset after a given spot market solution and the responsible TSO resolves residual congestion in bilateral trade by providing incentives for generators, and possibly consumers, to diverge from their spot market position. Counter trade is presently conducted by individual TSOs using the resources available in their operating area. The daily process is based on bilateral communication between TSOs and a limited number of generators and on occasion some larger consumers. By this process neither local resources nor resources outside individual TSOs operating area are used efficiently. The practice may be combined with export or import capacity reductions in the spot market, which reduce the need to counter trade, but which often have questionable side effects with respect to overall efficiency.

The principal difference between congestion management regimes based on market splitting and counter trade is that market splitting resolves congestions in the spot market clearing whereas counter trade solves congestion after the spot market has been cleared. The two regimes result thus in different electricity prices in the spot market and thereby different incentives and economic consequences to power producers and consumers. Moreover, there will be implications for long-term investment signals as spot prices are different in the two regimes.

The two methods give different signals to the TSOs regarding the incentives for grid investment. The market splitting model gives direct information to the TSOs on the price differentials and thus the socio-economic value for

producers and consumers of the congestions. The TSOs must have an obligation to invest in the grid based on a socio economic assessment. With counter trade, the TSOs get a direct incentive to invest through the counter trade costs. Also in the counter trade system, the TSOs have a socio economic obligation to invest.

A generator with market power in a specific area can exert its power and increase its profit by strategic bidding whether the area is a separate spot area or the area is included in a bigger spot area and the TSO has to relieve congestions by counter trade. There are no general conclusions as to whether market splitting or counter trade give the best scope for profit increases for a generator with market power. Different examples give different results and the scope for increasing profit is also dependent on the efficiency of market surveillance

The main result of the principle model used in the analyses is that in situations when congestion is anticipated, there is more strategic bidding and less resource efficiency if counter trade is used instead of market splitting. The main advantage of counter trade is that it enables the use of fewer spot areas and thereby more competitive retail markets, at least in areas where the customers choose fixed price contracts. Negative effects of strategic bidding and less resource efficiency have to be compared with negative effects on the retail competition on a case by case basis in order to reach an optimal balance between efficiency and competition.

In the analysis, the current seven spot areas of the Nordic market and the current practise of transmission capacity restrictions to resolve internal congestion have been defined as the baseline and then compared to a market divided into more spot areas or into less spot areas (one, four and six). The results of this analysis show that all changes from today's practice regarding capacity reductions yield a modest socioeconomic benefit, with the 11 area case being the most beneficial.

Based on the analysis in the report, the winners will be consumers on the continent and the Nordic generators. The losers will be the Nordic consumers and the generators on the continent. The size of these effects varies between the Nordic countries.

These are the recommendations from the consultancy consortium:

**1) It is recommended that new areas are established as separate Elspot areas or separate bid areas within existing Elspot areas for CM of cut 2 and cut 4 in Sweden, cut P1 in Finland and the congestions west of Oslo.**

The Consultants have no firm recommendation as to whether the new areas should be established as separate Elspot areas or separate bid areas within existing Elspot areas. Negative effects of strategic bidding and less resource efficiency have to be compared with negative effects on the retail competition on a case by case basis in order to reach an optimal balance between efficiency and competition. However, The Consultants want to stress that the most important prerequisite for resource efficiency is that the present reduced capacity allocations to Elspot come to an end. If there is uncertainty regarding the division of a certain Elspot area into bid areas or spot areas, it is better to establish the new areas as separate bid areas first and then later decide if they are to be changed to separate Elspot areas based on experience of the amount of counter trade in the common Elspot area. The worst alternative is to postpone the decision and thereby not end the present reduced capacity allocations to Elspot.

