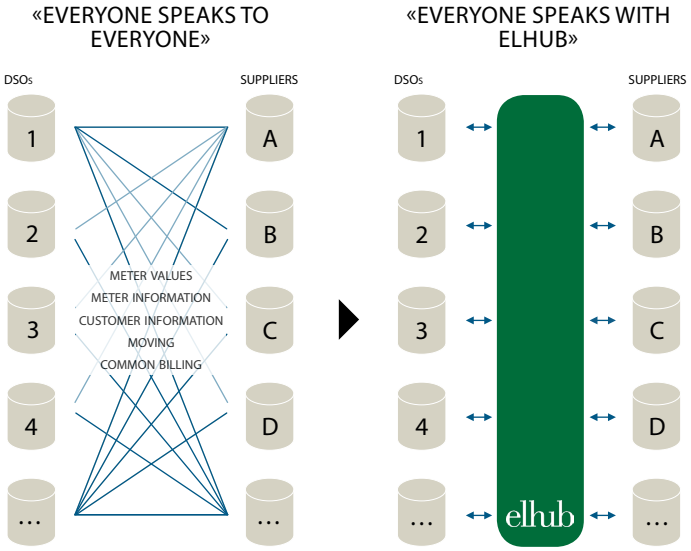
Elhub and smart meters are enabling a more efficient Norwegian energy system

Efficient management of meter data is the key to unleashing the potential of smart meters. Data must also be protected against cyber-attacks, while still being easily accessible for market actors. A data hub, such as Elhub in Norway, is able to meet these needs. In Norway, an innovative start-up company has also shown that it is possible to use meter data, along with electricity price profiles and smart home components, to help customers save electricity costs, and at the same time ease the bottlenecks in the power grid. The goal of zero emissions by 2050 requires new and smarter solutions, and Elhub's powerful system can provide a significant contribution.

New European climate policies demand a faster transition to an electricity-based energy system
The new European climate targets have placed entirely new requirements on the development of the European energy system for the coming years: The goal of an emission reduction of at least 55% over the next ten years emphasizes the urgency of finding new solutions. The EU has launched its Green Deal for transitioning from fossil fuel to electric power or other sustainable energy sources, including a strong investment in offshore wind power, with a target of approx. 450 GW by 2050. There will be continued focus on large-scale electrification, in order to utilise the new power resources. Reduced greenhouse gas emissions require a transition from fossil fuel to a more electricity-based energy system, which also increases the need for electricity grid investments significantly.

New solutions are required for a successful transition from a fossil fuel to a renewable energy system
Common for many of the energy sources of the future, is the increased variation and unpredictability in the production profiles, compared to fossil fuel-based energy. Together with limitations in grid capacity, this will require smart and flexible consumption. Market solutions aimed at encouraging customers to adapt their consumption to the limitations of the energy production and the grid will require automated digital solutions. Smarter utilisation of the power grid may help to reduce the need for investments in the grid, and would offer electricity customers opportunities for major savings. But how can this be done in practice? Experiences from Norway have given us an indication:

Elhub is an important tool for transitioning from fossil fuels to renewable energy
In Norway, an advanced metering infrastructure (AMI) for hourly meter readings has been established for all households. The rollout was completed by the end of 2019, as required by the Norwegian Water Resources and Energy Directorate (NVE). In order to reap the benefits of smart meter monitoring of electricity consumption, Statnett was put in charge of establishing a data hub (Elhub). The hourly meter readings necessitate a need to efficiently receive and process approximately 70-80 million meter readings and 150 thousand market messages daily.



Elhub has streamlined data processing and market communications related to electricity consumption in Norway

Elhub was put into operation by Statnett in February 2019, after a thorough process of requirements specification, where Statnett worked closely with power grid companies and electricity providers in the Norwegian electricity market. The establishment of Elhub, along with the rollout of smart meters, facilitates the automation and digitalization of value chains related to the exchange of meter data, changes in suppliers, sharing of customer information, and financial settlements. The centralisation of these tasks offers major administrative benefits. This also facilitates a more robust IT security by pooling these investments in one place.

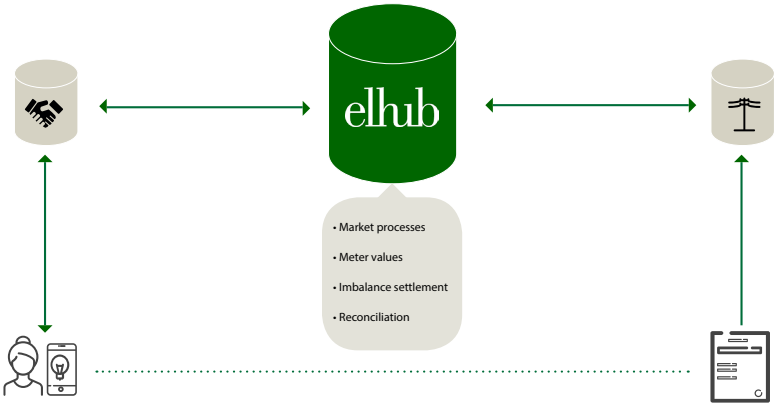
Elhub functions as a hub for the automatic exchange of information between power grid companies and power suppliers, and all of these companies are digitally connected to Elhub 24 hours a day. The metering data in Elhub is the basis for settlement of roughly in the amount of NOK 100 B (Approx. EUR 10 B) per year, based on electricity sales and fees. A study was recently conducted among all market parties in Norway, documenting that Elhub is functioning according to plan.

