

Final Draft 8 May 2008

## One Nordic System Operator

Investigating if and how a Nordic  
system operator may be established

*FÖR DISKUSSION PÅ NORDISKA MINISTERRÅDETS  
ELMARKNADSSEMINARIUM 26-27 MAJ 2008*

## CONTENTS

KEY ABBREVIATIONS	4
Foreword	5
1. Introduction	6
1.1. The task: investigating if and how a Nordic system operator could be established .....	7
1.2. The purpose: Increasing Nordic benefit .....	7
2. Summary of EMG recommendation	8
3. The current Nordic cooperation	9
3.1. Common market .....	9
3.2. Nord Pool .....	11
3.3. Current organisation for system planning and operation in the Electricity market.....	12
Grid and system operation	12
3.4. Lasting cooperation as regards transmission and system operation in the Electricity market .....	12
The Nordic TSOs: Nordel .....	13
The Nordic regulators: NordReg .....	15
4. The key challenges:	16
4.1. System investment and planning.....	16
4.2. Congestion Management .....	18
4.3. Future influx of renewable energy .....	19
4.4. Nordic Balance management towards a common retail market	20
5. The organisational choices and issues	21
5.1. Nordic ISO (NISO).....	22
5.2. Nordic TSO (NTSO).....	23
6. Experiences from other countries	28
7. Obstacles and challenges	28
7.1. Ownership issues .....	28
7.2. Investment decisions and maintenance of the grid .....	29
7.4. Control and security of supply issues .....	31
7.5. Regulatory challenges .....	32
7.6. Relationship to the EU and third countries .....	32
8. EMG views – If, how, and what?	35
9. References	38
Appendix 1: Stakeholder views (Dessa borde grupperas efter kategori)	39
APPENDIX 2: TSO UNBUNDLING ISSUES IN FINLAND	41
APPENDIX 3: STAKEHOLDER POSITION PAPERS	44
Vattenfall .....	44

Nordel.....	45
NordReg.....	48

## Key abbreviations

ACER	Agency for the Cooperation of Energy Regulators
EMG	Electricity Market Group
ERGEG	European regulators
ISO	Independent system operator
NCM	Nordic Council of Ministers
Nordel	Organisation for the Nordic TSOs
NordReg	Nordic Regulators
TSO	Transmission system operator
NTSO	Nordic Transmission system operator (grid and system operation)
TSOW	Transmission system owner
RIO	Regional independent system operator (system)
NISO	Nordic independent system operator (system)

## Foreword

At their meeting in Helsinki 20 September 2007, the Nordic Council of Ministers stated that an investigation was to be carried out, focusing on *if and how* a Nordic System Operator can be established. This Nordic system operator should, if established, have the responsibility for network operations as well as system development and investment planning in a Nordic perspective <sup>1</sup>

The NCM requested the results of this investigation in due time before next Meeting of the NCM, which will take place in Stockholm, September 2008.

The Electricity Market Group (EMG) is responsible for following through the Ministers' declarations. EMG is mandated to:

- Coordinate discussions
- Analyse key issues
- Summarise and conclude
- Bring recommendations to the Ministers in time for their Annual Meeting in 2008

The objective of the EMG is to help facilitate discussions about the issue and the aim is to achieve a balanced overview of arguments in favour of and against the establishment of an NSO, to conclude and to bring recommendations to the Nordic Council of Ministers. The steps in this process are:

- Organise a Stakeholder workshop 14 November 2007 at Stockholm-Arlanda and write up a "summary of discussions" from this workshop.
- Conduct on-going deliberations and discussions in EMG.
- Carry out a consultation with Nordic organisations such as Nordel, Nordenergi, and NordReg on 6-7 March 2008 in Helsinki.
- Contribute to the Conference on 26-27 May 2008, organised by the Swedish chairmanship for the Nordic Council of Ministers – provide recommendations from the deliberation process.
- Prepare the Nordic Council of Ministers' Annual Meeting, Umeå September 2008.

The members of EMG are appointed by the relevant national ministries and there are two representatives from each of the countries Denmark, Finland, Norway and Sweden:

- Flemming G. Nielsen, Danish Energy Authority (Chairman)
- Peder S. Bjerring, Danish Energy Authority
- Petteri J. Kuuva, Ministry of Trade and Industry, Finland
- Arto Rajala, Ministry of Trade and Industry, Finland
- Kjell M. Grotmol, Ministry of Petroleum and Energy, Norway
- Cathrine Holtedahl, Ministry of Petroleum and Energy, Norway
- Christina Simón, Ministry of Enterprise, Energy and Communications, Sweden
- Magnus Blümer, Ministry of Enterprise, Energy and Communications, Sweden
- Amund Vik, Nordic Energy Research (Secretary, from 1.1.2008)

---

<sup>1</sup> Ministrarna ber ämbetsmannakommittéen att utreda om och hur man kan etablera en nordisk systemoperatör med ansvar för såväl operationell drift som systemutveckling och investeringsplanering ur ett nordiskt perspektiv. Ämbetsmannakommittéen bör rapportera till ministrarna i god tid innan nästa ministermöte (NCM, Helsinki 2007).

## 1. Introduction

The EMG was asked by the Nordic Council of Ministers to investigate “*if and how* a Nordic system operator could be established.”

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).

A crucial facet of the Nordic power market is the cooperation between the transmission system operators (TSOs) Statnett SF (Norway), Svenska Kraftnät (Sweden), Energinet.dk (Denmark) and Fingrid OY (Finland), which operate the transmission networks in the four respective countries.

The Nordic TSOs cooperate through the association, Nordel, which was established in its current constellation with only TSOS in 2000. A common grid code for the Nordic market was established in 2004. The grid code represents common conditions for operation and planning in the Nordic power system. As such, the grid code represents a formal base for a favourable development of a well functioning and effectively integrated Nordic electricity market (Nordel 2007).

Being transmission system operators, these companies take care of electricity transmission in the main grid, develop the main grid, maintain a continuous balance between electricity consumption and production, settle the electricity deliveries between the market parties at a national level, and promote the functioning of the electricity market.

There are differences in how the national TSOs are set up and in their mandates, which incurs different operational practices and creates possible inefficiencies in the system. However, there are certain tasks that create the common core of the system responsibility and network operation in the Nordic market. These are identified by NordReg (2005) to be:

- Ensure the operational security of the power system.
- Maintain the momentary balance between demand and supply.
- Ensure and maintain adequacy of the transmission system in the long term.
- Enhance efficient functioning of the Nordic electricity market.

Because of the TSOs fundamental role in the electricity market, much of the harmonization efforts have focused on the TSOs.

### 1.1. The task: investigating if and how a Nordic system operator could be established

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.

To follow up this task, EMG organised a workshop "One Nordic System Operator" in Stockholm November 14<sup>th</sup> 2007. Stakeholders were invited to share their views on this matter.

In the continued work on this issue, the EMG, based on the 2006 Econ study "*Coordination of network operations and system responsibility in the Nordic electricity market*" and consultations with the stakeholders in the region (through the workshop and stakeholders written position papers), identified three main pathways for further harmonisation:

1. The further harmonisation can continue as today, with four TSOs cooperating.
2. The cooperation can be organised through a Regional Independent System Operator (RIO=NISO) that can have either a shallow or a deep mandate.
3. The cooperation can be organised as a Nordic Transmission System Operator (NTSO).

These options will be discussed in detail below.

### 1.2. The purpose: Increasing Nordic benefit

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. In a European perspective there is a push for increased integration and transparency in the electricity market, the ambitions are high. The EU internal market package for energy advocates ownership unbundling, increased transparency, formalised cooperation among TSOs (European Network of Transmission System Operators for Electricity (ENTSO)), more independent and strong national regulators, and an agency for cooperation of the energy regulators (Agency for the Cooperation of Energy Regulators (ACER)).<sup>2</sup>

---

<sup>2</sup>Link to the 3<sup>rd</sup> energy package on-line  
[http://ec.europa.eu/energy/electricity/package\\_2007/index\\_en.htm](http://ec.europa.eu/energy/electricity/package_2007/index_en.htm)

The Nordic EU members (and Norway through the EEA agreement) are legally obliged to harmonise their rules and regulations within the defined northern European region (whereas by contrast the Nordic harmonisation is voluntary). This region includes the four Nordic countries (Iceland not included) plus Poland and Germany. The EU ambitions are high, but the process has not come as far as the harmonisation process in the Nordic power market.

The proposal of establishing a Nordic system operator must be seen in light of the current obstacles for further harmonisation of the Nordic electricity market and new investments. The intention of the proposal is hence to speed up the harmonisation process in order to promote investments and harmonised regulatory frameworks and thereby enhance the functioning of the market. It must be emphasised that changing the organisational structure of the TSOs is not necessarily the answer to the challenges.

## 2. Summary of EMG recommendation

*EMGs recommendations will be ready after the discussions at the Electricity Market Seminar in Stockholm 26 – 27 May 2008.*

### 3. The current Nordic cooperation

The Nordic electricity market is the most harmonized and integrated 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 current Nordic Electricity Market cooperation is characterised by plurality in participants and themes. In this note, we present the current cooperation in a broad sense, mentioning the crucial players, and the scope of the cooperation. For a more in-depth analysis of the state of affairs in the Nordic Electricity Market, see the annual EMG memo.<sup>3</sup>

#### 3.1. Common market

Over the years, the Nordic Electricity Market has had a remarkable development, from being four national markets, to becoming a liberalized, harmonized cross border market. The most crucial milestones in the process have been:

- 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 Nord Pool is established as the first international power exchange (Norway – Sweden)
- 1998 Finland joins the Nordic spot market (Nord Pool)
- 1999 West-Denmark joins the Nordic spot market (Nord Pool)
- 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 (Nord Pool)
- 2000 Extended intra day market, Själland
- 2000 CfD trading launched in Nord Pool
- 2002 Common Nordic regulation power market
- 2004 Nordel agreement on 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 decision on common principles for Balance management
- 2008 Market Coupling DK/DE
- 2008 Nordel launches a new Grid Master Plan

---

<sup>3</sup> The memo can be downloaded from [www.norden.org](http://www.norden.org)

The Nordic electricity market has been a model market in a European and a global context. As such the harmonisation of the electricity market is a success story, and it has been a success story over a period of several years.