**2) The Consultants recommend the following method as a feasible method for counter trade in Elspot if new bid areas are established within an Elspot area.**

The new bid areas shall be established within the Elspot area so that bids on the deficit and surplus sides of the congestion can be separated from each other. In the first Elspot calculation, all bid areas are treated as Elspot areas. Congestions between bid areas are thus managed by market splitting and the result is the same market clearing and the same power flows as if the bid areas had been Elspot areas. Afterwards, a second calculation is performed for a certain Elspot area if the first calculation has resulted in different prices for bid areas that are within that Elspot area. As input, the second calculation uses the same power flows with other Elspot areas that were established in the first calculation. The purpose of the second calculation is only to establish a common spot price for the Elspot area and to perform the most cost-effective counter trade to relieve the congestion that arises as a consequence of the common spot price. The most cost-effective counter trade is a counter trade that gives the same dispatch within the Elspot area as the dispatch that was achieved in the first calculation. Thus, the second calculation does not change the power flows with adjacent Elspot areas. The final result in the Elspot market will be the same price signals in other Elspot areas and the same dispatch in all areas as if all bid areas had been different Elspot areas and only market splitting had been used.

**3) The Consultants recommend that all bid areas and Elspot areas are treated as separate areas in the intra-day market (Elbas) and the regulation market**

There will be misleading incentives for intra-day trade if there is only one common price in the intra-day market in situations when the counter trade in Elspot has resulted in different prices for counter traded volumes in the surplus and the deficit areas. The recommendation will enable efficient intra-day markets and regulation markets with less special regulations and unnecessary reductions in transmission capacities. It will also enable better management of peak-load situations.

**4) The Consultants do not recommend that the TSOs shall always allocate a guaranteed transmission capacity to the Elspot market even if the physical capacity is lower because of e.g. outages.**

The Elspot market is not a more efficient market if TSOs are obliged to guarantee that the transmission capacities are always a certain percentage of the normal levels. A market clearing of the day-ahead market that reflects the physical realities should be encouraged – not concealed.

EMGs view:

Today there are congestions within all Elspot price areas, in various degrees. These are handled within the national borders, and all countries occasionally reduce the capacity on the borders. This leads to inefficiencies in the Nordic electricity market. Solving the issues regarding congestion management is one of the most crucial aspects of further electricity market harmonisation.

One of the most important issues when it comes to reducing the congestions in the Nordic grid is timely grid planning in order to expand the interconnection capacity (whenever such an expansion is considered to be profitable according to socioeconomic criteria).

Besides timely grid investments in order to reduce congestions, it is of due importance to find harmonised principles for congestion management, as congestions always will exist and must be handled. An efficient congestion management in the Nordic electricity market would improve the functioning of the market.

The EMG supports some of the conclusions and recommendations from the consultants, and will initiate a process with the relevant actors in this matter, see recommendations below.

Nord Pool Spot has in a position paper regarding the Ea/Hagman study stated that the bidding area model may have adverse effects on the market. Hence, if some of the countries want to choose this model instead of price areas, the TSO should be responsible for analysing the eventual effects an implementation of this model can have on the market.

#### EMG Recommendations:

##### *Nordic grid investments*

There is a need to further facilitate investments in the grid that are beneficial in a Nordic perspective. The issues regarding allocation of costs and benefits of Nordic grid investments must now be addressed. Progress on this issue is critical, as projects may have costs in one country and benefits in other countries. The current situation in the grid infrastructure and the history of grid investments should also be taken into account. EMG should evaluate the current situation as regards grid investment and investment criteria and find solutions on how to enhance the Nordic perspective in these processes. The aim should be to give the TSOs and the regulators a stronger Nordic mandate in order to promote the investments needed. This may lead to amendments in the legislations, regulations, concessions and mandates.

To strengthen the "Nordicness" of the grid planning process, the EMG propose:

- The Nordel Grid Master Plan 2008 is welcomed, and works on the previous and new proposed grid investments should commence as soon as possible.
- The grid planning done by the Nordic system operators should be strengthened. The planning committee of the Nordic system operators should be given a strong mandate to propose investments that are socio economically sound for the entire Nordic grid.
- The analyses and data foundation of the Nordic TSOs' plans should be made public – to improve transparency in the process.
- EMG shall evaluate the current situation as regards grid investment and investment criteria and find solutions on how to enhance the Nordic perspective in these processes. NordREG and The Nordic TSO's should be consulted after the EMGs initial work. EMG shall give their recommendations before the next meeting of the Nordic Council of Ministers for energy.

