NordREG's status report

- update and national development

NordREG Report 2 – 2015
Published: 2015-08-17

Preface

NordREG, the cooperation between Nordic energy regulators, has for several years been devoted to the work of developing the Nordic electricity market. In recent years, NordREG has focused on establishing joint recommendations in order to achieve a harmonized Nordic retail market for electricity. A harmonized electricity retail market with common practices and market rules is a natural next step following the establishment of major initiatives such as NordPool Spot and Nordic Balance Settlement (NBS). A harmonized Nordic retail market based on a supplier centric market model should lead to increased competition in the market, and higher consumer engagement and satisfaction. It is also in line with – and supporting – the development at European level towards an internal European electricity market.

NordREG has also continued a cooperation throughout the years on a Nordic level regarding other issues than specifically relate to the retail market. There are two other working groups actively looking at wholesale- and distribution and network regulation issues. The focus is to share good practices and to cooperate and exchange view on network codes and other EU-related topics at hand.

A new Flexibility Working Group has been working within NordREG during 2015. The working group is going to present a separate memo regarding demand-side flexibility that will be presented to the EMG in August 2015.

The project for a Nordic electricity market is carried out on a voluntary basis and is funded by the Nordic energy regulators (NRAs). Both the project and the outcome is therefore dependent on political backing. The Nordic Council of Ministers and the Energy Market Group (EMG) have provided useful and fruitful input during the years that has enriched the work done by NordREG.

NordREG provides an important platform for information exchange and sharing of best practices on the EU-arena. The Nordic countries have made substantial changes to the national electricity markets in order to have a truly Nordic electricity market such as supplier centric market processes and the development of data-hubs.

The main target groups for the road map are the Nordic governments, legislators and the electricity industry.

Finn Dehlbæk

Chair of NordREG

Copenhagen, August 2015

Executive summary

NordREG's work is increasingly influenced by the development on the European arena. The European Commision (EC) has placed significant weight on the establishment of a common European electricity market. The importance of the goal is underlined by the communication on the Energy Union from the EC in February 2015. The road to a single European energy market includes targets on improved market design on a European level. The EC has launched a process of public consultation on a new market design in the summer of 2015 – followed by possible legislative follow-up proposals in 2016.

NordREG's work is, and has been, highly influenced by the development of the framework guidelines and network codes that are underway with specific demands etc. for the market, the market participants and regulators among others. The development emphasizes the value of a cooperative approach in dealing with the general trends and challenges.

Retail market development

The competitive stakeholders point out that quite a lot of the entry- and market operations processes are similar in the Nordic countries. The stakeholders also expressed an overwhelming support for the speedy implementation of a supplier centric model and that the establishment of a national data hub. These two issues would strengthen the possibilities for the competitive stakeholders to start up and stay in business for the long term.

Furthermore the overview of the national development suggests that soon a large part of the Nordic customers will be able to enjoy the benefits of smart metering. Functionalities such as hourly metering and open interface will allow access for customers and 3rd parties directly to the metering system. This will enable the development of smart, flexible offers to the customers and the possibility to develop services to enable smart home solutions.

NordREG therefore supports and encourages the national work to implement a supplier centric model, roll-out of smart metering and the development of hubs.

NordREG finds that the key processes have been harmonized at a Nordic level and awaits implementation nationally. Nordic cooperation and sharing of information during this implementation is of great importance.

Wholesale and transmission

In order to be able to quickly respond to upcoming issues and to become more proactive, the work in this area will from 2105 become more flexible. The two main tasks will be to 1) identify new issues on the European level that may have a significant impact on the Nordic markets and 2) to act as a facilitator among the Nordic NRAs in terms of initiating forums and settings where common work can be performed.

The continued work on the Nordic balance settlement, where the Finnish, Norwegian and Swedish TSO have agreed to combine their balance settlements into one organization called eSett will also be on the agenda in 2015.

NordREG also continues the work on the capacity calculation project (initiated in 2012) examining the methodology how the TSO:s determine the capacity available at the cross border connections needs to be fixed in light of the forthcoming european network codes.

Network regulation

NordREG is in the process of developing a report regarding tariffs in the Nordic countries. The report's focus is "what *can* the NRAs do to incentivize more energy efficiency in distribution and use of energy through grid tariff design?". The report will among other things include a survey of the different tariff designs in the Nordic countries that can make a platform for discussing whether there is any potential for the NRAs to harmonize different tariff designs between the Nordic countries.

For the report to fully take into account the market participants views on tariff designs there will be input from the industry, academics, consultants and others at a workshop organized in Stockholm in November 2015. The workshop's focus is "what *should* the NRAs do to incentivize more energy efficiency in distribution and use of energy through grid tariff design?".

Flexibility

NordREG has responded to a request from EMG to comment on the report "Demand response in the Nordic electricity market" made by THEMA Consultants. The work by NordREG in this area so far is reflected in memo the memo "Memo to Elmarknadsgryppen regarding demand-side flexibility".

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1 Introduction

NordREG, the cooperation between Nordic energy regulators, has for several years been devoted to the work of developing the Nordic electricity market. NordREG's work has created a momentum of change in all countries. The work is in line with and supports the development at the European level, in particular as a good example of a regional initiative in order to identify and remove berries towards a harmonized electricity market.

The work towards a single Nordic electricity market is based on NordREG's vision that all Nordic electricity customers should have the possibility to choose suppliers and benefit from efficient and competitive prices and reliable supply through the Nordic and European electricity market.