In 1995 in Louisiana, the Ministers' declared a vision for a free and open market with efficient trade with neighbouring markets. The following year Nord Pool was established, and the Swedish, Norwegian, Finnish and Danish markets were liberalised with open third party access in close succession. A common grid code for the system operators was established, and by year 2000 all four Nordic countries had joined Nord Pool and opened up their markets. In 2000, Nordel, the transmission system operators (TSO) association, announced its vision to act as a single TSO in the Nordic region.

At their annual meeting in Akureyri in 2004 and in Narsarsuaq in 2005, the Nordic Council of Ministers declared that a further and deepened integration and harmonisation of the electricity market is desirable and that a common Nordic end user market should be investigated. This on-going process of harmonisation has proven to be beneficial to the Nordic electricity market, and the actors in this process, especially the TSOs and the regulators, have delivered fruitful inputs to the process.

In their latest studies on the Nordic end user market, NordReg has stated that there are no physical or juridical obstacles hindering an electricity retailer from one of the Nordic countries from establishing activities in another Nordic country. However, they found that the several remaining barriers of technical, regulatory or commercial nature sum up to create factual barriers. NordReg now focus on the possibilities for uniting the end user markets in the region to one common market. A quantitative study on the costs and benefits of such an arrangement will be ready in November 2008. (NordReg 2008)

60 – 70 % of the electricity trade in the Nordic region is done at the Nordic power exchange, Nord Pool. This makes the market per definition a permanent cross border market. The power flow in the Nord Pool area is increasing, with increased production in the member states, and increased import/export capacity to the adjacent areas (interconnector to the Baltic States and Northern Europe).

The total consumption of electricity in the Nordic region has increased steadily for many years – in 2006, the total consumption in the Nordel area was 465.4 TWh (Nordel).

Trade in Nord Pool spot has increased steadily over several years. The monthly turnover in the physical market in March 2008 was 23.3 TWh.

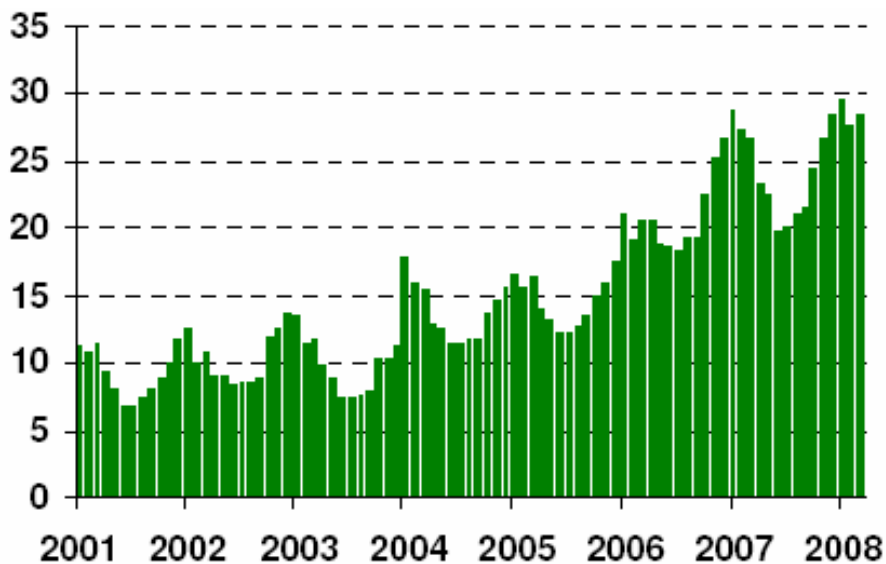


Figure 1 Spot turnover, monthly TWh (y axis) Nord Pool Spot

The Nordic electricity market consists of several organisations and stakeholders. For our purposes in this text, Nord Pool, NordReg and Nordel are the most prominent – in addition of course to the four governments.

### 3.2. Nord Pool

Nord Pool was the first international exchange of electric power in the world. During the late 1990s, the Nordic Electricity Market was created around rules, regulations and goals advocating an open and free competition in the supply of electric energy. One of the crucial elements in the establishment of this transnational market place was the Nordic Systems Operation Agreement that formalized the cooperation between the four TSOs in the region (Svenska Kraftnät, Fingrid, Energinet.dk, and Statnett).

The trading in Nord Pool's physical market, Nord Pool Spot, consists of a day-ahead market, in Elspot, and an intraday market in Elbas. Actors from all the countries in the Nordic market participate in the Elspot market, while actors from Sweden, Finland, Denmark and Germany also participate in the Elbas market. Apart from this, the Nord Pool group also has a market for financial contracts, Nord Pool ASA.<sup>4</sup>

At present, Nord Pool is still the world's only multinational exchange of electric power, and has more than 70 employees in their headquarters in Oslo and branch offices in the other participating countries. The Nord Pool group has more than 420 market players from 20 different countries.

The ownership of Nord Pool Spot is shared by the Nordic transmission system operators (TSOs) and Nord Pool ASA. Nord Pool ASA, Statnett SF, Affärsverket Svenska Kraftnät, Fingrid OY and Energinet.dk each own 20 percent of Nord Pool Spot AS.

<sup>4</sup> Recently, Nord Pool ASA sold out Nord Pool Clearing ASA, Nord Pool Consulting AS and Nord Pool International AS to OMX.

The percentage of the Nordic consumption traded through Nord Pool has increased in a steady pace since the beginning in 1997. Today 60 -70 percent of the total Nordic consumption is traded through Nord Pool Spot, while the rest is traded bilaterally (Nord Pool 2008).

### 3.3. Current organisation for system planning and operation in the Electricity market

The most common way to handle transmission and system responsibility issues in deregulated markets is that one integrated system and transmission responsible party (TSO) handle both issues. In an open market, measures for system operation and grid management are dependent on each other. Information on investment needs arise in the operative management of the system and grid. All countries in EU who have deregulated markets, have integrated solutions for grid and system responsibility.

#### Grid and system operation

##### *Grid*

Sweden, Norway, Finland and Sjælland are connected in an alternating current (AC) grid. Towards the other systems, i.e. the Russian and Central European systems, they are connected by high voltage direct current (DC) grid. The system operating grid owners (TSO's) in the Nordic region operate and maintain the grid system within their respective countries, including the interconnectors, in close cooperation with each other. The TSO's also have to ensure the security of supply and safe system operation at all times.

Secure operation is imperative, even after serious outages and errors in the grid. Operation planning includes determining transfer capacity and congestion management.

##### *System responsibility*

The TSOs have the responsibility to maintain the balance between production and consumption of electricity in their respective countries. Imbalances and frequency disturbances occur when the planned production for some reason do not correspond with the actual demand. The system responsibility also includes the liability to ensure that the total national electricity system works in a safe and stable manner, and that there are sufficient reserves in the power system. Through balance regulation, the national TSOs, in close cooperation with each other, handle the imbalances that occur in the operation hour. A large share of the balance regulation takes place in the common Nordic regulating market, which was established in 2002.

### 3.4. Lasting cooperation as regards transmission and system operation in the Electricity market

Rather than being based on formal institutions, as the EU cooperation, the Nordic electricity market has consisted of cooperating organisations and national authorities.

For this purpose, the most prominent Nordic Electricity Market organisations are Nordel and NordReg – respectively the TSO organisation and the Regulators organisation. In their roles as national TSO and national regulators, these two organisations have an obvious role to play when it comes to the further development of the Nordic electricity market. An eventual change in organisational structure of the TSOs must be compared with this current solution.

## The Nordic TSOs: Nordel

Nordel is the organisation for the Nordic TSO's. Nordel's mission is to promote the establishment of a seamless Nordic electricity market as an integrated part of the North-West European electricity market and to maintain a high level of security in the Nordic power system. The cooperation covers system operation, system planning and market facilitation.

Nordel's objectives today are:

- Development of an adequate and robust transmission system aiming at few large price areas.
- Seamless cooperation in the management of the daily system operations to maintain the security of supply and to use the resources efficiently across the borders.
- Efficient functioning of the North-West European electricity market with the aim to create larger and more liquid markets and to improve transparency of the TSO operations.
- Establishment of a benchmark for European transparency of the TSO information.

### **System operation**

Nordel co-operation in system operation aims at handling the short-term technical system issues and setting up the technical framework for grid operations. The Operations Committee is responsible for these issues.

The co-operation contributes to the operational co-ordination between the TSOs and to the efficient utilisation of the interconnected Nordic electricity transmission system in order to

- meet the needs of the market (taking into account the agreed technical quality)
- Ensure operational and supply security.

The co-operation is formally based on the rights and obligations defined in the Nordic System Operation Agreement. The Operations Committee also contributes to international co-operation in relation to transparency and market coupling.

Specific issues in the operational co-operation include:

- Co-ordinated outage planning
- Development of congestion management
- Co-ordinated system protection schemes

- Follow-up of power balance, frequency quality, regulating power and reserves
- Development of market-based principles for balance and system services
- Analysis of operational disturbances
- Systems for information exchange.