##### *Harmonised principles for Nordic congestion management*

Based on, among other things, the new report from EA, Hagman and COWI, as well as discussions with stakeholders at the Electricity market seminar in Stockholm 26 – 27 May, the EMG recommend that the following steps be taken:

- *In order to manage the existing problems with congestion management and to facilitate an efficient Nordic wholesale market, the NCM will ask the national TSOs to start the process of splitting the Nordic market into additional price/bidding areas. The present situation indicates that 11 areas could be feasible.*
- The TSOs must address to the relevant national authorities the necessary changes needed in national legislation, regulations and concessions in order to carry out the proposed changes. The TSOs shall keep their national authorities continually informed on their progress.

- It will be the TSOs task to solve the specific administrative, practical and technical issues regarding this change in market design. The TSOs must find an appropriate way of organising the cooperation on this work.
- The TSOs should make the necessary market changes no later than the end of 2010.
- The national authorities are responsible for carry out the (eventual) necessary legislative, regulatory and concessionary amendments. NordREG shall have an active role in this process.
- The Nordic TSO's shall inform the Nordic Council of Ministers and the EMG on their progress before the next meeting of the Nordic Council of Ministers for energy.
- If some of the countries want to choose bidding areas instead of price areas, the TSO in the respective country should carry out analyses of the effects on the market and report back to the relevant authorities. In this process, Nord Pool Spot should be consulted.
- In case of adverse effects on the market, it is recognized that the national authorities also have an alternative to return back to the current congestion management method.

### Task 3: Peak load arrangements

*“NordREG is invited to make an assessment of Nordel's proposal, focussing on to what extent common Nordic principles is needed, and how these principles should be designed to minimise the impact on the market. The analysis should focus on implications for prices in the short term (extreme situations) and long term, power flows and investments.”*

Nordel was in 2006 invited by EMG to study if and how a joint Nordic solution on long term is needed to secure the sufficient peak load capacity investments. The backdrop for this was the EU directive 2003/54/EC that requires that each country “shall ensure the possibility, in the interest of security of supply, of providing new capacity or energy efficiency/demand-side management through a tendering procedure (...)”

In February 2007, Nordel published their “Guidelines for transitional peak load arrangements”. The proposed guidelines imply harmonised principles for national arrangements if there is a need for peak load resources in the power system in the relevant country. The guidelines include common methods for assessment of the power system adequacy and relevant market design issues. The tendering procedure is aimed to be the last resort if market mechanisms fail, and the implementation will be a national decision.

The guidelines stressed, among other things that:

*Before implementing a tendering procedure the Nordic TSOs should be consulted to evaluate how the peak load arrangement may affect the market with the aim to minimise the negative impact on the market. A peak load arrangement should be an exceptional and temporary solution*

*to overcome a critical period. The time period of the arrangement should be fixed in advance and as short as possible depending on the situation in the country concerned, with a maximum length of 3 years. (Nordel 2007)*

NordReg was asked to comment on Nordels proposed guidelines for transitional peak load arrangements. To do this, NordReg commissioned a study by EC Group, to investigate Nordels proposal, focusing on the extent to which Nordic common arrangements are needed, and how these Nordic principles should be designed.

In May 2008, NordReg organised a workshop about peak load capacity with the relevant stakeholders and the consultant from EC Group, who presented the study.

NordReg has, however, been delayed in making a decision on this issue, given that the Swedish regulator (Energy Markets Inspectorate) has been given a national task to evaluate the Swedish Peak Load arrangements as the legal basis of this arrangement expires by the end of 2011. NordReg has decided to do their analysis of Nordels proposal in parallel with the Swedish study, and will deliver a report to the EMG early 2009.

#### EMG recommendation:

- The Nordic TSO's are invited to continue their work on common guidelines. The EMG invites a joint process by NordREG and the Nordic TSO's to work on this issue in parallel with EIs national study, and report back to the EMG early 2009. Based on this work, the EMG will give their recommendations before the next meeting of the Nordic Council of Ministers for energy.

## **Task 4: Balance management**

*"The national authorities are invited to initiate a process with the relevant institutions within each country, with the intention of implementing the suggested principles in 2009, as proposed by Nordel."*

*"NordREG is invited to continue the work with a more harmonised regulation power market in cooperation with Nordel. The aim should be to find common Nordic standards for price setting, bidding and quality control, increased transparency and a common gate closure in the regulation power market."*

*"The TSOs are asked to publish detailed descriptions of the existing rules and operations of the regulation power market."*

In 2006, Nordel delivered the report "Balance Management - Common principles for cost allocation and settlement" and in 2007 the report "Harmonisation of the balance management" where suggestions for harmonisation of the balance management in the Nordic countries were introduced.

