Nordic Council of Ministers
Electricity Market Group

Status of harmonisation in the Nordic Electricity market 2010

Status and developments following the Nordic Council of Ministers' Action Plan for a borderless electricity market

Sammendrag

Det nordiske elektrisitetsmarkedet har kommet langt i harmoniseringsprosessen. Det nordiske elmarkedet er det mest harmoniserte mellomstatlige elmarkedet i verden Dette skyldes en kontinuerlig sterk politisk støtte til prosjektet, og et godt samarbeidsklima mellom interessentene i markedet.

Fra 1995 og fram til i dag har det nordiske elektrisitetsmarkedet utviklet seg fra å være fire nasjonale markeder til å bli ett felles nordisk marked. Verdiene og tankene fra Louisiana erklæringen i 1995 om et fritt og åpent marked med effektiv handel med nabolandene er fortsatt grunnpilarene i harmoniseringsarbeidet.

Selv om det fortsatt er behov for nye tiltak, kan det nordiske elmarkedet tjene som eksempel for andre regionale aktører i og utenfor EU. Denne posisjonen ivaretas gjennom å forholde seg aktivt til de prosesser som foregår i EU på elmarkedsområdet.

Handlingsplanen for et effektivt, grenseløst og bærekraftig nordisk elmarked med god konkurranse og en effektiv handel med omverden som ble vedtatt på Nordisk Ministerråd for Energis møte i Umeå i 2008 legger grunnlaget for en samlet økt innsats for det nordiske elektrisitetsmarkedet. Foruten tiltak for å styrke planlegningen av nordiske nettinvesteringer, gjennomføre investeringer som det allerede er oppnådd enighet om, og legge til rette forutsetninger for et felles sluttbrukermarked omfatter planen også å dele det felles nordiske børsområdet inn i ytterligere pris-/budområder.

Handlingsplanen ble supplert med nye punkter ved Nordisk Ministerråd for Energi i Stockholm i 2009, i den forbindelse ba ministrene om en rapport på utviklingen av de ulike punktene i handlingsplanen til ministermøtet i Danmark i 2010. Dette er Elmarkedsgruppens rapport om utviklingen i det Nordiske elmarkedet, og oppfølgningen av handlingsplanen med de suppleringer som kom inn i Stockholm.

Elmarkedsgruppen har arbeidet med følgende saker i 2009/2010:

Fra Handlingsplanen for et grenseløst elmarked:

- Flaskehalshåndtering
- Nettinvesteringer
- Nettplanlegning

Fra Stockholmsdeklarasjonen:

- Systemdrift i elsystemet med mye energi fra variable energikilder
- Utvikling av et felles nordisk sluttbrukermarked
- Nettinvesteringer

Fra Sevilla:

- Markedets funksjon vinteren 2009/2010

Andre saker

- Topplasthåndtering

Elmarkedsgruppen har arbeidet med disse oppgavene i nært samarbeid med TSOene, NordREG, Nordenergi og andre relevante samarbeidspartnere.

Handlingsplanen har gitt et sterkere politisk trykk for å gjennomføre endringer og forbedringer i det nordiske elmarkedet. Oppfølgningen av planen går godt framover, og store skritt har blitt gjennomført for å bringe det felles markedet videre. Særlig gjelder dette flaskehalshåndtering og utviklingen mot et felles nordisk sluttbrukermarked, men også innenfor de andre områdene ser gruppen framgang.

Flaskehalshåndtering

Så nær som Finland blir nå alle de nordiske landene delt opp i prisområder. I Finland er situasjonen annerledes, og i følge Fingrid ser man ikke de sammen problemene i Finland med flaskehalser som i resten av regionen. Det er viktig å nevne at prisområder kun er en måte å håndtere midlertidige flaskehalser på, og at det sentrale langsiktige virkemidlet for å unngå flaskehalser på er nettinvesteringer.

Nettinvesteringer

På oppdrag fra ministrene har NordREG analysert de nordiske landenes lover, regler og prosedyrer for nettinvesteringer med utgangspunkt i Nordisk nytte. NordREG har kommet fram til at det ikke er noe i lovverket som konkret hindrer samnordiske investeringer, men at regleverket og prosedyrene kan bli klarere når det gjelder nordisk fokus. Elmarkedsgruppen er fornøyde med å kunne konstatere at alle de foreslåtte nettinvesteringene fra 2004 i dag enten er ferdige eller har fått konsesjon fra de nasjonale myndigheter og at TSOene er godt i gang med arbeidet med investeringsprosjektene fra 2008.

Nettplanlegning

EMG understreker at investeringer som er samfunnsøkonomisk lønnsomme for Norden bør gjennomføres. Erfaringene fra Nordels to nettinvesteringspakker er at god nordisk nettplanlegning legger et godt grunnlag for gjennomføring av nordiske nettinvesteringer. Elmarkedsgruppen foreslår derfor at de nordiske TSOene skal levere nordiske nettutviklingsplaner, som tar utgangspunkt i beregninger av nordisk nytte, også i framtiden – dette skal skje uavhengig av den organisatoriske utviklingen i EU for øvrig.

Systemdrift i elsystemet med mye energi fra variable energikilder

EUs direktiv om fornybar energi pålegger de enkelte land å øke andelen av fornybar energi vesentlig. Innføring av store mengder elektrisitet fra variable fornybar energikilder som vindkraft stiller store krav til det nordiske systemet. Gjennom å ta grep i systemdriften, øke forbrukerfleksibiliteten og styrke nettet kan det nordiske systemet stå sterkere i møtet med disse utfordringene. På den måten kan det nordiske systemet bli et reelt smart grid. På oppdrag fra ministrene har de nordiske TSOene utarbeidet en systemdriftsplan for det nordiske systemet gitt store mengder vindkraft. Elmarkedsgruppen anbefaler at de tiltak som trekkes fram i planen gjennomføres så raskt som mulig, og at TSOene rapporterer tilbake til gruppen og Nordisk Ministerråd for energi om fremgangen i dette arbeidet ved neste ministermøte.

