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Theme(s): Climate change and energy

Electricity grid adaptation to climate change in Norway and Sweden

A recent study has explored how national regulations and culture, company size and experience with weather incidents have influenced adaptation to climate change in electricity distribution companies in Norway and Sweden. Smaller companies in a strongly regulated environment, with less experience of extreme weather events, find it more difficult to pursue climate change adaption results, the study suggests**.**

Future climate change impacts pose challenges to the security and efficiency of electricity supply from distribution companies. Extreme weather events, in addition to gradual changes in the climate, are likely to have adverse effects on the resilience of electricity networks and can potentially lead to interruptions of the power supply and, in severe instances, extensive blackouts.

This study investigated the extent to which four electricity grid companies in Norway and Sweden have adapted to potential changes in the climate. Both countries have similar climate conditions, but the companies operate in different national contexts. Two large-scale and two small-scale electricity grid companies in each country were analysed for their response to the impact of increased temperatures and precipitation (rain and snow), greater variability in the weather and more extreme weather events anticipated in the future.

The researchers explored the company adaptation responses using information from national and local official reports, in addition to interviews with a variety of stakeholders, including company representatives, municipal authorities, regulators and interest groups.

Of the four companies investigated in this study, investments by the two Norwegian companies were found to be strongly based on economic efficiency. This approach reflects the influence of the national regulatory framework that is efficiency-focused, in addition to an organisational culture where economic efficiency has a higher profile than other issues, such as the robustness of the system and the grid.

In contrast, the two companies in Sweden focused on investments that have more of a balance between increasing the robustness of the grid and economic efficiency, reflecting the national regulatory framework. The Swedish companies have consequently been able to invest more in adaptation measures than the Norwegian companies.

A major storm (*Gudrun*) in Sweden in 2005 that caused wide-spread damage has influenced the views on climate change by Swedish electricity companies. Such an extreme weather event exposed the vulnerability of the grid to future severe storms. One consequence has been for the larger Swedish company to speed up investment in underground cables to replace overhead transmission lines. Such investments are also seen as economically feasible in the long term.

In Norway, the companies have experienced an increased frequency of heavy snow. Whilst the companies regard the replacement of overhead lines with underground cables as being too costly, the larger Norwegian company has adapted by increasing maintenance of the system, in addition to investing in insulated overland lines which are stronger and better able to withstand the weight of the snow.

In addition, the larger companies have more resources to plan for adaptive measures to cope with future climate change than the smaller companies. Local knowledge in small companies does not provide enough expertise for adapting to future vulnerabilities.