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Larsén, Xiaoli Guo; Volker, Patrick; Sørensen, Poul Ejnar; Nissen, Jesper; Du, Jianting; Giebel, Gregor; Ott, Søren; Hasager, Charlotte Bay; Maule, Petr; Hahmann, Andrea N.

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Large Scale Offshore Wake Impact on the Danish Power System

Xiaoli Guo Larsén, Patrick Volker, Poul Sørensen, Jesper Nissen, Jianting Du, Gregor Giebel, Søren Ott, Charlotte Hasager, Petr Maule, Andrea Hahmann, Tobias Ahsbahs, Jake Badger

SUMMARY

This poster gives an overview of the ongoing Danish ForskEL/EUDP project “OffshoreWake” (2017 - 2020).
The focal point of this project is to develop a calculation system that adds the large scale offshore wind farm wake (WFW) to the power system. There are five components in this calculation system, as shown in FIG 1, with 0, 1 and 2 already existing. OffshoreWake adds components 3 and 4, namely the WFW and surface wave conditions.

RELEVANCE

With a rapid increasing number of offshore wind farms to be installed, wind farm clusters are bound to arise (FIG2). A wind farm will experience mean wind reductions from upstream wind farms. Such reductions (e.g., WFW) have shown to be significant and can extend up to several tens of kilometers downwind. The calculation of the total wakes from the farms thus include not only the single turbine wake but also mesoscale effect.

As offshore wind energy is playing bigger role in the development of sustainable energy system in the coming years, the impact of the growing farm clusters needs to be taken into account regarding wind power reduction as well as the additional wind variability.

REFERENCES