In 2007, EMG welcomed the proposal for a harmonised Nordic balancing mechanism, as a common balancing mechanism can improve and simplify the operation of e.g. suppliers to act in the whole Nordic market and supply customers in more than one country. This will also contribute to strengthening the Nordic market in a regional / EU context.

In the aftermath of the Helsinki meeting of the Nordic Council of Ministers for Energy, the national authorities have been invited to initiate a process with

the relevant institutions in each country in order to implement proposed changes of Nordel for a harmonised balance management.

In 2008, NordReg published the report "Harmonised Nordic Balancing services". The report is a first attempt to create a common Nordic interpretation of the 2003/54/EC Directive criteria. NordReg recommends that Nordels vision of a common Nordic balance management should be used by the Nordic regulatory authorities when approving the terms and conditions for balancing.

In their report, NordReg proposed a revised roadmap for further harmonisation work in this area. They propose action in three phases:

- Actions needed to implement the Nordel proposal by 2009 – these actions need to be taken by the TSOs, national regulatory authorities, in some cases by governments, and by the balance responsible parties.
- Actions needed to evaluate the effects of the new balance settlement after the implementation, including information collection and evaluation of fee structures.
- Further work in order to continue the harmonisation process for a common Nordic balance management.

The Nordic regulators will cooperate with each other to support the process towards a common Nordic balance management.

In their report "Monitoring of Nordic Regulating Power market" in 2007 NordReg concluded that there was a lack of transparency regarding balance management in the Nordic Electricity market. The EMG then requested that Nordel deliver a description of the current rules and operations in the Nordic regulating market.

In March 2008 Nordel delivered the report *Description of Balance Regulation in the Nordic Countries*. The report outlines the current situation in the balance management in the Nordic countries.

The Nordel proposal is now being discussed with the regulators and other relevant stakeholders in the region. The goal is to implement changes in the legislation within 1 January 2009.

#### EMG recommendations:

- The EMG welcomes the actions taken by the TSOs and the regulators, to be implemented before next years meeting of the Nordic Council of Ministers.
- NordREG should continually evaluate the effects of the new balance settlement, and take new actions towards a common Nordic balance management.

## **Task 5: Common end user market**

*"NordREG is asked to proceed with activities towards the vision of a common Nordic retail market. It should be considered whether the activities are beneficial in a Nordic, socioeconomic perspective. NordREG should take account of the business aspect for suppliers in one common retail market, also considering influences of activities to retail customers and retail and distribution prices in each country. Nordenergi shall be consulted."*

Following up the Helsinki declaration, one of the tasks identified by the EMG was to further the work with a common Nordic end user market. In March 2008, NordReg delivered the report *Harmonised supplier switching model*. This report outlined the potentials for harmonising the way the consumers switch suppliers – to make it possible for instance, for consumers in Sweden to purchase electricity from suppliers in Finland.

The report compares the different practises in the Nordic country for switching supplier. Based on the identified differences between the countries, the report suggests efforts to increase harmonisation. Implementing the changes recommended in the report incurs changes in the legislation in the four countries, though for the market participants it mostly requires a change of IT systems. NordReg underlines the importance of that the legislative framework be in place before the market participant's start harmonising their IT systems.

Based on the argumentation from NordReg, it is necessary to establish a political agreement on the issue, "to initiate the preparation of the needed changes in the legislation and the regulatory framework for each country".

Establishing a common end-user market for electricity in the Nordic region could be a suitable next step in the harmonisation process. It is however crucial that the relevant stakeholders have sufficient information in order to make the necessary political decisions.

The Nordic prime ministers held their summer meeting on 18 and 19 June at Punkaharju in 2006. They shared a positive attitude towards the opportunities and challenges of globalisation for the Nordic countries. The declaration from the Punkaharju meeting outlined a Nordic Approach to globalisation.

