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Implementation of data hubs in the Nordic countries

Status Report, June 2018

Index

Preface

NordREG, a 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 electricity retail market. The Nordic countries have and still are making substantial changes to their national electricity markets in order to make them coherent. Such measures include supplier centric market processes and the development of data hubs.

NordREG provides an important platform for information exchange and sharing of best practices. This report describes the current status of the implementation of data hubs in the Nordic countries. The information comes from both the Nordic transmission system operators (TSOs) and the Nordic regulators.

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Stockholm, June 2018

Executive summary

Since 2005, NordREG has worked towards a harmonized electricity retail market. Many important steps have been taken. However, the common objective has not yet been achieved. The Nordic countries still have five separate Retail markets with many similarities and some differences.

A successful implementation of data hubs and the ability for those data hubs to interact is an important key for a harmonized retail market.

Today, all Nordic countries are moving towards the implementation of data hubs for electricity meter data and market processes. Governments and regulators in the Nordic countries have given the transmission system operators (TSOs) in Denmark, Norway, Finland and Sweden the responsibility of introducing a data hub for each of the electricity retail markets.

The Danish data hub is fully implemented and handles all communication between suppliers and the DSOs. The Norwegian data hub has been delayed several times but is now scheduled to go live in February 2019. According to the national TSOs in Finland and Sweden the Finnish data hub will go live in spring 2021 and the Swedish data hub in the beginning of 2021.

1. Introduction

Since 2005, NordREG has worked towards a harmonized electricity retail market. As a part of this work, NordREG has identified a number of key processes that customers encounter. These processes are switching, moving, contracts, billing and pricing.

So far, Denmark is the only NordREG member that has fully implemented a data hub.

NordREG believes that implementation of data hubs is clearly beneficial for the development of electricity retail markets. The development of national data hub solutions and adhering regulations will be implemented on a national level. However, NordREG promotes the exchange of ideas and lessons learned from current data hub projects. Increased cooperation between data hub operators may potentially lead to lower costs and improved IT services for the industry.

In recent years, NordREG's Retail Market Working Group (RMWG) has published a biannual status report to The NordREG Board that describes the ongoing work to implement national data hubs. Up until June 2017, this report has been based on information from the national regulators in NordREG. Now, with the legislation is in place (or suggested to the government[1]) and the TSOs gradually taking responsibility for the implementation, the RMWG has included the TSOs in the biannual status report.

In chapter 2, the TSOs have given the current status of the implementation of data hubs. In chapter 3 the national regulators describe the legal framework and functionalities of the data hubs. Chapter 3 is structured in the same ways as previous biannual status reports.

[1] Ei has suggested new legislation to the Swedish government. New law has not yet been approved by Swedish parliament.

2. Status of the Nordic TSOs' implementation

All Nordic countries are moving towards the implementation of data hubs for electricity meter data and market processes. Governments and regulators in the Nordic countries have given the transmission system operators (TSOs) in Denmark, Norway, Finland and Sweden the responsibility of introducing a data hub for each of the electricity retail markets.

In this chapter, the Nordic TSOs describe the status of the implementation of data hubs. NordREG RMWG has asked Energinet, Fingrid Oyj, Statnett and Svenska kraftnät to describe:

- The current status of the data hub implementation and what has been done so far
- What is planned to be done in 2018
- What is left to do in 2019 and onwards and
- When the implementation of the national data hub is intended to be completed?

Table 1 (below) presents a summary of the answers from the national TSOs. This is followed by a full presentation of the answers. The answers are presented as they were received by each of the national regulators from the national TSO.

Table 1. Status of the TSOs data hub implementation - summary

	Norway	**Denmark**	**Finland**	**Sweden**
Status of national data hub implementation, April 2018	The Elhub software has been developed and is now being tested by Statnett as part of the final user acceptance test. Elhub is also currently being tested by system vendors and Elhub user pilots. Market Trials have now started.	A Supplier Centric Model was implemented in April 2016. The data hub is implemented and handles all communication between suppliers and the DSOs.	The pilot period has finished. Opening for the whole industry awaits legislative changes. According to previous inquiries industry readiness is polarized. Go-live plan version 1.0 is finished. There is a public procurement being finalized for the data hub system. The target is to finalize the procurement in Q2/2018. Webinars for stakeholders continue.	Svenska kraftnät has been assigned to develop the Swedish data hub. By the end of 2017, the project initiated procurement of the data hub. The aim is to sign a contract with chosen supplier mid-2018. A request for information regarding a migration system for structured data has been initiated. Preparations for validation of structured data is ongoing.

