

# DeMoKab –

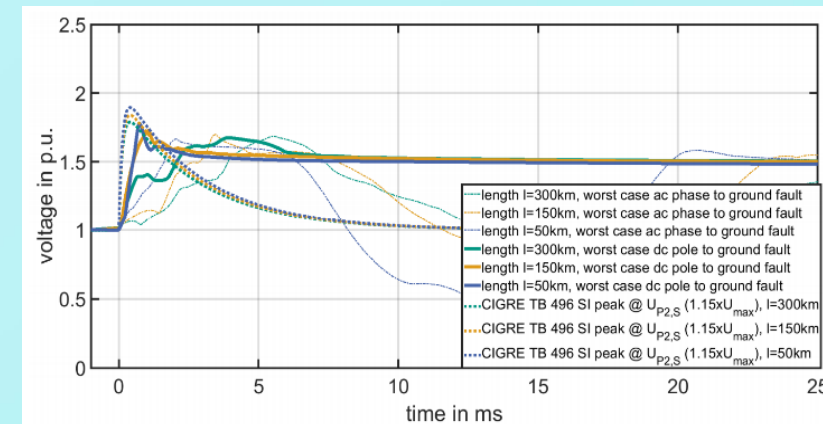
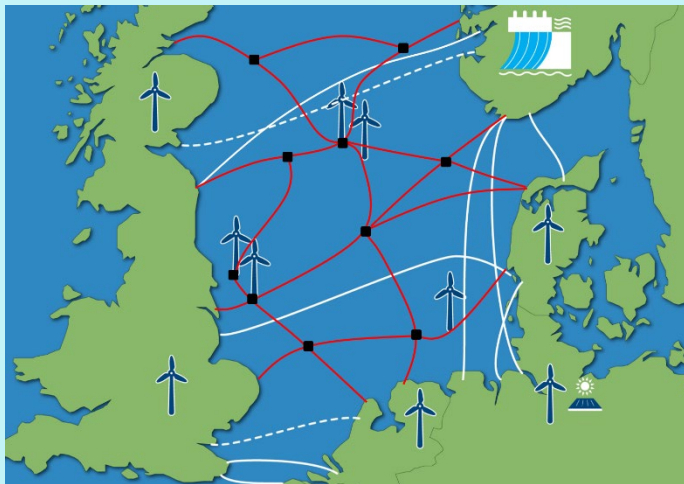
Design, modeling and testing of HVDC cables for future grid

Jon Ivar Juvik, Chief Engineer, HVDC and Cable, Statnett



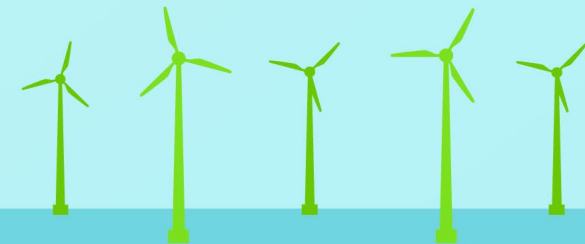
# DeMoKab

- Research project financed by Forskningsrådet with Nexans Norway, SINTEF Energi and Statnett as partners.



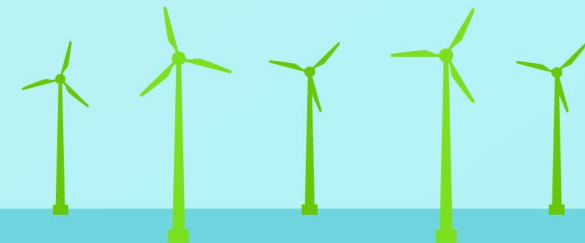
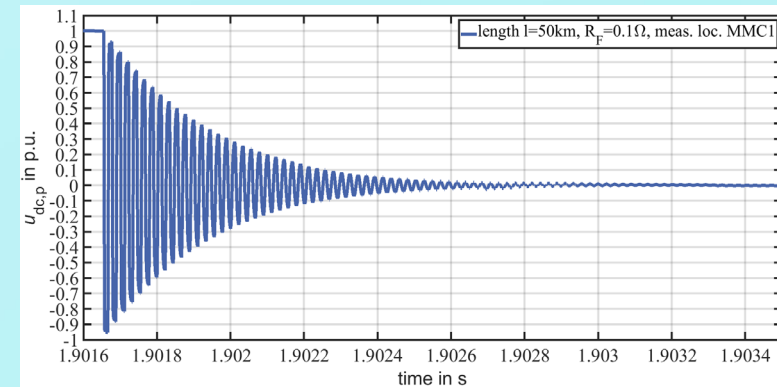
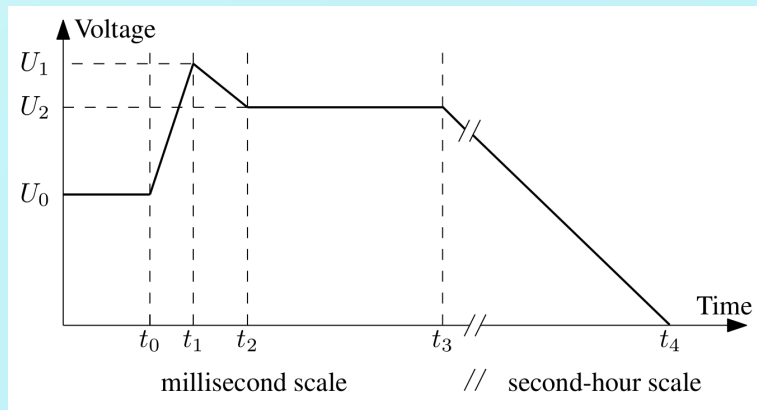
# Background

- Cigre JWG B4/C4/B1.73 have identified long temporary overvoltages (LTOV) caused by the use of VSC converters (earlier converters were LCC)
- Brochure titled "Surge and extended overvoltage testing of HVDC Cable Systems"
- These overvoltages have some properties that is not covered by existing test standards for HVDC cables
- The project will do analyses and experiments to evaluate the response of both extruded and lapped HVDC insulation to discover the consequences of the identified overvoltages.