*"Nordic co-operation must also be reinforced in the energy sector. The Nordic electricity markets shall be harmonised, and investments in power transmission and production shall be increased in order to make the Nordic electricity market more efficient, borderless and stable. This would guarantee security of electricity supplies in the Nordic countries"*<sup>2</sup>

In the aftermath of this declaration, the Nordic Council of Ministers has earmarked money for globalisation projects. The Nordic Council of Ministers' globalisation initiative has enabled the EMG in cooperation with Nordreg to conduct a further analysis of the costs and benefits of a common end user market in the region.<sup>3</sup>

Through the Nordic Council of Ministers Globalisation Initiative, the EMG funds a further study by NordReg, to investigate the expected costs and benefits from uniting the Nordic end-user markets.<sup>4</sup>

Deliverables from the study will be available in November 08, and should create a good basis for a decision about further integration on the retail level.

EMG recommendation:

- The EMG awaits the cost-benefit analysis in November 2008.

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<sup>2</sup> Prime ministers' declaration, Punkaharju 2006

(<http://www.norden2007.fi/Public/default.aspx?contentid=92863&nodeid=36238&contentlan=2&culture=en-US>)

<sup>3</sup> For more information on the NCM globalisation initiative see [www.norden.org](http://www.norden.org)

<sup>4</sup> The new cost-benefit analysis is based on the VTT study "Study on cost-benefit analysis of Nordic retail market integration" – commissioned by NordREG in 2008.

- NordREG is invited to see their proposed political roadmap in connection with the results from the cost-benefit analysis and propose a detailed implementation plan to the EMG 01.03.09.

## **Summary and conclusions**

There is a long tradition and strong political support for the Nordic energy co-operation. The cooperation is based on consensus and common understanding.

Within the energy policy cooperation, the Nordic Council of Ministers' (NCM) vision is for "a free and open market with efficient trade with neighbouring markets" (Louisiana 1995). The objective of the Nordic energy co-operation is to create the best possible framework for the development of the Nordic electricity market, and therefore to serve as a model for the rest of Europe (Action Plan for Nordic Energy Co-operation 2006-2009).

Increased cross-border trade, connection of new production and increased consumption in the Nordic electricity system lead to altered power flows, a need for new flow patterns and more transmission capacity. This goes for both within the Nordic area as well as to other neighbouring countries. Therefore, it is of great importance for a further positive development of the Nordic electricity market that the Nordic Power system has the capability to meet the increased demand for trade.

Against this backdrop, now is the time to take another important step forward for a better functioning Nordic market, increasing the Nordic benefit. Solving the issues of Nordic grid investments and congestion management will contribute to maintaining the Nordic region's role as a forerunner in Europe in electricity market harmonisation. This increases the potential for better integration with the continent.

At their Annual Meeting in Helsinki 2007, the Nordic Council of Ministers asked for an investigation about if and how one can create one independent Nordic system operator, with responsibilities for system operation, system development and investment planning. The senior officials committee on energy should report back to the ministers on this before the next Nordic Council of Ministers.

The background for this initiative was to accelerate the harmonisation process in the Nordic electricity market as regards investments and regulatory frameworks. The key challenges today are how to achieve a stronger Nordic perspective in system investments and planning and agreement on harmonised principles for congestion management. Further, a harmonised Nordic balance management, common Nordic peak load arrangements and a common Nordic retail market has been discussed in the report as challenges that still exist today. Apart from this, future influx of renewable energy and the further development in the EU has been discussed.

In an evaluation of whether a change in the organisational structure of the TSOs is needed, the question of whether such a change would facilitate solutions to the key challenges in the market today should be assessed.

### **Road Map for a Nordic action**

There is no doubt that there is a need for increased Nordic action in the electricity market - especially when it comes to grid investments and congestion management, but also in other crucial areas such as retail market integration and balance management.

The EMG was tasked with investigating whether establishing a Nordic ISO could be the right tool for increasing the Nordic perspective in the electricity market, and facilitating a more transnational approach to investments and system operation.

In EMGs view, a Nordic ISO is not assessed as being "the tool" to solve the problems at hand in the Nordic electricity market today. Separating the grid ownership from the system operations would not be perceived as a step in the

right direction. Regarding grid investments and system operation, other measures could prove more fruitful for the Nordic electricity market.