During 2015 NordREG has four active working groups;

- Retail Market Working Group
- Wholesale- and transmission Working Group
- Network regulation Working Group
- Ad hoc Flexibility Working Group

The following chapters will describe the work done within the four groups during the last year.

2 Retail Market WG

NordREG's main objective for the integration of retail markets in the Nordic region is to minimize the regulatory and technical obstacles for suppliers that are willing to operate in all Nordic countries. The main purpose behind this is to harmonise the market models in the Nordic countries to the extent that the transition will be smooth and feasible for suppliers who want to start operations in other Nordic countries. The market integration would thus provide a harmonised framework for the suppliers and energy service companies (ESCO) to make business in the whole Nordic region and in such, all retail customers would be eligible to take part in the Nordic electricity market. Also the framework of customer empowerment should be adequately secured so that the customer can buy electricity from any supplier and/or ESCO with confidence.

This chapter describes the work done in the Retail Market WG and the current state of affairs nationally looking specifically at smart metering and data-hubs. These two areas have been identified by the working group as an essential base for a well-functioning electricity retail market.

2.1 Work done the last year

NordREG has identified two areas of key importance for future work that will enable a competitive market where the customer will be able to engage actively and reap the benefits of competition. The areas are access to information and enabling the development of energy services and demand response. Therefore NordREG commissioned VaasaETT to study the competitive conditions in the national Nordic markets in Denmark, Finland, Norway and Sweden. The study looked into the market entrance and the market operation processes under which suppliers and energy service companies (ESCOs) act.

Furthermore NordREG decided to commission a mapping exercise covering the current legal framework for information exchange, unbundling, energy services, micro-production and demand response. An overview of current national regulation of the DSO is important since the area that is clearly defined as a non-DSO activity will increase the playing field for the competitive stakeholders.

2.1.1 Supplier centric model and access to information via hub is important in order to increase competition in the Nordic market

VaasaETT interviewed a number of new suppliers and ESCOs in depth and also carried out an online questionnaire during the spring, summer and fall of 2014. The report was on public consultation during the fall of 2014. The report together with the results from the public consultation was presented at a hearing held at Vaanta airport, Helsinki on the 17th of November.

The results presented in the final report[1] gives a thorough look at each countrys market processes and in which degree these processes are similar between the Nordic countries. NordREG is pleased to see that quite a lot of the entry- and market operations processes are very similar in the Nordic countries. The stakeholders also expressed an overwhelming support for the speedy implementation of a supplier centric model and the establishment of a national data hub. These two issues would strengthen the possibilities for the competitive stakeholders to start up and stay

[1] Market Entrant Processes, Hurdles and Ideas for Change in the Nordic Energy Market - the View of the Market

in business for the long term.

NordREG notes that quite a lot of barriers were listed in the report and would in this context like to point out that some level of hurdle/barrier is necessary for market entry, especially looking at balancing issues, otherwise the system itself would collapse. The stakeholders expressed that they found in total 60 hurdles to market entry and market operations. However the importance of these barriers indicates that the most important ones were 26[2]. The overwhelming majority of the most significant hurdles were related to DSO-related operations and sales and marketing.

2.1.2 Current state of TSO's and DSO's roles and responsibilities and the current market design for enabling energy services.

The TSO's role is changing with the establishment of national data hubs run by the TSO and thereby the TSO becomes a market facilitator. In the near future it will become increasingly important to provide the customers with energy services. The retail market needs to be designed in a way that enables energy service providers to enter the Nordic market. The DSO's, TSO's etc should give these new actors the possibility to manage the customers' electricity consumption and/or balance. It is important to provide a market design and a regulatory framework that clearly states the roles and responsibilities for energy service providers. The work of NordREG on rules for energy services focuses on market rules for DSO's and unbundling.

With regards to the Energy Efficiency Directive (2012/27/EU), demand response is given a larger role in the electricity market in dealing with network constraints as a result of more renewables in the grid etc. How much should the customer be able to choose and what should be "controlled" by other parties? In order to reach the European climate goals that involves an increasing share of renewable energy, it is important to have rules that enable customers to become producers. Therefore rules regarding access to the grid needs to be transparent to reduce entry barriers.

In June 2015 NordREG published three reports; "Mapping of TSO and DSO roles and responsibilities related to information exchange", "Rules and regulation for energy services" and "Rules and regulation for demand response and micro-production"[3].

Regarding the findings in the report related to information exchange NordREG finds the mapping of TSO and DSO roles and responsibilities related to information exchange markets useful as an overview and that the findings also show that there are many similarities between the Nordic markets when it comes to regulations and market rules on information exchange. NordREG therefore decided that there is no need for new Nordic recommendations for harmonised rules in this area at the present time.

Regarding the findings in the report related to demand response and micro-production NordREG finds that the current regulations and proposed changes are similar in the different national markets with seemingly similar roles of TSOs and DSOs. NordREG therefore decided that there is no need for new Nordic recommendations for harmonised rules in this area as of now. With regards to

[2] See page 27 f

[3] Mapping of TSO and DSO roles and responsibilities related to information exchange, Rules and regulation for demand response and micro-production

micro-production, a lack of relevant regulation has been observed in the report. This means among other things that customers and ESCOs need to be in direct contact with the large number of DSOs if they would like to offer services related to micro-production. This could be quite demanding and costly which could be a reason for having common rules to standardize the process and should be analysed further. NordREG therefore considers the need to seek support from the Nordic Council of Ministers to finance such a study.

However, while no regulatory differences are observed for demand response in the report, it is clear that there seems to be a lack of information regarding the level of demand response measures in place. NordREG therefore considers that an assessment of the availability of demand response initiatives currently in place could prove to be useful for future work on demand response .