### ***System planning***

The Nordel co-operation as regards the system planning aims at developing the grid from a Nordic perspective taking into account the international aspects and paying attention to environmental impacts. The Planning Committee is responsible for these issues. Each TSO is responsible for the national transmission grid as regards operation, maintenance, planning and investments. The main objective is to achieve continuous and co-ordinated Nordic planning between the TSOs and identify the grid investment projects that will ensure an efficient functioning of the integrated Nordic electricity market and the targeted level of adequacy in the Nordic power system.

Specific issues in planning co-operation include:

- Information exchange on demand forecasts and planned generation expansions in the Nordic countries
- Nordic scenarios for transmission grid planning
- Planning and grid investment criteria
- Development of common planning tools
- Power system simulations
- Communication of the future outlook on power and energy balances
- Co-ordination with the adjacent regional power systems.

### ***Market facilitation***

Nordel's co-operation in *market facilitation* aims at creating and preparing for an efficient Nordic wholesale electricity market by developing and harmonising the market rules and market conditions for all the involved market participants and by contributing to the compatible development of the European electricity market. The Market Committee is responsible for these issues.

Specific issues of co-operation in market facilitation include:

- Balance settlement
- Congestion management
- Market coupling
- Market monitoring
- Transparency of market information.

## The Nordic regulators: NordReg

NordReg is the regulators Nordic organisation, where the Nordic regulators cooperate to reach common goals for the Nordic Electricity Market.<sup>5</sup>

The vision of NordReg is: "In cooperation, we actively promote legal and institutional framework and conditions necessary for developing the Nordic and European electricity markets."

The objectives of the NordReg cooperation are:

- Exchange of views
- Working together to map and analyse energy market issues
- Producing reports and statements
- Taking common action to influence the development of the Nordic or the European energy markets

In 2004 NordReg formulated a set of goals for their cooperation. These were:

- A truly common Nordic retail market with free choice of supplier
- A well-functioning Nordic wholesale market with competitive prices
- Reliable supply
- Efficient regulation of TSOs

The regulator cooperation in the Nordic region is very important for the future development of the market. A lot of the harmonisation efforts to come will be on the regulators table. Especially the issue of retail market integration is closely related to the regulators, and most other issues in the market are in some way dependent on the regulators cooperating in NordReg. The focus of this analysis however lies on the TSOs in the Nordic market.

### 3.5 Organisational structure of the current cooperation between the Nordic TSOs

Continuing today's formal models of cooperation, is one of the ways to further the Nordic Electricity market cooperation. The key organisational features of the current model are:

- **Ownership structure** – Nationally owned grid and TSOs.
- **Governance and decision making structure** – The four nationally owned TSOs in the Nordic region are cooperating through Nordel and through a Nordic system operation agreement.
- **System operations** – National TSOs operate the national systems, and cooperates closely to uphold secure operation in the entire region based on binding agreements, such as the System Operation Agreement.

---

<sup>5</sup> That is: NVE in Norway, DERA in Denmark, EMA in Finland and EI in Sweden. ORKUSTOFNUN from Iceland is also part of the Nordregs cooperation, though not part of the Nord Pool area.

- **Grid maintenance and system expansion** – National TSOs are responsible for the day-to-day maintenance of the grid. Nordel prepare an investment plan, and the national TSOs and governments carry out the investments. There is a practice of using bottleneck income for the financing of new grid investments within the Nordic region.
- **Financing mechanism** – Nationally specified.
- **Regulatory issues** – National regulators charged with regulating the national TSOs, NordReg and Nordel interacting on the Nordic scene.

As the chapter above suggests, the current Nordic electricity market has pioneered cross border power trading. The market functions and creates socioeconomic benefits for the players involved. The current TSO solution has thus far proved to be a good way of organising the Nordic electricity market.

Although the Nordic market is indeed a well functioning market, there are a number of challenges that need to be solved in the coming years. The discussion as to whether the Nordic TSOs should be grouped together in one body (NISO as regards the system operation and system planning) relates closely to the challenges and forthcoming issues in the market. The most central issues are outlined in the chapter below.

## 4. The key challenges

In this chapter we will give an overview of the key challenges that are present in the Nordic electricity market today. The foremost challenges for continued advances in the Nordic electricity market is to further improve the conditions for investments, and to harmonise the rules and regulations for market actors and TSOs in such a way that the electricity market becomes even more borderless.

The challenges listed below are not necessarily all the challenges facing the Nordic electricity market. They are however the challenges that the EMG judge to be the most crucial for a further positive development at this moment.

The goal is to create the best prerequisites for the stakeholders to meet these challenges. Whether or not organisational change of the TSO structure is the answer to these challenges is an open question. This will be further elaborated and discussed.

### 4.1. System investment and planning

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.

In the Nordic electricity market, investment decisions should ideally be based on overall calculations of costs and benefits - in a Nordic perspective. From a theoretical point of view, this is a prerequisite for optimal investments in an integrated market. In practice, the operation of the existing TSOs may vary although Nordel aims at optimal investment decisions. If investments shall be carried out according to socioeconomic Nordic criteria, each country must be willing to commit to this, even though it might imply a loss for one nation in the short run.

During the last decade the planning process in Nordel has moved towards integrated Nordic planning concerning grid reinforcements and expansions. Two Grid Master Plans have been presented by Nordel in order to meet the demands. The previous Grid Master Plan released in 2004 resulted in a recommendation to build five major transmission interconnectors within the Nordic area. Four of these are now being built and the fifth one is to be decided this spring. In addition, Nordel recommends that studies are initiated to investigate further interconnections between the Nordic grid and neighbouring areas.

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 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).

The decision to invest in the proposed reinforcements is taken by each involved TSO. That is to say that, even though, Nordel have pointed out several strategic investments from a Nordic perspective these can only be regarded as recommendations as the actual decision for investments is national.

The investments are financed nationally, by the TSOs grid tariffs. A complicating aspect of this decision model is that the cost of an investment does not necessarily match the benefit for the national consumers. Differences in the national concession regulations, the decision-making processes and in the national criteria for economic profitability regarding the expected benefits may possibly delay the projects.

Finding a way to distribute costs in relation to the benefits of an investment between the Nordic countries is a challenge.

It is possible to argue that a Nordic system operator would speed up the market integration, enhance price convergence, and increase transparency and trust in price formation. The transparency and trust in price formation is a prerequisite when laying down framework conditions for investments (for example, long term planning). However, for this to happen it is a prerequisite that the Nordic system operator has a strong mandate and hence the authority to make investments in an efficient way.

## 4.2. Congestion Management

Congestions in the grid will naturally occur, and must be handled continuously. 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 then benefit the common Nordic electricity market, Nordic consumers or producers in general.

The electrical system in the Nordic countries was from the beginning primarily designed to support national power demand. The development of an integrated Nordic market, with steady increased power trade and changed power flows, has pointed out the need for adjustments. The packages of prioritised Nordic grid reinforcements are important steps forward in this respect. However it is not socio-economically feasible to invest in the grid to avoid congestions under all circumstances.

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

The first approach, splitting the market into price areas, emphasises the role of economic signals in the Nordic power system. Prices reflecting the real local physical situation are, by this approach, considered to give incentives to efficient Nordic grid investments,<sup>6</sup> optimal location of new power generation and consumption, promote demand response and give efficient signals to the running of power plants as well as trade.

This would lead to optimal use of the resources and thus enhance the operational reliability and security of supply in the long term. This principle would also increase the predictability and the confidence in the market as well as ensure equal treatment of all players in the market. This approach generates income (bottleneck-tariffs) to the TSOs. This first approach is supported by Energinet.dk and Statnett.

The second approach, counter trade, emphasizes the view that large and few price areas will enhance competition in the market by reducing market-concentration and improving competition. In this approach the Elspot areas are kept together by counter trade and by thus guaranteeing for trade based on one el-spot-price in the larger price-area. Counter trade causes costs to the TSOs and thereby creates incentives for grid investments. The counter trade also creates incentives for the suppliers of the necessary and required

---

<sup>6</sup> When the prices reflect the real local physical situation in the grid, the TSOs gets accurate information on the actors' valuation of removing the bottlenecks between price-areas (through the income generated from the bottleneck-tariff). This information is needed for socio-economic analysis of grid investments to remove the bottlenecks.

capacity. This approach, thus, also enhances the operational reliability and security of supply in the long term. The second approach is supported by Svenska Kraftnät and Fingrid.

Today each country can be a separate price area. Both Finland and Sweden have one price area in the country. Whereas in Denmark there are two price areas and in Norway there are dynamic price areas due to changes in the power flows and the physical congestion.

On the borders between the countries there has been a practice of reducing the transmission capacity due to internal congestions. This is not done from a Nordic perspective. This practise is independent of which of the two approaches that is used.

Inside every price areas, irrespective of approach chose, the TSO's have to counter trade in order to handle grid congestions due to outages and disturbances. Price areas defined by the major physical congestions in the grid will lead to a reduced need for counter trade.

There are different opinions regarding how far 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.

The questions of congestion management have been discussed for several years and are often mentioned as one of the larger challenges for the Nordic electricity market. EMG has commissioned a separate study to investigate congestion management, thus a further discussion of congestion management and the different approaches, is not the focus of this document.

### 4.3. Future influx of renewable energy

In all probability, there will be a substantial influx of renewable energy in the Nordic grid over the next 10 – 20 years. The energy and climate plans in the Nordic countries all stipulate a higher share of renewable energy than today.

Sweden has set the target to increase the production of renewable electricity by 17 TWh during the period 2002-2016.

The Finnish Government is preparing a National long term climate and energy strategy to meet the proposed EU target for renewable energy and emission reduction. The proposed target for renewable energy is 38 percent of total final energy consumption in 2020. This will mean a significant increase in the use of bioenergy and wind power. The concrete proposal will be ready in autumn 2008.