A company based cooperation as regards grid and system operation could be beneficial in order to increase the "Nordic perspective" but it should be stressed that before going to the step of establishing a Nordic transmission system operator, the TSO's should reach a higher degree of harmonisation based on the co-operation that exists today. Common playing rules would facilitate an eventual creation of a Nordic transmission system operator at a later stage and would be crucial with regards to the strength of the mandate given from the governments to such an organisation.

While the EMG does not propose to establish a Nordic ISO, the group none the less proposes a series of steps to improve the market. The steps proposed by the EMG represent a significant move towards a more harmonised market.

The Nordic electricity market is still the most harmonised cross-border electricity market. In order to keep this position, the ongoing efforts for further harmonisation, such as enhancement of Nordic grid investments, a harmonised method for congestion management, the retail market integration, harmonised balance management and the work on peak load arrangements should be strengthened. The operation of the Nordic electricity market should be based on a stronger emphasis of the Nordic benefit. To achieve this, it demands a stronger Nordic perspective and mandates from all parties involved, i.e. regulators, TSOs and governments. The EMG recommends the following steps in order to achieve this:

## **Congestion management**

### *Nordic grid investments*

- *The Nordel Grid Master Plan 2008 is welcomed, and works on the previous and new proposed grid investments should commence as soon as possible.*
- *The grid planning done by the Nordic system operators should be strengthened and continued. The Nordel planning committee should be given a strong mandate to propose investments that are socio economically sound for the entire Nordic grid.*
- *The analyses and data foundation of The Nordic TSOs' plans should be made public – to improve transparency in the process.*
- *EMG shall evaluate the current situation as regards grid investment and investment criteria and propose solutions on how to enhance the Nordic perspective in these processes. NordREG and The Nordic TSO's should be consulted after the EMGs initial work. EMG shall give their recommendations before the next meeting of the Nordic Council of Ministers for energy.*

### *Harmonised principles for Nordic congestion management*

- *In order to manage the existing problems with congestion management and to facilitate an efficient Nordic wholesale market, the NCM will ask the national TSOs to start the process of splitting the Nordic market into additional price/bidding areas. The present situation indicates that 11 areas could be feasible.*

- *The TSOs must address to the relevant national authorities the necessary changes needed in national legislation, regulations and concessions in order to carry out the proposed changes. The TSOs shall keep their national authorities continually informed about their progress.*
- *It will be the TSOs task to solve the specific administrative, practical and technical issues regarding this change in market design. The TSOs must find an appropriate way of organising the cooperation on this work.*
- *The TSOs should make the necessary market changes no later than the end of 2010.*
- *The national authorities are responsible for carry out the necessary legislative, regulatory and concessionary amendments. NordREG shall have an active role in this process.*
- *NordReg and the Nordic TSO's shall inform the Nordic Council of Ministers and the EMG on their progress before the next meeting of the Nordic Council of Ministers for energy.*
- *If some of the countries want to choose bidding areas instead of price areas, the TSO in the respective country should carry out analyses of the effects on the market and report back to the relevant authorities. In this process, Nord Pool Spot should be consulted.*
- *In case of adverse effects on the market, it is recognized that the national authorities also have an alternative to return back to the current congestion management method.*

#### **Peak Load arrangements**

- *Nordel is invited to continue their work on common guidelines for peak load arrangements. The EMG invites a joint process by NordREG and Nordel to work on this issue in parallel with EIs national study, and report back to the EMG early 2009. Based on this work, the EMG will give their recommendations before the next meeting of the Nordic Council of Ministers for energy.*

#### **Balance management**

- *The EMG welcomes the actions taken by the TSOs and regulators, to be implemented before next years meeting of the Nordic Council of Ministers.*
- *NordREG should continually evaluate the effects of the new balance settlement, and take new actions towards a common Nordic balance management.*

#### **Common end user market**

- *The EMG awaits the cost-benefit analysis in November 2008.*
- *NordREG is invited to see their proposed political roadmap in connection with the results from the cost-benefit analysis and propose a detailed implementation plan to the EMG 01.03.09.*

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## **Appendix 1 – Position paper by Nord Pool Spot**

Nord Pool Spot comments on the report “Congestion Management in the Nordic Market – evaluation of different market models”

### 1. Background

Nord Pool Spot AS' has studied the report on “Congestion Management in the Nordic Market – evaluation of different market models”.

