

Svenska kraftnät – Dynamic line capacity

Participants: Svenska kraftnät, Lindsey

Category: Transmission enhancement applications

Time plan: Installed in 2018

Contact person: Conny Nikolaisen, Svenska kraftnät

Location: Several locations in the Stockholm area

Possible to visit: Yes

Background

Svenska kraftnät is conducting tests of a new component, that uses sensors to give more accurate data about the transmission power lines. While some of this data is already available by other means, for example temperature, these are fed into models that are quite crude and inexact. With the installation of this new component, more data will be available, and the operator will be able to assess the load limit of the power line with greater precision. Decision-making on how to load the lines will rely more on actual data and less on models. Among the new data values are for example the line temperature and line sag, as well as relevant electrical parameters.

Implementation of the project

The new component weighs 7 kilograms and is installed onto lines that are in operation. The installation on each line in the test project was carried out in a matter of hours. The sensors then feed back data to the operator, who get precise information about the state of the line and can decide if an increased power flow can be allowed for in certain situations. The static rating of a line is always made with a substantial safety margin, and accurate data would make it possible to exceed this rating at peak load conditions, especially during winter.

Svenska kraftnät buys dynamic line rating as a service from Lindsey, that provides both hardware and software. In addition to the hardware component that was installed, data analysis and graphic presentation is done by Lindsey.

Benefits

With better data about the present condition of a particular line, the grid operator is able to operate the line at a higher power flow than its static rating, when the demand is high. As transmission lines increasingly are becoming congested, for example close to urbanizing areas, this could possibly postpone investments for new lines and cables.

In this case, Svenska kraftnät is reaching the limit on how much power it is possible to transmit into Stockholm at peak load and increased installed capacity will not be available for many years. With this project, the intention is to test whether better data allows for larger power flows at peak hours. Preliminary analysis shows that it is beneficial to run lines above their rated capacity when called for, from an economical point of view.

Scalability

The system is in itself scalable and could be used at a number of lines.

Interoperability

There is no reason to expect any interoperability problems, as this component does not affect the lines themselves, but barely extracts and collects data.

Investment horizon

In relation to building new lines, the investment to install these components at relevant locations in the grid is very small.

International potential

The system is already used to some extent in the US, Europe and at lower voltage levels in Sweden. The potential for more widespread use is good.