

Design Basis – What is required by a Turn-Key Supplier?

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The logo for Vestas, featuring the word "Vestas" in a stylized, italicized font with a registered trademark symbol, positioned on the right side of a dark blue horizontal bar.

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- Why is the Design Basis so important?
 - What are Design Parameters used for?
 - The central role of the Design Basis
 - Planning of Site Investigations
 - Interaction between Site Investigations and Design Basis
 - Design Basis
 - General Description of Wind Farm
 - Design Parameters
 - Design Principles

Why is the Design Basis so important?

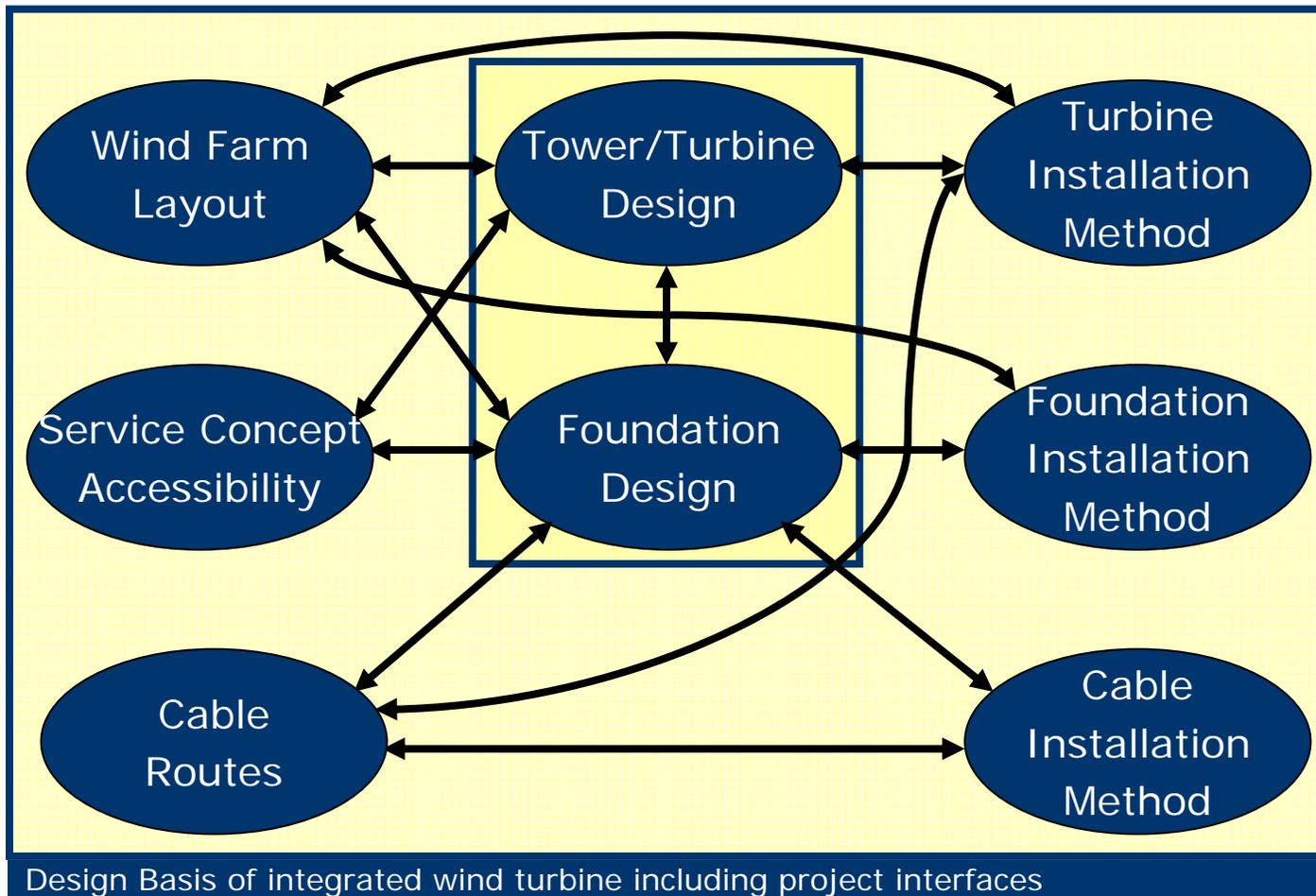
- The economic consequences of failure are much higher for offshore projects than for well known and easy accessible onshore wind farms. The uncertainties can already be reduced in the early planning phase if sufficient and reliable site information about climatic and geological conditions is available from desk studies and site investigations
- Offshore wind farm projects are much more cost intensive than onshore wind farms. Realistic design parameters are therefore the key to an
 - economic and efficient design
 - economic and efficient installation methods
 - optimised accessibility

Why is the Design Basis so important?

