

The Nordic Electricity Market

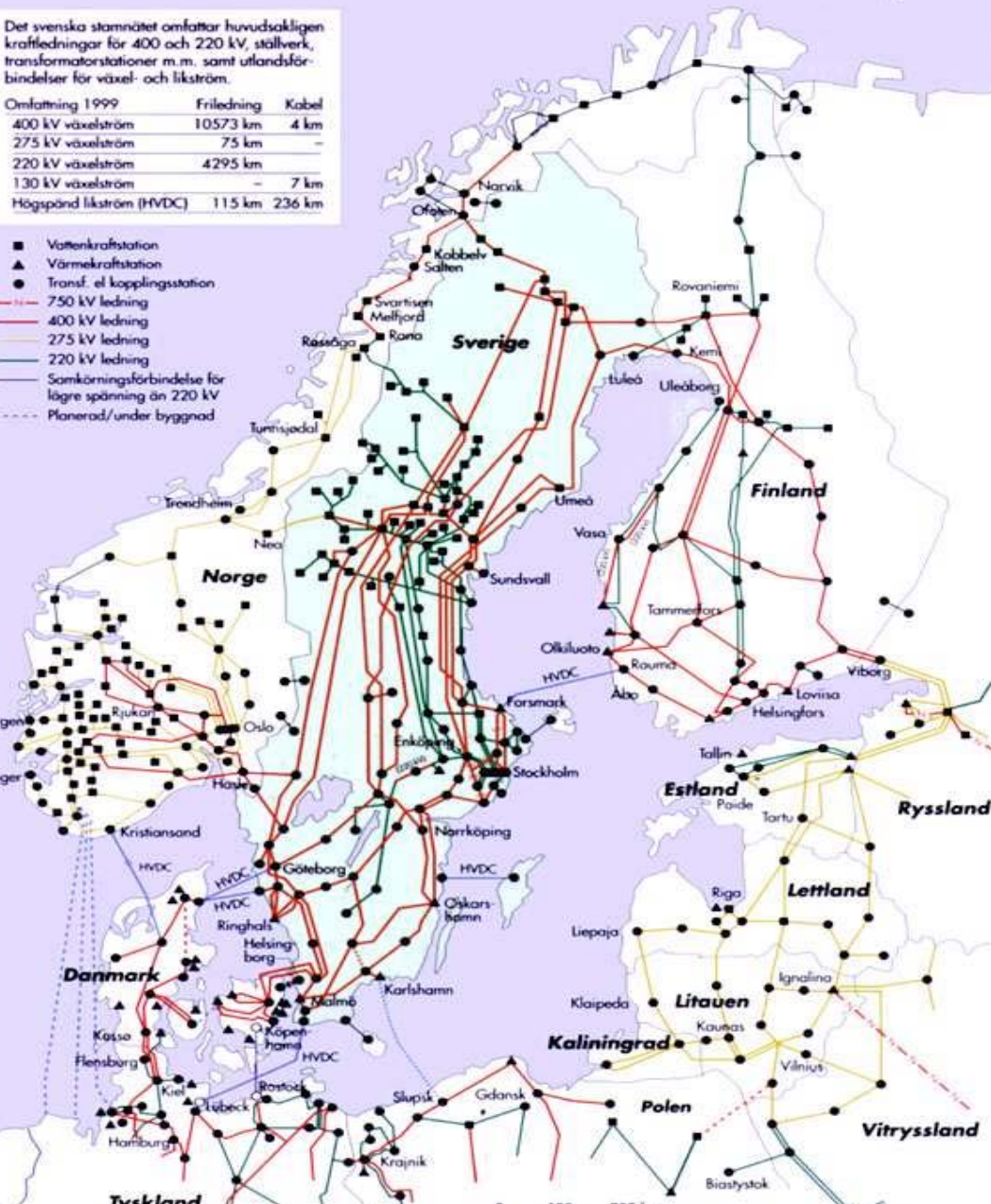
- The most successful international power market in the world. But...
- the market faces serious challenges in coping with security of supply and the needed investments in an increasingly stressed situation.
- Significant further improvements for customers and society can **only** be made through deeper Nordic integration.

