

ELOGOW- electrification of oil and gas installations by offshore wind

Science meets industry, 25.10.2022

3. NOVEMBER 2022

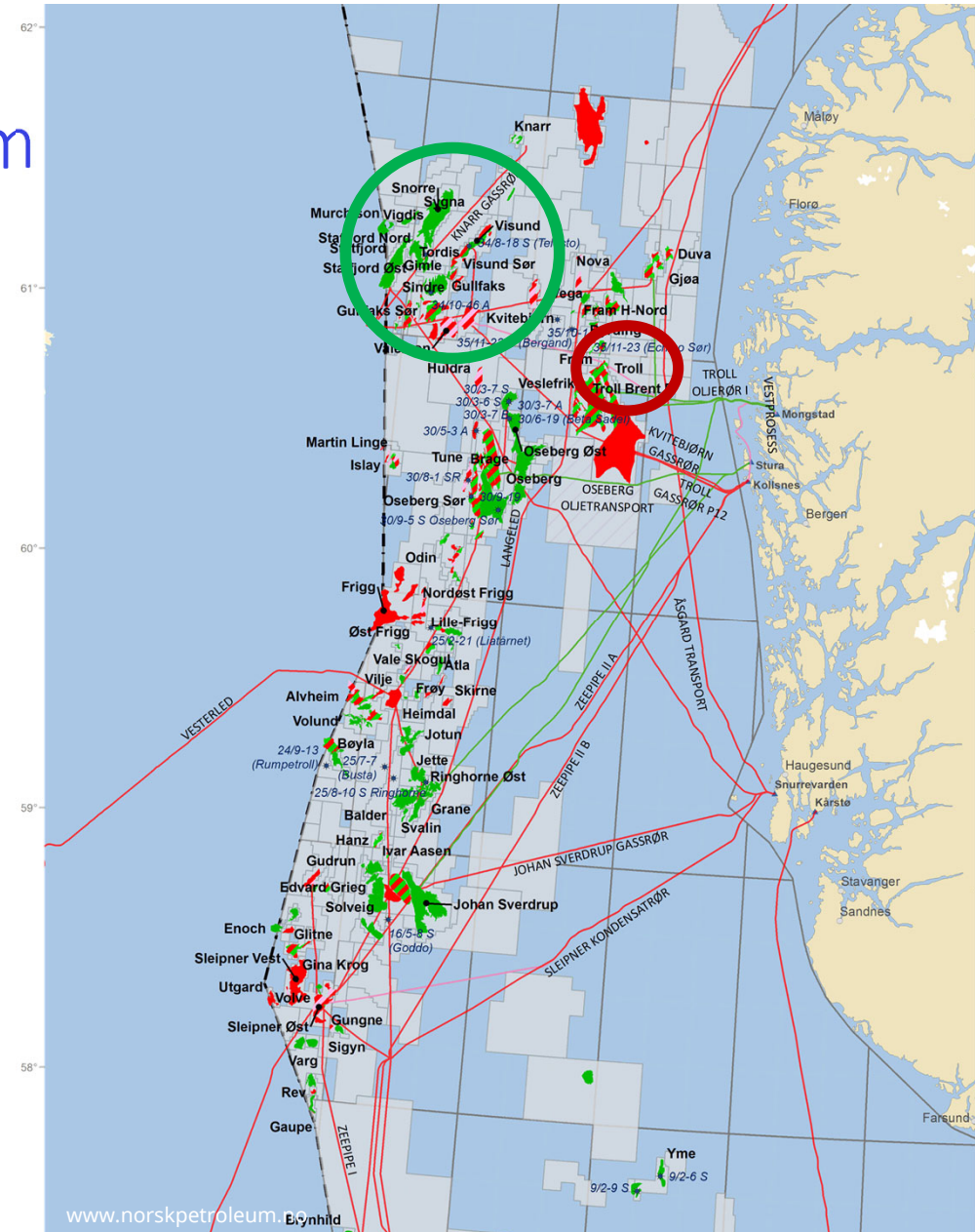
About ELOGOW



- Research project, funded by the Research Council of Norway
- Collaboration between research and industrial partners
 - IFE, NORCE, UiO, Equinor, ConocoPhillips, Aibel, Energy Valley
- 4-year project (2020-2024)
- Total budget: 16 MNOK (1.5 M€)