- The incorrect choice of design parameters will have strong economical impact on the overall costs of an offshore wind farm. Therefore site investigations should be carried out already in a very early stage of the development of an offshore wind farm

What are Design Parameters used for?

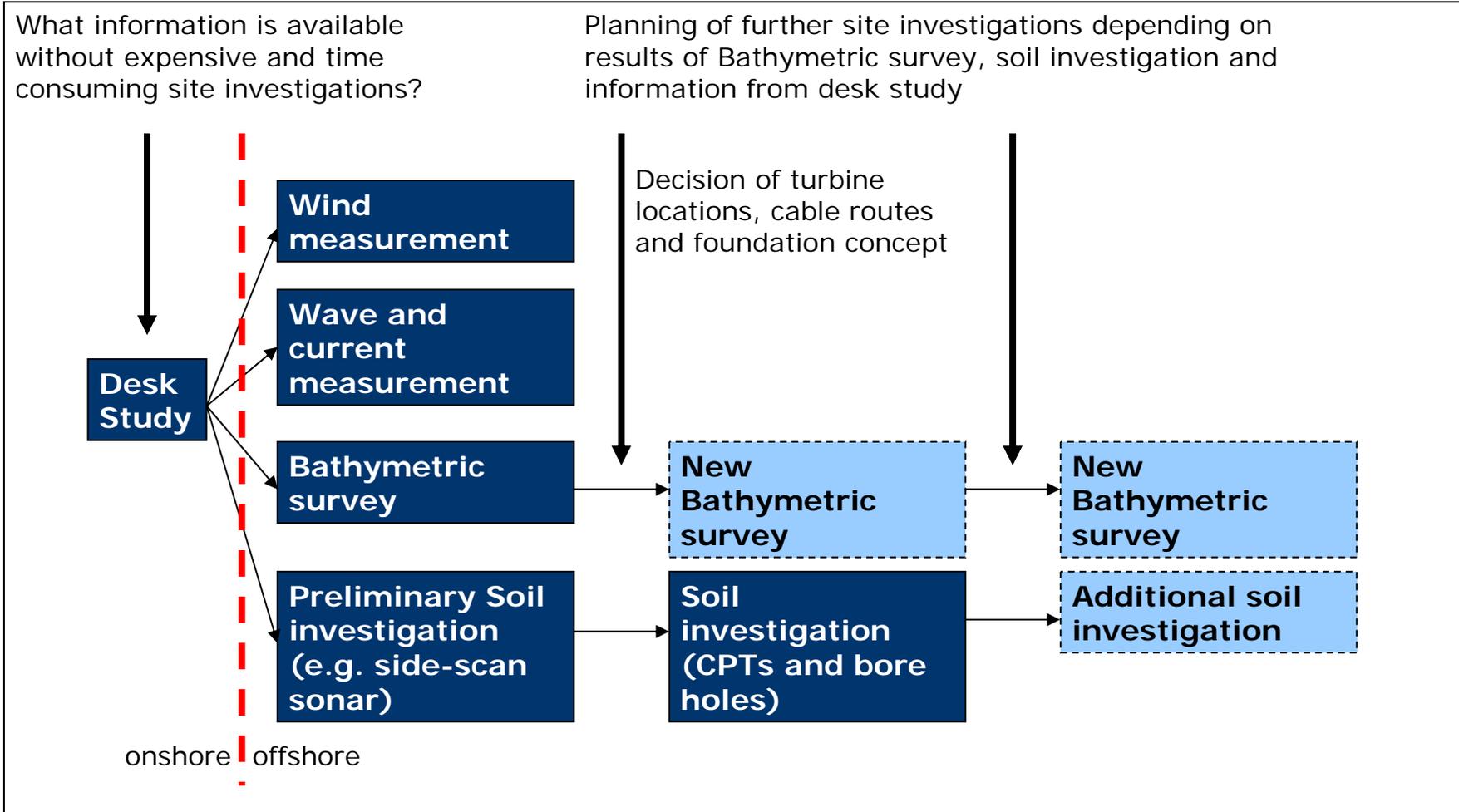
- Climatic and geological conditions of the offshore site are required for a number of different tasks during the planning phase:



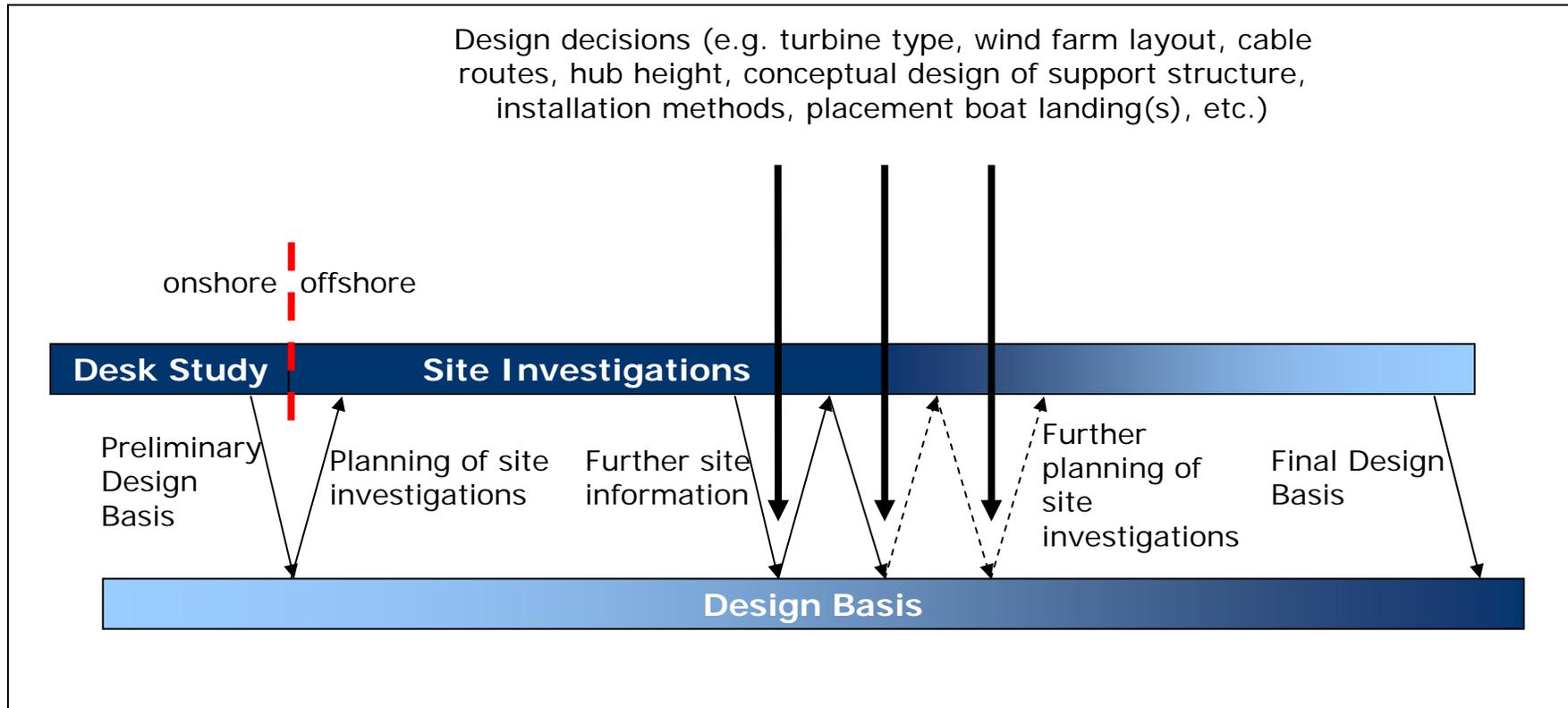
The central role of the Design Basis

- The Design Basis is the central document where all site specific information about climatic and geological conditions is compiled.
- The Design Basis document shall ensure that all parties in the project at an early stage agree on a common set of design parameters and design principles.
- The Design Basis will often have to be certified by an independent verification body as part of the project certification scheme adopted for the specific project in order for the Client and the Contractor(s) to have a third-party confirmation of the applied design parameters and principles.