2.2 National status

All recommendations issued by NordREG, put together, specifies the regulatory frames for a supplier centric model. A key area for successful implementation of the supplier centric model is information exchange systems and the access to information via a data-hub.

2.2.1 Denmark

2.2.1.1 General description

In Denmark the recommendations of the Nordic end-user market project are used as an important benchmark and as the minimum requirements when the national market rules are formulated as part of the on-going work with the introduction of the data hub, combined billing and the Danish supplier centric model (SCM).

The Danish TSO, Energinet.dk, is in constant dialog with the Danish Energy Regulatory Authority (DERA) and NordREG to assure that the Nordic recommendations are followed. Also, when preparing adjustments in the Danish Electricity Act the recommendations of NordREG are carefully considered to ensure that the national changes follow a harmonised Nordic approach.

The overall assessment is that the Danish retail market largely corresponds with the recommendations of NordREG in order to obtain a harmonised Nordic end-user market, though it is not always possible to strictly follow the recommendations of NordREG regarding the retail market.

All market rules are already updated in line with the Nordic proposals and according to the SCM recommended by NordREG i.e. a data hub was launched 1st of March 2013. The main difference from other NordREG member countries is that the Danish SCM will be developed one step further into a so-called wholesale model by the 1st of April 2016. It states that the customer will only have one contract and that is in relation to the supplier. Between the supplier and the DSO a standard contract will be present. The DSO (and the TSO) will sell their services to the supplier and not to the customer. Each supplier will bill the customer for “delivered electricity”, which is the electricity supply including net and system services, taxes, VAT etc. The SCM means that customers will only be in contact to their supplier. The supplier is responsible for customer-related master data. The supplier also gets the financial risk on the customer and must pay the DSO regardless of whether the customer pays. One is exception that DSO bears the risk the risk of the customers’ non-payment of tax and further, the DSO bears the financial risk if the supplier goes bankrupt.

Another effect of SCM is that the DSO can concentrate on their core tasks related to operation, maintenance and necessary conversion and expansion of the grid, measuring electricity consumption and promotion of energy saving.

2.2.1.2 Information exchange

In order to facilitate easier communication of meter and master data between DSOs' and suppliers, a data hub was introduced in 2013. A data hub also makes it easier for the customers to change supplier and to get access to their own consumption data. This new information exchange system is operated by the Danish TSO, Energinet.dk. A new version of the data hub is planned to be launched in April 2016 when the supplier centric model will be launched (see above).

2.2.1.3 Smart metering

The Danish government has decided a national roll out of smart meters (SM) by 2020. The SCM which will be introduced in April 2016 will not change the main duties of the DSOs regarding meters. In Denmark, the DSOs are responsible for the metering including the smart metering. This covers purchasing, owning, installing, and replacing the metering equipment, as well as inspecting, maintaining, and reporting metering data to the parties (e.g. datahubs) within the electricity trading. Customers with regular meters are responsible of reading the meter themselves. However, some suppliers read the regular meters by installing a small monitor nearby the meter.

The metering points shall be read at least once a year for the bills and upon changing suppliers, moving situations, or if the electricity supply is terminated.

Hourly metering was mandatory for metering points (customers) with an annual consumption exceeding 100.000 kWh/year. Customers whose consumption were below 100.000 kWh/year, did not have hourly metering hence the initial costs and the operation costs of the metering system would - according to some DSOs - be too high compared to the potential benefits offered by hourly metering. The Danish Government has though decided a national roll-out of smart meters in 2020.

For customers without hourly metering one profile for each DSO is established. The metering points of these customers are included in one harmonised customer profile (template). This template will be calculated for each DSO on an hourly basis from the grid area's residual hourly consumption.

The beneficiation of installing smart meters in Denmark:

- Customers can measure their actual electricity consumption hourly.
- Customers will become aware of their actual energy consumption and thereby bring an incentive to save energy.
- Competition will increase hence customers will be aware of actual tariffs which gives an incentive to research offers from the suppliers.

2.2.2 Finland

General description

The overall assessment is that the Finnish retail market corresponds fairly well with the NordREG´s recommendations. Most of the market procedures are already in line with the proposed Nordic recommendations. The main difference with other NordREG member countries is that the Finnish

government has informed that it supports the supplier centric model as such but not the mandatory combined billing at least not at the present time. This means that in Finland there are no legislation changes done or planned at the moment regarding processes relating to the billing model like in other member countries. In Finland the focus is currently concentrated around information exchange and its development and implementation of the NBS regulation.

2.2.2.1 Information exchange

The finnish TSO Fingrid Oyj, was commissioned by the Ministry of the employment and the economy in the beginning of the 2014 to investigate and asses what type of information exchange system would best serve the future needs of the information exchange development. The task was finished end of 2014 and was delivered to the ministry for further evaluation. The report proposed hub as future information exchange sollution and Fingrid as the responsible operation party. After assessing the results of the Fingrid´s report and the stakeholder comments the Ministry gave Fingrid a task to start developing a datahub for Finland in the spring 2015. Fingrid has started their development project in April 2015.

The Nordic TSO –project NBS has already lead to plans to implement the needed legislative changes to the balancing and information exchange acts. This work is currently been done by the Ministry. The proposals for the legislation are currently in public consultation and are expected to be given sometimes in this fall.

