

## Player in the electricity market - how does it work, and who does what?

*The energy system is like one large pulsating spider's web. When you pull in one of the threads, the entire network moves. As a player, it is therefore important that you understand your own and the other players' role in the market.*

*Read here and learn more about who is responsible for what in the electricity market.*

### **How the electricity system works**

The electricity's special characteristics are of great significance to the design of the electricity market. It is difficult and unprofitable to store electricity, and therefore, it is a product which must be used once it is generated.

Balance between consumption and generation and import and export is a prerequisite for a functioning electricity system. Otherwise, the system will collapse, because the frequency increases - or decreases.

As Denmark's TSO, Energinet.dk is responsible for keeping the balance and thus ensure that the grid always maintains the electric voltage, regardless of the customers' consumption.

### **How the electricity market works**

In Denmark, generation of and trade with electricity are subject to competition, while the actual distribution grid, which constitutes the market infrastructure, ie the close, spider's web-like grid that ensures transport of electricity from producer to customer, is owned by so-called natural monopolies. It is Energinet.dk and the grid companies that ensure transmission and distribution of electricity, while electricity suppliers and balance responsible players handle purchase and sale of electricity.

Players in the electricity market are in many areas mutually dependent on each other and therefore work closely together. The cooperation among the natural monopolies and the competition-exposed trading companies in the electricity sector is regulated by legislation and Energinet.dk's regulations.

### **DataHub - the centre of the market**

The DataHub is a central IT system, which through uniform communication and standardised processes handles the interaction between the players in the electricity market. The DataHub handles meter data and business processes for all 3.3 million metering points in Denmark, and the market players exchange information about customers' consumption, move-in, move-out, etc. through the DataHub.

Based on data from the market players, DataHub forms the settlement basis, which is the basis for electricity suppliers' billing of customers.

Energinet.dk owns and maintains the day-to-day operation of DataHub.

## Players in the Danish electricity market - who does what?

*Here you can read about the individual player's basic tasks in the market. The market regulations contain a more detailed description.*

**Energinet.dk** is Denmark's TSO, ie the enterprise responsible for the operation of the transmission grid and the electricity system in Denmark. Energinet.dk's core service is security of supply; in other words ensuring that the Danish population is supplied with electricity now and in the future. In practise this is done by ensuring balance between consumption and generation in the electricity system around the clock, all year.

It is also Energinet.dk's responsibility to set the framework for a well-functioning electricity market that ensures fair prices for both consumers and producers and promotes climate-friendly energy solutions.

**Nord Pool Spot** is a power market owned by the responsible transmission system companies (TSOs) in Finland, Sweden, Norway, Denmark and the Baltic countries Estonia, Latvia and Lithuania. On the free electricity market trading platform, the price of electricity is fixed by the hour on the basis of supply and demand. This market model ensures that while taking congestion in the transmission grid into consideration, electricity is generated from the cheapest production unit in order to match the buyers' bid.

**Balance responsible players** buys and seels electricity at Nord Pool Spot on behalf of electricity suppliers and plant owners. On a daily basis, they submit plans to Energinet.dk on the electricity expected to be generated and consumed in the next 24 hours by the producers and customers for whom they are balance responsible in the next 24 hours.

The balance responsible players are financially responsible to Energinet.dk for imbalances between expected and actual generation and consumption in the day of operation.

Actually, it is not possible to predict a day's generation and consumption to perfection. The imbalance, which most frequently is between expected and actual generation and consumption during the day of operation, will be counterbalanced by Energinet.dk. The cost of this will be invoiced to the balance responsible players who are responsible for the imbalances.

**Plant owners** sell the electricity generated at the plant to the electricity suppliers. In Denmark, there are around 100,000 large- and small-scale electricity-generating facilities. Approx. 60 per cent of the electricity generation comes from sun, wind, biogas and water. The remaining 40 per cent is generated at central power stations.

**The grid companies** own the network from the transmission grid to the consumer. Grid companies have monopoly on transporting electricity in their geographically demarcated grid area. It is the grid companies' responsibility to measure consumption and generation of electricity in their grid area. The task to collect, validate, send and receive meter data can be delegated to independent metering point administrators.