Kraftnätet i Nordvästeuropa

Det svenska stamnätet omfattar huvudsakligen kraftledningar för 400 och 220 kV, ställverk, transformatorstationer m.m. samt utlandsförbindelser för växel- och likström.

Omfattning 1999	Friledning	Kabel
400 kV växelström	10573 km	4 km
275 kV växelström	75 km	-
220 kV växelström	4295 km	-
130 kV växelström	-	7 km
Högsäpnd likström (HVDC)	115 km	236 km

- Vattenkraftstation
- ▲ Värme-kraftstation
- Transf. el kopplingsstation
- 750 kV ledning
- 400 kV ledning
- 275 kV ledning
- 220 kV ledning
- Samkörningsförbindelse för lägre spänning än 220 kV
- Planerad/under byggnad



The Nordic Electricity Market

NORDENERGI

- Nordenergi, a co-operation joining the electric industry organisations for producers, suppliers and distributors of electricity within the Nordic countries aiming at the further development of the Nordic electricity market in a European perspective.

Svensk Energi (pres.)

EBL

Sener

Dansk Energi

Finergy

Samorka

Objectives

- **NORDENERGI**
To ensure the development of a necessary infrastructure for a well functioning Nordic electricity market in a European perspective.
- **WG Network Regulation Management**
To analyse various models or benchmarking tools in order to propose common instruments to steer the regulation of distribution in the Nordic countries
- **WG Reserve Capacity**
To find a joint position regarding the peak power problem and fast reserves
- **WG Transmission & Cong. Man.**
To find a joint position regarding congestion management and the development of the transmission system for the common Nordic electricity market.

Main issues

- There should be
 - a common Nordic process and decision making concerning transmission system investments and financing.
 - common principles in the operational phase, especially regarding congestion management and capacity allocation on interconnectors. In a longer perspective, it is important to reduce physical bottlenecks and thereby the need for price areas in the Nordic region.
 - common Nordic principles for handling peak-load situations through market-based balancing of supply and demand.
- Failing to address the situation in an appropriate time frame will escalate the problems.

Nordenergi urges that

- the existing national perspectives must be complemented with or in some cases replaced by a Nordic approach.
- the Nordic ministers have to take responsibility for the ongoing studies on how to further develop the common Nordic electricity market in the areas of system operations, transmission development and security of supply, and to make sure that they are accelerated. Good proposals must lead to decisions!
- co-operation between the Nordic Council of Ministers, Nordel and Nordenergi.

Background (I)

- The interconnected transmission system constitutes an essential **infrastructure** for security of supply and for an efficient allocation of resources. The structure and operation of the transmission system constitutes a vital **framework** for the functioning of the electricity market.
- The development of the transmission network has historically to a high extent been based on national planning and decisions. To improve the functioning and thereby strengthen the competition, there is a **need for an increased co-ordination** of transmission systems planning and investments with a **Nordic focus**.
- Development is necessary regarding the **planning** as well as the **operation** of the transmission system.

Background (II)

