



ENERGY

OFFSHORE WIND FARM LAYOUT OPTIMISATION

Introduction

The offshore wind industry is being challenged to reduce the cost of the energy it delivers to the market. Significant capital is being invested in reducing the front-end cost of delivering a project; however, a holistic approach is required to not only reduce cost, but also maximise revenue. Optimising a wind farm layout for Cost of Energy (CoE) is key to delivering this holistic approach.

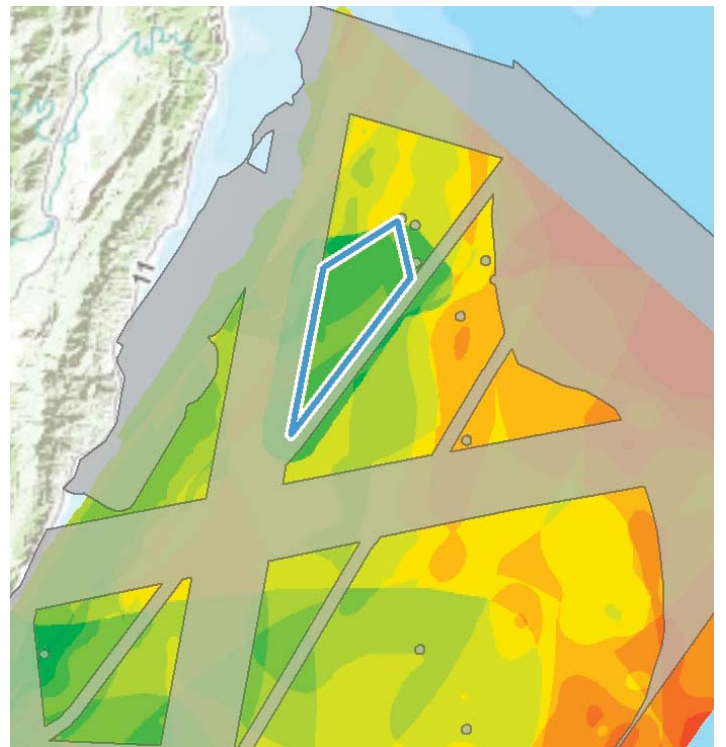
The following study presents three approaches to designing a wind farm layout, all of which have been implemented by different parties in the industry, and compares these against a fully integrated CoE approach.

Case Study

The project site has been identified through a rigorous site selection assessment, considering all constraints that will affect the siting of the wind farm, such as, shipping, subsea cables and pipelines, seabed wrecks, etc. The intention is to develop project options, up to 500 MW based on the following characteristics:

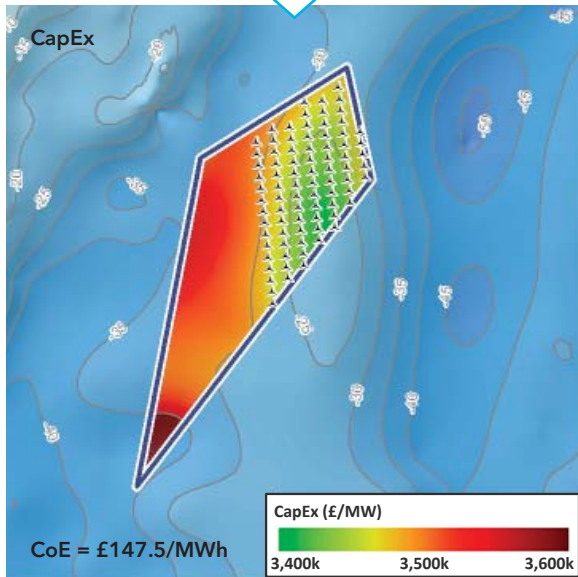
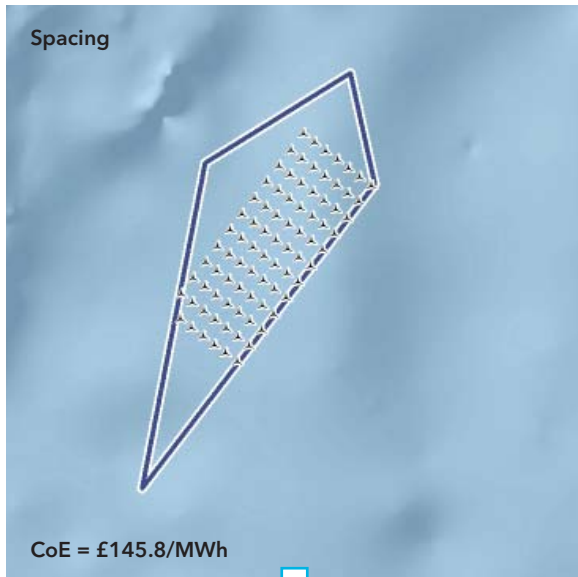
Wind turbine generator (WTG)	6.0 MW
WTG diameter	154 m
Number of WTGs	83