A steadily growing portion of Danish energy consumption in the coming years should come from renewable energy sources. An increase to a 20% share of renewable energy has been agreed for 2011. The Danish EU goal for renewable energy will be binding on Danish energy policy until 2020 and is expected to be about 30%.

In Norway, the Government has established a long term target of 30 TWh production from renewable energy sources and energy savings in 2016, compared to the 2001 level. The short term target is 12 TWh in 2010, compared to the 2001 level.

This situation creates challenges with regard to grid investments and to market design, due to the expected increased share of unregulable power, like wind power. These challenges need to be handled in a Nordic perspective.

Other issues that remain to be addressed in the Nordic electricity market today is the development of a common Nordic retail market, common principles for balance management (is to come), common peak load arrangements, etc.

#### 4.4. Nordic Balance management towards a common retail market

The Nordic electricity market is today a common market on the wholesale side. There is also a Nordic balance regulation market where the TSOs use the balance responsible in each country to uphold the national balance.

The end- user markets in the Nordic region are still national. Although there are no physical or juridical obstacles hindering a common Nordic end-user market, there are several technical, regulatory or commercial barriers. A company that wants to be established in a Nordic country needs to be a balance responsible party in that country, and adapt the national rules. The national rules for balance responsible parties are mostly similar in the Nordic countries, although different in some crucial areas. For example, the cost base for the balance management varies greatly between the countries. In some countries the reserve costs are included in the balance management cost base, in other countries these are paid by the TSO via the grid tariffs. Further, there are different gate- closure times for bids to the regulation market among the Nordic countries. Neither are all companies in the Nordic region capable of maintaining balance within the operating hour (intra day trade). Nordel have recently proposed increased harmonisation of balance services, in order to overcome the described differences that exist today. The 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.

NordReg recently published their report "Harmonised Supplier Switching Model", in which they argue for harmonising the IT systems used by DSOs in the different countries. A comprehensive cost- benefit analysis of a common retail market in the Nordic region is currently underway, and will be ready in November 2008.

#### 4.5. Peak load arrangements

The EU directive 2003/54/EC 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 (...)" The procedures can only be launched if the generating capacity or the demand-side flexibility is in-sufficient to ensure security of supply. In light of this,

Nordel has established a proposal for common guidelines for assessing the adequacy of the power system, if transitional arrangements are considered to be needed. These guidelines form the basis for possible national arrangements for securing peak load capacity. It is important to stress that the guidelines are voluntary, and not binding.

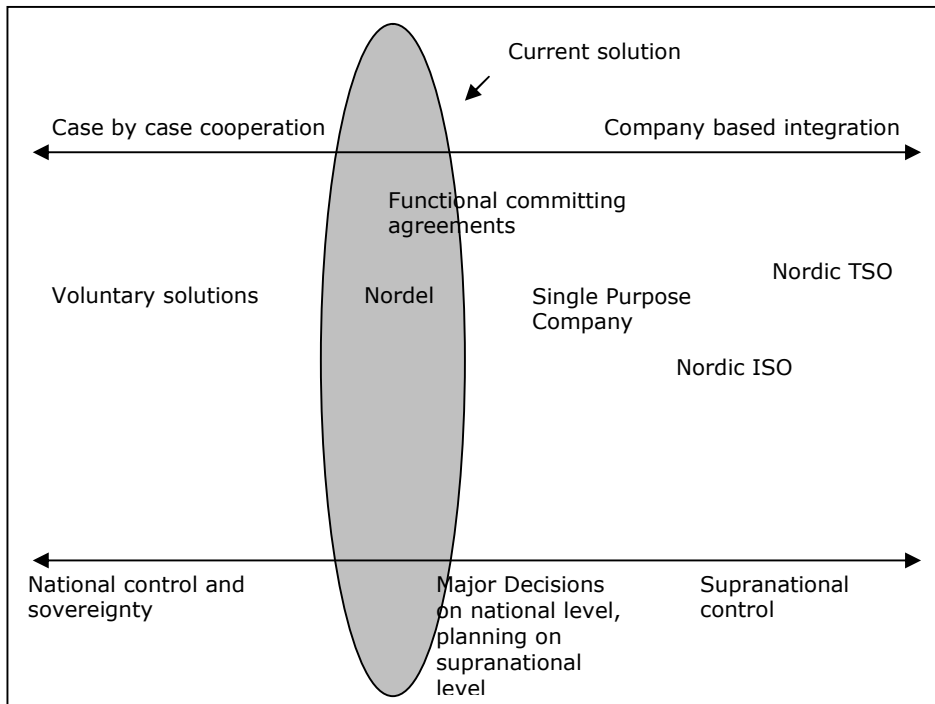
The proposed guidelines imply harmonised principles for national arrangements *if* there is a need for peak load resources in the power system during a transitional period in the relevant country. The guidelines include common methods for assessment of the power system adequacy and relevant market design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

The arrangement proposed by Nordel is designed in a way that the resources are first activated in the commercial markets (Elspot, Elbas), thereafter the regulating power market. All resources shall only be used after all the commercial bids have been activated.

The issue of peak load capacity is currently being discussed between Nordel, NordReg and the EMG. The Swedish regulator has been given the task of assessing the Swedish peak load arrangement, in parallel with this task; NordReg will look at the Nordic arrangement, and the need for guidelines.

## 5. The organisational choices and issues

As the 2006 Econ report suggests, we can identify several different ways to further harmonise the Nordic electricity market. In this section we outline the possible choices for further harmonisation of the TSO services in the Nordic region. We can view the different choices as a scale, from voluntary cooperation to company based harmonisation (see figure 2). The option of continuing the harmonisation process through voluntary cooperation between the TSOs (through Nordel) has been described in 3.5. The other options will be described in the following. The section ends with a table summarizing the different choices, and their key organisational features.



**Figure 2 Organisational models (ECON 2006)**

### 5.1. Nordic ISO (NISO)

An ISO means that the system operation is separated from the grid ownership. The grid owner operates and develops the grid based on the instructions from the ISO/RIO. This grid owner is thereby responsible for connections to the grid, and for undertaking maintenance and grid investments.

An ISO model hence means that one company has the responsibility for the operation and planning of the grid, in addition to market issues, while another company owns and has the economic responsibility for the grid itself.

A Nordic ISO would imply a joint unit to exercise the system responsibility (balance management, investment planning and electricity market issues) for the entire Nordic power system. The costs of system operation could be financed through a system operation fee levied on all market participants.

The grid operation would be done by the national grid owners, who would have the responsibility for reliable operation of the grid, and collecting grid tariffs from its customers. The grid owners would be responsible for operation and maintenance, as well as investments in the national grid.

Location of the headquarters would obviously be a political question, and also the process for investment allowance. A Nordic board of national authority representatives could approve investments.

In the current proposal for the EU's third internal market package for energy, the ISO model is regarded as a solution if one for some reason cannot establish a fully unbundled TSO. Though it is unclear

how the European Commission would react to the establishment of a transnational ISO, as it seems today as the ISO path is perceived as a lesser alternative than unbundled TSOs. However, if the owners of an ISO consist of unbundled TSO's, this would probably be in line with the proposal of the Commission. See also section 7.6.

Econ (2006) has outlined some key organisational features of a joint Nordic ISO:

- **Ownership structure** – The new organization could be owned by the four Nordic states. Another possibility would be to establish the Nordic ISO as a holding company owned by the national TSOs. National considerations of ownership have to be taken into account. Choice of organisational structure will significantly influence governance and decision making structure.
- **Governance and decision-making structure** – A Board of governors could decide principles for market operation. Each country could have representatives on the company's board of governors.
- **System operations** - The new entity would be charged with overall system operations and coordination of the four transmission owning companies. This model of system operations is in many respects similar to the US RTO model and the Australian model.
- **Grid maintenance and expansion** – The joint Nordic ISO will not complete any grid investments but should be the overall system planner and must ensure that transmission owners expand the grid according to Nordic system development plans. In this respect it would be sensible to transfer most (if not all) of the existing competencies in Nordel into the new Nordic ISO.
- **Financing mechanism** – The Nordic ISO's could operate as a non-profit organization, and administration and system operation costs would be financed through a *system operation fee* levied on all market participants.
- **Regulatory issues** – The Nordic regulator group (NordReg) could conduct an annual review of system operations, including the *system operation fee*.

The deeper the mandate of the ISO, the more of the system development and investment decisions would lie in the hands of the ISO. However, regardless of the depth of the ISOs mandate, what differentiates the ISO from the TSO is the grid ownership. In any conceivable version of the ISO, the grids remain on national hands.

## 5.2. Nordic TSO (NTSO)

The preferred solution in the European Commission's proposal for the third energy market package is unbundled TSOs. In the Nordic region, all the TSOs except Fingrid are fully unbundled. In a regional sense, the TSO solution would imply a Nordic TSO that functions with a mandate like the national TSOs today. That is: grid ownership, responsibilities for grid expansion and maintenance, grid investments, system operation and all the other tasks that the TSOs have today.

Creating a Nordic TSO (NTSO) would imply merging of the four national TSOs into one responsible entity that both owns and operates the high voltage grid in the Nordic region. As grid owner, the company would have to ensure adequate maintenance and expansion of the main Nordic grid. As system operator, the company would also be charged with the overall operational responsibility of the Nordic system.

Advocates of the TSO model claim that ownership of grid assets may give better incentives for optimal grid maintenance and expansion than an ISO model (ECON 2006)

Forming a joint Nordic TSO (company based merger) is dependent on a strong mandate. This implies giving up the possibility of using the national TSOs for national objectives. Otherwise domestic TSO conflicts end up in the NTSO, where decisions have to be determined in negotiations between countries.