Utvikling av et felles nordisk sluttbrukermarked

NordREG leverte en implementeringsplan for et nordisk sluttbrukermarked til Elmarkedsgruppen i 2010. Utviklingen av dette går framover. NordREG indikerer følgende generelle målsetninger for et felles nordisk sluttbrukermarked:

- Et felles nordisk sluttbrukermarked skal være åpent for alle kunder
- Kundene må ha den samme beskyttelse uavhengig av hvilket land leverandøren kommer fra

- Lave etableringshindringer bør sikres gjennom å gjøre det let for leverandører å operere i alle nordiske land.

Det er videre nødvendig å analysere om den eksisterende forpliktelsen om sistehånds forsyning inkluderer elementer som er negative for markedets funksjon.

Markedets funksjon vinteren 2009/2010

Vinteren 2009/2010 oppsto det problem i det nordiske kraftsystemet på grunn av veldig kaldt vær, mindre nedbør enn forventet og nedetid i svenske kjernekraftverk. Elmarkedet reagerte i vinter slik det er tenkt, ved å øke prisen når tilbudet er lavt og etterspørselen høy. Nordisk Ministerråd og Elmarkedsgruppen har diskutert problematikken, og hvordan det nordiske elmarkedet kan styrkes for å unngå så store prisutslag i slike tilfeller i framtiden.

Elmarkedsgruppens konklusjoner og anbefalinger 2010:

Pris-/budområder

- Elmarkedsgruppen er tilfreds med utviklingen innen nordisk flaskehalshåndtering. EMG oppfordrer de Nordiske TSOene til å fortsette et nært samarbeid om flaskehalshåndtering. Gruppen ønsker en utvikling mot prisområder som er uavhengige av nasjonale grenser når det er relevant.

Nordiske nettinvesteringer og - planlegning

- EMG understreker viktigheten av å gjennomføre investeringer som er samfunnsøkonomisk lønnsomme for det nordiske området. Slike investeringer er viktige siden et robust transmisjonsnett er essensielt for å legge lette den planlagte økningen av andelen fornybar energi, forsyningssikkerhet og videre utvikling av det nordiske elmarkedet. Elmarkedsgruppen oppfordrer TSOene til å legge et stort arbeid i dette.
- EMG oppfordrer de nordiske landene til å handle raskt, og ta de nødvendige skritt for å sikre at de respektive TSOer og regulatorer har et nordisk perspektiv når de planlegger og godkjenner framtidige nettinvesteringer.
- EMG understreker viktigheten av fortsatt nordisk nettplanlegning. TSOene bes derfor levere nordiske nettutviklingsplaner hvert andre år. Den første planen skal leveres til EMG før mars 2012. En preliminær rapport om framgangen i arbeidet skal leveres i god tid før neste Nordisk Ministerråd for Energi.
- Når det gjelder nettinvesteringer som er samfunnsøkonomisk lønnsomme for det nordiske området, men hvor kostnadene og nytten er ulikt fordelt mellom landene kan TSOene forhandle om delingen av kostnader og inntekter. I tillegg er det relevant EU lovgivning på dette feltet.
- EMG er tilfredse med utviklingen av implementeringen av Nordels foreslåtte nettinvesteringer fra 2004 og 2008. Alle investeringene i pakken fra 2004 har nå blitt godkjent, og TSOene er godt i gang med investeringene planlagt i 2008. Dette understreker ytterligere verdien av å foreslå nordiske nettinvesteringer basert på samarbeid mellom de nordiske TSOene, og at det multilaterale planlegningssystemet, kombinert med frivillig samarbeid er en effektiv metode for å styrke det nordiske nettet.

Plan for systemdrift med høy andel fornybar energi

- EMG er tilfredse med TSOenes plan for systemdrift med store mengder vind i systemet.
- I deres toårlige nettplaner bes TSOene ta integrasjon av store mengder fornybar energi med i overvejelserne.

- EMG oppfordrer TSOene og regulatorene til å overveie å øke fleksibiliteten i forbruk og produksjon ved å anvende smart grid løsninger. Relevante markedsaktører bør inkluderes i prosessen.
- EMG vil fortsette å følge prosessen med integrasjon av store mengder vind i systemet og inviterer TSOene til å rapportere på framgangen i implementeringen av tiltakene skissert i planen i behørig tid før det neste møtet i Nordisk Ministerråd for Energi.

Nordisk sluttbrukermarked

- EMG er positive til NordREGs ambisiøse tidsplan fram mot et nordisk sluttbrukermarked i 2015.
- EMG er tilfredse med NordREGs implementeringsplan og støtter NordREG i det fortsatte arbeidet med de foreslåtte aktivitetene.
- NordREG skal rapportere tilbake til EMG på framgangen i arbeidet før det neste møtet i Nordisk Ministerråd for Energi.

Elmarkedets funksjon vinteren 2009/2010

- EMG anser at det nordiske elmarkedet fungerte slik det skulle i vinter, ved å drive prisene opp når tilbudet var lavt og etterspørselen høy, men at grep må tas for å unngå denne situasjonen med høye priser i kommende vintre.
- EMG hilser NordREGs preliminære forslag til tiltak velkommen. Forslagene inkluderer økt gjennomsiktighet i markedet, økt forbrukerfleksibilitet, justerte prisområder og sikring av tilgang til produksjon. EMG oppfordrer NordREG til å ferdigstille sine forslag og ta de nødvendige skritt for å implementere relevante tiltak så snart som mulig.
- Smart Grids bør tas med i overvejelserne om mulige tiltak.
- EMG er også tilfredse med den foreslåtte styrkningen av Urgent Market Messages systemet (UMM) i NordPool Spot-markedet for å tilby bedre informasjon til markedsaktørene.

Topplasthåndering

- EMG er tilfredse med NordREGs vurdering av retningslinjene. Den framtidige utvikling og bruk av retningslinjer for topplasthåndtering bør ses i sammenheng med erfaringene fra vinteren 2009/2010 og den endelige evaluering av hvordan markedet fungerte denne vinteren.

