2020 Research report summary

The Swedish electricity market: power to the people

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Summary

THE SWEDISH ELECTRICITY MARKET is facing major challenges: electrification of transport and industry, an increasing share of renewable and intermittent production, and an ongoing phase-out of nuclear power. In worst case, the increased demand, together with more intermittent generation may lead to occasional shortages of electricity; according to Svenska kraftnät[1], this shortage may amount to 2000 mW during a very cold winter. In addition, media have already reported capacity constraints in metropolitan areas: there is simply not enough transmission capacity to connect new houses, server halls and battery factories to the grid.

Both policy makers and researchers have argued that the transformation of the electricity market would be both easier and less expensive if households were more active on the electricity market than they are today. With more demand flexibility – that is, with households responding to the availability of electricity by adjusting their consumption – the costs associated with peak demand can be reduced, and demand flexibility can simplify the integration of renewable electricity and help break the bottlenecks in electricity grids.

Are households likely to help address these challenges by becoming more active on the electricity market? This report answers this question by describing the households' behavior, and the possibilities and incentives to contribute to a functioning electricity market. The report builds upon research by the author and other scholars in the field of energy economics.

Demand flexibility requires that households choose electricity contracts with prices that reflects the availability of electricity, react to the signals that these contracts provide, and choose to invest in automation technology. All these actions require sufficient incentives for the individual households. This report argues that expectations about households' willingness to contribute demand flexibility by changing con-

1. Svenska kraftnät is the authority responsible for ensuring that Sweden's transmission system for electricity is safe, environmentally sound and cost-effective (www.svk.se/en).

sumption over time in many cases are unrealistic and based on naïve assumptions. The report identifies several barriers to demand flexibility. For example, working hours, outdoor temperature, weather and daily habits can limit households' ability to adjust their consumption to the availability of electricity; many studies have underestimated or ignored these costs. In addition, substantial societal gains do not necessarily translate to large cost savings for a household. For example, one study finds that even if Swedish households shift their consumption five hours forward, they save only a few kronor. Finally, the stated compensation required to contribute flexibly is substantially more. Therefore, demand flexibility appears to be of little interest to households. The low demand for hourly pricing contracts suggests that this is indeed the case.

Because of the restrictions on load shifting, the small cost savings, and the large required compensation, it is unlikely that widespread demand flexibility will be realized in the short term. In the longer term, automation and other technological advancements may make demand flexibility more attractive, but households are likely to invest in such technology only if incentives are sufficient. Therefore, demand flexibility in a deregulated market, whether through behavioral changes or automation, depends on sufficient incentives for individual households. Policies for the transformation of the electricity market therefore need to take this into account.

About the author

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