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**Introduction of Fast Frequency Reserve to Handle Low Inertia in the Nordic  
Power System**

**N. Modig<sup>1</sup>, R. Eriksson<sup>1</sup>, M. Kuivaniemi<sup>2</sup>, P. Ruokolainen<sup>2</sup>**  
Svenska kraftnät<sup>1</sup>, Fingrid Oyj<sup>2</sup>

The Nordic Power System is a medium-sized synchronous area consisting of the power systems of Norway, Sweden, Finland and eastern-Denmark. The system is characterized by a relatively large dimensioning incident (loss of the largest unit, 1 450 MW) compared to the system size (load 20–70 GW) which challenges the maintenance of frequency stability during low inertia situations.

The TSOs of the Nordic Power System (Statnett in Norway, Svenska kraftnät in Sweden, Fingrid in Finland and Energinet in Denmark) already see that during low inertia situations the loss of the largest production unit can cause frequency to decrease below the dimensioning value of 49.0 Hz, below which under-frequency load shedding starts (48.8 Hz). During the summer of 2018, the power output of the largest production unit had to be limited three times in order to maintain transient frequency stability after the dimensioning incident.

The Nordic TSOs are currently designing a new ancillary service, Fast Frequency Reserve (FFR), to mitigate low inertia issues and to avoid the downregulation of the largest production units. The current goal is to start the procurement of FFR in 2020. FFR is expected to have an activation frequency of 49.6 Hz and full activation time of 1 second. Alternative activation frequency and activation time with the same performance may also be considered. Studies indicate that roughly 250–300 MW of FFR will be sufficient to guarantee frequency stability during low inertia situations in the coming years.

The authors plan to present the work carried out to design FFR.