	Norway	Denmark	Finland	Sweden
			Legislation is late.	
TSO-plans for 2018?	Work in 2018 will focus on the final implementation of the Elhub solution and the final Market Trial tests and Go-Live rehearsals.	There is an ongoing rollout of smart meters with a deadline 31 Dec 2020. In 2017, Energinet started the implementation of 'Flexbilling' – an hourly settlement of households and small customers. It continues in 2018.	The aim is to finalize system procurement and open data migration service for all stakeholders. The legislation should also be in place. Go-live plan version 2.0 will be created. Co-operation with stakeholders continues.	In mid-2018, a system developer will be contracted and an intense collaboration between the project and the system supplier initiated. Procurement regarding a data migration system will be initiated. Public instructions for AS-IS and a gap analysis will be provided to market participants.
What remains to be done in 2019 and ahead?	Depending on the decision to implement a supplier centric model in Norway, Elhub may be further developed.	Energinet continues the implementation of hourly settlement of all customers, which will end in 2020.	Preparations for go-live readiness.	Work will focus on the actual implementation of the data hub as well as the establishment of an organization for customer support, operation and maintenance of the data hub.
When do you estimate that the implementation of the data hub is completed?	Go-live is planned for 18th February 2019.	Already implemented.	Spring 2021.	The data hub project aims for the data hub to be commissioned at the earliest by the end of 2020.The Energy Market Inspectorate propose that it enters into force 1 January 2021. Svenska kraftnät has in its response to the report, indicated that this is challenging.

2.1 What is the status of the national data hub. What has been achieved so far?

Denmark (Energinet.dk)

In March 2013, we implemented the Data hub. In 2012, a political decision was made to implement a Supplier Centric Model as a direct follow-up on implementing the Data hub. The Supplier Centric Model was implemented on 1st April 2016 after considerable preparation in cooperation with the industry and significant development of the Data hub. The Data hub handles all communication between the suppliers and the grid companies (DSO), which means that all information about metering data and tariffs, fees and taxes is in the

Data hub. Grid companies use this data for billing the suppliers for the use of the grid and handling the task of meter reading.

Finland (Fingrid Oyj)

Data migration is bought as a service, implemented and operated by Solteq Oyj. Service is named 'Titta'. Pilot phase is finished and is ready for official use. However, opening for the whole industry is awaiting legislative changes.

Fingrid has carried out three large inquires towards the industry to try to understand what the current data quality and level of readiness is like. According to the results, readiness seems to be somewhat polarized. In the future, Fingrid will ask this four times a year by using a simple questionnaire.

There is a public procurement being finalized regarding the actual data hub system. Preliminary offers have been given, and Fingrid is now in a negotiation phase. The target is to finalize procurement in Q2/2018.

Go-live plan is being processed in a working group with the industry. Version 1.0 is finalized, and version 2.0 will be created when the data hub system procurement is completed. Recorded webinars are held for stakeholders, also available on YouTube.

Norway (Statnett)

Market processes, such as Business Requirement Specification (BRS) have been defined together with the industry, aligned responsibility of data maintenance in Elhub, market rules and validations. In addition, a VEE (Validation, Estimation and Editing) quality standard for metering data has been agreed. All these rules are written as regulations, laid down by NVE. All market design is documented, now as version 1.7, and accessible on Elhub.no.

The design and development of the Elhub solution is finalized and now under User Acceptance Testing (UAT). In parallel with the development of Elhub, the market has implemented the necessary changes, like personal ID number and org. number and started to verify own data quality. We are now in a phase where key system providers are testing their software changes against Elhub functionality and messages. Some key pilot market parties are testing their processes and production data against Elhub – mostly sending in metered values, carrying out BRS's and performing imbalance calculations to verify results against reported values from DSOs to NBS (Nordic Balance Setlement).