INNHOLD

Abbreviations

ACER	Agency for the Cooperation of Energy Regulators
AMR	Automatic Meter Reading
CFD	Contract for Difference
EMG	Electricity Market Group
ENTSO-E	European Network of Transmission System Operators for Electricity
ERGEG	European Energy Regulators
NCM	Nordic Council of Ministers
Nordel	Organisation for the Nordic TSOs
NPS	Nord Pool Spot
Nordenergi	Nordic Energy Industries
NordREG	Nordic Energy Regulators
TSO	Transmission System Operator (grid- and system operation)

Introduction

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

In their 2008 declaration from Umeå, The Nordic Council of Ministers for Energy underlined the importance of strengthening the Nordic perspective. The perspectives from the Umeå declaration was underlined and supplemented at the Nordic Council of Ministers for Energy meeting in Stockholm in 2009. This memo summarises the Electricity Market Groups follow-up efforts to that declaration.

Background

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

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

- Flemming G. Nielsen, Danish Energy Authority (Chairman)
- Peder Bjerring, Danish Energy Authority
- Markku Kinnunen, Ministry of Employment and the Economy, Finland
- Bettina Lemström Ministry of Employment and the Economy, Finland
- Kjell Grotmol, Ministry of Petroleum and Energy, Norway
- Manus Pandey, Ministry of Petroleum and Energy, Norway
- Christina Simon, Ministry of Enterprise, Energy and Communications, Sweden (until June 2010)
- Magnus Blümer, Ministry of Enterprise, Energy and Communications, Sweden
- Amund Vik, Nordic Energy Research

The following key actors are involved in the harmonisation process:

- The Nordic TSOs
- NordREG, the cooperation body of the Nordic energy market regulators
- Nordenergi, the cooperation body of the Nordic energy industry associations
- Nord Pool, the Nordic power exchange

The 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. The annual meetings of the Nordic energy ministers set the course of the cooperation.

This note is EMG's input to the Nordic Council of Ministers meeting in Copenhagen in October 2010, summarising the implementation of the Nordic Council of Ministers Action Plan for a Borderless

electricity market as decided on by the Ministers at their meeting in Umeå in 2008, and supplemented in Stockholm in 2009.

The Nordic Action Plan for a borderless electricity market

In their meeting in Umeå, the energy ministers passed what has been labelled the Nordic Action Plan for a borderless electricity market. In the declaration most focus was placed on congestion management and grid investment.

The declaration also put emphasis on the common end user market, and the development in the European electricity sector.

- *National processes for grid investments shall be compared. Necessary changes in laws, regulations, assessment criteria and government mandates shall be identified. The goal is to provide Nordic governments, regulators and TSOs a Nordic perspective and mandate, thereby improving and intensifying the process of developing the Nordic electricity system. The possibilities shall be explored for fairer cost-sharing for measures taken in one country that provide benefits in another.*

- *The work of the national TSOs with grid planning shall be strengthened. The ministers encourage the Nordic TSOs to propose investments that are socio-economically beneficial for the entire Nordic region. Already settled investments for increased transmission capacity must be realised as soon as possible.*

- *National TSOs are asked to begin the process of dividing the Nordic market into additional potential bidding and/or price areas towards 2010.*

- *Work to further harmonise national rules for balance-responsible companies and to improve the conditions for barrier-free trade and a common retail market shall continue towards next year's ministerial meeting.*

National regulators and TSOs have a specific role in implementing the action plan, and in increasing cooperation regardless of the organisational form it may take in the future.

The Committee of Senior Officials for Energy shall deliver a progress report before the ministerial meeting in 2009. The report should also include a review of how Nordic cooperation should be best organised in light of the development of the European electricity market and its institutions.

In their meeting in Stockholm i 2009 the Nordic energy ministers supplemented and underlined the action plan. The meeting agreed on the following:

The development towards a borderless electricity market continues

The action plan lays the ground works for an efficient, borderless and sustainable Nordic electricity market with good competition and efficient trade with the surrounding areas. The action plan was adopted at the meeting of the Nordic Council of Ministers for Energy in Umeå in 2008. The ministers underline that the different components of the action plan shall be seen as complementary and that all parts are equally important.

The action plan deals with, among other things, efforts to promote grid investments with Nordic benefit and congestion management. The ministers are oriented on the TSOs progress in establishing more potential price/bidding areas. Increases of price/bidding areas however do not reduce the importance of grid investments. The minsters await the Electricity Market Groups analysis of the grid investment procedures in the different Nordic countries, to be presented at the ministerial meeting in Denmark in 2010. The ministers underline the importance of implementing the grid investments that the TSOs have already agreed on. A time plan for the remaining grid investments shall be presented at the next ministerial meeting in 2010.

A common Nordic end user market is the natural continuation of the ongoing work with harmonising and strengthening the Nordic market for electricity. NordREG has indicated 2015 as a possible implementation plan. The ministers strengthen their support for a common Nordic end user market, and requests a detailed implementation plan covering the necessary decisions to reach the goal. The plan shall be submitted before the next ministerial meeting.

The organisational development in the EU emphasises the Nordic cooperation, and raises the question of how the Nordic grid planning will be organised in the future. The ministers states that the Nordic cooperation should continue with an undiminished level of ambition, and agree that the Nordic TSOs shall deliver updated grid plans for the Nordic market in a regular basis.

The focus on renewable energy yields new challenges for the Nordic power system. The ministers request a plan from the Nordic TSOs on how they will deal with the increased amount of electricity from fluctuating renewable energy sources. A report on the work is requested by next year's ministerial meeting.

Following up the Umeå and Stockholm declarations, the EMG has in cooperation with Nordel, NordREG and Nordenergi, sought to develop recommendations and analysis to the ministers on the following tasks:

- Congestion management and grid investments (including time plan for Nordel investments)
- Retail market integration
- Plan for system operation with a high share of electricity from renewable energy sources
- Functioning of the Nordic electricity market during the winter of 2009/2010
- Peak load arrangements

This is the EMGs analysis and assessment of the current status of harmonisation in the Nordic electricity market.