Through Elhub, power suppliers and third-party suppliers providing other electricity-related services, only need one standardized digital interface for information, which they in turn can use for their services to the market. All market parties receive access to user data with a simple integration, and after user consent. In this manner, Elhub also effectively safeguards privacy issues.

Digital innovation and win-win

Elhub's start-up has made it easier for new and innovative actors to enter the end-user market. New market participants do not have to create an integration for each power producer and each grid company. The focus and resources can now be allocated to creating value for the customer. The new start-up Tibber AS is leading the way in the Norwegian market. They are taking advantage of easy and automated access to data with customer value creation in focus.

While customers previously received invoices by post once a month, they can now continually follow – and manage – their electricity consumption using a smart phone app.



Elhub is the link between the smart meters and the customer. Through quick and automated access to data with the use of an app, customers gain a better overview of their electricity consumption, with the opportunity to save electricity and money.

End customers can now purchase off the shelf EV chargers and heat- pumps for heating homes, which automatically monitor and adjust their electricity consumption during peak hours, when the market price of electricity is high. New suppliers promise 20% savings for EV charging. Algorithms for home heating use price signals, weather prognosis and temperature sensors to optimise heating. Statnett has also run a pilot project for the use of smart management of EV chargers, for the better utilisation of grid capacity.

End customers can now save money on electricity bills, and will also save money on grid tarrifs in the near future.

Continued development of Elhub
An important task for Elhub in the future will be to facilitate digital access to more information through Elhub, to ensure the continued development of the market and of services. This particularly applies to the distribution of grid tariffs, so that customers are presented with the entire electricity bill based on an hourly rate, and not simply the part that refers to the price of electricity. This will provide end customers with a stronger price signal, which in turn will provide an even stronger incentive to take energy efficiency measures that allow for smarter management of energy consumption. The automated solutions now in place lowers the barriers for end user adaption to price fluctuations, easing congestions issues.

The data hub solution will be continually developed to meet the challenges of the future. One example is meeting the requirement for a 15-minute interval in the power market. Elhub has also planned a cloud-based solution in the near term, which will increase scalability even further, and provide opportunities for the delivery of Elhubs services in Europe.

Is Elhub and the experiences from Norway relevant to the European energy market?
Europe has a larger share of variable renewable energy production (solar and wind power), compared to Norway. Electricity prices therefore vary to a greater extent throughout the day and night, which makes balancing a greater challenge than in Norway. The value of smarter monitoring and demand response of electricity use will therefore be even greater for european end users, power grid companies and system operators than for those in Norway. Smart meters are now being rolled out across Europe. There are major benefits to be gained by using this data in a smart system such as Elhub. It can enable better and cheaper balancing of the power market, and better utilisation of the transmission network and production assets.

As a leading data hub in the European power market, Elhub has received numerous inquiries about the use of the services in other European countries. Statnett has conducted a feasibility study, which concludes that there could be major savings if the Elhub solution is reused in Europe, with some minor adjustments for local conditions. The major development costs associated with the establishment of a data hub solution (MNOK 650 for Elhub) would indicate that the reuse of the Elhub solution makes sound economic sense. This includes the opportunity for reusing solutions for smarter gas meters. Based on this information, Statnett would like to explore opportunities for offering data hub services to Europe. Elhub customers will benefit from our experiences from our own process of implementing a solution, and from the current functional solution and competent, operational Elhub team. Sharing future development costs is an added bonus.

How can the implementation of the Elhub solution help Europe rebuild its economy after the Covid-19 pandemic?
EU has launched the Green Deal and Digitalisation packages to ensure that current investments in the rebuilding of the economy are a part of the solutions for tomorrow, ie. renewable energy with digital solutions as a tool. We believe that a data hub, such as Elhub, is the piece of the puzzle that connects the two initiatives. It is not the administrative savings that have made Elhub part of the solution. Rather, it is the simplification and automation of data exchange for new and old market actors, lowering barriers to new and innovative solutions. For individual customers, this means better value in the form of lower electricity and grid bills. For the energy system, it means increased power grid capacity and better utilisation of renewable production resources. This is what makes Elhub an important part of the solution to the current challenges facing the energy market in Europe.