

Optimization based decision support tool for O&M

Innovation description

- Common for most decision support tools within offshore wind logistics are the use of some sort of simulation algorithm to evaluate the effects of a *given* solution. We are adapting a different approach where we utilize mathematical models and optimization techniques to *search for the cost-optimal vessel fleet*.
- The basis for the innovation is a stochastic mathematical optimization model. The main goal is to determine the optimal fleet size and mix of vessels and corresponding infrastructure in order to support logistics and maintenance activities at offshore wind farms.
- The prototype is developed by MARINTEK in cooperation with industry actors in NOWITECH, FAROFF and LEANWIND (with main contributions from Statkraft and Statoil).

Further development

The tool is currently being further developed in collaboration with the EU FP 7 project LEANWIND.

References

- Stålhane M, Halvorsen-Weare EE, Nonås LM (2016): A decision support system for vessel fleet analysis for maintenance operations at offshore wind farms. MARINTEK/NTNU. Working paper.
- Stålhane M, Halvorsen-Weare EE, Nonås LM (2014): FAROFF Optimization model technical report. MARINTEK Report MT2014 F-097.

Impact

- The logistic decision support system will enable planning experts to make faster, better and more informed decisions both with respect to cost and risk in the planning phase.
- The main cost savings and risk reduction is achieved through improved decision support on
 - Vessel fleet selection and usage
 - Choice of infrastructure (ports, offshore platform and accommodation)
- Since the cost of vessel and related infrastructure are one of the most expensive resources of the offshore wind logistics for O&M one can expect to gain large savings due to more advanced decision support tools such as the vessel fleet optimization model.
- These types of advanced decision support systems will push the industry from an ad hoc planning process to more structured, reliable and informed decision processes.
- The decision support tool has been used by Statkraft in the development of Dudgeon offshore wind farm.
- The research field of Operations Research and optimization based logistics has been applied for the first time within offshore wind in order to develop a decision support tool for the O&M phase.

