

Data and facts

Project and Risk Management of Offshore Wind Farms: Minimizing Costs and Increasing Efficiency

COAST – Comprehensive Offshore Analysis and Simulation Tool

Offshore activities entail many different planning challenges linked to various risks. Project delays due to bad weather can quickly give rise to high additional costs that may put the financial viability of the project at risk. Therefore, effective project and risk management forms the basis for the successful and cost-efficient planning, construction, and operation of offshore wind farms.

During the planning and execution phase, we offer project planning and weather risk analyses to identify and assess potential risks at an early stage. With our expertise, we can help to minimize these risks and optimize the efficiency of the project logistics.

Overview of services

- Project plan analyses and qualitative assessment of operational planning in project logistics
- Accurate estimations of the influence of the weather on project duration and costs
- Clear identification and visualization of bottleneck activities during project planning
- Post-construction performance analysis and real-time project controlling with AIS data

To make the weather a calculable factor right from the planning phase, Fraunhofer IWES has developed a new tool named COAST, which is designed to simplify the weather data-based planning, validation, and assessment of offshore work processes in the installation and operation phases.

The incorporation of the analyses into the day-to-day workflows is quick and easy thanks to the compatibility with standard project management software.

Project planning and logistics

The challenges associated with the management of offshore activities are many and vary for all parties involved. Planners review their timetables in advance for practical viability. Logistics and installation specialists optimize the deployment of their vehicles and vessels. Operators improve their maintenance tasks and component replacement strategies. Investors and banks validate their financial models. Insurers design customized cover concepts or cover amounts. Lawyers and economists devise sophisticated payment plans, contractual penalties, and concepts for sharing the weather risks.

The COAST software allows weather risks to be assessed in detail during the project planning phase and, if delays occur in the execution of a project, a realistic estimate can be made of project acceleration measures. On completion of the construction phase, the influence of project and weather risks can be validated, compensation claims asserted or rejected, and lessons learned for the future.

AdWaTSS – Advanced Weather Time Series Scheduling method

The AdWaTSS method is designed to simulate the workflows involved in offshore activities with all their weather restrictions. The processes are defined using planning tools such as Primavera and Microsoft Project. However, the local conditions and weather boundaries are described using time series that may cover over 50 years. As a result, not only measured or model data time series such as wind, wave heights, and wave periods but also any other time restrictions, e.g., day and night, lock opening times, tidal windows, and water levels, environmental restrictions such as the spawning season, and calendar restrictions, e.g., holiday season, can be considered in the analysis.

Three main features are considered:

- The use of weather data sets for multiple locations and/or route-based weather data allows for a more accurate estimation of the possible project delays.
- The use of multi-dimensional operation parameters helps estimate the variability of the expected project duration.
- The analysis of the critical path including primary and secondary weather risks of weather-dependent tasks serves as a basis for the development of more reliable and robust project plan schedules.

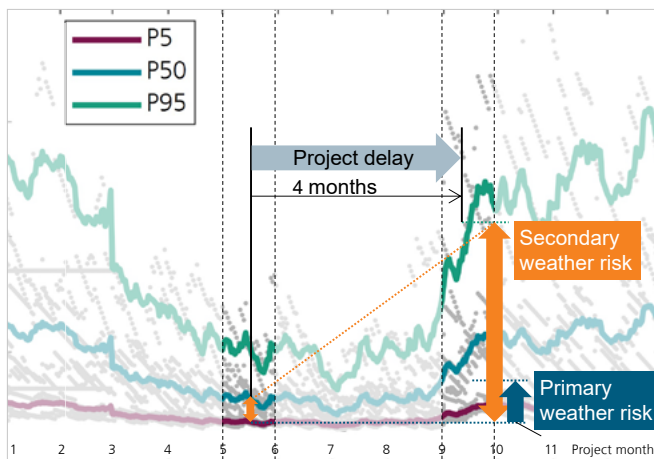


Figure 1: Weather risks during project execution

To identify project durations and their distribution, simulation results are statistically evaluated. Furthermore, the overall results and the individual simulations are graphically visualized.

The COAST software makes it possible to compare different technical concepts and variants in terms of their weather and project risk resilience. Project plans can be optimized using sensitivity and scenario analyses. The results clearly illustrate weaknesses and bottlenecks in specific phases or activities.

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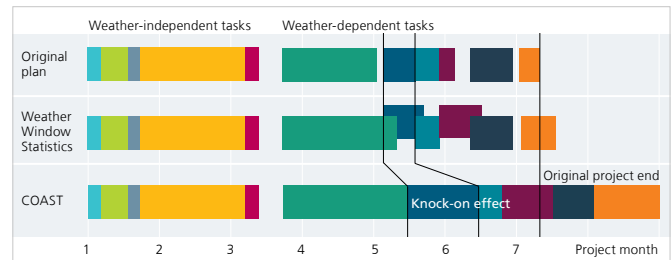


Figure 2: Visualization of bottleneck activities

The **Offshore Logistics** group of Fraunhofer IWES focuses on the development of tools for the analysis of risks in the project logistics, agent-based decision support for the evaluation of maintenance concepts, and the probabilistic cost modeling of offshore wind farm projects.

Further information

Fraunhofer IWES secures investments in technological developments through validation, shortens innovation cycles, accelerates certification procedures, and increases planning accuracy by means of innovative measurement methods in the wind energy and hydrogen technology sectors. At present, there are more than 300 scientists and employees as well as more than 100 students employed at the nine sites: Bochum, Bremen, Bremerhaven, Leer, Görlitz, Hamburg, Hannover, Leuna, and Oldenburg.

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