When discussing organisation and ownership of TSOs, the ownership of Nord Pool, the market exchange (which is fully owned by the four TSOs) must also be addressed. During the stakeholder workshop, one speaker representing a large producer proposed the following:

Nord Pool spot may be owned by the NTSO. A prerequisite is that the ownership is independent from any market actor. Market and Planning Committees with representatives from market actors may however give advises and launch proposals.

In the case of a NTSO, the representatives in the NTSO could be one for each owner and two additional should be independent board members (one of them chairman with casting vote). As in the case with a NISO, the location of the headquarters would be a political question, and also the process for approving investments. A Nordic board of national authority representatives could approve investments.

Ownership issues would have to be addressed, as the issue of asset value would have implications for e.g. voting rights and influence in the NTSO.

Econ (2006) has identified some possible key organisational characteristics of a joint Nordic TSO:

- **Ownership structure** - The new organization could be owned by the four Nordic states. However, alternative ownership structures can also be considered. National considerations of ownership have to be taken into account.
- **Governance and decision making structure** – This point will be even more relevant for a joint Nordic TSO than for a NISO, as both national and intra-national grid investments have to be decided.
- **System operations** – The new entity would be charged with overall system operations. The minimum function would be simply to ensure short-term reliability. However, as Nordel has pointed out,

proactive measures in terms of the long-term security situation should also be adopted.

- **Grid maintenance and expansion** – System plans for grid maintenance and expansion would have to be made both at the regional, national and Nordic level.

- **Financing mechanism** - Tariff design issues related to use of grid fees, grid financing and payment of system services are just some key issues that would need to be resolved. The Nordic TSOs currently have significantly different tariff designs.

- **Regulatory issues** – Today there are also differences in regulatory models adopted by regulatory authorities. Agreement therefore would need to be reached as to which regulatory model is adopted.

<b>Organisational choice</b>	<b>Ownership structure</b>	<b>Governance and decision making</b>	<b>System operations</b>	<b>Grid maintenance and expansion</b>	<b>Financing mechanisms</b>	<b>Regulatory issues</b>
<b>Continued Cooperation</b>	As today, national ownership to grid and TSOs.	Negotiations between the four TSOs in Nordel, or equivalent organisation.	As today. Cooperation between the four TSOs.	The national TSOs are responsible for grid maintenance, expansion plans developed by Nordel for intranational connectors.	As today	Harmonisation necessary between regulators.
<b>NISO<sup>7</sup></b>	New organisation owned by either the four states or the four TSOs	Board of governors decides principles for market operations. Rotating chairmanship.	New entity charged with overall system operations and coordination of the four transmission owning companies.	New entity will be the system planner, and must insure that transmission owners expand grid according to plan. Most competences from Nordel transferred to the ISO.	The Nordic ISO would operate as a non-profit organisation, administration and system operation financed through <i>system operation fee</i> .	Annual review of system operations by Nordic regulator group.
<b>Nordic TSO</b>	Owned by the four states.	Since national and intranational grid investments need to be decided, this governance structure must be the result of negotiations.	Ensure short-term reliability, and take proactive measures in terms of the long-term security.	System plans for grid maintenance and expansion both t the national and Nordic level.	Tariff design related to use of grid fees, grid financing and payment of system services.	Agreement needs to be reached by regulators. Today the regulating practises vary,

**Table 1 Key organisational features: Continued voluntary cooperation, ISO, Nordic TSO**

<sup>7</sup> Note that an Independent System Operator might also have a deeper, more extensive mandate than what is presented in this table. This deeper ISO mandate could include more investment decisions and planning responsibilities, however the ownership of the grid will remain on national hands in any ISO solution.

### 5.3. ECON conclusions and EMG views

Econ concludes in its report that harmonisation on relevant policy is at least as important for improved efficiency as harmonisation of the system responsibility. These two are of course closely interrelated in the sense that at least some degree of policy harmonisation is necessary for the harmonisation of system responsibility.

According to Econ the following issues of policy harmonisation are crucial to the functioning of the market:

- Ensuring optimal transmission grid investments
- Unifying principles for congestion management

#### EMG's comments and recommendations (2006):

The Electricity Market Group supports Econ's recommendation that coordination and harmonisation around the right policies should be the favoured approach for enhancing the functioning of the market.

Further, EMG supports Econ's conclusion that increased harmonisation primarily is solved through negotiations and agreements, either between the Nordel members as a co-ordinated group or via bilateral agreements.

## 6. Experiences from other countries

In Europe different countries have tried different solutions when de-regulating and structuring their electricity markets.

All the EU countries that have a de-regulated electricity market have an arrangement with system operation and grid responsibility together. Italy and Hungary previously had an ISO who had the responsibility for system operation and a separate grid owner. They now have a TSO solution.

The European Commission has studied the TSO – ISO issue before the presented the third internal market package for energy. When choosing between an ISO and TSO, the Commission strongly recommends the TSO approach. Today, all the EU countries have a TSO arrangement. According to the 2006 ECON report, the TSO is evaluated as being the key institution in order to attain a competitive power market. ECON also stresses that these organisations should be unbundled as far as possible (ECON 2006).

## 7. Obstacles and challenges

While the different alternatives are relatively clear, there are substantial obstacles and challenges connected with choosing a company based model for further harmonisation. In the following section, we outline some of these challenges.

At the stakeholder workshop, a number of practical problems on the path towards a NTSO/NISO were identified; political support and willingness to give up some "sovereignty" to a supranational Nordic unit was named as one of the most crucial points. Another issue was the question of ownership. This may be difficult based upon two facts; the ownership structures differ between the countries (one country has a mixed private and public ownership), and the networks differ both with respect to scope and cost level (see below). Further, there are some principal considerations that should be emphasised regarding the benefits of having a TSO- structure compared with an ISO-structure.

### 7.1. Ownership issues

The ownership structure matters for cross country political decisions. The second part of the Nordic Council of Ministers' declaration asks *how* a joint Nordic system operator may be established. Organisation of the ownership is important in this respect.

If a NTSO is to be created, the ownership to the network must be addressed. (This would not necessarily be the case with an NISO). One stakeholder at the workshop suggested that the four Nordic states could own 25 % each of the NTSO. A challenge in relation to this is the different ownership structures of the Nordic TSOs today. Three of the TSOs (Energinet.dk, Statnett and Svenska Kraftnät) are fully state owned, while the fourth (Fingrid) has a mixed private and state ownership structure. The Finnish state is committed not to increase its ownership share in Fingrid.

Furthermore, the fact that the extent of the network varies means e.g. that the value of the assets and thus also the value of the TSOs vary. As such, a simple split of 25 % ownership to each country may not be as straight forward as it seems. According to annual reports for 2006, the value of total assets of the four TSOs differ as much as 50 %<sup>8</sup>. The purpose here is not to give an accurate company valuation, since that would require whole analysis of its own, but rather to indicate the potential problems on reaching an agreement on ownership shares.

The problems with ownership are closely related to issues of security of supply and crisis management, where the states seem especially reluctant to give up sovereignty. This will be further elaborated in 7.4.

Crucial questions regarding ownership:

- What counts as the transmission grid?
- What is the economic value of the four national grids?
- Distribution of decision- making power in a prospective new company?

Also for the case with establishment of a Nordic RIO (NISO), the distribution of power in a new company would be an issue. Such an organisation would also require an agreement on the voting rights, board members etc., something that can turn out to be a quite severe practical challenge.

## 7.2. Investment decisions and maintenance of the grid

The most important distinction between organising the system operator as an ISO or a TSO is the ownership to the grid. Apart from being responsible for the system operation, the TSO also follow through investments and maintenance of the grid continuously. Critics of the ISO- model question whether such an organisation of the system responsibility can be an effective way of operating, maintaining and building infrastructure. It is unlikely that a Nordic ISO could solve the challenges involved better than a national ISO.

There are several advantages of having a link between the ownership to the grid and the system operation. First, the ownership of the grid leads to more accurate information about the needs for maintenance in the grid. This information is important in order to secure a sufficient level of maintenance in the grid continuously. It is also importance for the daily operation of the grid. Second, this information provides a good foundation for making investment decisions in the grid.

Another important aspect is that a TSO is empowered to make an investment or maintenance decision in one step. An ISO, on the other hand, must go through a two-step process. First, the ISO must recommend an investment to the transmission asset owner, and

---

<sup>8</sup> Svenska Kraftnät had total assets of 10 051 MSEK in 2006 whereas Energinet.dk reported total assets of 14 086 MDKK in the same year. Source: company annual reports 2006.

then the asset owner must (this depends on the mandate) take the investment decision. These two stages may imply inefficiency in the investment process. Especially smaller investment projects may be hampered by this organisation. Further, there may be disagreements between the ISO and the transmission asset owner that leads to delays in the projects.

An ISO-solution would most likely require some guarantees from the transmission system owner that the proposed investments actually will be carried through. If the transmission system owner can refuse to carry out the investments proposed by the ISO, it would probably lead to underinvestment and insufficient maintenance of the grid. From this it follows that the national transmission system owners some times would have to invest even though it would not have been regarded as profitable by the grid owner.

The present organisation of the system operators as TSOs promotes efficient maintenance and investments in the grid. Stakeholders on the workshop also emphasised the value of having a TSO compared with an ISO.

### 7.3. Congestion management

Congestions are managed by the grid owner, as congestions are a grid problem. The balancing of the system in general is the task of the system operator. Tasks performed by the TSOs are done by them as both grid owner and system operator. For example, a problem can arise as a grid problem, and then develop into a balance problem, as these two issues are closely related. Today, the organisation and the means of the Nordic TSOs can be used to mend both congestions and balance issues in an efficient way.