Sweden (Svenska kraftnät)

In mid-2014, the Energy Markets Inspectorate finalized its report on a model for handling information flow in the future Swedish electricity market. This report formed the basis for the assignment that was given to Svenska kraftnät by the government of Sweden in mid-2015. Svenska kraftnät was assigned to develop and, in the end, operate the Swedish data hub (Elmarknadshubb). Svenska kraftnät delivered a pre-study report in mid-2016 and started forming an organization for the procurement and implementation projects. During 2017, the project focused on preparing for the coming procurement phase, and is now looking forward to, together with a supplier with the right capabilities, starting to develop the Swedish hub. Early in 2017, the project also initiated a change management process with the aim to secure that all market parties have access to correct and accurate information regarding the hub and related processes. Change management will be of great importance for the success of the project.

By the end of 2017, the procurement process was initiated and Svk has the ambition to finalize the procurement before the summer of 2018.

2.2 What do you plan to do in the near future (2018)?

Denmark (Energinet.dk)

In 2013, the government decided to carry out a complete rollout of smart meters in Denmark by the end of 2020. When implemented, it will be possible to make hourly settlement of all customers in Denmark. At the moment, only customers with a yearly consumption of ca. 100.000 kWh need to be settled on an hourly basis. Many grid companies have already installed smart meters that can be read remotely and deliver hourly meter values. We, therefore, started the implementation of what we call Flexbilling. Flexbilling is hourly settlement of households and small businesses. The implementation will commence in late 2017 and continues in 2018.

Finland (Fingrid Oyj)

Plan is to start the project together with selected vendor regarding the actual data hub system. Data migration service to all market participants will be opened and milestone 1 will be reached. A go-live plan version 2.0 is created. Fingrid will continue co-operations with stakeholders. The legislation should be in place during 2018.

Norway (Statnett)

The plan is to finalize the UAT program, certify system vendors, perform the market trails program, perform operational testing and disaster recovery processes, certify all market parties and rehears the go-live process.

Sweden (Svenska kraftnät)

During 2018, the Swedish data hub project will have two main focus areas, namely procurement and active involvement of market participants. Uncertainties that also need to be straightened out are identification of a suitable organizational form, as well as cyber and information security.

- **Procurement**: A correct and well-executed procurement process is of ultimate importance both for Svenska kraftnät and the data hub project itself. A well-performed procurement process will secure the right supplier with the right capabilities to deliver a data hub for the Swedish electricity market. The ambition is to have a system supplier in place before the summer of 2018 and initiate the actual work straight after.

- **Involvement of market parties:** Experiences both from previous changes in the Swedish electricity market but also from data hub projects in our neighboring countries have pointed out the importance of involving market parties at an early stage. During 2018, market participants will be actively engaged in the change management process and explicitly via the initiation of the structure data validation and migration process.

- **Organizational form:** There are pros and cons with operating a data hub within the current Svk organization as well as within a fully owned subsidiary to Svenska kraftnät. During 2018, Svenska kraftnät will evaluate different alternatives for operating the data hub.

- **Cyber and information security:** Cyber and information security is of outermost importance both for Svenska kraftnät and all market participants. This will be highly prioritized during years to come.

The report issued by The Swedish Energy Markets Inspectorate has been on public consultation and the ministry is currently reviewing the report together with the feedback from the consultation. Hence, there is still some uncertainty about the ministries timetable for the future legislation, which may thus impact the current project time table and planned work.

2.3 What is left to do 2019 and forward?

Denmark (Energinet.dk)

We will continue the implementation of hourly settlement of all customers, which will be fully implemented in 2020.

Finland (Fingrid Oyj)

Aim is to complete the go-live readiness for both Fingrid and market participants.

Norway (Statnett)

After go-live, we will perform test of the 15 min capability in Elhub and make enhancements as agreed with the market and Elhub operations. The regulator (NVE) has indicated there might be a version 2.0 of Elhub, with focus on a complete supplier-centric market model including single invoice.

Sweden (Svenska kraftnät)

During 2019, focus will shift from procurement towards the actual implementation of the data hub. The implementation phase will be the most intense phase both for the project itself, but also for the almost 400 involved market parties. The project will together with the selected supplier focus on building a data hub fit for its purpose but also lead the continuous dialogue with all involved market participants. The market participants will have to focus on understanding the new model, make necessary IT-changes and align processes among many other tasks.

In 2019 Svk will initiate the establishment of an organization for customer support, operation and maintenance of the data hub. The financing model for the data hub will have to be evaluated to find and secure a proper model for the financing of the data hub investment and operations.