Congestion management, planning and grid investments

Price / bidding areas

From the Umeå action plan:

- *National TSOs are asked to begin the process of dividing the Nordic market into additional potential bidding and/or price areas towards 2010.*

From the Stockholm declaration:

- *The ministers are oriented on the TSOs progress in establishing more potential price/bidding areas. Increases of price/bidding areas however do not reduce the importance of grid investments. The minsters await the Electricity Market Groups analysis of the grid investment procedures in the different Nordic countries, to be presented at the ministerial meeting in Denmark in 2010.*

In the Umeå action plan, the Nordic energy ministers decided to move forward with splitting the Nordic electricity market into more price/bidding areas. Besides timely grid investments in order to reduce congestions, it is of due importance to use harmonised principles for congestion management, as congestions always will exist and must be handled. An efficient congestion management in the Nordic electricity market will improve the functioning of the market.

Norway and Denmark are already divided into price areas. 1 May 2010 the Swedish TSO decided to split Sweden into four bidding/price areas. This will be in effect from 1 November 2011. Finland has decided to not split the Finnish market into more price or bidding areas. According to Fingrid, there is less congestion in the Finnish grid, and Fingrid has started an ambitious grid investment strategy to ensure sufficient transmission capacity within Finland. Also in Sweden, Norway and Denmark the TSOs have ambitious plans for grid investments.

EMG conclusions and recommendations

- The EMG is pleased with the development in congestion management. The EMG encourages the Nordic TSOs to continued close cooperation on congestion management. The EMG welcome a development towards price areas independent of the national borders when it is relevant.

Nordic grid investments

From the Umeå action plan:

- *National processes for grid investments shall be compared. Necessary changes in laws, regulations, assessment criteria and government mandates shall be identified. The goal is to provide Nordic governments, regulators and TSOs a Nordic perspective and mandate, thereby improving and intensifying the process of developing the Nordic electricity system. The possibilities shall be explored for fairer cost-sharing for measures taken in one country that provide benefits in another.*

- *The work of the national TSOs with grid planning shall be strengthened. The ministers encourage the Nordic TSOs to propose investments that are socio-economically beneficial for the entire Nordic region. Already settled investments for increased transmission capacity must be realised as soon as possible.*

From the Stockholm Declaration

- *The minsters await the Electricity Market Groups analysis of the grid investment procedures in the different Nordic countries, to be presented at the ministerial meeting in Denmark in 2010. The ministers underline the importance of implementing the grid investments that the TSOs have already agreed on. A time plan for the remaining grid investments shall be presented at the next ministerial meeting in 2010.*

One of the key challenges for the continued strengthening of the Nordic electricity market is to enable sufficient grid investments. At their meeting in Umeå in 2008 the Nordic Energy Ministers asked for a mapping of the present rules and regulations concerning grid investments in the Nordic region.

On 20 November 2008 the EMG sent a letter to NordREG asking the organisation to map and analyse the differences in investment decision procedures in the Nordic countries. The letter from the EMG stated the following:

NordREG is asked to perform two tasks:

1. Mapping

    a. Mapping of the national authorities procedures and assessment criteria for approving of grid investment. Focus is to be placed issues especially relevant for investments that yield benefits in more than one Nordic country.

    b. Mapping of the national TSOs procedures and assessment criteria, as well as laws, rules and mandates relevant for their possibility to partake in projects concerning grid investments in other Nordic countries.

    c. Mapping of the TSOs opportunity to enter agreements on co-financing of investments in the other Nordic countries.
    d. Mapping of the grid ownership rules: is joint ownership of grids possible in the various countries?
    e. Mapping of how the EU's current rules influence transnational Nordic grid investments, limited to the issues especially relevant for grid investments with benefits on several Nordic countries. In addition to evaluating the effect of the EUs emerging rules (3rd package) may affect these areas.

2. Analysis
    a. Analysis of prospective differences in laws, rules, criteria and mandates in the Nordic countries that may hinder grid investments that show a benefit in more than one Nordic country, including the expected effect of the EU rules and regulations.
    b. Possibility for Nordic financing.

NordREG established a task force under the Transmission and Wholesale WG to undertake the task. As the Danish regulator DERA do not explicit competence with regard to investment decisions, the Danish Energy Agency has represented Denmark in the work.

The task given to NordREG was twofold. Firstly NordREG was to map the current grid investment procedures in the Nordic countries. Second, NordREG was to analyse the results from the mapping. When NordREG has delivered the mapping and analysis, the EMG will continue working with the material, with the aim of identifying areas where the Nordic perspectives can be strengthened, or the rules and procedures harmonised.

The EMG received the final report in this task from NordREG on 25 May 2010. To get feedback on the contents of the report the EMG then sent the report to relevant industrial stakeholders for comments.

The main findings from the NordREG report, sorted on the various components of analysis are:

1) The processes and evaluation criteria for investment projects considered by the TSO's are quite similar for all Nordic countries. All countries base their evaluation to a high degree on common criteria used under the former Nordel-cooperation. The Nordel criteria imply that socioeconomic benefit is necessary for an investment project to be carried out. The Nordel criteria evaluate socioeconomic benefit of both interconnectors and national investments which might affect the Nordic electricity market, which means that the Nordic benefit of the investment is considered.

All countries include all identified transmission projects in the national Grid Master Plan, which is updated annually and forward looking.

2) Generally, it can be stated that there are no rules or legislations in any of the Nordic countries that explicitly regulate the issue of common financing within Nordic countries. There seem to be few formal limitations on TSO participation in investments in other countries. However there are no explicit rules regulating this. The fundamental tasks of the TSOs as defined in laws, regulations and bye-laws have a primarily national perspective, and the lack of an explicit framework describing how TSOs may participate in common Nordic investments may to some degree constitute an obstacle to such projects.

3) It is possible for a foreign party to have (shared) ownership of network in all Nordic countries and all Nordic countries accept foreign ownership of network assets inside their country under certain conditions (NordREG 2010b).