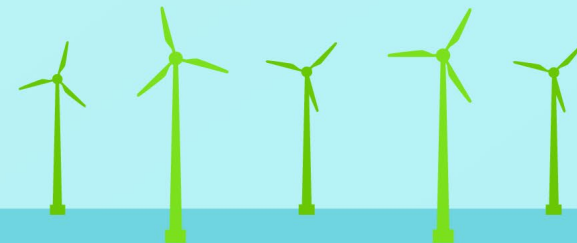
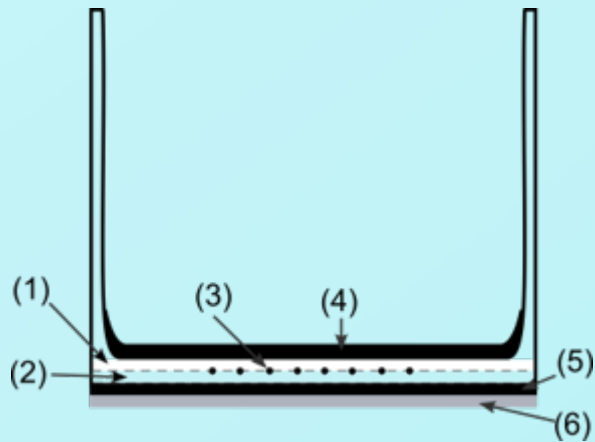
# Two major voltage

- Synthetic voltage waveshape for symmetrical monopolar schemes (LTOV)
- High frequency damped oscillation transient voltage (DOTV)



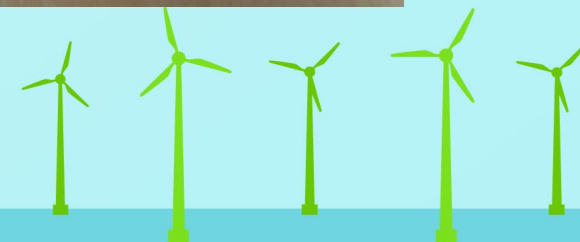
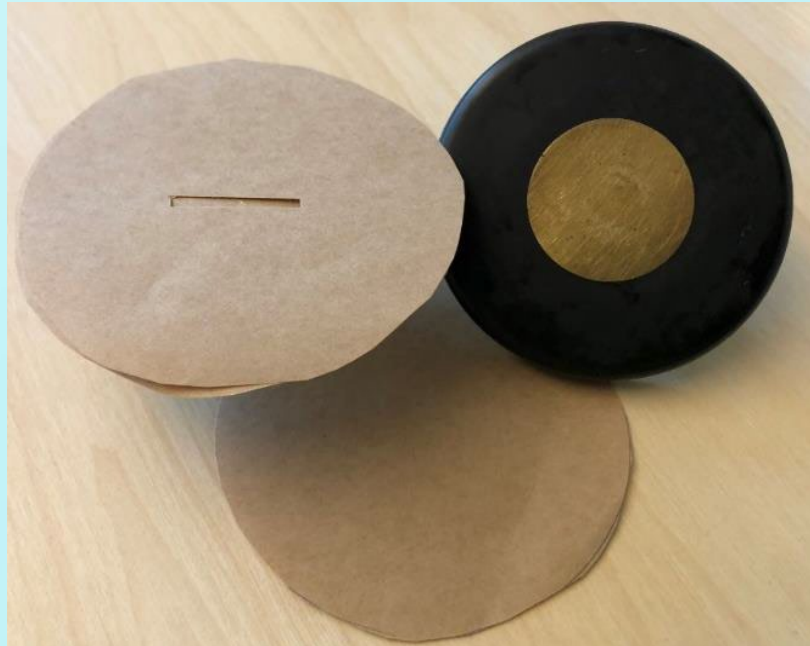
# Experimental set up extruded

- Cups with contaminations



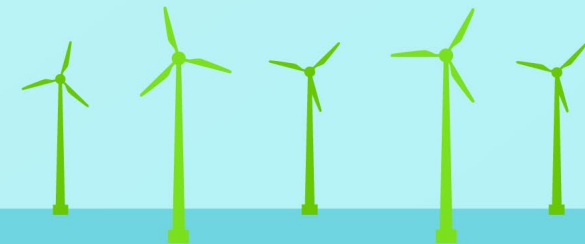
# Experimental set up lapped

- Paper with slit simulating butt-gap and electrode



## Reason

- The Cigre WG does not give any information about the consequences of the defined overvoltages neither on a macroscopic or microscopic level
- The experimental studies together with modelling will give an input to understanding how the insulation system of cables will be affected
- Improvements may be made to make the cables more robust
- Experiments and tests are already being done on full scale cables in specific projects.



# Goal

- It is important to understand the effect of the defined overvoltages on the insulation system
- This will make it possible to design and produce cables that have the best possible properties
- For Statnett, in light of the potential huge investments in cables in the future, it is important to be sure that the cable system can achieve the life expectancy we require

