

Access to Power: The New Role of Grid Companies as Distribution System Operators

Hannes Sonnsjö

Hannes Sonnsjö, PhD student at Environmental and Energy Systems,
Lund University.



The Swedish electricity system is undergoing major changes. Demand is expected to increase significantly as the industrial and transportation sectors are electrified while an increasing share of electricity comes from decentralized and weather-dependent energy sources. A key actor, yet somewhat forgotten, in this sustainable energy transition is the grid operator that provides the distribution network needed for connecting power production and consumers.

For decades, we have enjoyed the benefits of a “fit and forget”-approach towards grid investments. The grid was built with a certain amount of over-capacity, which has increased as energy efficiency measures have reduced our electricity consumption over time. However, the need for reinvestments in our aging grids, together with a rapid and extensive electrification, is putting pressure on grid companies to work more efficiently and to provide a growing number of customers with access to the grid. The obvious solution to the problem of a lack of grid capacity is to build more grids, which is already underway on a large scale. But grid expansion is not only costly, it is also time-consuming and intrusive to the environment.

An alternative to traditional grid investments is to make better use of existing infrastructure, leading us into an era characterized by “flex or regret”, with a growing need for higher utilization of our grids. This approach is also emphasized in several EU-policies, such as the European Green Deal, Fit for 55, RePowerEU and the Commission’s Grid Action Plan. A particularly relevant legislation, included in the Clean Energy package, addresses the internal market for electricity (directive 2019/944) in which the grid owners are assigned a new role as *distribution system operators* (DSOs). This legislation implies a more active role for the grid owner as a market facilitator and enabler of the sustainable energy transition, including responsibilities for reducing grid congestion and removing barriers with regard to establishing and participating in local flexibility markets.

The new role of grid owners as system operators also requires a more efficient use of distribution networks to enable more efficient grid connections. Key findings from interviews with thirty stakeholders, including both DSOs

and grid customers, alongside a literature review, reveal several technical, organizational, and regulatory challenges that are facing grid owners:

- › Digitalization represents a key enabler for delivering the services needed for a flexible electricity system, not least for estimating the need for, and potential of, demand response as well as for calculating the hosting capacity in the grid.
- › The supply of skilled individuals and other strategic resources must be strengthened as more and more countries and sectors compete over the same assets.
- › A more customer-oriented and transparent information-sharing system is needed in order to alleviate the workload and administrative burden for grid owners and customers alike.
- › Grid development depends on extensive collaboration and coordination with regard to, for instance, forecasting, standardized tariffs and connection agreements, or more speedy permit processes.
- › Ensuring coherence between various policy areas will become increasingly difficult as more and more issues are related to, or have an effect on, access to electricity.
- › The legislation regulating grid operations is very extensive and calls for increased guidance in terms of how to interpret rules as well as common approaches with regard to, for instance, the use of conditional connection agreements or prioritizing between different grid users in the connection queues.
- › The time it takes to put new cables in place is unnecessarily long, and the permit process is identified as one of the areas in need of improvement.
- › The barriers for participating in flexibility markets, both as a supplier of a flexible asset as well as a buyer, will have to be reduced for these markets to become viable alternatives to traditional grid reinforcements.
- › The economic incentives for a more efficient utilization of the grid are too weak, while the regulatory scheme is steering toward capital-intensive investments rather than the most cost-efficient.
- › Proactive and more forward-looking grid investments are needed in order to meet future demand, which requires regulations adopting a new approach on how to determine what is efficient (and allowed) in the short and long term.

In conclusion, as electricity demand rises and decentralization increases, grid owners play a vital role in the energy transition. Embracing digital solutions, improving resource management, and fostering collaboration constitute critical steps forward. Overcoming regulatory and operational barriers will be essential for unlocking grid flexibility, while proactive investments will ensure that future demand is efficiently met. A regulatory framework promoting both short-term solutions and the long-term development of a robust, well-functioning grid will be key to navigating the challenges ahead.

SNS

Box 5629, 114 86 Stockholm

Phone: +46 8-507 02500

info@sns.se www.sns.se

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