

CASE STUDY · OFFSHORE WIND DEVELOPER

NorthPeak Wind Partners

Redesigning Floating Foundations to Cut Steel Cost 18 Percent

SUMMARY

Independent structural review and platform redesign for a 500 MW floating offshore wind project reduced foundation steel mass by 18 percent without compromising the certified design envelope.

18% STEEL MASS REDUCTION	-9% MOORING PEAK TENSION	None SCHEDULE IMPACT	500 MW PROJECT CAPACITY
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The Problem

NorthPeak Wind Partners was developing a 500 MW floating offshore wind project using a semi-submersible platform design, but pre-FEED cost estimates showed foundation and mooring costs meaningfully above the project's target levelized cost of energy, threatening the project's competitiveness in an upcoming offtake auction.

The developer needed an independent structural engineering review to identify credible cost reduction opportunities without triggering a full design restart or jeopardizing the project's development timeline ahead of the auction deadline.

Our Solution

HydroLabs' structural engineering team conducted a detailed load path and structural optimization review of the platform design, using coupled aero-hydro-servo-elastic simulation across the project's site-specific metocean conditions to identify conservative design margins that could be safely reduced.

We identified three specific structural optimization opportunities: column wall thickness reduction in low-stress regions identified through refined finite element analysis, a revised bracing configuration reducing redundant structural members, and mooring line pretension adjustment that reduced peak structural loads under the site's actual metocean envelope.

All proposed changes were validated against the applicable classification society design standards and presented alongside a full engineering justification package to support the developer's certification process.

Timeline

Independent Structural Review	6 weeks — load path analysis, FEA review of existing design
Optimization Study	8 weeks — coupled simulation across metocean envelope, design iteration
Certification Support	6 weeks — engineering justification package, classification society liaison

Results

- Total platform steel mass reduced by 18 percent relative to the original pre-FEED design, translating to a meaningful reduction in fabrication cost per platform across the project's planned fleet.
- Revised mooring pretension configuration reduced peak mooring line tension under extreme metocean conditions by 9 percent, improving the design's margin against the certification envelope despite the reduced structural mass elsewhere.
- The redesigned platform received classification society design approval within the project's original schedule, preserving the developer's auction timeline.