The grid companies are also responsible for payment of electricity taxes to SKAT (central Danish tax administration) of the amount of electricity consumed in the grid company's grid area.

Electricity suppliers must pay the grid companies for transporting electricity to the customers. Danish Energy Regulatory Authority regulates the grid companies in order to ensure that the price they charge is proportionate to the costs associated with the operation of the network.

Operation of the network comprises tasks, such as the connection of new customers, specification of electricity consumption as well as development and maintenance of the physical plants. Grid companies are also responsible for a number of ad hoc tasks, such as re-establishment of live cables that have been damaged and establishment of live cable at new plants.

**The electricity suppliers** are the customers' primary contact to the electricity system. They buy electricity through a balance responsible party at Nord Pool Spot or directly from plant owners and sell it to the customers.

Electricity suppliers must pay the grid companies for transporting electricity to the customers and to transmit meter data for settlement purposes.

As the electricity supplier, you are among other things responsible for the following:

- That customer information in DataHub is correct (eg electricity suppliers register change of customers and changes to customer relations at metering points)
- Collecting payment for both consumption, duties, tariffs and transport at the customer in one single invoice. Grid companies and Energinet.dk will invoice the electricity supplier charges and the use of grid.
- Payment for consumption on the metering points the electricity supplier is registered in the DataHub.

Electricity suppliers are obliged to, against payment, to supply all household customers with electricity.

Energinet.dk carries out four annual random inspections at electricity suppliers to control that an agreement has been entered for the recorded changes of supplier.

**Metering point administrators** carry out the task of collecting, validating and submitting meter data to DataHub on behalf of the grid companies and can receive meter data and calculated time series from DataHub. The grid company is always responsible for the metering point administrator.

**Third parties**, eg electricity agents and energy consultants, will find the best offers for the customers by constantly monitoring the different products on the market and inviting quotations from the country's electricity suppliers. By means of an electronic power of attorney, the customers can grant electricity agents and energy consultants access to own data in DataHub.

**The customer** buys electricity from the electricity supplier and pays - in addition to consumption - also all duties and taxes, subscriptions, tariffs, etc. to the electricity supplier. In order to ensure supply of electricity, the customer must actively choose an electricity supplier. The customer contacts its electricity supplier, if there are any problems or questions.

#### **Access to data in DataHub**

Only grid companies and electricity suppliers may have direct access to the DataHub according to special agreement with Energinet.dk. The agreement obligates the player to comply with applicable regulations.

Metering point administrators submit data to DataHub on behalf of the grid companies' meter data and can apply for and receive calculated sums. Metering point administrators do not have access to customer-specific information in DataHub.

Balance responsible players receive data from DataHub on a daily basis to be used for settlement of consumption and generation for the electricity suppliers they are responsible for. Balance responsible players do not have access to DataHub, but can receive extracts of data.

By using NemID, end customers may see data for own electricity meters via a customer portal connected to DataHub. They can also grant third parties access to own consumption data.

By entering agreement with Energinet.dk, third parties can be permitted to ask customers for access to the customer's consumption data.

### **IT systems must be able to interact**

In order to ensure a well-functioning market, a number of requirements are made for the functionality of the IT systems used by the players in the electricity market. IT systems that are used to exchange information between players in the market must have the ability to:

- ensure logging of all messages The player must be able to document all exchanges at least three years back in time
- ensure that the quality of the data log enables use for error detection and error correction. Messages must be retrievable in a readable, non-encrypted form
- pass an IT system test defined by Energinet.dk
- be tested without affecting production data.

All players must also have a GLN (Global Location Number) or EIC number (Energy Identification Code). Both numbers are unique codes, which in the day-to-day operation of the electricity market ensure an effective and reliable identification of all players with access to DataHub.

### **Theory and practise are linked in the test system**

DataHub is a complex IT solution connecting the players' various IT systems. If the interaction with just a single player's system fails, the entire market may be affected.

In order to reduce the risk of errors, the IT systems, which the players want to use for exchanging electronic data with the DataHub, are being tested. The same applies to the players' understanding of the system's functionality.

Thus the player's IT system must pass a so-called system test, and the player must pass a so-called End2End test.