Green house gas emissions from Norwegian oil and gas extraction

- Oil & Gas extraction facilities on the Norwegian Continental Shelf contribute to ~27% of the total greenhouse gas emissions in Norway
 - ~66% of this due to gas turbines



ELOGOW approach



- Gas turbines are optimized to run close to their maximum rated power. Kinsey et al (2019): CO₂ emissions at idle mode is only 30% lower than in full operational mode
- Can we reduce running gas turbines in idle mode. Ideally complete shut-down, start-up on the fly?
 - Use of energy storage (batteries) will give more time for a start-up on the fly, and ensure a steady, stable and responsive energy supply
- Approach:
 - Develop energy system model
 - Develop autonomous controller and energy management system
 - Propose concept designs of cost minimized systems for reduction of CO₂

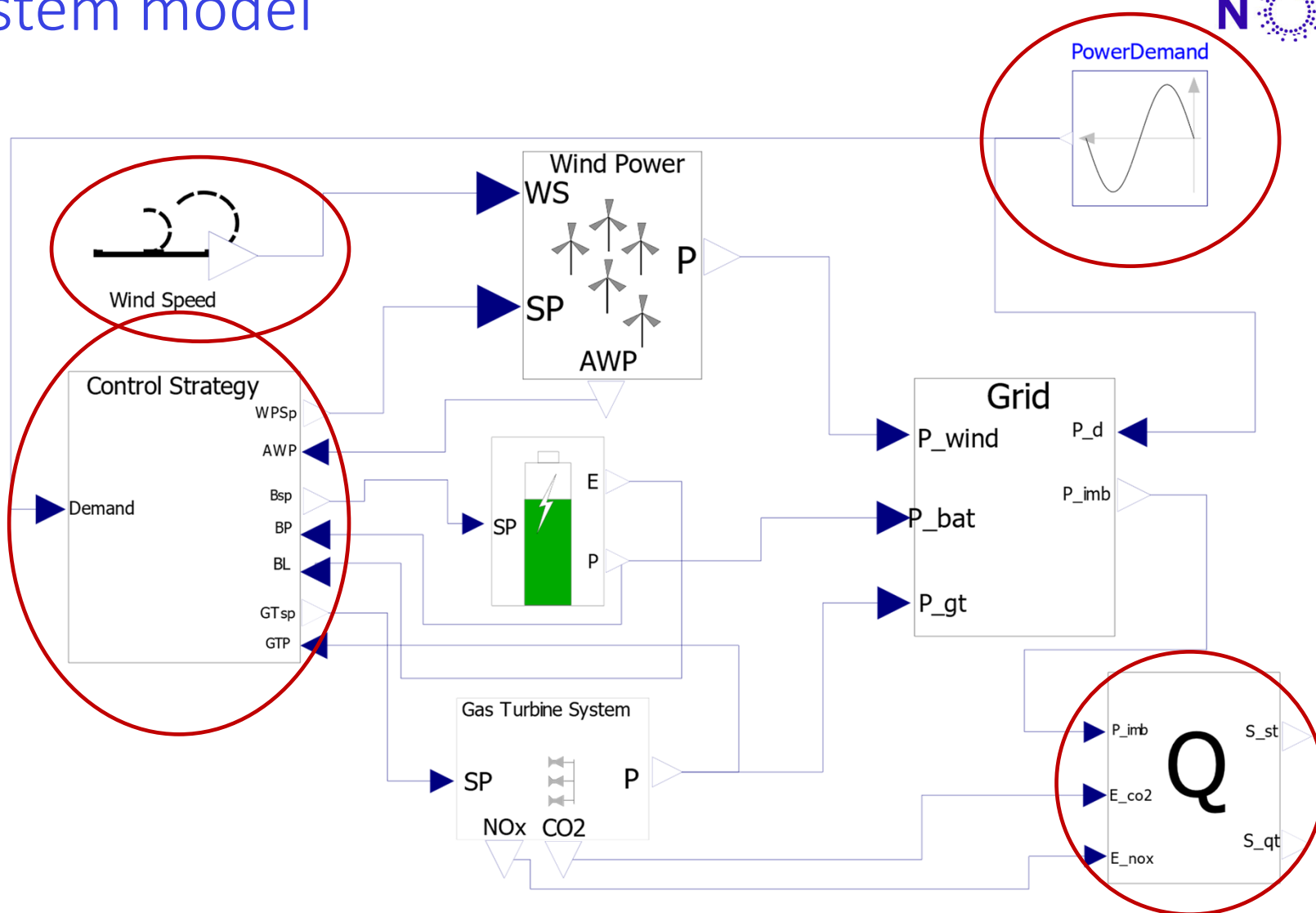
ELOGOW research topics



- Design of substructure containing battery storage
- Battery system design and characterization
- Short term predictive models for wind and wind energy production
- Modelling of the energy system