Planning of Site Investigations

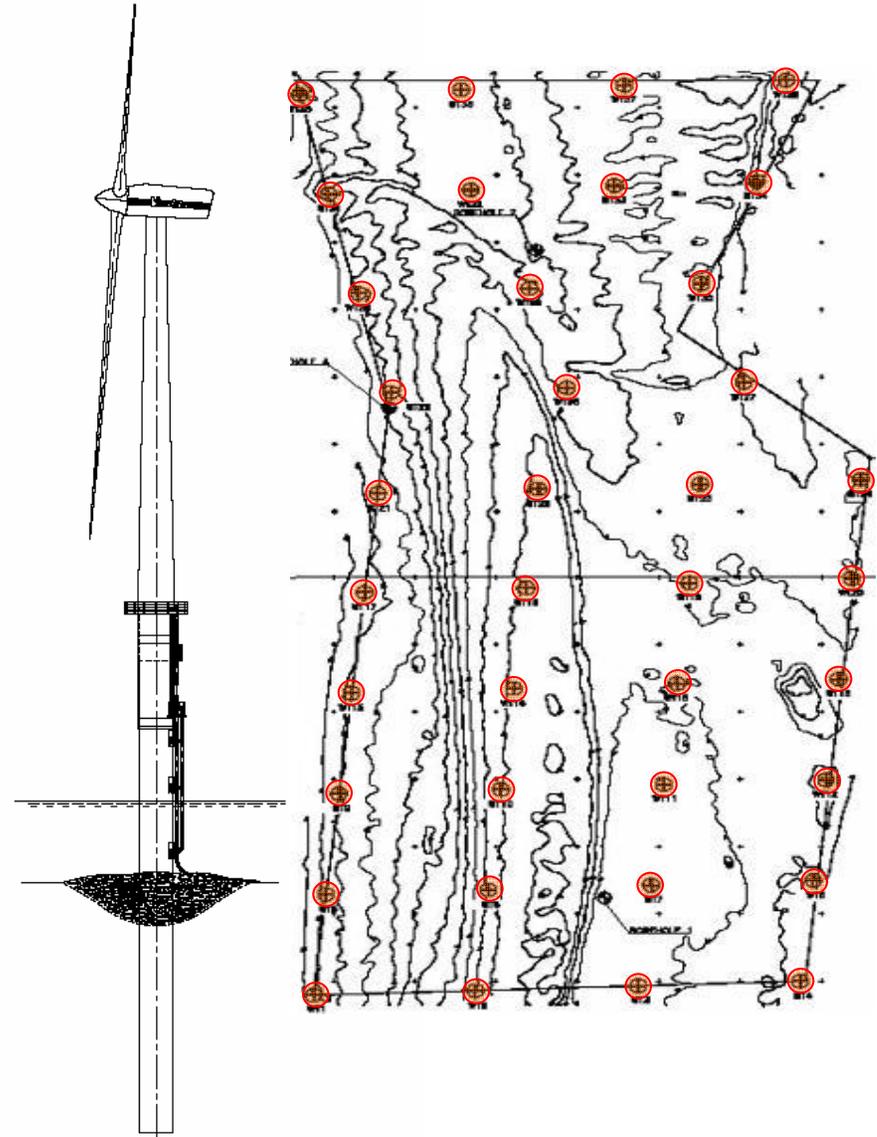


Interaction between Site Investigations and Design Basis



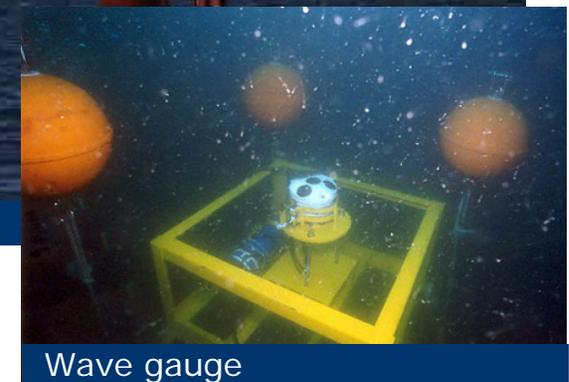
Design Basis - General Description of Wind Farm

- General description of offshore wind farm
 - Turbine type
 - Wind farm layout including the geographic co-ordinates of turbine locations, of transformer station(s) and of cable routes
 - conceptual design and installation method of support structure
 - hub height of wind turbine and interface level between turbine and foundation
 - placement of boat-landing systems, ladders, intermediate resting platforms, J-tubes, etc.