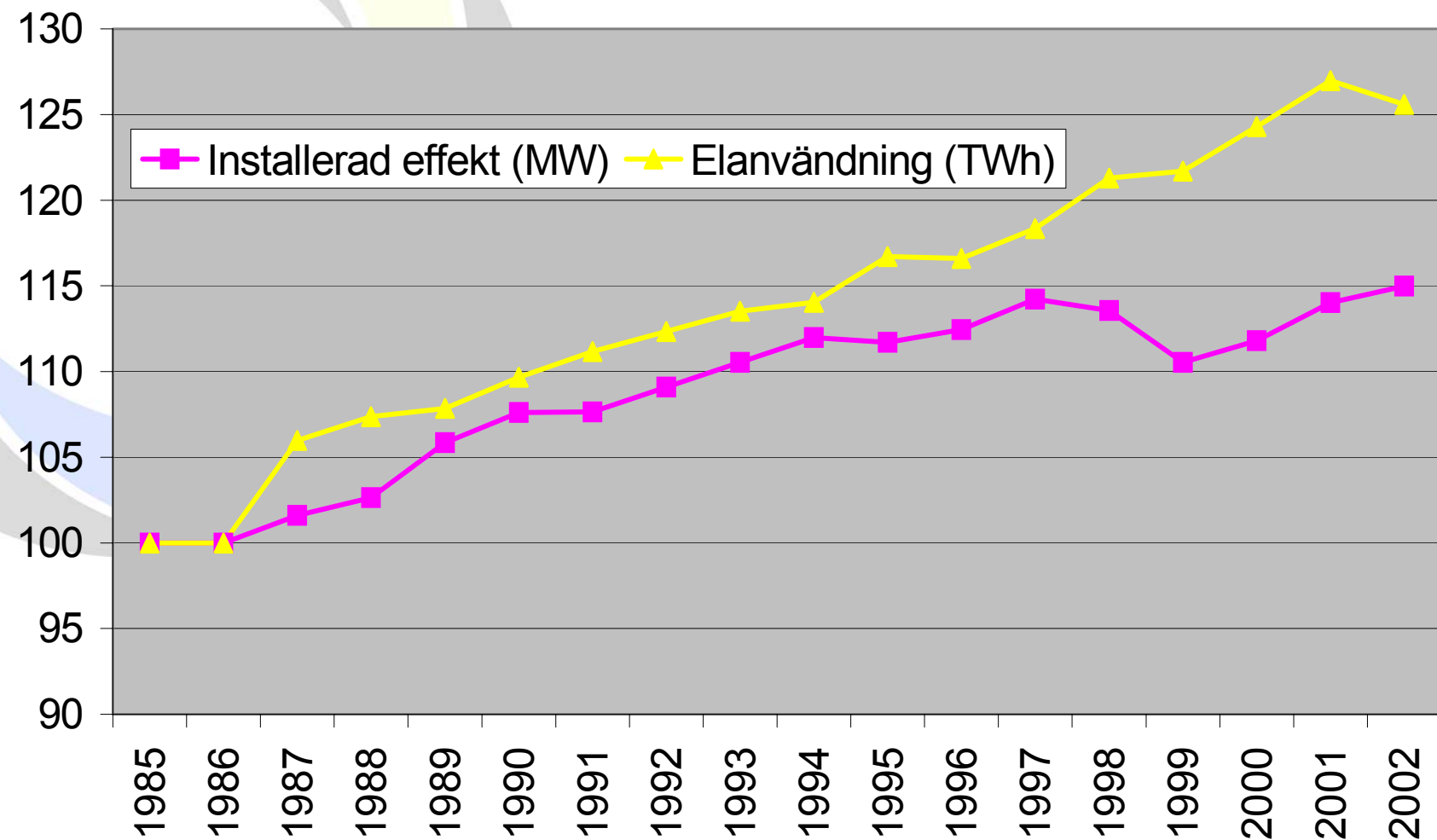
- The transmission system is a natural and legal monopoly. Therefore the **organisational structure** is of great importance, and also the **regulation** of the monopoly is important in determine the level of investments.
- The main grid should be reinforced when the value for the society of increased security of supply, reduced transmission losses, and a better functioning electricity market exceeds the costs for the reinforcement. (**MC=MU**)
- The current organisation of operation and planning coincides with national borders, furthermore the **regulation and assignments** from the respective governments differ and the TSOs' jurisdiction falls within the respective country borders. This may lead to a restricted national perspective in the decision making and analyses of investments might not take **benefits on a Nordic level** into account.

Background (III)

- In a liberalised market, the price is the main instrument for an efficient utilisation and development of the power resources. ***The price formation is essential.***
- A single price in the market area reduces the market risk and stimulates trade activity, and thereby ***increases the competition and the efficiency.***
- The management of transmission bottlenecks (and the reserve capacity) ***influence the price formation.***
- Vital for the price formation are a ***harmonised and reliable model for congestion management*** and common market based principles for reserve capacity.