2.4 When do you estimate that the implementation of the data hub is completed?

Denmark (Energinet.dk)

As mentioned, the first version of the Data hubdata hub was implemented in 2013 and the 2nd version in 2016 so today we have a Data hubdata hub that uses the supplier centric model.

Finland (Fingrid Oyj)

In spring 2021.

Norway (Statnett)

Elhub go-live is 18th February 2019.

Sweden (Svenska kraftnät)

Based on experiences from our neighboring countries, it is a delicate issue to give a specific date for the commissioning of an IT-project of this range with over 400 involved market parties. As far as the suggested changes to the Swedish electricity market are concerned, this itself is even more complicated since the assignment from the government includes both the implementation of a central IT-system and a supplier-centric market model. The data hub project expects that the data hub will be commissioned at the earliest by the end of 2020. The Swedish Energy Markets Inspectorate propose entry into force 1 January 2021. Svenska kraftnät has in its response to the report indicated that this is challenging.

3. The legal framework described by the Nordic regulators

Today, all four countries are moving towards the implementation of data hubs for electricity meter data and market processes. Governments and regulators in the Nordic countries have given the transmission system operators (TSOs) in Denmark, Norway, Finland and Sweden the responsibility of introducing a data hub for each of the electricity retail markets. As shown in the table below, Denmark has recently implemented a second version of its data hub. Norway is underway in development of Elhub. Finland's datahub is scheduled to roll out in spring 2021. Sweden estimates that the data hub could be operational in Q1 2021.

Table 2. Status of data hub implementation – summary of answers from NRAs

	Norway	**Denmark**	**Finland**	**Sweden**
Status of data hub implementation	Elhub go-live is planned for 18th February 2019.	data hubDenmark's data hub has been in functional since 2013. Version 2.0 was launched 1st April 2016.	Scheduled to roll out in spring 2021.	Estimated to be operational in Q1 2021.

3.1 Governance of data hub projects

Denmark

The Danish TSO, Energinet, owns and operates the data hub. Energinet has a close cooperation with stakeholders and authorities, including DERA. DERA approves methods within Energinet's market regulations., A key area of cooperation between companies, authorities and stakeholders is the assurance of the quality of data. The data hub ensures a level playing field for all electricity suppliers through:

- Standardized processes for registration and distribution of market data
- Low entry barriers for new market participants
- One point of entry for change of supplier
- Clear definition of DSO and electricity supplier, and separation of roles

The data hub protects data by providing a secure environment and a secure and traceable access process to data. Data stored in the data hub is e.g. meter readings and master data. Further, the data hub features services such as market support, reporting, monitoring and statistics. The data hub registers e.g. change of supplier and a consumer's change of address.

Finland

Fingrid Oyj (TSO) is responsible for developing the data hub and is in charge of the project. The Employment and the Economy Ministries prepare the necessary legislation. A public hearing on the secondary legislation was held this spring and the legislation should come in to force in the beginning of summer.

Fingrid established four different working groups for industry cooperation. An implementation working group has been working with issues related to implementation of the data hub. The council has monitored the progress of the project, contributed to the achievement of the project objectives, increased stakeholders' knowledge and given views in matters relating to industry and stakeholders. There are also sub-working groups that have concentrated on DSO processes, supplier processes and technical issues.

The process is at the end of the procurement phase and the industry is making the required preparations. Fingrid has in co-operation with the industry been preparing a deployment plan for the industry for the introduction of data hub.

Norway

NVE is in charge of the Elhub project at the superior level while Statnett is responsible for the operational implementation. NVE makes all binding decisions regarding Elhub for Statnett, DSOs, suppliers and third-party service providers. Statnett provides non-binding guidelines. By requirement from NVE, Statnett has established a stakeholder council for the project. The council consists of representatives from DSOs and suppliers, while NVE participates as an observer. The council has provided the industry with updates on the progress of the project from Statnett and NVE and invited to discussions of issues raised by any of the parties. NVE has also required that Statnett applies an external quality assurance. Since the beginning of 2014 three QA revisions of the project have been undertaken, resulting in recommendations for improvement of the project regarding project management, risk management, cost control, security, migration, architecture, contract, change request handling, stakeholder interaction, resources/competence, progress, goals/mandate of the project and realization of benefits.