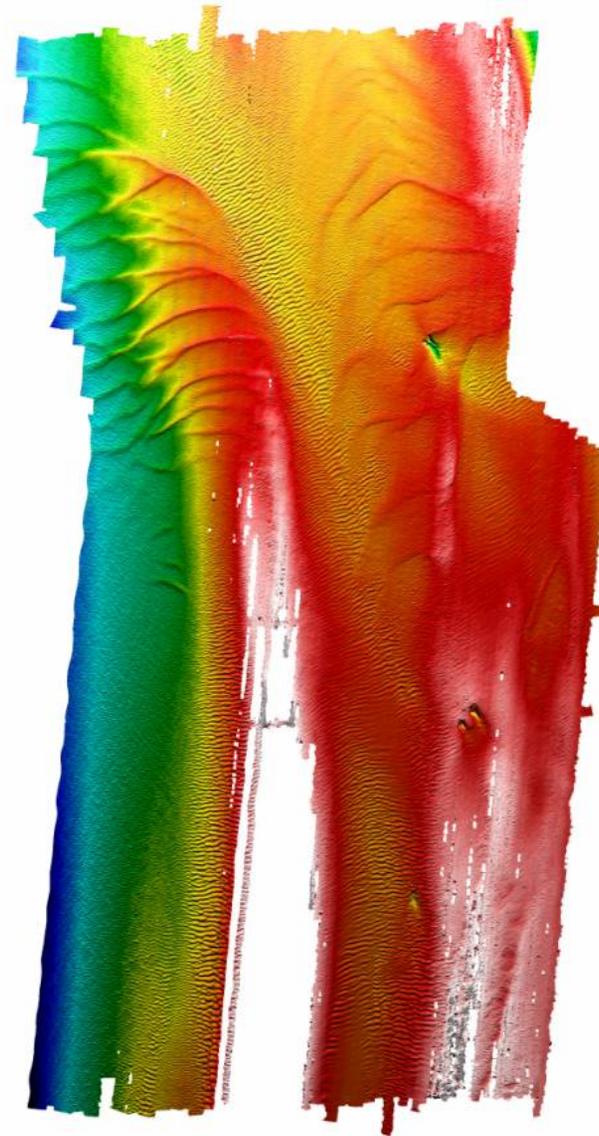
Design Basis - Environmental Design Parameters

- Environmental design parameters
 - Operational and extreme wind climate incl. information about ambient turbulence, wind shear and directional distribution
 - Operational and extreme wave climate incl. information about directional distribution, currents and marine growth
 - Joint probability of wind and waves
 - Weather windows available for installation and service related operations
 - Analyse of accessibility of wind turbines



Design Basis - Environmental Design Parameters

- Environmental design parameters
 - Water depths incl. information about tidal levels and range, long term seabed movements, global seabed erosion and storm surge levels
 - Soil conditions consisting of mechanical properties of soil and their range of stratum
 - Properties of sea ice floes in some areas



- Design Principles
 - Design life, return periods, safety factors
 - Definition of load cases
 - Hydrodynamic coefficients
 - Material properties (e.g. steel, concrete, grout)
 - Corrosion protection system, corrosion allowance, definition of splash zone
 - Local scour development
 - Loads on secondary steelwork and functional description of secondary steelwork
 - Ship impact



Scroby Sands

A photograph of an offshore wind farm at sunset. The sky is a mix of orange, red, and purple, with the sun low on the horizon. Several wind turbines are visible in silhouette against the bright sky. In the foreground, the dark blue water of the ocean is visible, with a reflection of the sunset. On the right side, a portion of a structure, possibly a crane or part of a turbine, is visible in silhouette. The word "END" is centered in the lower half of the image.

END