

Alpha Ventus: options for further asset use

DOTI – Alpha Ventus

RAVE | March 2024

7 different End-of-Life Options have been evaluated

Possible Future life options for Alpha Ventus

Decommissioning

1.1. Final Decommissioning full removal at end of site life – Year 2029

1.2. Final Decommissioning full removal before end of life - < 2029

2.1. Extend Lifetime from 20 years to 25

Life extension

- 3.1. RePower with existing foundations (limit 60MW)
- **3.2.** RePower with <u>existing</u> foundations + additional Grid
- **3.3** RePower with <u>new</u> foundations + additional Grid access

Repowering & Redevelopment

+ Hydrogen

- **3.4** RePower with existing foundations + Offshore Electrolyser + CTV fuel
- **3.5** RePower with <u>new</u> foundations + Offshore Electrolyser + CTV fuel
- **3.6.** RePower with <u>new</u> foundations + Siemens H2 Turbine
- 3.7 RePower with existing foundations + Siemens H2 Turbine

From 7 possible Options we explored at Alpha Ventus only 4 were feasible

- 1. Decommissioning at the end of planned Service life
- 2. Early Decommissioning
- 3. Full RePowering
- 4. Partly RePowering

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Foundation Reinforcement

To RePower Alpha Ventus, reinforcing current foundations is necessary. This strategic measure capitalises on the established infrastructure, ensuring prolonged utilisation of the site and assets. It plays a pivotal role in driving down the Levelized Cost of Energy (LCOE), enhancing the overall economic viability of the project.

Key information

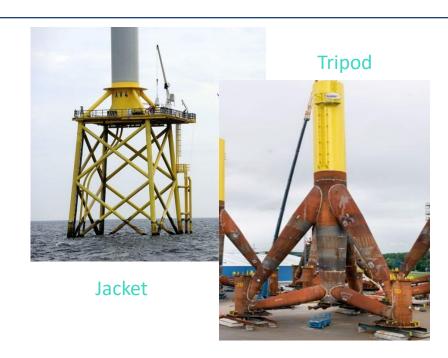
Foundation type: Tripod & Jackets

Reinforcement Concept:

- Jacket Foundation Reinforcement:
 - Tower design is optimized by replacing a T Flange with an L Flange
 - Nodes and beams are filled with grout
- <u>Tripod Foundation Reinforcement:</u>
 - A three-legged steel structure is created including adapter and tower connection
 - The steel structure is installed inside the tripod
 - Weak parts are filled with grout

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Tripods & Jackets





Reinforcement of Jacket Foundations

Process overview

1 Reinforcing the nodes with grout

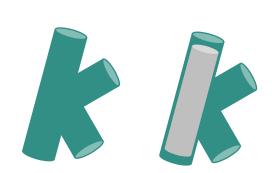
Nodes can be reinforced using CTV

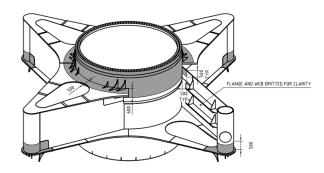
2 Filling the beams with grout

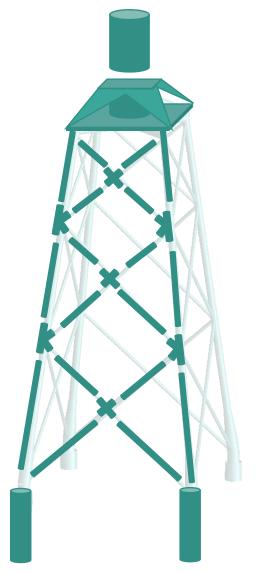
• Beams can be reinforced using CTV

3 Final change of the tower design

- Replacing a T Flange with an L Flange
- Design of an adapter









Reinforcement of Tripod Foundations

Process overview

Creation of a three-legged steel structure including adapter and tower connection

2 Installation of the steel structure inside the tripod

Filling weak points with grout, especially strengthening the weld seams