System model

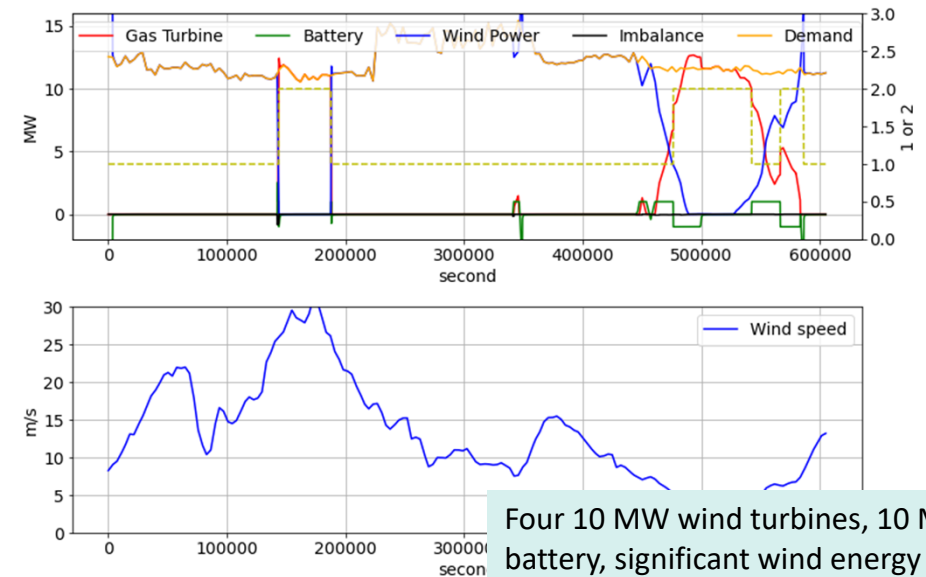
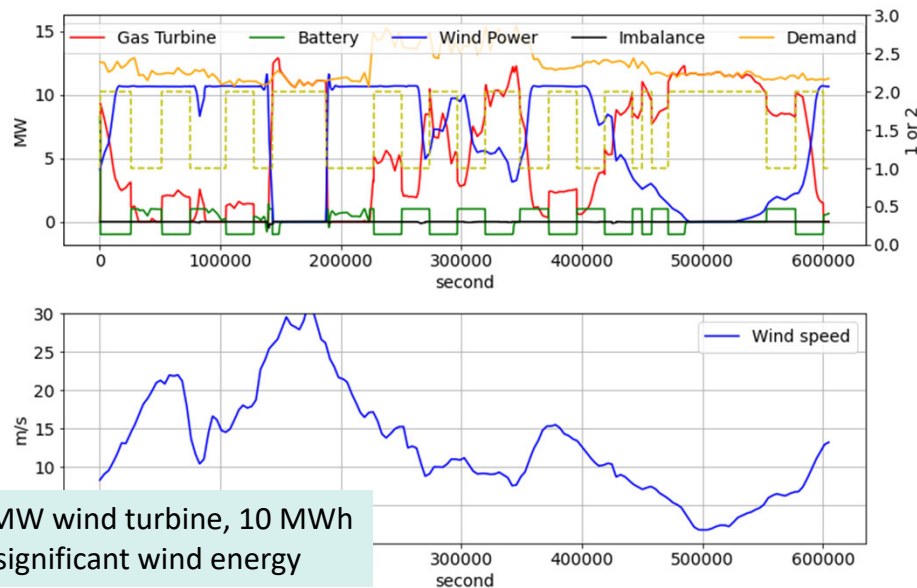
NORCE