When analysing the effects of EUs third legislative package for the internal energy market NordREG did not identify any obstacles for international (Nordic) cooperation in grid investments.

NordREG also analysed potential funding schemes for potential Nordic grid investments, and the impact of these funding arrangements on the grid investments.

Based on the analysis in the report, NordREG concludes in a press release and summary report that:

> The legal framework for licensing new network infrastructure needs to be harmonised across the Nordic countries and amended to take explicitly into account the Nordic and regional network development aspect.
>
> Any obstacles to participation by a TSO into a jointly agreed network infrastructure project with other Nordic national TSOs should be removed.
>
> The national legal frameworks for economic regulation of transmission network need to be adjusted to allow the inclusion of investments into the network infrastructure that have been made abroad if the investment brings benefits to the domestic customers (i.e. enabling sharing of costs and benefits) (Ibid).

Furthermore, NordREG suggests further analysis to be done on the ways the national TSOs calculate costs and benefits, and the financial arrangements mentioned above.

Grid planning

In 2009 the EU agreed on the 3rd marked liberalisation package for energy. As a part of the implementation of this package all previous regional co-operative organisations of TSOs, including Nordel, were dismantled and all joint TSO activities were placed under the European Network of Transmission System Operators for Electricity (ENTSO-E). The system development work in ENTSO-E is divided into working groups – the Nordic TSOs participate in two of these. Energinet.dk and Statnett participates in the North Sea Group, and all Nordic TSOs (except Iceland) participate in the Baltic Sea group.

In the Nordic region Nordel was charged with the responsibility to plan grid investments of Nordic benefit. Nordel thus presented two grid master plans for the region, one in 2004 and one in 2008. In the action plan for a borderless electricity market, the Nordic energy ministers decided to emphasise

the continuation of efficient and transparent grid planning in the Nordic region. This was re-affirmed in the ministerial meeting in 2009 in Stockholm. Following up the ministerial accord, the EMG asked the Nordic TSOs in ENTSO-E to present how the Nordic grid planning will take place in the future.

According to the 2009/72/EC directive ENTSO-E shall deliver 10 year network development plans (TYNDP) for the European electricity grid. In July 2010 ENTSO-E delivered the first 10 year network development plan. The Network Development Plan will be accompanied by 6 regional development plans. The Nordic TSOs have decided that the Nordic grid planning will take place in the Baltic Sea Group in the ENTSO-E cooperation. All calculations and analysis in this group will thus also include the Baltic States, Poland and Germany in addition to the four Nordic countries (ENTSO-E 2010a).

The 10 year Network Development Plans will be published every two years. The Pilot 10 Year Network Development Plan published in 2010 contains all proposed Nordic grid investments, with a time plan for finalisation.

EMG conclusions and recommendations

The EMG welcomes NordREG's work on the issue of grid investments, and the comments provided by Nordic industrial actors following the publication of the report. The EMG notes that there still are some differences in the licensing procedures in the Nordic countries. The Nordic perspective is not fully taken into account in all of the Nordic countries. However the group notes that the report does not point towards regulatory and procedural elements in the Nordic countries' grid investment procedures that hinder joint Nordic grid investments. However, to ensure the necessary development of future important Nordic network investments, further actions are needed to strengthen the Nordic perspective.

Furthermore the group notes that following Nordel's proposed grid investments in 2004 and 2008 a number of grid investments have been started and finished but some projects have been delayed. Some of the projects also include cost/income sharing mechanisms since the investments yield different national costs and benefits for the countries involved, for example Skagerak 4.

In addition the TSOs divide the congestion revenues in the Nordic region and there are also relevant EU regulations in this field.

NordREG also comment on the potential for establishing a joint Nordic investment committee, or another organisational set up fostering Nordic cooperation. The EMG discussed the potential for forming a new organisational structure for proposing, and investing in, Nordic grid investments in conjunction with the discussion on forming a Nordic TSO in 2008 (EMG 2008). The group remain of the opinion that forming a new organisational structure is not beneficial, but grants that there is a need for continued Nordic grid planning, and that this grid planning should be done in a transparent way.

The EMG emphasises that grid investments that are socio economically profitable for the Nordic countries as a whole should be realised. As a consequence the EMG believes it is important that the TSOs and the regulatory authorities have a Nordic perspective when planning and approving future grid investments in addition to the national perspective. Through grid planning such investments can easier be identified. The EMG therefore urges the TSOs to publish separate Nordic grid investment plans.

The EMG recognises that today Nordic grid planning is organized through ENTSO-e and that the Nordic area planning is covered in the Baltic Sea regional group. If the TSOs find it suitable, this planning can of course be organised within the ENTSO-e setting.

Realisation of projects that are socioeconomically profitable for the Nordic countries as a whole, but where costs and benefits are unevenly distributed between countries, can easiest be brought about through negotiations between the relevant TSOs. Through such negotiations projects can become socio economically profitable for all countries involved. Additionally there are also relevant EU regulations in this field.

Recommendations:

- The EMG wants to emphasize the importance of realising investments that are socioeconomically profitable for the Nordic countries as a whole. Such investments are important because a robust transmission grid is essential to facilitate the planned increase in renewable energy production, security of supply and further development of the common Nordic electricity market. The EMG encourages the TSOs to put their best efforts into this work.
- The EMG encourages the Nordic countries to quickly take the relevant measures to ensure that their respective TSOs and regulatory authorities also have a Nordic perspective when planning and approving future grid investments.
- The EMG underlines the importance of continued Nordic grid planning. The TSOs are therefore asked to publish on a biannual basis plans of Nordic grid investments and the first plan is to be delivered to the EMG by March 2012. A preliminary report on the progress of developing the plan should be delivered in due time before the next meeting in the Nordic Council of Minsters for Energy.
- When it comes to realizing grid investment projects that are socioeconomically profitable for the Nordic countries as a whole, but where costs and benefits are unevenly distributed between countries, the relevant TSOs can negotiate about the division of costs and revenues. Additionally there are also relevant EU regulations in this field.