If a Nordic system operator is to be established, one of the most important tasks is to find a solution for an efficient method of congestion management to be used in the whole Nordic region. This issue has been heavily debated over the years and there are disagreements between the different TSOs regarding which method is the most beneficial. (See 4.2)

In an efficiently functioning market, the distribution of responsibilities between the system operator and the grid owner must facilitate an efficient allocation of costs for e.g. congestion management. It can be argued that the congestion management is easier given the fact that they are both system operators and grid owners.

The proposal of establishing a Nordic system operator (NISO) seems to rely on a belief that if such a company is established, this will facilitate a common method for congestion management. This is not necessarily the case, as it is not considered to be realistic that the governments would give a strong mandate to a new company if the key challenges that exist today are not agreed upon initially.

The more disagreements there are about the playing rules (regarding congestion management, balance management, etc.), the more challenging it will be for a new company to reach agreements on these issues. Hence, it can be argued that the playing rules should

be further harmonised before an eventual new organisational structure of the TSOs is created.

#### 7.4. Control and security of supply issues

In the power system, momentary balance between demand and supply within each operational hour is required. The role and responsibility of the system operator is of crucial importance in this manner. To handle extraordinary situations it is also crucial that the rationing responsibility is clearly defined.

A strong mandate is a prerequisite for the system operator to be able to perform in an efficient way. This applies regardless of which organisational structure chosen. A system operator must be authorised to always act fast in order to maintain a sufficient level of security of supply. Today, the TSOs in the Nordic countries are empowered to act in such a manner.

For the long-term security of supply it is crucial that the system operator is empowered to carry out the needed investments in time to secure a sufficient level of maintenance of the grid. (See 7.5). Today there are differences in the TSOs' responsibilities regarding the long-term security of supply. The system operators in Sweden, Denmark and Norway have to a various degree a responsibility to secure the long-term security of supply. The Finnish system operator, Fingrid, on the other hand has no such commitment.

Also with regard to crises, the TSOs have different responsibility today. E.g. Svenska Kraftnät is the authority responsible for Sweden's power supply contingency and planning. Hence, they have the responsibility to meet the society's requirements during times of crisis and war. In the other Nordic countries, these activities have been delegated to other authorities. It would be of due importance to define the responsibility of an eventual Nordic system operator when it comes to extraordinary situations like rationing.

In a situation with energy shortage, e.g. in Norway, it is within the system operator's responsibility to take the necessary measures to prevent a situation with rationing. These measures can include use of energy options for large consumers, start-up of reserve capacity, to divide areas with energy shortage into price areas, etc. The cost allocation of introducing these measures should be addressed if a Nordic system operator is to be established. If one country has a problem with energy shortage, would the other Nordic countries be willing to finance the measures introduced in order to manage the situation? The possibility for the system operator to introduce measures in order to handle situations with energy shortage must not be limited with an eventual Nordic system operator, compared with today's practice, as this would increase the risk for rationing.

If the system operation is to be organised within a Nordic organisation, the mandate given from the national authorities will be decisive for the functioning of the NTSO/NISO, and hence have implications for the security of supply. It is also important that the mandate given is equal in all countries - if not there would be inefficiencies in the performance of the NTSO/NISO.

The stronger mandate given to the NTSO/NISO, the more control must be given up by the national states. The willingness to give up national sovereignty on this matter is a highly political question (ECON 2006).

## 7.5. Regulatory challenges

The regulation of the TSOs today differs between the countries. The creation of a NTSO or NISO would call for a certain harmonisation of the regulation, in order to avoid strategic responses to differences in the regulation and to improve the economic efficiency. (ECON 2006)

NordReg is the organisation for co-operation between the Nordic energy regulators. Their mission is to actively promote legal and institutional framework and conditions necessary for developing the Nordic electricity market. If a Nordic TSO is implemented, a symmetric formal regulator body may be necessary in order to secure an efficient supervision of the TSO. NordReg does not have a very strong mandate today and mandates given from the different countries differ.

An establishment of a Nordic regulator would require harmonisation of mandates and common regulatory principles. This calls for strong political support, and may also call for a willingness to give up some national priorities and sovereignty to harvest from the overall gain from Nordic trade of electricity. Further, the question of a Nordic appeal body remains. Today, the appeal body of the regulators often lies within the national ministries.

It is however not evident that there is a need for a common Nordic regulator, as one possibility could be furthering the current approach with national regulators cooperating within NordReg. Then the question remains as whether or not this is sufficient to secure an adequate level of control of the NTSO/NISO. The current EU laws say nothing about how to regulate an NTSO/NISO solution in a transnational perspective.

Creating a Nordic TSO or ISO would necessarily require some sort of legal changes in the Nordic countries. Today, there are no supranational laws in the Nordic region, except EU law – how these legal ramifications would manifest themselves is unclear. While the Nordic countries can implement a “Nordic” legislative framework for an ISO or TSO in their respective laws, the lack of Nordic supranational law could create problems with jurisdiction and appeal options.

## 7.6. Relationship to the EU and third countries

The Commission proposal from 19 September 2007 for the 3rd legislative package for the internal energy market has created a new situation that has to be taken into consideration when assessing the question of a Nordic system operator.

The Commission has proposed full separation of generation and supply from transmission networks (full ownership unbundling). In

practice this means that Member States must ensure that the same person or persons cannot exercise control over a supply undertaking and, at the same time, hold any interest in or exercise any right over a transmission system operator or transmission system. This provision also applies vice versa, that is, control over a transmission system operator precludes the possibility of holding any interest in or exercising any right over a supply undertaking.

Whilst the Commission considers that ownership unbundling remains the preferred option it however provides an alternative option – an independent system operator - for Member States that choose not to go down this path. The ISO option must provide the same guarantees regarding independence of action of the network in question and the same level of incentives on the network to invest in new infrastructure. The ISO option enables vertically integrated companies to retain the ownership of their network assets, but requires that the transmission network itself is managed by an independent system operator that performs all the functions of a network operator. In addition, to ensure that the operator remains and acts truly independently of the vertically integrated company, the Commission has proposed a heavier regulatory system with permanent regulatory monitoring for the ISO.

It is important to notice that bringing up the Nordic system operator needs to be executed in the framework of the future EU-legislation. This means that the Nordic system operator model has to qualify with the EU-legislation. This has several implications towards the Nordic system operator plan.

According to proposed article 8(5) in the electricity directive, several undertakings which own transmission systems can create a joint venture which acts as a transmission system operator in several Member States for the transmission systems concerned. No other undertaking may be part of this joint venture, unless it has been approved under article 10 in electricity directive as an independent system operator. This means that the Nordic system operator could only be owned by certified TSOs and ISOs and any market participants are not accepted to its owners.

However, while the Commission proposal recognizes a multinational joint venture as a system operator, it leaves open which regulations would be applied to it. According to the Commission proposal, different certification procedures and regulatory regimes are applied to TSOs and ISOs. The Commission has proposed a heavier regulatory regime for ISOs. The most important difference between the proposed regulatory frameworks is that the national regulatory authority has to approve in advance (ex ante) the investments plans for the ISO. The Commission proposal leaves also open, how the authority to regulatory oversight should be organized between the national regulators.

It is also a question for interpretations, if it would be possible for current TSOs to create a new ISO structure. Namely, the Commission proposal makes it clear that the preferred option of the Commission remains ownership unbundling. The ISO option is meant to be derogation from the basic ownership unbundling approach. The proposed legislation is built to direct transmission system structures

towards companies with full ownership unbundling. According to the proposal, it is not accepted to proceed to an opposite direction. The ISO option is applied only to vertically integrated companies. Thus it can be interpreted that it might not be allowed to change a company structure with full ownership unbundling to an ISO structure. It can be concluded, that according to the Commission proposal, none of the four Nordic TSOs can be transformed to an ISO, because they are not part of a vertically integrated company. Since the proposal from the Commission is not yet decided and the outcome is uncertain, it is not easy to conclude on whether a Nordic ISO would be in line with the EU energy policy goals or not. The answer probably depends on how the ownership would have been structured.

The focus on ownership unbundling in the European Commissions proposed legislative package for the internal energy market is especially important with regard to the organisational structure of Fingrid (see Appendix 2 for more information on the issue).

Another issue that requires attention is what effect a common Nordic System Operator would have on the market coupling towards Europe and the Baltic states. If one decides to proceed with this idea, a thorough study on these effects needs to be carried out.

## **7.7. Transparency**

The stakeholders present at the 14 November 2007 underlined the importance of ensuring transparency with regard to investments and grid planning. Nordel has been criticised for not being transparent enough, with regard to investment planning. Nordel has stated that one of its goals is to improve transparency in this area. Another reason for lack of transparency in the Nordic market is that after Nordel proposes an investment, the grid owner, and respective government continue the processes internally until all the socioeconomic aspects of the investment is covered. With an NISO solution, the decision making would still be on the national level. Hence the NISO solution would not necessarily improve the transparency.

## **7.8. Tariff harmonisation**

The tariff level and structure differs among the Nordic countries today. The share of the tariff that is covered by the producers and the consumers, respectively, differs widely and the structure of the price signals also differs. Sweden and Norway have tariff models designed to take marginal losses into account, while Denmark and Finland have more of a unit price model (ECON 2006). If a NTSO is to be established, harmonisation of the tariff structure has to be addressed and agreed upon. This can be a challenge and there is a risk that the chosen tariff structure could be determined by the least common denominator, which could lead to a situation that is not necessarily better than today.

If a NISO is to be created it would probably not be necessary with a complete tariff harmonisation. However, there would still be need to

agree on some principles for cost allocation of the system- respective grid operation costs. (For example a system and/or grid operation fee).