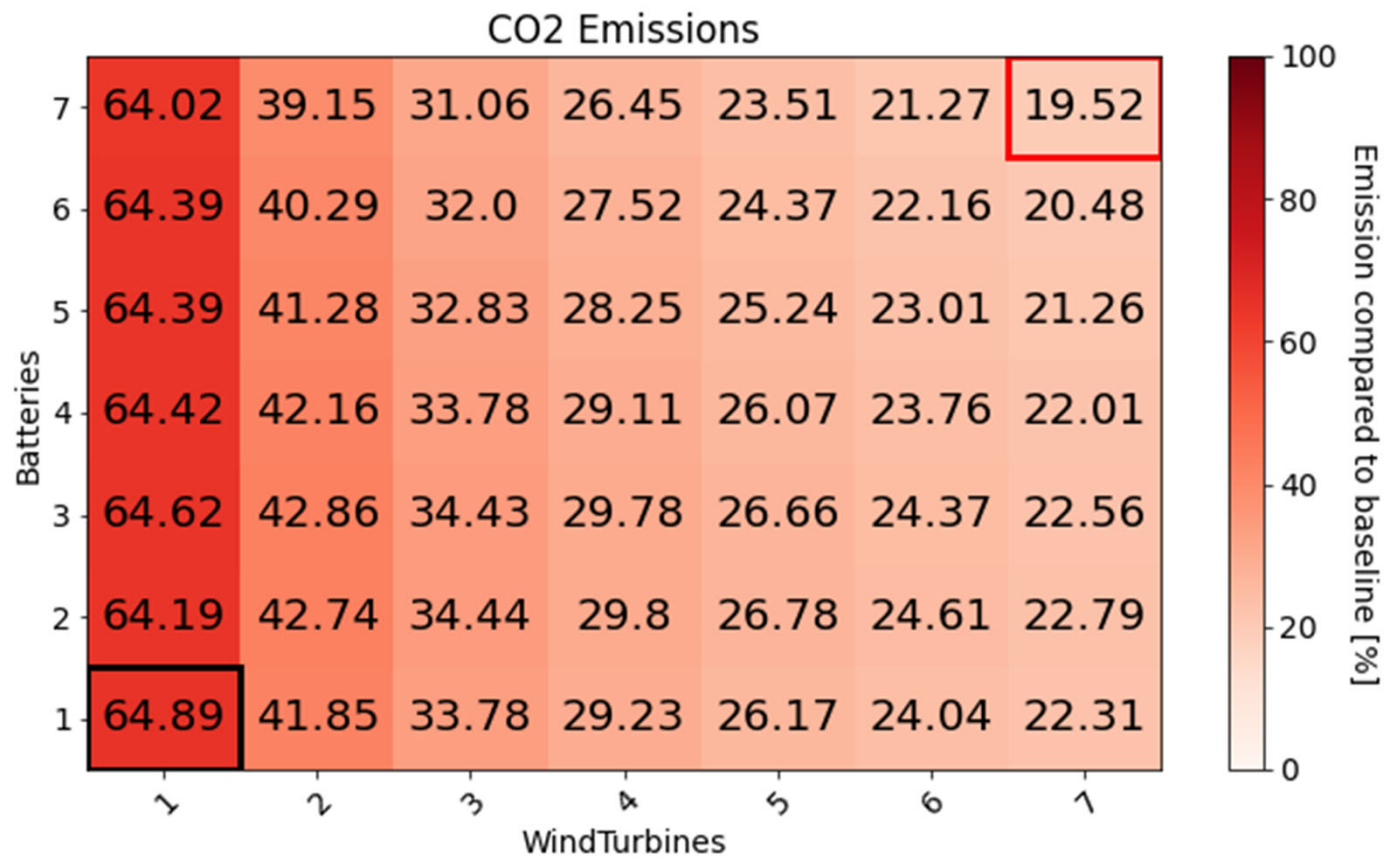
Energy system simulations



- Design and evaluate strategies / policies for how to manage the energy system
- Decisions:
 - Operation: when to start the gas turbines, how should we use the batteries
 - Design: number of wind turbines, battery capacity



Ensemble results (preliminary)



Summary



- Good wind conditions in the North Sea can be exploited to reduce climate gas emissions from O&G production
- Variability in wind conditions can be dealt with by using energy buffers
 - Gas turbines can be run in complete shut-down/start-up on the fly mode
 - Simulations indicate reductions in CO2 emissions by 35-80% depending on the number of wind turbines and number of batteries
- The energy system simulator will be used to evaluate different energy management policies