In the design of offshore wind farms as well as other offshore structures, it is important to have accurate and complete metocean data. This data is based on historical records, which means that the data is only as reliable as the input data. The data cannot take any responsibility for the raw data, but only the post-processing they are in control. A metocean report will include all data analyses and presentations to form the fundamental background data for a reliable foundation design. The necessary background data to be used for the metocean data analysis will consist of validated and certified long duration time series hindcast data from highly experienced data providers using state-of-the-art numerical models in combination with meterological input data from recognised institutions.

Examples of inadequate data
- Raw time series to be post-processed by e.g. the foundation designer. The foundation designer is extensive in the detailed design.
- It is a time-consuming challenge if the raw data are from two different sources that are not synchronised, e.g. wave data from a buoy and wind data from a metmast.

Example of incomplete and inconsistent data
- Missing tables making it difficult to establish the design basis.
- Different total count in various tables.
- Different values specified for the same property in different tables.
- In essence this will have to be commented on by the foundation designer as well as the certifying body and rectified by the metocean/wind assessment contractor making the certification process more time consuming than necessary.

Metocean study
In order to ensure that the background data for the foundation design are adequate and complete, Ramboll can offer to produce a complete metocean report applicable for a specific project site. The metocean report will include all data analyses and presentations to form the fundamental background data for a reliable foundation design.

The analyses carried out for the metocean report will include the following elements:
- Rose plots
- Extreme value analyses for selected return periods (typically 10, 50 and 100 years)
- Scatter tables and plots
- Exceedance and persistence probabilities

All analyses will be made with respect to directional intervals as well as seasonal analyses.

All data analyses and presentations are made using software from the recognized DHI MIKE package as well as software developed in-house.

Metocean study references, offshore wind farms
- Gode Wind II, Germany
- Atlantic City, US
- Humber Gateway, UK

### RISK MATRIX

In short the quality of the Metocean Background Data versus Risk Level and Extra Costs is summarized in the below table:

<table>
<thead>
<tr>
<th>Risk Level and Extra Costs</th>
<th>Background Data:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH</td>
<td>Inadequate, Incomplete AND Uncertified.</td>
</tr>
<tr>
<td>MEDIUM</td>
<td>Inadequate, Incomplete OR Uncertified.</td>
</tr>
<tr>
<td>LOW</td>
<td>Adequate, Complete AND Certified.</td>
</tr>
</tbody>
</table>

### FACTS ABOUT OFFSHORE WIND

Ramboll is a leading engineering, design and consultancy company founded in Denmark in 1945. We employ close to 10,000 experts, and with more than 200 offices in 23 countries we emphasise local experience combined with a global knowledge base. We constantly strive to achieve inspiring and enabling solutions that make a genuine difference to our customers, the end-users and society as a whole. Ramboll operates within the areas of Buildings & Design, Infrastructure & Transport, Energy & Climate, Environment & Nature, Industry & Oil/Gas, IT & Telecom and Management & Society. Ramboll’s Offshore Wind division has almost 100 dedicated employees situated in our three main offices in London, Copenhagen and Esbjerg as well as in our hub offices in Hamburg and New York.

### FURTHER INFORMATION

For further information on Metocean studies and our capabilities please contact Ramboll Energy - Offshore Wind, Hennemanns Alle 53, DK-2300 Copenhagen S, Denmark. Tel +45 5161000, Chief Consultant Jesper Skaup, js@ramboll.com