### 2. Nord Pool Spot's role

Nord Pool Spot's role in the Exchange Area is to quote reliable day-ahead and intra-day market prices, provide transparency and develop confidence. Key issues in developing reliability and confidence are:

- Simplicity – Pricing model and trading products must be fairly easy to understand
- Transparency – Price formation and settlement as well as information on events in the market must be transparent
- Stability – Price formation and structure must be stable
- Surveillance – Nord Pool Spot must have a surveillance function to follow-up participants trading in relation to the Nord Pool Spot Rulebook and the legal framework

### 3. Nord Pool Spot concessions

Nord Pool Spot has one Market place concession from the Norwegian Water and Energy Directorate (NVE) and one concession to organise the physical exchange of power with other Nordic countries issued by The Norwegian Ministry of Petroleum and Energy (OED).

It is stated in the Market place concession from NVE that the concessionaire shall contribute to an effective price formation and an adequate flow of power.

The concession from OED says that it is Nord Pool Spot's obligation through the Elspot market to secure that the exchange of power with neighbouring countries is as effective as possible. The exchange of power must be based on relevant area prices.

### 4. An example with the proposed model

The figure below shows a situation that is not according to the principle for Nord Pool Spot. In this example Sweden require one price (could be any other country). In step 1, prices and flows are calculated for the Nordic area with 11 Elspot/bid areas. The result is a common price of EUR 40 for Norway, Finland and in 2 of the 3 areas in Sweden. Southern Sweden south of cut 4 and Zealand in Denmark has a price of EUR 80, while Jutland and Funen has a price of EUR 90. Step 1 gave a different price in Southern Sweden south of cut 4 than in the 2 other areas.

In step 2 Sweden will be isolated for a re-calculation to obtain one price. Flows into or out of Sweden will be added as price independent sales or purchases. Internal bottlenecks in cut 2 and 4 are relieved by activating counter trading bids in Elspot. The re-calculation of Sweden to get one price in this scenario will always result in a price in Sweden that differs from the price calculation in step 1. This can lead to the following problems:

- Price differences without bottlenecks between countries
- Flow from a high price area to low price areas.
- Increases the frequency of individual areas/countries having different prices

- When counter trading via Elspot only bids in Sweden will be activated in step 2.

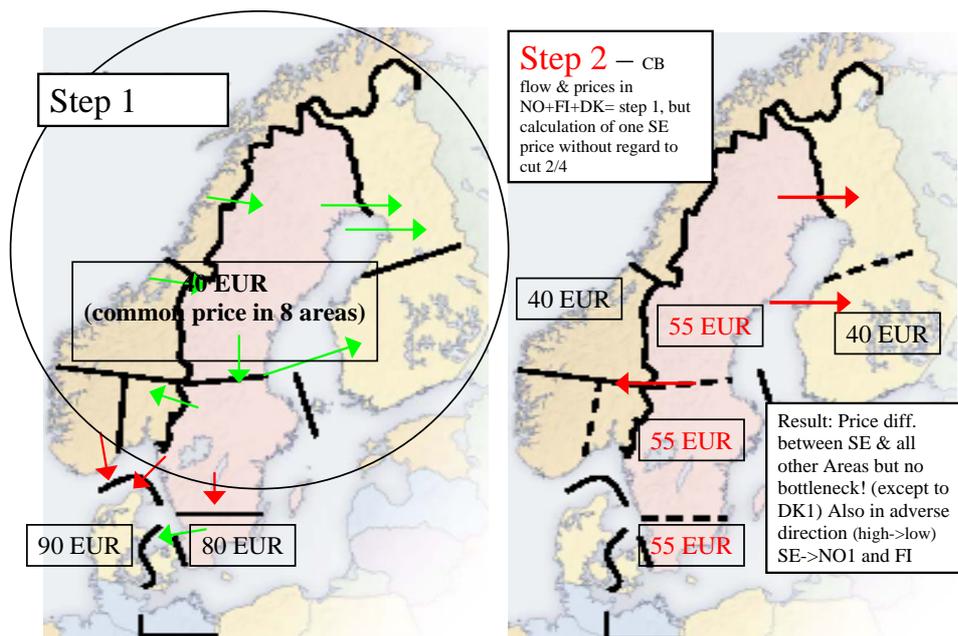


Fig.1 The 2 step model - an example

#### 5. Challenges with the proposed model

Nord Pool Spot's has the following comments to the proposed model:

- Decreases transparency concerning the price formation!
- Complicated and difficult to explain!
- Complicates surveillance
- Change in customer behaviour will have an impact on spot prices!
- Changed price formation in the spot market will influence the financial market!
- National handling of counter trade will lead to poorer utilisation of resources
- Different models in the Nordic countries are not in line with the objective of harmonisation!
- Nord Pool Spot's market place concession

##### 5.1 Decreased transparency concerning the price formation

The proposed model will dilute transparency concerning the price formation at Nord Pool Spot. The model will require three different price calculation steps (see item 5) with different conditions in order to obtain prices to clear the Nordic spot market. The market will, even with a precise description, interpret the model as not being market oriented.

##### 5.2 Complicated and difficult to explain!

The two step model is both difficult to explain and understand. The price formation is complicated as it is and a two step model will add to this complexity.

##### 5.3 Makes surveillance of the market more complex and difficult!

The proposed model will add to the complexity and make the possibilities for an effective surveillance function more difficult.

##### 5.4 The proposed solution will lead to changed customer behaviour

The proposed model will open up for tactical bidding in Elspot. Participants will if they see the benefit move volume from the Elspot price calculation to the calculation with counter trading. This will influence the price formation in the spot market.

5.5 Changed price formation in the spot market will influence the financial market

In the financial market contracts are traded with a time horizon of up to 6 years. Participants are buying and selling financial contracts based on the system price. They are expecting that the rules and model for the system price will be the same during the delivery period as it was when the contract was entered into.

5.6 National handling of counter trade will lead to poorer utilisation of resources

National handling of counter trade will lead to poorer utilisation of both transfer capacity and production resources within the Nordic region. There will be situations where production resources and transfer capacity will be available in neighbouring countries. These resources will not be possible to utilize since flows will be frozen after the first calculation. There will also be situations where it will be impossible to find sufficient counter trading volumes in Elspot.

5.7 Different models in the Nordic countries are not in line with the objective of harmonisation!

Introducing a model where countries can choose different models is not according to the objective of harmonisation in the Nordic area.

5.8 The proposed model is not compatible with Nord Pool Spot's concessions issued by NVE and OED (item 3)

The proposed two step model is not compatible with Nord Pool Spots concessions

- It will in some situations produce flows in the wrong direction.
- It will not utilise the available transfer capacities (see 5.6).
- The exchange of power will not be based on relevant area prices, as shown in fig.1.

6. Conclusion

Nord Pool Spot is positive to the evaluation of congestion management in the Nordic Market. Nord Pool Spot is of the opinion that the best solution from a market perspective is to implement step 1 in the proposed model and adjust the number of Elspot/bid areas to reflect the infrastructural challenges within the Nordic system.

The current Elspot model is well known and it is transparent in the market. The model secures that the power flows according to the price signal in the whole Exchange Area.

The Elspot area model gives clear signals to the public concerning consumption patterns and it gives an investment signal to both authorities and producers. New transmission lines and new production capacity should be evaluated in Elspot areas that over time have higher prices than their neighbouring areas.

The Elspot area model will secure the best conditions for a correct price formation based on available resources and transmission capacities within the Nordic system.

The Elspot area model represents less risk for adverse influence for the financial market.

It is uncomplicated to add/remove Elspot areas in the Nord Pool Spot trading system and adapting the web page to accommodate changes in the number

of Elspot areas. The Nord Pool Spot settlement system will also accommodate a change in the number of Elspot areas without major changes.

If step 2 continues to be an option then Nord Pool Spot will ask the decision making authorities to carry out a thorough analysis of the challenges and the foreseen effects describe from a market perspective under item 5 above.

It is important for Nord Pool Spot to promote the interest of the market and continuously build and develop trust and reliability concerning the price formation for the Nordic area.