## 8. EMG views – if, how, and what?

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 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.

The answer to this question is not obvious. Establishing a Nordic system operator (NISO and/or NTSO) would perhaps yield a more "Nordic" approach to the marked operation than what is the case today. Especially with regard to investment planning and the actual grid expansion this could be the case. It could also be argued that the creation of a Nordic System Operator would facilitate agreements on issues like a harmonised Nordic congestion management. This would however depend on the mandate given by the governments.

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 NTSO/NISO.

From the previous discussion, 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. Hence, it is perceived as more probable to agree on a NISO than a NTSO.

With the current EU discussions as a backdrop, and emphasising the need for transparent and effective operation and grid expansion, the

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 efficient Nordic grid investments. As discussed earlier, 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. This was also pointed out by several actors on the stakeholder workshop. 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.

The obstacles connected with choosing a company based model 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.

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 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.

It can also be argued that before going to the step of establishing a Nordic system operator, the TSO's should reach a higher degree of harmonisation based on the co-operation that exists today (through Nordel). Common playing rules would facilitate an eventual creation of a Nordic 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 Nordel and NordReg, the following measures should contribute to untangling some of the issues raised by stakeholders in this process.

- Nordels new Grid Master Plan and its new prioritised grid investments should be welcomed. These investments and the five previously proposed investments will increase the power flow in the Nordic market.
- 
- The grid planning and strategic work done by Nordel 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, e.g. concerning a common Nordic retail market.

## 8. Conclusions

*The EMG will conclude in this issue after the 26 – 27 May Electricity Market seminar in Stockholm.*

## 9. References

- Cowi A/S and Ea Energianalyse (2007) *Steps for improved congestion management and cost allocation for power exchange and transit - Economic gains and losses from electricity trade*, TemaNord 2007:537  
<http://www.norden.org/pub/miljo/energi/sk/TN2007537.pdf>
- Econ (2006) *Coordination of network operation and system responsibility in the Nordic electricity market*, TemaNord 2006:518  
<http://www.norden.org/pub/miljo/energi/uk/TN2006518.pdf>
- Nord Pool (2008) *Nord Pool in brief*  
<http://www.nordpool.com>
- Nordel (2008) *Nordic Grid Master Plan 2008*  
<http://195.18.187.215/docs/1/AHAOPLABJLFFAIEDGNAKIGIIP/DBW9DBD7N9DW3571KM/Nordel/docs/DLS/2008-00096-01-E.pdf>
- Nordel (2007) *Nordic Grid Code 2007 (Nordic collection of rules)*  
<http://www.nordel.org/content/default.asp?pagenam=openfile&DocID=4948>
- Nordic Council of Ministers/EMG (2005) *Elmarkedsgruppens notat til Nordisk Ministerråd 2005*.  
<http://www.norden.org/pub/miljo/energi/sk/us2005488.pdf>
- Nordic Council of Ministers/EMG (2006) *Electricity Market Group 2006*.  
<http://www.norden.org/energi/el/sk/electricity%20market%20group%202006.pdf>
- Nordic Council of Ministers/EMG (2007) *Electricity Market Group 2007 – Status of the harmonisation of the Nordic Electricity Market*  
<http://www.norden.org/energi/el/sk/emg%202007%20final%200sep%202007.pdf>
- NordReg (2008) *Harmonised Supplier Switching model*  
<https://www.nordicenergyregulators.org/upload/Reports/NordREG%20Activities%202007.pdf>
- NordReg (2007) *Regulation of the Nordic TSOs with focus on market efficiency and harmonisation*. NordREG Report 7/2007.  
<https://www.nordicenergyregulators.org/upload/Reports/regulation%20of%20the%20nordic%20tso.pdf>
- NordReg (2005) *A common definition of the system operators' core activities*  
<https://www.nordicenergyregulators.org/upload/Reports/SYSTEM%20OPERATORS%20CORE%20ACTIVITIES.pdf>

## Appendix 1: Stakeholder views presented at the 14 November workshop

As mentioned above, the EMG organised a stakeholder workshop to shed some light on the stakeholders' views in this matter. The workshop was held at Arlanda airport, 11 November 2007. The following people presented their views at the workshop.

The views of these producers differ substantially. Vattenfall argued heavily for the further harmonisation of the TSO services, focusing on the possibilities for a more flexible and "Nordic minded" system operation.

The representative from PVO OY presented a different view – reflecting a satisfactory position towards the current Finnish solution. The ensuing discussion after these presentations revealed an eagerness to further the harmonisation process. Following the presentation by Mr Damsgaard, the stakeholders also stressed the need for harmonizing around the right set of policies.

The view taken by Vattenfall focused on moving the current discussions on congestion management into the tasks of the new system operator, hence achieving a Nordic focus rather than a national focus when setting the congestion management guidelines. Nordenergi presented a more subtle view, as the organisation has not yet taken a position in the issue. The presentation instead focused on how the Nordic region can keep its position as a leader in this field, and pointed out that more and closer integration is needed if the region is to avoid just following the EU in the electricity market regulation. The stakeholders present at the workshop echoed this view.

NordReg has not yet taken a view in this matter; their presentation focused more on the implication of the forthcoming EU legislation for this issue. Regarding the TSO issue, the EU regulation might have the most profound effect on the Finnish model, where the unbundling issue is a source of controversy (see Appendix 2 for more information on the relationship between the Fingrid, Finland and the EU legislation). On the issue at hand, NordReg states in their position paper that regional regulation raises many issues and challenges (see Appendix 3)

In the presentation from Bente Hagem, Nordel underlined their view that further voluntary cooperation between the Nordic TSOs, through Nordel is the most effective solution to these issues. In the Nordel position paper they state that increased cooperation of unbundled TSOs is the preferred way to proceed in the Nordic electricity market (see Appendix 3).

During the presentation, the issue of transparency in Nordel was discussed. Especially some of the representatives from the producers claimed that the current transparency in Nordel's investment planning could be improved, and that organising a common Nordic ISO to handle the investment planning might increase the transparency in these planning processes.

Nordel pointed out that most of the challenges in the grid for increasing the flow in the Nordic common market would be mended with the new investment package. Hagem also claimed that transparency would be better during the next stage of investment planning in the region.

The stakeholder workshop ended with a panel debate, where those present in the audience could ask questions, and the panellists could discuss each other's points.

In the debate, the panellists appeared to agree that something needed to be done, especially with regards to the congestion management. However, the panellists did not agree on whether or not we should establish a Nordic TSO, an ISO or if we should continue with four TSOs as we have today. The panellists did however express concern about the coming EU legislation, and how the Nordic region best can position itself in relation to the legislation. One stakeholder wondered whether the region could isolate itself in the EU by being too ambitious before we know where the EU is headed.

Vattenfall expressed the view that the common Nordic ISO should be privately owned, and not a public body.

The stakeholders that participated in the workshop were invited to present their view in the form of a short position paper. These papers are included as Appendix 3 of this note.

Summing up, the responses from the stakeholders were not conclusive in any direction. The stakeholders seemed to agree on some points: that something needs to be done with the congestion management, balance management, intra day-trade and that further harmonisation must be done around the right policy.

## Appendix 2: TSO unbundling issues in Finland

### I The Structure and Regulation of the Finnish TSO-model

The Finnish electricity TSO (Fingrid) is not part of a vertically integrated company. Instead, the Finnish TSO -model is based on balanced ownership structure combining two energy companies, the state and investors (Fortum<sup>9</sup> 25,08 %, PVO<sup>10</sup> 25,08 %, state 12,33 %, different institutional investors 37,51 %, corresponding voting rights in the board of directors 1/3, 1/3, 1/6 and 1/6). The shareholders are committed to a shareholder agreement according to which all major issues have to be decided by unanimity of Fortum, PVO and the State in order to prevent the power generators to act in their own favour. A possibility to sell TSO-shares to outsiders is restricted by the shareholder agreement. The chair rotates between Fortum, PVO and the State. The TSO have an advisory committee, a network operation committee and a power system committee where the customers of the TSO are represented. These committees create an important base for cooperation within the power system and in cooperation between the TSO and its customers.

The Finnish TSO-model was established 1996 in order to create a single TSO by combining the two national vertically integrated grids, namely the state company owned grid and the industry owned grid. The decision was one of the fundamentals for the liberalization process and establishing the national power market and later the Nordic Power Market. The balanced ownership structure was aimed to prohibit the generators to misuse their powers in the decision making process in the company. The purpose of the special voting rules is to secure that neither the State nor the private owners could dominate the TSO. It is important to notice that the extensive minority rights in Fingrid are basically created in order to restrict the powers of the two generators and to enable the State to preserve the public interest in the TSO decision making.

It is also important to notice that it is not only the ownership structure of the TSO that promotes a well-functioning power market in Finland. The regulatory system, established for the TSO, is built to improve this objective. The Finnish regulatory system obliges the TSO to actively develop its network and network services. It means that the Finnish TSO is obliged by law to develop the power system, interconnections and network services in order to improve the functioning of the market and according to its customers' reasonable

---

<sup>9</sup> Fortum is a generator and supply company listed in stock exchange. The Finnish State owns the majority of its shares. The State shall keep its' majority in the company due to the Parliament policy decision.

<sup>10</sup> PVO is a non-profit generator company owned mainly by a group of energy intensive industrial end-users and municipalities from Finland. The purpose of the company is to generate electricity on a cost price to its' shareholders. PVO's shareholders are forest industries (63 %), energy and distribution companies (21 %), municipalities (6 %), chemical industries (5 %), metal industries (< 1 %) and others (5 %). It is important to notice that PVO – although it is a generator – has a non-profit grid-user interest in the TSO instead of a typical business interest for vertically integrated companies.

needs. The Regulator supervises this obligation ex post with effective executive powers.