Time plan – Planned grid investments

From the Stockholm declaration:

> - *The ministers underline the importance of implementing the grid investments that the TSOs have already agreed on. A time plan for the remaining grid investments shall be presented at the next ministerial meeting in 2010.*

At the ministerial meeting in Stockholm in 2009 the ministers asked for a time plan for the implementation of the grid investments presented in the Nordic TSOs grid plans (Nordels prioriterte snitt 2004 and Nordels Grid Master Plan 2008). These grid investments are:

- Fenno-skan
- Nea-Järpströmmen
- Skagerak 4
- Storebelt
- SydVästlänken
- Ørskog-Fardal
- Arktis

In the figure below, the time schedule for the investments is indicated. The times given in the schedule depend on national decision making procedures and TSO analyses (Nordel 2008a; Nordel 2008b).

Figure 1

Navn på prosjektet	Strekning	Prosjektstart	Planlagt ferdigstillelse	Status
Fenno - Skan 2*	Finland - Sverige	2008	2011	Planlagt ferdigstilt november 2011
Nea - Järpstrømmen*	Norge - Sverige	2007	2009	Ble ferdig mars 2010
Skagerak 4*	Norge - Danmark	2010	2014	Konsesjon gitt
Storebelt*	Danmark	2007	2010	ferdig
Sørvestlenken (Sørlenken* og Vestlenken**)	Norge - Sør Sverige	2010	2015/2017	Under planlegning, den norske delen planlegges ferdigstilt i 2016/2017. Den svenske delen planlegges ferdigstilt i 2015.
Ørskog - Fardal**	Norge	2010	2014/2015	Fått konsesjon av NVE, til klagebehandling i Oed.
Arktis**	Norge	2012	2014 - 2018	Ofoten – Balsfjord planlegges ferdigstilt 2014 – 2015, mens Balsfjord – Hammerfest planlegges ferdigstilt 2016 – 2018.

* Prosjektet inngår i Nordels anbefalinger ("pakken") i Nordels prioriterete snitt fra 2004.
** Prosjektet inngår i Nordels anbefalinger i Nordic Grid Masterplan 2008.

Alle de planlagte investeringene er avhengige av konsesjonsbehandling, eventuell klagebehandling, og endelig investeringsbeslutning hos de involverte TSO'ene.
Sørlenken og Vestlenken omtales gjerne som sørvestlenken.

EMG conclusions and recommendations

- The EMG is pleased with the progress in implementing Nordels proposed grid investments from 2004 and 2008. All grid investments in the package from 2004 have now been approved by the licensing authorities and the TSOs are well under way with the grid investments proposed in 2008. This underlines the benefit and value of proposing Nordic grid investments based on cooperation between the TSOs, and that the multilateral planning scheme, combined with voluntary cooperation is an efficient method for strengthening the Nordic grid.

Plan for system operation with high share of RES

From the Stockholm declaration:

- *The focus on renewable energy yields new challenges for the Nordic power system. The ministers request a plan from the Nordic TSOs on how they will deal with the increased amount of electricity from fluctuating renewable energy sources. A report on the work is requested by next year's ministerial meeting.*

All the Nordic countries have ambitious targets for new renewable energy in the energy system towards 2020 and beyond. Finding ways to operate the system with a high amount of fluctuating renewable energy sources feeding into the system is one of the key challenges for the Nordic and European electricity systems. High shares of renewable energy in the system also yield a need for increased grid investment and strengthening of the Nordic electricity grid – placing even more emphasis on the high importance of continuing Nordic grid planning regardless of the organisational structure the Nordic TSOs operates under in the EU.

Following the Ministerial meeting in Stockholm in 2009 the EMG asked the Nordic TSOs to deliver a plan for system operation with large amounts of renewable energy in the electricity system. The EMG received the plan from ENTSO-E 1 September 2010.

ENTSO-Es report focus on the implementation of wind power in the Nordic electricity system. According to ENTSO-E we can expect an increase in the installed capacity of renewable energy from wind in the Nordic electricity system up to a total of 15-20 GW in 2020. The total amount of electricity from all sources today is 100 GW.

Introduction of large amounts of renewable energy poses some significant challenges for system operation. The most significant challenges relate to the fluctuant nature of wind power, and the potential difficulties in predicting production levels.

The Nordic TSOs in ENTSO-E propose to do the following actions to mitigate the impact of large amounts of wind in the electricity system (ENTSO-E 2010b):

- Implement actions to mitigate the current weakening trend of the Nordic frequency quality
- Develop harmonized Nordic technical requirements for the installation of renewable production units including requirements for ability to deliver ancillary services
- Contribute to development of more physical flexibility in production and consumption which can react to price variations in the market
- Contribute to development of more flexible bids in all market segments including the balancing market and delivery of ancillary services

- Develop a suitable and harmonized market design for balancing especially close to the operating hour
- Develop an effective exchange of resources between different synchronous systems
- Develop harmonized Nordic methods to ensure sufficient flexibility to handle the fluctuations in renewable production.
- Contribute to development of improved forecasting procedures and tools for fluctuating production
- Implement requirements for real time measurement of physical production

EMG conclusions and recommendation

- The EMG welcomes the TSOs plan for system operation with a large amount of wind power in the electricity system.
- In their biannual Nordic grid plans the TSOs should take into consideration the increase of renewable energy in the Nordic electricity system.
- The EMG urges the TSO's and regulatory authorities to consider increasing flexibility in consumption and production by making use of smart grid solutions. Relevant market players should be involved in the process.
- The EMG will continue to follow the issue of integrating large scale wind power in the Nordic electricity system, and invites the Nordic TSOs to report on the progress implementing the measures outlined in the plan in due time before the next meeting in the Nordic Council of Minsters for Energy.