2.2.2.2 *Smart metering*

The transition period for installing smart meters (hourly measurement and distant reading capabilities) at least up to 80 % of all the consumption places in each DSO´s grid area ended in the beginning of 2014. The legislation concerning smart meters came into force already in 2009. In Finland the decision to install smart meters hasn´t been direct effect of the Nordic retail market development. The coverage of the smart meters is estimated to be about 97 % of all the consumption places. The legislation now states that the balancing and meter reading should be based on the hourly measurement unless otherwise stated.

2.2.3 Norway

General description

The Norwegian retail electricity market was established in the early 1990's. Over time, the market has become increasingly competitive with the establishment of independent suppliers and the entry of existing suppliers into markets outside their traditional area. In 2014 there were almost 350 000 household customers switching suppliers in Norway, which represents approximately 13 % of the households. However, the dominant supplier within each DSO area still has an average of 70 % of all household customers.

The Norwegian electricity retail market is generally in line with NordREG's recommendations for a harmonized Nordic retail market. Most market processes can be initiated from the supplier, thus our current market model can be said to be partly supplier centric. At the same time there are several ongoing processes that intends to move the Norwegian market towards a harmonized Nordic market.

Currently, the two main ongoing harmonisation processes are the introduction of the Norwegian

national point of information exchange (ElHub), and the ongoing study on the implementation of mandatory combined billing. These harmonisation processes have been initiated or heavily influenced by NordREG's work and recommendations.

2.2.3.1 Information exchange

The process of establishing the national point of information exchange , Elhub, is well underway. Statnett was delegated the responsibility in the summer 2013 to develop and operate Elhub and has in turn contracted a consortium led by Accenture to accomplish this task. Elhub will be operational from February 20th 2017, however the first version (1.0) of Elhub will not provide support for the NordREG recommendations on supplier centric model. This will be facilitated by the second version of Elhub (2.0)

Elhub will facilitate information exchange between DSOs and power suppliers by handling the exchange of metering data and other relevant customer data. Given its position as national information exchange point, Elhub will provide the core for several market processes in the retail market.

The introduction of the Elhub in the Norwegian market requires a substantial revision of relevant regulations on metering and settlement under the Energy Act ("Forskrift om måling, avregning og samordnet opptreden ved kraftomsetning og fakturering av nettjenester"). The suggested revisions of the regulations were on public consultation fall 2014, and on 8 June 2015 NVE adopted the revised regulations. Information on these changes can be found on www.nve.no

More information about the Norwegian Elhub can be found on www.elhub.no.

2.2.3.2 Smart metering

The roll out of smart meters in Norway is scheduled to be completed by January 1st 2019. The legislation regarding the roll out of smart meters allows NVE to monitor the DSOs roll out processes. The first monitoring was carried out spring 2015.

The smart meters in Norway will be required to:

- Measure power consumption with an hourly frequency, but with the opportunity to increase to 15-minute frequency.
- Communicate, through open standards, with external equipment.
- Cut supply and limit the use in each metering point.

The full list of requirements is listed in §4-2 in the regulation on measurement, calculation and coordinated action of power distribution and billing of grid services.

This first round of monitoring has established that by January 2015 approximately 200 000 smart meters are installed, of these 150 000 are so called "AMS light"-meters, these meters are exempted from some of the functional demands.

The monitoring also shows that the DSOs are at very different stages in their procurement processes. According to the information given in this first monitoring, the bulk of the AMS roll out

process will come in 2017 and 2018.

The next monitoring on the AMS roll out process will take place late 2015/early 2016.

2.2.4 Sweden

General description

The Swedish electricity market was reformed in 1996. Since then, supply and production of electricity have been separated from network opverations and exposed to competition. The Swedish electricity network consists of 545,000 kilometres of power cables, of which 329,500 km are underground cables and 215,500 km overhead lines. Affärsverket svenska Kraftnät (SvK) is the State-owned utility that owns the Swedish national grid, and is responsible for maintaining the balance between production and consumption of power, as well as for the operational safety of the Swedish electricity transmission system. SvK is certified as the national transmission network operator by the Energy Markets Inspectorate (Ei). In its role as a regulator, Ei has the task of scrutinising SvK. Local and regional network companies are responsible for sufficiently maintaining their networks to ensure that each connection within their individual networks, at all times, have access to electricity according to given quality standards. As of 2015, there are 180 electricity network companies in Sweden.

The Swedish Energy Markets Inspectorate runs the price comparison webbsite Elpriskollen.se where suppliers are required to report contracts and prices. According to statistics from Elpriskollen.se, Swedish consumers can choose from almost 2000 different electricity supply contracts whereof 1200 are contracts with 100 percent renewable energy.

The Swedish government gave Ei the task to suggest a national legislative framework for a Nordic end user market in late 2012. The basis for this assingment was the recommendations from NordREG that a supplier centric model is the most customer friendly market model. A proposal from Ei to introduce a legal framework for a supplier centric model was delivered to the government in June 2013. The proposal took fully note of the NordREG recommendations.

Quite a lot[4] of Swedish customers have so called anvisningsavtal (de fault contracts) with the supplier. The customer usually ends up with this contract when moving to a new home. Since these contracts are more expensive for the customer than other contracts, Ei was asked by the government to make a CBA[5] regarding the implementation of a supplier centric moving process[6] before the establishment of a national data hub. The CBA was negative.

The government decided in late June this year to ask SvK, to establish and run a national data hub and gave Ei the task to set up the legal frame work. The Swedish government also gave EI the task to review its proposal on a legal framework for a supplier centric model and if needed align the proposals with the legal frame work for the data hub as well as the joint Nordic Balancing Settlement procedure. In its instructions to Ei the government concludes that a supplier centric model should be introduced in Sweden. Among other things, this model should include combined

[4] 15,2% in January 2015 which is about 690 000 customers

[5] Elhandlarcentrisk flyttprocess – en kostnadsnyttoanalys, Ei R2015:05

[6] A supplier centric moving process makes it necessary for the customer to choose a contract before a move

billing, the process for moving and switching should be carried out by the supplier and the customer should receive information of its consumption and total costs from the supplier. A revised propsals from Ei should be delivered to the government in February 2017.