Utveckling i Norden 1985-2002

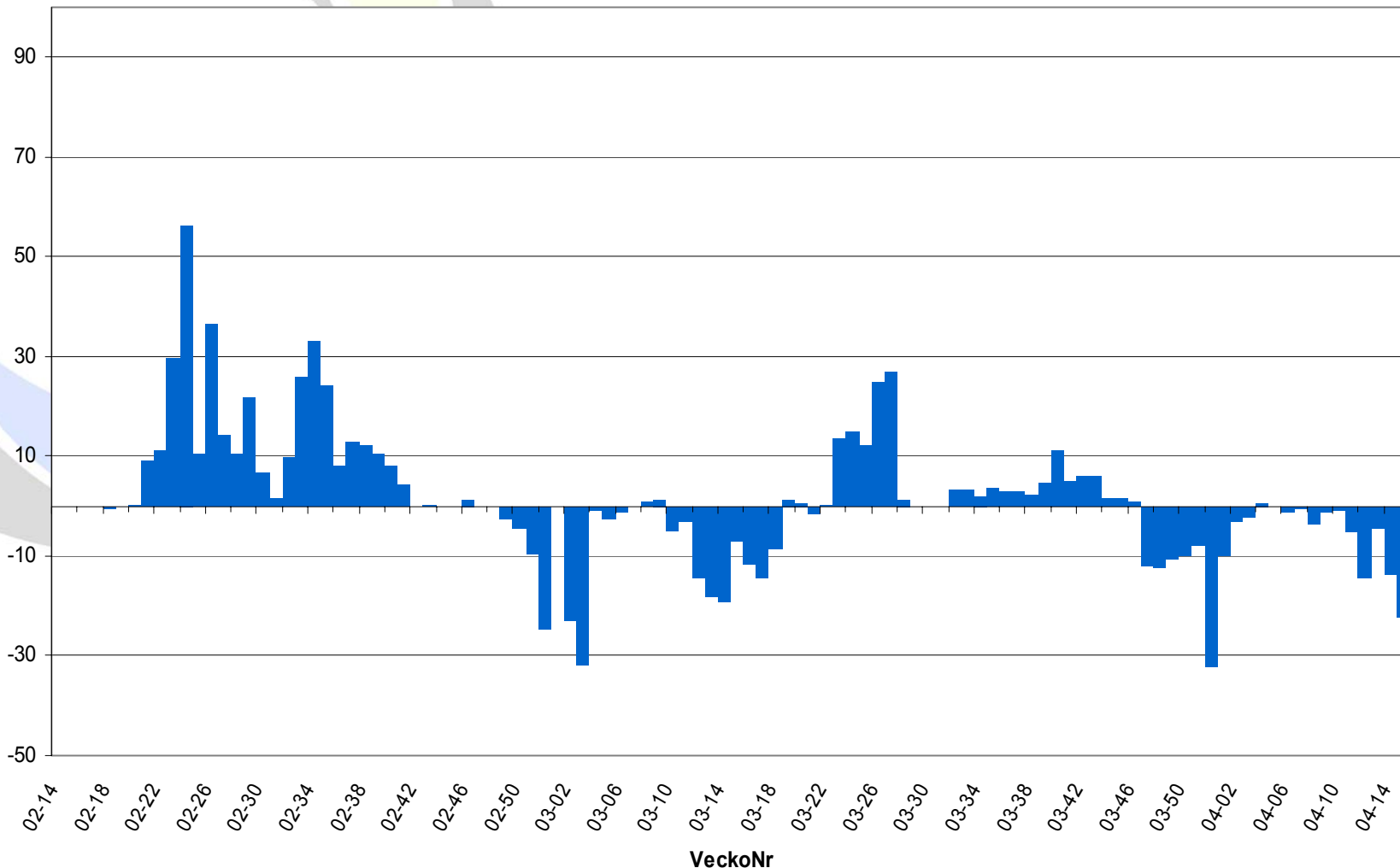
Index 1985=100



Prisområden i den nordiska marknaden

Spotpriset i Sverige jämfört med systempriset, öre/kWh Källa: NordPool

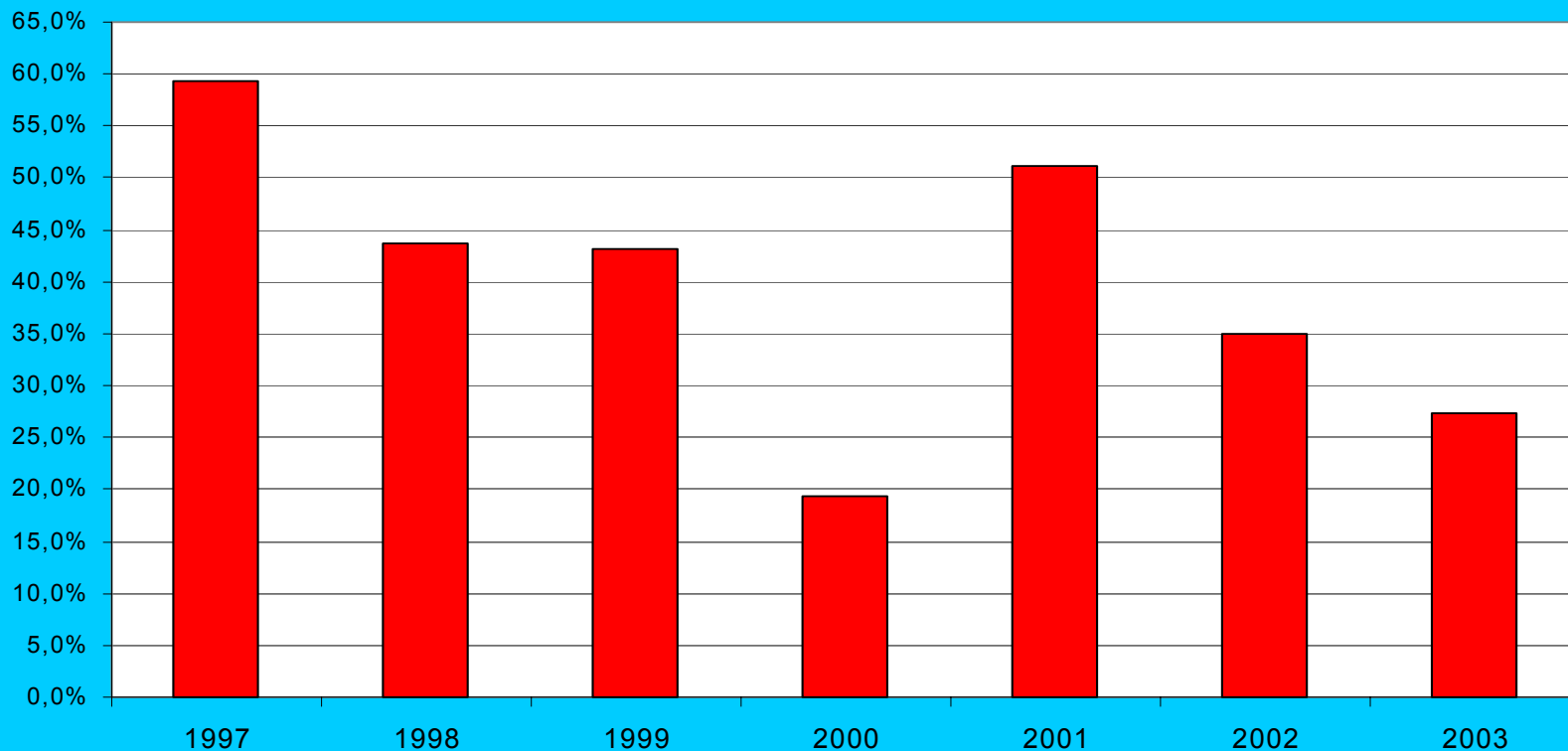
SEK/MWh



Prisområden i den nordiska marknaden

andel timmar med gemensamt pris i hela börsområdet,%

Elspot - andel (% av tid) med gemensamt pris i hela Elbörsområdet



År	Antal tim	%	År	Antal tim	%	År	Antal tim	%
1997	520	59,4	2000	1 703	19,4	2002	3 076	35,0
1998	3 825	43,7	2001	4 487	51,2	2003	2 397	27,3
1999	3 788	43,2						

Investments in transmission capacity

- An extensive analysis of the Nordic electricity market must be conducted in order to put forward a ***priority list of investments in transmission capacity***. The analysis must involve a full cost-benefit study on investments in transmission capacity within the Nordic power market as well as to neighbouring power markets. It is fundamental that the ***valuation of benefit comprises the Nordic society as a whole***.
- One complication to deal with regarding new investments is the ***question of financing***. It will be necessary to find methods on how to divide the costs of the investments on all Nordic countries.