Sweden

Svenska kraftnät (Svk) is responsible for developing, building, implementing and running the data hub. They will also be responsible for working out details in the user contract, compiling a handbook and other such detailed requirements. Ei is responsible for producing the overall regulatory framework that is required for giving the data hub a place in the electricity market. The Government and Parliament must approve the legislative changes that Ei recommends before they can be introduced. Ei will be responsible for issuing any required secondary regulation. In June 2017, Ei handed over a report to the Government containing proposals for legislative changes necessary to allow the introduction of the data hub as well as a supplier-centric market model. The report has been on public consultation until November 2017. During the process that led up to the finished report, Ei and Svk were working closely with stakeholders in different reference and working groups in order to ensure stakeholder involvement. There has been and will continue to be a close cooperation between Svk and Ei.

3.2 Functionalities in Nordic hubs

	Norway	Denmark	Finland	Sweden
Meter point management	Yes. DSO provides the data.	Yes	Yes. DSO provides the data (creates, updates and removes metering points). Supplier may request changes, which the DSO carries out.	Yes. DSO provides the data.
Customer data management	Yes. The supplier is responsible for updating customer information.	Yes	Yes. Supplier provides the customer data in connection with a new contract. The supplier is also responsible for updating customer information. The DSO may request changes. The data hub forwards the request to the supplier with the latest customer contract.	Yes. The supplier will be responsible for updating customer information.

	Norway	Denmark	Finland	Sweden
Customer moving and switching	Yes	Yes	Yes. When providing data on a new supply contract, it is not necessary need to specify whether it is due for moving or switching -> the data hub validates it automatically.	Yes, these processes will be part of the hub.
Contract management	Includes contract data for start and end of supply, but no data on supply prices. Elhub does not notify suppliers of fees for cancellation of fixed price contracts.	The data hub has no legal authority to store data concerning the contract between the supplier and the costumer.	Supplier provides information on new supply contracts as well as updates them. The data hub automatically terminates the previous rolling contract once a new contract is registered in the data hub and communicates it to the previous contract party. The data hub includes the end date for fixed contracts, but not possible contractual penalties forbreach of contract. In valid fixed time contracts, the data hub prevents making a new supply contract in cases where the same customers are in question. The DSO confirms new network contracts and updates them.	Suppliers register information on customers' supply contract (end date and if there is a fee for ending the contract early). The data hub will not contain any physical contracts these will be handled outwith.
Forwarding service requests from supplier to DSO	Yes	Yes	Yes, and vice versa.	Yes
Meter value management	Yes. DSOs are responsible for data quality.	Yes	Yes. The DSO or a service provider is responsible for providing meter values. The DSO is responsible for meter	Yes

	Norway	Denmark	Finland	Sweden
			equipment and data quality. Meter values will be stored for six years.	
Third party access to metering data	Yes	Yes	Yes	Yes
Provides settlement data to NBS	Yes	No	Yes. Provides balance settlement data to eSett according to NBS rules.	Yes
Market monitoring	Yes	Yes, to a limited extent.	Yes	Yes
Correction settlement	Yes	Yes	Yes	Yes
Compiling statistics	Yes	Yes	Yes, that is planned (no details yet).	Compiling information for Statistics Sweden, etc.
Billing	Mandatory combined billing has not yet been decided in Norway, and this functionality has not been included in the first version of Elhub. It will be possible to include the functionality at a later stage (probably closer to 2019).	In accordance with the supplier-centric model, the bill from the DSO and the bill from the supplier have merge into one bill. The supplier sends the bill to the consumer.	Mandatory combined billing has not been implemented in Finland. The data hub includes information on separate/combined billing as well as on billing channels (paper bill, E-billing, email, etc.). DSOs and suppliers can submit more detailed billing data into the data hub (e.g. billing frequency, start and end date, product, price, amount).	Ei has suggested to the Government that mandatory combined billing should be introduced.
Other functionalities	1. Reversal of business processes (e.g. in case of faulty switches) 2. Security management system 3. Privacy management for customers incl. giving data	The data hub sets up possibilities for third party access to the. A consumer controls third party access to the data hub. The data hub handles data	1. Disconnection and reconnection processes 2. Handling of customers' power of attorney 3. Cancellation (due to distance selling	1. Central registration and/or handling of customers' power of attorney 2. Supplier of last resort functionality for customers that are without power supply.

	Norway	Denmark	Finland	Sweden
	access to other persons or companies and view own data stored in Elhub 4. Security management system	from prosumers.	regulation) and contract	