2.2.4.1 Information exchange

NordREG has made recommendations[7] for all NordREG members when looking into a revision or change of its national information exchange model. The report also highlights the importance of having one or very few contact-points for a supplier wanting to conduct business in a national and/or Nordic market.

Looking at the NordREG recommendations and following discussion nationally Ei suggested in June 2013 that there should be a centralized information exchange model with SvK, as the responsible party. This suggestion was part of a public consultation in the fall of 2013. After comments and further analysis of the topic the government gave Ei the task to develop a regulatory framework for a centralized information exchange model by June 2014. In June Ei reported back to the government. Ei suggested that there should be a centralized information exchange model (hub) which carries out the key processes in the electricity market. Processes such as switching and moving should be carried out in the hub. The hub should also be the access point of the competitive stakeholders to the electricity market. Ei believes that it would be easier to establish business in Sweden if you only have to be in contact with one point rather than each and every one of the DSOs, depending on in which area the customer lives.

On 25June 2015 the government decided to give Svk the task to develop and run a national data hub. The government also decided to give Ei the task to give proposals for how the current legislative framework needs to change in order to implement the national data hub.

2.2.4.2 Smart metering

Ei has developed recommendations for demand on functionality in the smart metering system. Even though there is no legal framework for functional requirements of electricity metering systems (apart from meteorological requirements) today, there is a quite high level of functionality in the Swedish metering systems. But since most of the meters and metering systems currently used were installed between 2006-2009 it will soon be time to replace them. The Swedish government therefore tasked Ei with analysing what, if any, the functional requirements should be. Ei has concluded that there should indeed be functional requirements and Ei has proposed that the meter should:

1. be equipped with an open, standardized interface that delivers real time information on power, aggregated consumption, voltage and, if relevant, production. The consumer is given access to this information.

2. for all phases meter voltage, current, energy and active and reactive power in both directions.

3. allow remote reading of all metered data.

[7] High level suggestions for common Nordic processes for information exchange- obstacles and possibilities, Report 1/2012

4. register consumption with a frequency of 60 minutes. It should also be possible to change the registration frequency to 15 minutes.

5. register and save information on any interruption longer than 3 minutes on one or several phases, including start and end time of the interruption.

6. detect zero faults and automatically send alarm when these occurs.

7. allow remote upgrading of software and settings.

8. allow remote connection and disconnection of electricity supply.

The recommendations were submitted to the government late May. The government has sent Ei:s report on public consultation untill 28 September. It seems realistic to anticipate propsals of detailed regulation on metering systems during 2016. The implementation of the second generation of smart meters is expected to take place between 2017 and 2025.

2.2.5 Summary on the national development

NordREG is happy to see that all four countries have decided to create a national datahub. Denmark is moving towards updating the already existing datahub by April 2016 when introducing the new market model in which the supplier will be the only contact for the customer. Norway will introduce a datahub from 20 February 2017 and are currently developing functionalities and has recently adopted the legislative framework. This year, the TSO:s in Finland and Sweden have been given the task to develop a datahub.

It seems that all four countries are well on the way of having rolled out or rolling out smart metering for all customers. The establishment of a hub and the existence of smart metering will be important tools for the future development of offers, services and enabling the customers to be participants of the electricity market.

	Data hub	Smart metering	Functionalities
Denmark	Data hub was introduced 2013. New version will be launched 1st April 2016	Yes, from 2020	The supplier centric model will be introduced 1st of April 2016
Finland	Project to investigate future information exchange model will be finished by the end of 2014. Decision on the future model will be	Yes	No functionalities decided yet

	done after that		
Norway	Establishment of data hub is underway and will be operational from Feb 2017.	Yes, from 2019	Smart metering will: • store the meter values with a maximum time resolution of 60 minutes, and be able to be converted into a minimum time resolution of 15 minutes • have a standardized interface that facilitates communication with external devices based on open standards • be connected and communicate with other types of meters • ensure that stored data is not lost during power outages • be able to break and limit the power in each meter point, except for transformer metered customers • be able to send and receive information about electricity prices and tariffs, as well as to transfer management and earth fault information • provide protection against misuse of data and unauthorized access to control functions and register the flow of active and reactive power in both directions.
Sweden	Svenska Kraftnät has been given the task to develop and run a data hub. Ei has been given the task to revise the legal framework accordingly	Yes	• open, standardized interface that delivers real time information • for all phases meter voltage, current, energy and active and reactive power in both directions • remote reading of all metered data

			• hourly metering[8] • register/save information on interruption longer than 3 minutes • detect zero faults and automatically send alarm • remote upgrading of software and settings • remote connection and disconnection

Figure 1 Summary of national development

2.3 Areas of focus for future work on retail markets

NordREG believes that an accessible and efficient information exchange is at the core of enabling a well-functioning retail market. NordREG therefore intends to continue to focus on this area in the coming year(s). The need for a continued good dialogue with organisations outside NordREG, such as the EU organisations for example, is a high priority for the successful development of the Nordic retail market.

[8] Also be possible to change the registration frequency to 15 minutes.

3 Wholesale- and transmission WG

This chapter describes the work done in the Wholesale and Transmission working group and the current state of affairs.