Nordic retail market integration – implementation plan

From the Umeå action plan:

- *Work to further harmonise national rules for balance-responsible companies and to improve the conditions for barrier-free trade and a common retail market shall continue towards next year's ministerial meeting.*

From the Stockholm declaration:

- *A common Nordic end user market is the natural continuation of the ongoing work with harmonising and strengthening the Nordic market for electricity. NordREG has indicated 2015 as a possible implementation plan. The ministers strengthen their support for a common Nordic end user market, and requests a detailed implementation plan covering the necessary decisions to reach the goal. The plan shall be submitted before the next ministerial meeting*

Following the decision of the Nordic Council of Ministers for Energy on the development of a common Nordic end user market, the EMG gave the task to NordREG to develop an implementation plan, with the target year of 2015. NordREG embarked on the task in cooperation with relevant partners from the TSOs and industry (Nordenergi). The report "*Implementation plan for a Common Nordic Retail Market"* was submitted by NordREG to the EMG on 29 June 2010 (NordREG 2010a).

In the report NordREG outlines their strategy and key elements that need to be resolved in order to establish a common Nordic end user market. A common Nordic end user market is operationalised by NordREG as the following:

"... The market model for the common end user market shall provide solutions to allow all users to take part in the common [Nordic] market (NordREG 2010a; NordREG 2009)."

In NordREGs work, the following four aspects have been discussed:

- The target market model
- Customer interface
- Data exchange
- Balance settlement

These are the most crucial areas in the development of a common Nordic end user market.

After thorough analysis and several workshops with key stakeholders NordREG propose the following time plan for the implementation of a common end user market in the Nordic region.

2010 – 2012: Specification
2012 – 2014: Design
2014 - : Implementation

Target market model

In their report, NordREG outlines the following general objectives for a common Nordic end user market:

There are some general issues that form the basic requirements for the definition of the target market model. We should keep these general objectives in mind when defining the detailed model for the common Nordic end user market.

- The common Nordic end-user market shall be open for all customers.
- Consumers must have the same protection independent of the origin of the supplier
- Analyse if the existing obligation to supply and the supplier of last resort schemes include elements that have relevant negative impacts on the market's functioning.
- Low entry barriers should be ensured by making it easy for suppliers to operate in all Nordic countries.

One important way to achieve an efficient common Nordic end-user market is according to NordREG to implement common procedures for key processes like supplier switching and moving etc. with common messages and data formats. Standardisation and automation will then contribute to create a more effective communication between market players and improving the IT-systems that they use. The Nordic model shall take the standards of the existing and forthcoming data hubs into consideration.

NordREG find it important for a supplier to be able to use a single IT-system inside the same company while operating in all Nordic countries. This objective requires that the business processes are harmonised between the Nordic countries. In order to lower the costs of suppliers and entry barriers for new entrants, common message formats etc. must be developed, with this overall goal in mind.

When designing the common Nordic end-user market it is important to keep in mind and follow the harmonization process of the EU electricity market. Recommended market model and business process solutions should be as future proof as possible (NordREG 2010a: 9-10).

EMG conclusions and recommendation
The EMG stresses the value of forming a Nordic end user market without any significant regulatory or technical obstacles for the suppliers to operate in various Nordic countries and leading to a larger electricity market being available to the suppliers and a potential reduction in their unit costs. The EMG remain committed to NordREGs ambitious time schedule of implementation

- The EMG welcome NordREGs implementation plan, and supports NordREG in continuing with the proposed activities.
- NordREG shall report to the EMG on the progress of the work in due time before the next meeting of the Nordic Council of Ministers for Energy.

Functioning of the electricity market during the winter 2009/2010

During the winter of 2009/2010 the Nordic power market experienced high prices, and three especially high price spikes. On 17 December in the evening, on the morning of 8 January and the morning of 22 January the price was 1400, 1000 and 1400 EUR/MWh respectively.

During this period the price of electricity in general was high in the Nordic region, except from southern Norway and Western Denmark where the price was comparatively low.

The key drivers behind the high prices in the market have been identified as:

- Especially cold winter weather in the region
- A substantial amount of the Swedish nuclear power generators were out of operation due to delayed activities of maintenance and upgrading longer than expected.
- Low precipitation to water reservoirs during the winter.
- insufficient transmission capacity in the Nordic system

The EMG asked NordREG to analyse the experiences from this winter, and look at the functioning of the Nordic electricity market (NordREG 2010c).

NordREG's memo points to the following elements:

Transmission capacity
While the Nordic market is interconnected with several lines there were lines having reduced capacity during the price spikes. When the consumption in the Oslo region is high, the TSO reduces the transmission capacity on the Hasle connection that runs from Southern Norway to Sweden. During the price peak on 8 January this line had zero capacity. NordREG points to the fact that the TSOs decide the transmission capacities between price areas based on predictions on the consumption. During the winter of 2009/2010 the actual consumption was in many cases lower than the predicted consumption. This over estimation of consumption may have resulted in a larger reduction of transmission capacities that would otherwise have been necessary.

Deviations between Elspot volumes and actual volumes
In their report to the EMG NordREG writes that:

> In all peak hours there were substantial down regulation in the high price regions. The cause for this can be two fold; it can be regarded as a sign of the capacity of electricity consumers to react on the price signals by cutting temporarily demand.
>
> A further explanation can be that special regulations by the Swedish TSO in the southern parts of Sweden due to congestions rendered the system overbalanced. According to normal routines this situation would lead to a need for down regulation (NordREG 2010c).

Demand flexibility

NordREG points to the fact that consumers may be price flexible on NordPool Spot, given that they have hourly metering. NordREG further notes though, that demand flexibility is low, and the consumers are seldom the ones trading and being active on NordPool Spot. Even the large consumers often remain passive on NordPool Spot. Even a small increase in demand flexibility could reduce the price substantially in peak hours. NordREG writes:

> More price elasticity could be enabled through the introduction of hourly read smart meters, which would establish the capability for the end users to react on the price signals either autonomously or through a load aggregator. This could trigger changes in the retailers informing requirements in the legislation (NordREG 2010c).

Transparency

In their memo NordREG also looks at potentials for increasing transparency on NPS:

> Increased knowledge of high peak price behavior to retailers and producers in high price situations would need to be published. This could encourage the demand flexibility behavior.
>
> Publishing individual bids may from a competition point of view be much more complicated on this oligopolistic market. However, with a time-lag, individual bids should be available for analysis and research (NordREG 2010c).

