This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 791875.

Developing the Next Generation 12+ MW Offshore Wind Turbine for Clean and Competitive Electricity

Parameters impacting the logistics and cost of IAC pre-lay in a floating offshore wind project

The impact on schedule and on cost has been assessed within WP2[1] for two Inter-Array Cable (IAC) installation strategies. The baseline procedure considers deploying and connecting the IAC to the platforms once they are hooked up to their mooring system. The alternative strategy involves two steps: first, pre-laying the IAC prior to the platform hook-up with a Cable Laying Vessel (CLV), which requires wet storage equipment to maintain it on the seabed. Second, connecting the IAC to the platforms with an Anchor Handling Vessel (AHV) once they are hooked up to their mooring system. Principle Power built on this work to study the impact of different parameters on the base case and alternative installation methods and to identify some risks with IAC pre-lay. The findings are presented below.

Metocean

Different metocean conditions (mild, medium and severe) were applied. For the IAC pre-lay alternative, CLV duration of use and associated cost decreases more for more severe metocean cases. AHV duration of use and associated cost increases more for more severe metocean cases when hook-up and IAC pull-in are performed by the same AHV. When two different AHVs are used, AHV duration of use and cost increase seems independent from the metocean case. IAC pre-lay strategy, vs. baseline, seems beneficial in terms of costs when two different AHVs are used for hook-up and IAC pull-in for very challenging metocean cases.

Number of units

Different project sizes (20 and 40 platforms) were applied. IAC pre-lay operation duration and costs do not depend on the number of platforms. AHV duration of use and cost depends on weather only when operation run over winter and experiences delays.

Number of installation campaigns

Different number of campaigns for platform hook-up and connection (one campaign and two campaigns, restricting the vessel operation to summer season only) were applied. For a project of 40 platforms, there is a risk of running operations over the winter season in harsh weather. Dividing the hook-up and IAC connection into two campaigns reduces by 40% the duration and cost associated, which makes this strategy more beneficial.

Hook-up operation duration

Different hook-up durations (baseline of 40 hours vs. a more optimistic assumption of 20 hours) were applied. AHV duration of use and cost do not seem too dependent on the weather for the 20 hours case when same AHV performs both hook-up and IAC pull-in (as opposed to 40 hours hook-up duration where longer weather windows are required). AHV duration of use do not seem too dependent on the weather for hook-up duration of 20 hours case when distinct vessels are used but cost variation is more dependent on weather.

WTG integration rate

Benefits of IAC pre-lay strategy can be impacted by the WTG integration rate or hook-up rate. A higher WTG integration rate than hook-up or IAC connection duration impacts AHV use, stand-by duration and associated costs.

Risks

- IAC pre-lay can help to reduce the critical path and allows connecting platforms sooner to the grid. Assuming projects secure a fixed-term remuneration contract, connecting the project to the grid earlier is not expected to yield significant financial benefits.
- IAC wet storage technical feasibility and equipment still requires derisking studies.
- Potential IAC damage during wet storage after pre-lay implies corrective maintenance.
- Nacelle yaw runs on diesel generator between platform hook-up and grid connection. Fuel tank refueling is challenging in case of bad weather. IAC pre-lay aims to reduce this period.

Source

1. Deliverable 2.2 Simulation report for baseline concept, ReaLCoE, Rev1.0, 30.04.2023 (Confidential, only for members of the Consortium including the Commission Services).

ReaLCoE's vision is to unleash the full potential of offshore wind energy
€35/MWh LCoE Goal, +12MW WEC Capacity, ~32 mio € Total Budget, 42 month project duration

SCAN ME

Join the ReaLCoE community!

Further information about the ReaLCoE Programme can be found on our website: ReaLCoE.eu