The Nordic area is a forerunner in the development of the international deregulated power market. The present Nordic market structure is based on development that started in Norway in 1991. Sweden joined the market in 1996, Finland in 1998 and Denmark in 2000. The market was further expanded to include Estonia in 2010 while Lithuania and Latvia followed in 2012.

The European market integration has grown in importance as the Nordic market in an ever increasing pace has been integrated more closely to the pan-European market, both through physical interconnectors and common trading sollutions and rules. The European market is developing at a high pace and Nordic NRAs and TSOs have contributed to the development of the legal framework of network codes and guidelines. In this context, the Nordic cooperation has proven to be a successful way of enhancing the Nordic market perspective.

NordREG is is an important platform for regulators, TSOs and market players for information exchange which is useful in a purely Nordic context as well as for European issues. The Wholesale and Transmission WG has lately evolved from being a working group where reports have been produced on various subjects to a group where ad hoc discussions can take place in order to analyse how proposals from the EU fit into the Nordic market model or to address special requirements or to make proposals to influence network codes and guidelines. The wholesale market is increasingly European, but joint efforts and common approach is advantageous for all Nordic countries.

3.1 Work done

In 2014, the electricity exchanges of North West Europe combined their calculation algorithms so that at the present time the prices, demand, generation and cross border transfers of electricity are calculated at one time for most of Europe. The process is still ongoing towards including areas that still remain outside the joint calculation. The objective is that the areas not included in the calculation, as yet, will be included in the near future.

The focus of the work this year is concentrated on the development of network codes and guidelines. The listing below summarizes the work done on various tasks indicated in the Work Plan for the Wholesale and Transmission for 2015.

3.1.1 Nordic Balance Settlement

This joint Nordic Balance Settelement (NBS) is a forerunner in European context. Nowhere else is there a joint international unit for balance settlement. The Finnish, Swedish and Norwegian TSO:s have agreed to combine their balance settlement process and operation through one organization. This organization has been established under Fingrid and is called eSett. For this to become functional, several practical details need to be fixed.

Preparation of the legislative base is ongoing in all concerned countries. eSett's operational phase will start with the balancing settlement for the balancing responsible parties in Finland with expected go-live 1 February 2016. Sweden and Norway are expected to follow in mid-April 2016.

The Nordic NRAs have followed the NBS-project through a work stream under the W&T WG, where

one aim is to coordinate and prepare regulatory processes for establishment and follow up of eSett.

3.1.2 NordREG Capacity calculation (project initiated in 2012)

The forthcoming European regulations on the Internal Electricity Market will set out the rules for the European electricity markets. One of these regulations is the CACM guidline and it entered into force on the 14 August 2015. It includes a.o. comprehensive guidelines on TSOs calculation of capacities relevant for cross-border trade. According to this guideline the detailed regulations are to be determined based on proposals from TSOs on a number of issues, which are to be approved by NRAs. NordREG has followed closely the Nordic TSOs work in this field in order to prepare for NRAs approvals.

An important issue is the choice of Common capacity calculation methodology to be used in the relevant Nordic area. Based on information received in the work shops so far, NordREG has sent a letter to Nordic TSOs requesting a written note from TSOs to outline the foreseen process towards their proposal on a Common Methodology.

3.2 Update of NordREG report on the Nordic Financial Electricity Market published in 2010

The forthcoming Network Code on Forward Capacity Calculation (NC FCA) will ask of the NRAs to take a stand on how the Nordic electricity market hedging will be arranged in the future and in which way the functioning with regard to financial cross border trade could be enhanced. The present set-up relies on the financial markets, where market participants are able to hedge their exposure to prices in the physical market. As this set-up might have to be altered or complemented as a consequence of the forthcoming code, the Nordic regulators performed a study in 2010 to investigate the role of financial markets in the overall Nordic electricity markets.

The purpose of the study was to investigate if there was any room for improvements that could make the Nordic financial electricity market more efficient in order to secure optimal price setting in the wholesale and retail markets. The report identified some key characteristics that can be identified as signs of efficient financial markets and through analysis of the public market information and stakeholder input, the report concluded that the Nordic financial electricity market seemed to perform efficiently. However, in some areas there was some room for improvements.

As the issues analyzed in the study are still quite valid and some fundamental characteristics of the market has changed since 2010 (for instance the introduction of new bidding zones in SE, the slow recovery following the financial crisis etc), a decision was made to update the study to make visible the most recent developments in the market. The update should be published before the end of 2015.

3.2.1 Nordic Market Report

Since 2006 a special NordREG working group has been tasked with preparing and publishing a Nordic Market report, which in statistical terms gives an overview of the Nordic electricity market. The work will continue during 2015.

3.2.2 Nordic positions on various topics

Besides the regular tasks under the wholesale and transmisson umbrella, some ad hoc working

groups have been established to work on topical issues that need a common Nordic position in a short time frame.

During 2014 Ei was appointed as the lead regulator within NordREG of the EU-Regulation on Capacity Allocation and Congestion Management (CACM). The main responsibility is to coordinate Nordic discussions and potential work on upcoming issues within CACM.

With CACM follows the obligation to open up for competition between electricity exchanges (or National Electricity Market Operators – NEMO:s, as they are called in CACM) within each member state. Every country in the Union needs to nominate at least one NEMO to operate the electricity markets in the country. This designation process has started in all MS, with the Nordic countries to some extent paving the way for the rest of Europe along with Ofgem (UK). During the spring, a couple of telcos as well as a physical workshop were arranged in order to initiate the work and disseminate thoughts and analysis within the Nordic group of regulators.