**The system test** is typically carried out by the player's IT supplier. Here it is tested whether the IT system has been installed correctly in relation to the specifications prescribed by the DataHub system, and whether the system can handle the message flow defined in BRS and RSM guides.

Players using an IT system which is already approved in system test can proceed directly to the End2End test.

**Note:** The player's IT supplier must complete the system test before the player starts the End2End test.

**End2End the test** is compulsory for all players. The End2End test is targeted at the players' employees who must support the customers in day-to-day situations. Here the player's handling of the business processes, that are applicable to the relevant player's market role, are tested.

The players are expected to read relevant regulations and instructions and to complete the associated e-learning modules before starting the End2End test.

The players must expect time to ensure that the tested business processes are correctly implemented in own system, so data can be used in internal processes for eg settlement and invoicing of customers and business partners.

**Note:** Players that are responsible for more than one role in the market must complete a test for each of the roles they are responsible for. All tests must be correctly completed before a new player will be granted access to DataHub.

**Tip:** A good understanding of the interfaces between the system's users and its functionality reduces the amount of faults and enables faster completion of the End2End test.

### **Testing in practise**

New players and IT system suppliers can be granted access to testing by contacting Energinet.dk and entering into agreement about access to the test systems. The described tests are carried out by the market player or its IT supplier in a closed test system.

The system test must be approved before the End2End test is started.

The player completes the End2End test by reviewing a number of fixed market scenarios. Energinet.dk will assist the players with guidance and error detection in the course of the process and will validate the result of the various tests.

It is important to carry out tests ahead of time before the player expects to be active in the Danish electricity market, as tests may reveal possible basic errors in the player's IT system.

**Read more**

The rights and obligations of grid companies and commercial players in the Danish electricity market are described in market regulations. They have been developed by Energinet.dk on the basis of relevant legislation.

At the time of entry into the electricity market, players are obliged to comply with the stated obligations and applicable legislation.

Regulation C1: Terms of balance responsibility

Regulation C2: The balance market

Regulation C3: Handling of notifications and schedules – daily procedures

Regulation D1: Settlement metering

Regulation F: EDI communication, including appendix report 1, Syntax and structure in EDI messages

Regulation F1: EDI communication with the DataHub in the electricity market

Regulation H1: Change of electricity supplier, move-in/move-out, etc.

Regulation H2: Profile settlement, etc.

Regulation H3: Settlement of wholesale services and taxes

Regulation I: Master data

Terms and conditions for electricity suppliers' payment of services supplied by Energinet.dk and provision of security

Business processes for the Danish electricity market (BRS guide)

EDI transaction for the Danish electricity market (RSM guide)

### Getting started

If you are ready to take on the role as new electricity supplier or balance responsible player in the Danish electricity market, please submit your application to Market Operation Electricity in Energinet.dk. Please find the registration form at [www.energinet.dk](http://www.energinet.dk)

**Note:** The company's GLN no./EIC no. must be informed when applying.

If you have any questions, please contact Electricity Market Electricity via [www.energinet.dk/support](http://www.energinet.dk/support)

### Tips for quick start-up

You will get faster access to the market, if you already before application have

- a GLN no./EIC no.
- entered into an agreement with a balance responsible party (relevant for electricity suppliers only)
- an IT system from an approved system supplier
- allocated sufficient manhours to carry out the End2End test
- completed Energinet.dk's e-learning modules
- read the regulations, guidelines and test scripts which are relevant for your player role
- read the BRS guide to DataHub
- read the RSM guide to DataHub (Relevant for IT system suppliers.)

**Note:** Electricity suppliers must enter into an agreement with the individual grid company on usage of their grid. The Danish Energy Association has prepared a standard agreement, which includes all grid companies, which electricity suppliers may choose to use. The standard agreement is approved by the Danish Energy Regulatory Authority.

See '[Agreement between grid company and electricity supplier on the use of the distribution network.](http://www.danskeenergi.dk/AndreSider/Vejledning/Engrosmodellen)' [www.danskeenergi.dk/AndreSider/Vejledning/Engrosmodellen](http://www.danskeenergi.dk/AndreSider/Vejledning/Engrosmodellen)