Background

Every day power is traded based on the estimated consumption, and the scheduled production on the Nord Pool Spot power exchange. On this exchange, power produced from different sources is bought and sold and is ready for delivery the next day. This is called the Day-ahead market.

Even though the marked is planned to be in balance, the system is continuously influenced by factors that could lead to imbalances. This could be changes in consumption as result of colder weather or unplanned outage in a Power Station. During the last decades Statnett have introduced market solutions to ensure sufficient supply of reserves.

To manage and plan for sales in an increasing number of markets, most power producers have engaged production planners. In production planning, the power producer attempts to optimize the value of the resources in a long and short-term perspective. This is done by applying a wide range of models and commercial competence

The complexity in the planning and nomination process is increasing. The time from when information is acquired to decisions are made is getting shorter, and the degree of details modelled in the power systems, and the amount of information processed, is continuously increasing. In addition, restrictions given by local, state-dependent, concessional and environmental conditions tend to introduce additional requirements to models that are applied in the planning process.

The objective of this project is to develop new methods for applied decision support for hydro- and windpower production planning. The long-term target is automatization of the nomination process using a combination of fundamental models, and deep reinforced learning methods.

Hans Ole Riddervold

Department of Electric Power Engineering

2017 – 2021

Automated short-term production planning for hydro- and wind power

Supervisor:
Magnus Korpås
In cooperation with Hydro

NTNU

PHD THESIS