One area of specific interest and importance for the Nordic regulators is the future position of Nord Pool Spot in an environment where several NEMO:s would be active in the Nordic bidding zones. Since Nord Pool Spot have been given a unique position in the Nordic market, partly embedded with TSO:s internal operations and co-operation, Nord Pool Spot's roles and responsibilities need to be settled in a way that enhances possibilities for fair competition. Specific arrangements for more than one NEMO in a bidding zone should be proposed by each TSO, following art 45 and 57 of CACM. NordREG has held a couple of internal working meetings to identify arrangements in today's setting that might hinder fair competition and assess different options that could be used to arrange things differently in the future. A dialogue with the Nordic TSO:s has also been initiated to make sure that the Nordic TSO:s will be ready to propose appropriate measures if and when more than one NEMO will be designated in any of the Nordic bidding zones. One possible way of arranging the market is by setting up a "virtual hub". A similar solution has been in place in the UK for some time.

Another activity initiated was a workshop on the importance of and potential consequences that could follow from different compositions of Capacity Calculation Regions (CCR:s). The establishment of CCR:s follows from CACM, but will have importance as a decision-making forum in decisions applicable to more network codes and guidelines than just CACM.

Besides the CACM, a work shop on the Forward Capacity Allocation Network Code was arranged in Stockholm in April 2015. The main purpose of the workshop was to get the Nordic market players views on the draft network code's legal framework for hedging oppurtunities. Additionally the Nordic NRAs have presented a position paper and actively dialogued with the Commission and ACER in getting the wording of the FCA NC so that the present well-functioning Nordic financial market would not be jeopardized.

4 Network regulation WG

Chapter 4 describes the work done last year and the work to be done in 2015 within the Network Regulation WG.

Last year's focus in the Network Regulation WG was on the report "A better organized electricity grid" for the Norwegian Ministry of Petroleum and Energy, where the WG evaluated whether the different suggestions would be relevant in their respective countries.

The WG's focus this year is on writing a report entitled *"Tariffs in Nordic countries – survey of load tariffs in DSO grids",* focusing on what NRA can do to incentivize more energy efficiency in distribution and use of energy through grid tariff design.

4.1 Work done this year

4.1.1 Workshop

The NordREG Network Regulation WG organized a workshop in Copenhagen on Friday 7th November 2014.

The main topic of the workshop was network regulation and new technologies in the Nordic countries – focusing on the challenges for the Distribution System Operators (DSOs). Director General Finn Dehlbæk from the Danish Energy Regulatory Authority presented the main presentation regarding the paper "A Bridge to 2025", which described the future regulation in EU.

In addition there were presentations from the Danish Energy Association on behalf of the Nordic Energy Associations, the Swedish Coordination Council for the Smart Grid, the Danish consultancy Ea Energy Analyses and the four Nordic regulatory authorities.

4.1.2 Suggestions for "A better organized electricity grid"

On the 5th of May 2014 an expert group delivered a report to the Norwegian Ministry of Petroleum and Energy called "A better organized electricity grid". The Network Regulation WG summarized and evaluated whether the report's suggestions to the Norwegian Ministry of Petroleum and Energy would be relevant for the different Nordic countries. The expert group's report had the following suggestions with associated comments from the other Nordic countries:

Suggestion #1: The expert group suggested a corporate and functional division between different business areas, so that grid companies only are able to operate grids. The background is that the group assumes that the close integration between grid activity and other activities, like production or sales, may prevent an appropriate organization of the industry.

Denmark, Finland and Sweden do not have ownership separation between grid companies and trading companies. However, different degrees of organizational separation exist between grid activities and other activities, such as electricity production and sales.

Suggestion #2: The expert group suggests assigning some DSOs the responsibility for ranking investment projects in larger area. The background is that there will be a need for large investments in the coming years. This is due to large reinvestments needs in addition to higher demand for capacity, large investments in distributed generation etc. There is therefore a need to coordinate

investments.

In Denmark, Finland and Sweden this is not an issue as the DSOs can coordinate investments themselves if they find it appropriate. Coordination on national level on the other hand is completed by the Transmission System Operator.

Suggestion #3: The expert group suggests that the regional level is included in the distribution level. The background is that three levels, in addition to the large number of grid companies, result in many interfaces within the electricity system. Reducing the number of levels will also harmonize better with EU laws and legislation. The group cannot see that the regional level has very different tasks from the distribution level, and believes reducing levels will be more socio-economic rational.

In Sweden there is no discussion of this issue and one likely reason for this is that the three dominating DSO companies each have its own regional grid. Finland has 12 regional DSOs that only operate in high voltage grid (110 kV). There are currently no changes to the situation planned for the future. In Denmark there are already only exist two grid levels – i.e . the distribution and transmission levels.

Suggestion #4: The expert group suggests changing the arrangement that all grid companies have the duty to connect producers and consumers that demand connection. The background is that today the grid company only has the duty to connect producers to the existing grid, so if there is any distance from the existing grid to the production point the producer often builds these grid gaps themselves. The result of this is a situation where many producers own a small part of the network, while their main activity is other than operating grid. To reduce the number of grid owners the expert group suggests that the duty to connect changes so that it involves building grid all the way to the production point.

Neither Denmark, Finland nor Sweden has any discussion regarding a change of rules for connection to production plants. In Sweden the common way to handle the need for connection lines is that the producer has a grid company in the company group. In Denmark, network companies can determine how production plants must be connected.

