

Wind turbine icing assessment

Background

Rotor blade icing is one of the main sources for power losses of onshore wind farms situated in cold climates. To evaluate the impact of icing during the operation, a correct identification and prediction of when icing occurs is required.

Project description

CGN Europe Energy applies the state-of-the-art *IEA Task19 Ice losses methodology* to estimate icing losses. To detect the ice, the method uses percentiles of the reference, non-iced power curve in combination with temperature measurements in order to use the turbine rotor as an ice detector. Actual temperature measurements are performed by instrumentation installed in the nacelle. During the wind turbine operation, high temperatures are reached, and some heat radiation from the nacelle can affect the temperature measurements. This effect can bias the temperature sensor reading.



The prospective student group's task is to evaluate temperature measurements from nacelle measurements on an actual wind farm situated in northern Sweden using programming tools like Matlab, Python or similar. The data should also be compared to meteorological datasets available from the Swedish meteorological and hydrologic institute (SMHI) as well as ERA5 data, and conclusions about the reliability of nacelle-based temperature measurements should be made.

Company description

CGN Europe Energy is headquartered in Paris. Its main business includes the development, investment, construction, operation and maintenance of wind power, solar energy and other renewable energy projects, with assets spread across France, the United Kingdom, Ireland, Belgium, the Netherlands, Sweden and Senegal. To date, its total investment in Europe and Africa has exceeded 3 billion euros (\$3.3 billion), while its total installed capacity now reaches 2.4GW.

Prerequisites and qualification

The prospective student should have:

- › High motivation for wind energy applications
- › A professional attitude with good organisation
- › Basic programming skills in Matlab or Python

Contact

Jan Bartl jan.bartl@hvl.no

The thesis is co-supervised by Luis Garcia Salgado at CGN Europe, Sweden Holding AB