Site Selection



Standard Layout Design

No information is known about the site conditions. WTGs shall be sited by respecting a minimum spacing of 6 WTG diameters (D) in the prevailing wind direction and 4D in the non-prevailing direction.

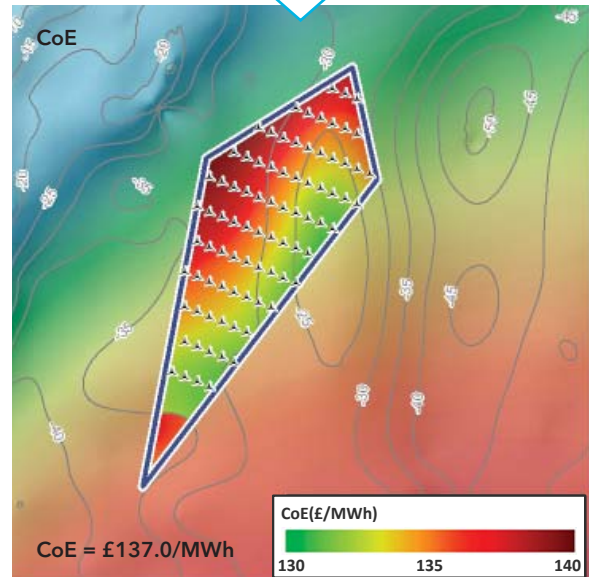
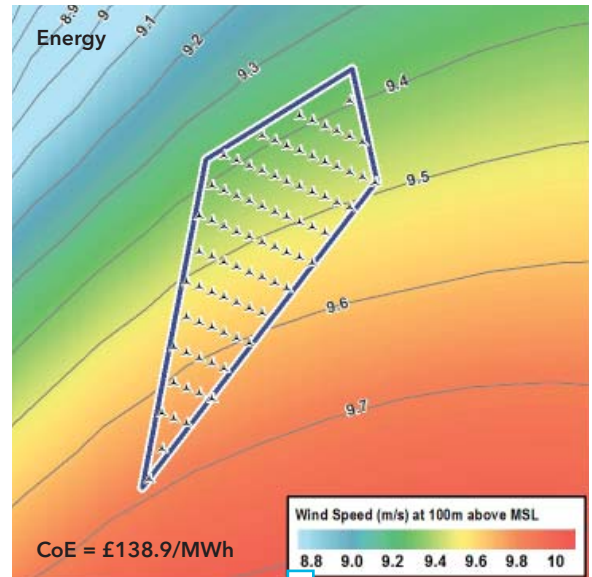


CapEx Optimised Layout Design

The developer prioritises minimising upfront project costs and has geo-tech data across the site. This allows the layout to be optimised for capital costs by siting WTGs in areas of reduced water depth, while spacing them as close as permissible to minimise inter-turbine cable cost.

Energy Optimised Layout Design

The developer prioritises energy production and has wind speed data across the site. This allows the layout to be optimised for energy capture by siting WTGs in areas of high wind resource, while spacing them as far apart as permissible to minimise inter-turbine wake losses.



CoE Optimised Layout Design

The developer chooses to undertake a full study and optimises for CoE. All required data are available. The layout is optimised for both capital costs and energy revenue, by balancing the conflicting drivers of increased energy capture with increasing CapEx.

For more information, please contact renewablesadvisory.energy@dnvgl.com.