## II Effectiveness of the Finnish TSO-model

The Finnish TSO-model has proved to be successful both in terms of transmission tariffs, network security and investments. According to a tariff benchmarking study by ETSO in 2005, Fingrid had the lowest tariff in 400-110 kV voltage level grids and was among the top-three companies of which the two other companies operated only in 400-220 kV voltage level grids. Average time for transmission disturbances in the Finnish grid has been 0.5 -1 minutes per year since 2002. In addition, Finland has not met any major disturbances or black-outs since Fingrid was established. It is also important to note the active investment policy of Fingrid. The Finnish grid is the only national grid among the Nordic Countries where there is not any major congestion. Fingrid has also invested actively in Nordic interconnection capacity; during 2006 the congested time in Finnish-Swedish interconnector contained only 7 % of time.

In other words, Fingrid can be seen as an example of a well functioning TSO and it also fulfils all those objectives which the Commission has set for full ownership unbundling.

## III Problems in implementation of OUB and ISO

According to Section 15 in the Finnish Constitution, the property of everyone is protected. The Constitutional Chamber of the Finnish Parliament supervises ex ante that all legislative proposals by the Government fulfil the requirements of the Constitution, for example the basic rights and liberties. The implementation of the Commission proposal for ownership unbundling and ISO-option would be a difficult process in Finland. Problems will arise especially because of the following provisions:

- a) OUB (art. 8): The proposal in practise prohibits generators to own TSO-shares and assets. If a generator refuses to voluntarily renounce its shares and assets, the State has to expropriate those shares and assets. This will probably mean an enactment of a new law on expropriation regarding to TSO-shares and assets.
- b) ISO (art. 10): The ISO-option means in practise inter alia: the ISO has a full right of use on the property of another person (Para 5), the TSOW has an obligation to finance investments decided by the ISO / the ISO has a right to fulfil investments directed to the TSOW's property (Para 6 b and d) and the TSOW has an obligation to provide for the coverage of liability relating to the network assets used by the ISO. These rules pre-empt in practise the asset owner's possibilities to utilize TSO-assets in his own network business. If a generator refuses to voluntarily renounce its shares and assets, the State probably has to expropriate those shares and assets also in this case.

In conclusion, the Commission proposal for ownership unbundling and ISO-option would function well in a situation where the TSOW's are willing to renounce their shares voluntarily, but if they are not

willing to this, difficult legal processes will arise regarding to expropriation of the TSO shares and assets.

## Appendix 3: Stakeholder position papers

### Vattenfall

Stockholm 2008-01-08

In addition to my presentation at the seminar at Arlanda airport November 14<sup>th</sup>, I would like to make the following comments.

I agree that the potential biggest difficulties can be found in legal harmonization, structure of a Nordic regulatory function, governance and ownership issues. In this respect I would recommend ministries not to exaggerate difficulties. Here we have four countries with a common goal in a Nordic electricity market, more similarities than differences in legislation, a relative similar TSO structure and a huge support from customers and suppliers to improve the functioning of the market. Be practical. Formulate a common Nordic electricity law/cross border regulation. Implement it in national law. Set up a Nordic cross border regulator from the national regulatory authorities. Be open-minded and construct governance solutions that can avoid political interventions, what so far have been possible in each country can be done for all countries together. When it comes to ownership, remember that we are talking of quite limited capital involved. Replacement value of the four transmission systems is not more than around 75 billion SEK.

The national TSO's have different tasks not directly related to the transmission business. I think it would be helpful to list all such duties and then see what task that should be harmonized with a Nordic system operator - typically support to renewables would be efficient to handle on a Nordic level - and what task that should be transferred to national authorities or the national transmission owner.

## Nordel

### **Enhanced Nordic TSO Co-operation**

#### **Introduction**

Ownership unbundling of the Transmission System Operators (TSO) is considered as a pre-requisite for a competitive, transparent and efficient electricity market. In the Nordic countries, the TSOs are ownership unbundled. This is not the case in all European countries, where many of the large generators still own and operate the transmission network. This has initiated a discussion, whether ownership unbundling could be avoided by launching a regional ISO model (Independent System operator).

Arguments for an ISO model has also been that the national TSOs are not enough committed to a regional development which is considered as the first step towards a pan European electricity market. In addition, The Nordic Council Ministers have asked the Electricity Market Group to evaluate if and how a Nordic ISO could be established.

#### **European development**

The European Commission launched 19 September a proposal for the 3rd package of energy legislation. Here ownership unbundling is the preferred option compared to an ISO. In the third package, the EC Commission also notes that ETSO, have made a significant contribution to the internal market development and increased the efficiency and reliability of the transmission networks. The voluntary co-operation through ETSO has however showed its limit, and the Commission has proposed to mandate the TSOs to strengthen their co-operation, by establishing a European Network of Transmission System Operators for Electricity (ENTSO-E). This is done by an amendment of "Regulation (EC) No 1228/2003 on conditions for access to the network for cross-border exchanges in electricity".

The proposed ENTSO-E co-operation will be the key stakeholder for the future development of the European electricity sector, specifically within transmission and system planning, system operation and market development.

Strengthening of the co-operation between the TSOs will have great impact for the Nordic TSOs and possibly change the structure of Nordel. It is however too premature to conclude in this matter.

#### **Regional ISO**

A regional ISO model gives many challenges which must be solved at a political level and a legislative level. This refers specifically to roles and responsibilities between an ISO and the owner of the transmission grid. In Nordel's view the establishment of an ISO will be a time consuming process requiring strongly harmonised regulation both at regional and European level. The main challenges are:

- How to ensure that the grid investments and maintenance policies proposed by an ISO will be implemented by the grid owner?
- How to optimise investments cost, to cost related to system operations?

- How to define the responsibilities in meeting the adequacy and performance standards?
- Who will be the ultimate decision making body?
- How to avoid the impact of national interests and energy policies in the regional decision making?

For the Nordic countries a separation of the already ownership unbundled TSOs into a system operation body and a grid ownership body will be a step backwards. The TSOs have more and stronger instruments and mechanisms available to meet the needs of the electricity markets and to develop the grid in a timely and cost-efficient way.

### **Enhanced Nordic TSO Co-operation**

The TSOs' co-operation at the regional level within Nordel has resulted in a track record as a European forerunner in a well developed regional market:

- Market coupling of the Nordic countries based on implicit auctions. Future market coupling between Denmark and Germany and between the Netherlands and Norway.
- Common market structure as to day-ahead, intra-day and balancing power markets.
- The cross-border transmission capacities are 20-60 % of the national peak demand. These figures clearly exceed the EU target of 10 %.
- A continuous integrated Nordic grid planning process, including the first regional grid investment plan in Europe. The five prioritised Nordic grid projects identified in the plan are now in the pipeline, and a new plan is being made.
- After implementation of the five grid projects the market price is expected to be equal about 75 % of the time in all Nordic countries compared to much lower figure today (33 %).
- Nordic Grid Code defining the common planning and system operation principles to ensure system security and adequacy of the transmission system.
- Harmonisation of the Nordic balance settlement, which will pave way for a Nordic retail market.

However, Nordel has recognised that there is still room for further development in promoting of a seamless Nordic electricity market as an integrated part of the North-West European electricity market and maintaining high level of security of the Nordic power system. In spite of the achievements the current Nordel co-operation has perhaps not lived up to all the expectations. An ISO model could, in theory, deliver more at least in some areas. However, Nordel is convinced that the same and better results can be achieved through enhanced co-operation of the Nordic TSOs while maintaining the strong benefits of the integrated TSO structure, e.g. decision making and implementation of investment. Nordel has therefore prioritized the following issues on the agenda:

- Strengthening of the planning resources and development of a multiregional planning process between European regions
- Improved control of the daily operations and more efficient use of the resources having ISO model as a benchmark

- European benchmark for market transparency - precise and accurate operational information to the market
- Common market coupling in North-West Europe
- Common Nordic principles for congestion management
- Common Nordic balance settlement - one Nordic balance agreement
- The Nordic TSOs have committed themselves to implement these action plans within the next five years.

### **Conclusion**

Nordel believes that increased co-operation of unbundled TSOs is the fastest and most efficient way for further development both in the regional Nordic market and for the integration of the European market. It is Nordel's perspective that a well coordinated TSO structure with the ability to implement timely developments is superior to a regional ISO model with regards to market development, planning and execution of grid operations and development.

## NordReg

### **A Nordic independent system operator – regulatory challenges**

The Nordic energy regulators, working together in NordReg, have not taken any position on the question about if and how a Nordic independent system operator may be established.

At the workshop at Arlanda I made, on behalf of NordReg, a presentation on what implications proposals for new EU legislation may have for system operation in the Nordic power market.

A main message in my presentation was that, even though regional cooperation is an important part of the strategy to further develop the European market, there may be a possible regulatory gap on the regional level.

In the development of the Nordic and European energy market, there is a common understanding and experience that effective and transparent regulation is an important and necessary prerequisite.

The regulator has to have well defined legal powers and responsibilities. This is not at least important in relation to the system operator.

To set up a regulatory regime on a regional level raises many issues and challenges. As far as I know there is little working experience on how this can be done. As commented in my presentation at the seminar, the proposals for new EU legislation in the third energy package may at present raise more questions than answers with regard to the development of regional regulation. Although regional cooperation and development is taking on momentum in Europe, there is concern about a possible regulatory gap on the regional level.

An investigation to establish a Nordic independent system operator should be accompanied by a thorough study on the regulatory challenges and proposals and on possible solutions to these.