Congestion Management

- **Transparent rules** for congestion management is important to limit risks for abuse of dominant positions.
- Area prices gives the producers and consumers incentive to adjust their production and consumption respectively. However, **other factors** probably have a greater impact on investment decisions.
- **Freedom of information** (of e.g. variations in the transmission capacity) is fundamental for a trustworthy price formation. In order to give the TSOs incentives to eliminate bottlenecks and uphold the predictability, transparency and credibility in the price formation, the **nominal capacity** in the transmission system should always be guaranteed by the TSOs by the use of counter trade.
- Theoretically, the principle of a well functioning and effective market is **one market – one price**. This must be considered as the long run ambition, whereas an intermediate objective is to reduce the current number of price areas and the magnitude of area price differences.

Organisation

- The transmission system is a natural legal monopoly and the ***organisational structure is of great importance***. The current organisation coincides with national borders, with the possible outcome that the planning and operation of the Nordic power grid is not efficient from the view of a liberalised Nordic electricity market.
- The TSOs meets ***different regulation and assignments*** from their respective authorities. Furthermore, national legislation might obstruct the possibilities for the TSOs to act pan-Nordic.
- For an efficient functioning electricity market the same rules must apply to all actors. However, some issues might not be as important as others might be and therefore a ***total harmonisation is not necessary in the short run***.
- A merger into one joint TSO could be a long run objective. Other possible solutions should be investigated, such as to establish a ***common Nordic decision process***.

Reserve Generation Capacity (I)

- It is fundamental that maximum power demand is **handled by the market.**
- Balancing supply and demand has to be attained by bringing new reserve capacity into the market **combined by demand response and power import.**
- Demand response is not **solely sufficient.**
- Peak power capacity could be regarded as **a common good?** (hence there could be a need for a collective solution?)

Reserve Generation Capacity (II)

- The TSOs have to guarantee all participants equal transmission services in the Nordic market area
- Operational (momentary and fast) reserves dimensioned on effective Nordic principles.
- Sharing of operational reserves within the Nordic area and between the Nordic and Continental TSOs.
- All sources have to be managed equally in reserve procurement so that the reserves are not confined by grid capacity constraints.
- Elbas trade should be extended to all Nordic countries to reduce the amount of balance power needed.
- Power exchange between market areas to be managed by Nord Pool and the German and Polish power exchanges.

Reserve Generation Capacity (III)

- Common Nordic principles for operational reserves must be established
- Common, harmonised Nordic principles without any central acquisition of peak load resources in order to secure the same market-based conditions for commercially profitable power generation and demand response to all markets participants.
- If the level of operational reserves becomes inadequate, a further common development and extension of already existing commercial framework is needed for acquisition and management of fast operational reserves.
- If the market mechanisms and operational reserves are not regarded as capable of balancing supply and demand in stressed situations, a form of collective insurance on a Nordic basis should be developed. (The determination of electricity prices must not be disturbed and a sliding change toward a situation where power is being traded outside the market must be avoided.)

Main principles (I)

- Sufficient transmission capacity is a *prerequisite* for an efficient market. The planning, development and financing of transmission capacity must be based on a *Nordic perspective*.
- The elimination of price areas is a long run theoretical goal. In the short run the goal should be to *diminish the number of price areas* and the magnitude of price differences.
- The planning of the transmission system is a regular task. The TSOs must meet the *right incentives*.

Main principles (II)

- There is a ***need to identify and analyse variables***, which have to be adjusted in order to reach a solution. Organisational questions regarding e.g. mandate and regulation as well as practical issues like the balance settlement must be investigated thoroughly. Nordenergi must be able to participate in this process.
- The ***question of financing is crucial***. It is necessary to find methods on a simple and reasonable way to finance inter-Nordic investments in transmission capacity. Current economic regulation of the TSOs must be investigated.

Conclusions

- In order to further develop the Nordic power market it is essential that the TSOs seeks to find solutions based on requirements from the market participants and Nordic politicians. The recommendation is Nordenergi to suggest that the possibilities to establish ***a common Nordic decision process*** should be thoroughly investigated.
- Congestion management must be seen from a ***larger perspective*** where e.g. investments in transmission capacity must be taken into account.
- Measures in the long run must be complemented by short run measures regarding organisation and operation.