Adjusting price areas

According to NordREG adjusting price areas into more relevant price areas as a means of combating price spikes should be studied further, and states that:

> Market power does not depend on the regime used to handle bottlenecks in the grid. If a producer has market power under one regime, the same producer will have market power under another regime. It is only on which sub-market the market power may be exercised that is affected (NordREG 2010c).

Ensure production availability

In their report NordREG suggest that harmonizing the scheduling procedures for the maintenance of major generating units should be analyzed for the entire area. One option could be not to permit maintenance between December 1 and the end of February, i.e. during the period when the highest demand occurs. Another way to address the issue could be to introduce a system following the Finnish pattern to the entire Nordic area. In Finland the legislation states that regulators should have the mandate to approve or to postpone the maintenance outages of major generating plants (over 100 MW) scheduled for the winter period.

In addition to the NordREG analysis, and based on discussions within the EMG and with other stakeholders, the EMG point to the following elements in understanding the situation this winter:

Insufficient information in UMMs

On NordPool spot the market actors communicate to the market through Urgent Market Messages (UMM). These messages are intended to inform the market on issues affecting the price formation and trading. In a system with a high share of hydro power the UMMs are especially important as the operators of hydro power use the market information to make their disposition on the use of their reservoir capacity.

When the Swedish nuclear generators were down this winter, the UMMs sent out from the operators gave the impression that the generators would come back online in a relatively short time, and repeatedly gave the message to the market that the maintenance was about to be finished. This information influenced the disposition of reservoir power, and incentivized increased use of the reservoirs. As the maintenance took longer time than indicated in the UMMs the reservoirs may have been reduced so that the water levels were lower than necessary.

Maintenance procedures and enhancing production availability

During the summer of 2009 several nuclear plants in Sweden underwent substantial maintenance and upgrading. Many of the activities proved to be more complicated and time consuming than expected. The major owners of the nuclear power plants have stated that the mistakes will not be repeated and that the revision during 2010 will focus on yearly maintenance. It is important to avoid that this situation occurs again.

Nordic Ministerial meeting in Seville

Due to the high prices in the winter 2009/2010, the Nordic energy ministers met to discuss the situation in conjunction with EUs energy ministers meeting in Seville. At the meeting the representatives agreed that:

> The Nordic power system has tackled this challenge in an efficient way. We have a secure supply of electricity in the Nordic region and there has been enough power in the system, meaning that drastic measures such as disconnecting the electricity supply of ordinary consumption have been unnecessary. However the situation has highlighted the need to continue establishing new power production and using alternative energy sources, increase energy efficiency, increase demand flexibility and ensure a strong transmission grid, both in and between the Nordic countries. The representatives from the four countries underline that a common Nordic electricity market is important to maintain a secure and efficient power supply (NordREG 2010c).

EMG conclusions and recommendations

- The EMG concludes that the market functioned as it should, driving the price up when the demand was high and supply low, but that steps should be taken to avoid this situation with such high prices in coming winters.
- The EMG welcomes NordREG's preliminary proposals. The proposals include increased transparency in the market, to activate demand flexibility, adjusted price areas and to ensure production availability. The EMG urges NordREG to finalize their proposals and take necessary steps to implement relevant measures as soon as possible.
- Smart grids should be considered among possible future measures.
- EMG also welcomes the proposed strengthening of the UMM system in NPS to facilitate better information to market actors.

Peak load arrangements

In 2007 Nordel published their Guidelines for Transitional Peak Load Arrangements. The EMG then asked NordREG to comment on the guidelines on how Peak Load arrangements may affect the market. The EMG thus financed a small consultancy study for NordREG in the issue. In 2008 the EMG asked NordREG and Nordel to look at this in concert.

In March/April 2009 the EMG has received two reports on the issue of peak load arrangements – one from NordREG and one from the Nordic TSOs. EMG in 2009 asked NordREG to comment on the final report from the TSOs. In 2010 the EMG received a new report from NordREG on guidelines for transitional peak load management. In the report NordREG concluded the following:

> Firstly, the peak load arrangements should be introduced only in situations when security of supply cannot be met without these arrangements. Since the decision to introduce peak load arrangements might be of a political/legal nature, the length of such arrangement cannot be fixed. However, there should be a regular evaluation by the competent authority of the need for such an arrangement.
>
> Secondly, when peak load arrangements are introduced they should be designed to minimize distorting effects on price formation in the Nordic electricity market. Furthermore, if there are to be peak load arrangements, there might be a need for rules how to distinguish the peak load reserves from other reserves at the disposal of the TSOs. However, this issue needs further discussions and development.
>
> Thirdly, Nordic consultation should be carried out where the views of all relevant authorities and stakeholders in the market affected are invited. It is recommended that the governments consult with their Nordic counterparties before submitting legal proposals on peak load arrangements affecting Nordic price formation. These consultations should also be with regulators and TSOs who are involved in the design of the actual peak load arrangements.
>
> The proposed guidelines have served as a starting point for the process that led to the common rules for activation of Swedish and Finnish peak load reserves in Elspot. NordREG views that the guidelines have served their purpose in this process. In this process modifications in the principles compared to the original Nordel guidelines were agreed. NordREG finds that the revised guidelines do not introduce any new principles not known to the regulators when the 2009 assessment was made, thus NordREG has no reason to change its assessment of 2009.
>
> During the winter 2009/2010 the PLR have been activated. It is NordREG's view that the activation should be monitored by NordPool Market Surveillance as well as by the relevant regulators and transparently reported.
>
> Finally, NordREG wants to emphasize the importance of Nordic consultation procedures as soon as new rules are introduced which could affect the price formation on the Nordic market. This consultation process should happen on all levels including the governmental level (NordREG 2010d).

EMG conclusions and recommendations

- The EMG is pleased with NordREGs assessment of the peak load guidelines. The future development and use of guidelines for Peak Load management should be seen in connection with the experiences from the winter of 2009/2010, and the final evaluations of the functioning of the market this winter.

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