Suggestion #5: The expert group suggests a change in the model for calculating revenue caps in order to strengthen the incentives for cost efficiency. NVE regulates the electricity grid companies. They calculate yearly revenue caps which are 40 % own costs and 60 % cost norm. Thus the companies are guaranteed to have 40 % of their costs covered; the cost norm is based on other companies' costs and gives incentives for cost efficiency. The expert group suggests to increase the emphasis on the cost norm to 70 %.

The regulatory model for Sweden will go in this direction for the next regulatory period by introducing firm specific targets on reduction of revenue frames by efficiency targets.

The Finnish regulation model for DSOs is incentive based and there are incentives for cost efficiency, innovations, investments, quality of supply and security of supply. Currently, the regulatory model and incentives are further developed for the fourth (2016-2019) and fifth (2020-2023) regulatory periods.

The Danish network regulation and benchmarking model could be changed as a result of regulatory checks in many areas. Changes are expected to be adopted in parliament, so that the changes will take effect January 1, 2017.

4.2 Work to be done this year

4.2.1 Planned report

The Network Regulation WG is working on delivering a report regarding tariffs in the Nordic countries, which will include a survey of load tariffs in DSO grids. The report is on track and is expected to be delivered in December 2015.

The report will focus on "What *can* the NRA do to incentivize more energy efficiency in distribution and use of energy through grid tariff design?". The idea is to first give an overview of the different tariff designs in the respective Nordic countries and secondly to summarize the differences and similarities that may exist. This will create a platform for the NRAs to discuss whether there is any potential to harmonize different tariff designs between the Nordic countries.

4.2.2 Planned workshop

In the process of developing the former mentioned report the WG will organize a workshop with the focus on "What *should* the NRA do to incentivize more energy efficiency in distribution and use of energy through grid tariff design?". The reason for organising the workshop is to get input to the report from the industry, academics, consultants and so forth.

The workshop will held in Stockholm on November 5th, 2015.

4.3 National similarities/implementation

The Network Regulation WG's focus is not on national implementation but rather on finding potential candidates for harmonisations across the Nordic countries and to discuss appropriate future tariff designs.

5 Ad Hoc Flexibility WG

5.1 Work done

The working group on demand flexibility is an ad hoc group established to respond to a request from EMG. EMG has requested that NordREG evaluates the report "Demand response in the Nordic electricity market" made by Thema Consultants. The evaluation shall consider the content of the report in relation to the ongoing work of the regulators. NordREG has presented a memo to EMG. In the memo we conclude that:

- The question of how to develop the regulations and market rules to enhance flexibility is considered as very important by NordREG and is also an issue of great importance in the European context. NordREG therefore suggests considering further studies to **enhance the knowledge regarding demand-side flexibility**. Due to limited resources, NordREG suggests that such studies are financed by NMR. If financing is provided, NordREG can come back to specific proposals for studies at a suitable point in time.
- NordREG takes note of THEMAs recommendations related to the **development of the spot market**. NordREG finds that the CACM guideline will cover the issues highlighted by THEMA in relation to development of the spot market design. NordREG will continue its work to influence the implementation of the guideline in dialog with the Nordic TSOs and concerned NEMOs. Since the implementation of CACM should be carried out by national regulators, NordREG sees no immediate need for further coordination of actions between the ministries.
- NordREG takes note of the THEMA's recommendations on **improvements of the Nordic balancing market**. NordREG finds that the priority during 2015 and 2016 should be to follow the Nordic pilot project and other relevant initiatives by the TSOs, and to develop and influence the configuration of the NCEB[9]. NordREG finds it important that when the NCEB enters into comitology, the ministries should seek to coordinate their input. If wanted by the ministries, NordREG can provide input in this process.
- NordREG takes note of THEMAs suggestions related to **aggregation of demand**. NordREG will continue to closely monitor the European processes concerning the aggregator's role and models for aggregation of demand in the electricity market in various forums. NordREG believes there can be need for coordinated actions on ministry level if rules for aggregators or aggregation of demand would be included in the development of the NCEB or other network codes or guidelines. The role of aggregators is discussed in the Commission's Market Design Communication. NordREG is investigating a common position on the role and responsibilities for the aggregator. Coordination at ministry level should be considered when responding to the Market Design Communication later in October.
- NordREG agrees with THEMA that there is need for further analysis regarding how to handle **peak loads in local grids** in a cost efficient way and the need of exploring further how the revenue cap regulation can provide correct incentives. Since these issues are also explored within CEER working groups, NordREG believes that it is suitable that the Nordic regulators carry out the necessary analyses in relation to the work in the relevant CEER

[9] Network Code on Electricity Balancing

groups. NordREG will also continue to closely monitor the European processes concerning incentive regulation and tariff design in various forums. The role of the DSO related to demand-side flexibility is also an issue in the Commission's Market Design Communication, and coordination at ministry level should be considered when responding to the Market Design Communication later in October.

- NordREG considers that **smart metering and efficient information exchange** is a prerequisite for demand-side flexibility. At present, actions are ongoing in all Nordic countries related to smart metering and data exchange. Availability of data is handled through establishment of hubs, by regulations regarding customer protection and regulations regarding rights to access and standards for access. NordREG has initiatives ongoing regarding these issues, and we do not see the need for further initiatives at the moment. Smart metering and efficient information exchange are issues covered by the Commission's Market Design Communication, and coordination at ministry level should be considered when responding to the Market Design Communication later in October.

NordREG established this WG at the start of January 2015. The work of the group has so far been related to evaluation of the mentioned report and drafting the memo that EMG has requested.

Since demand side flexibility is a strategic issue for a well funcitioning Nordic market, NordREG will continue to work on a number of issues related to demand side flexibility.