Energy Yield Prediction of Offshore Wind Farm Clusters at the EERA-DTOC European Project

A new integrated design tool for optimization of offshore wind farm clusters is under development in the European Energy Research Alliance – Design Tools for Offshore wind farm Cluster project (EERA DTOC). The project builds on already established design tools from the project partners and possibly third-party models. Wake models have been benchmarked on the Horns Rev and, currently, on the Lilgrund wind farm test cases. Dedicated experiments from ‘BARD Offshore 1’ wind farm will use scanning lidars to produce new data for the validation of wake models. Furthermore, the project includes power plant interconnection and energy yield models all interrelated with a simplified cost model for the evaluation of layout scenarios. The overall aim is to produce an efficient, easy to use and flexible tool to facilitate the optimised design of individual and clusters of offshore wind farms. A demonstration phase at the end of the project will assess the value of the integrated design tool with the help of potential end-users from industry. This abstracts summarises the objectives and preliminary results of work package 3. In order to provide an accurate value of the expected net energy yield, the offshore wind resource assessment process has been reviewed as well as the sources of uncertainty associated to each step. Methodologies for the assessment of offshore gross annual energy production are analyzed based on the Fino 1 test case. Measured data and virtual data from Numerical Weather Prediction models have been used to calculate long term wind speed, wind profile and gross energy.

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