OWA *Wind Data for Non-Validated Areas* Project

Data Management and Confidentiality Arrangements

Background

The OWA Partners are increasing activity in new offshore wind markets. In northern European waters, there are good datasets from existing wind resource measurements (e.g. the Marine Data Exchange[1]) which allow mesoscale models and reanalysis datasets to be validated and/or calibrated in advance of deploying measurement systems at a prospective wind farm location. However, in the early phases of project selection and lease auctions in new markets, no such data are typically available. As a result, developers may have to rely on mesoscale models or reanalysis data with little evidence as to their accuracy.

The OWA S4Y4 *Wind Data for Non-Validated Areas* project aims to address this. Between them, the OWA Partners have installed a large number of floating LiDARs and other measurement assets in new markets. The resulting data are proprietary, and even the locations and ownership of these systems may be commercially sensitive. However, they represent the best opportunity to validate mesoscale models and reanalysis datasets in new markets. This in turn could be used by all of the OWA Partners to assess the potential bias and uncertainty on early-stage yield assessments based on reanalysis data and/or mesoscale models. It could also be used to decide which model, or ensemble of models, should be selected for a given site to minimise overall uncertainty.

The OWA TWG-Y members are also well-connected with commercial mesoscale modelers / virtual met mast (VMM) data providers. As such, they are well-placed to secure in-kind contributions from these organisations in exchange for feedback on their performance.

Purpose of This Document

The success of this project hinges on OWA Partners' willingness to share wind resource measurements from new markets around the world. Developers' interests in new markets, floating LiDAR data and mesoscale model results are all commercially sensitive. This project is being planned to maintain individual developers' confidentiality whilst maximising the usefulness of the outcomes.

This document sets out the way in which data will be managed in the project to ensure that confidentiality is maintained. Once agreed, TWG members can use this to support internal decision / approval processes on data sharing for the purposes of the project.

In the context of this project, "new markets" denotes any potential offshore wind farm location (fixed-bottom or floating) outside of the North Sea and the Baltic Sea.

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[1] Marine Data Exchange

Stakeholders and Data Transfers

Typically, OWA projects are delivered by a single contractor. In this case, to ensure confidentiality and broad participation, there are more stakeholders involved:

- **The Carbon Trust** will receive and anonymise all measured data, holding the original data secure and liaising with the other stakeholders.
- Each **OWA Partner** will supply their floating LiDAR or other wind resource data (with motion correction applied, if appropriate) to the Carbon Trust, along with the location (latitude and longitude) and any other relevant metadata.
- The Carbon Trust will also source resource measurements from **Public Domain Measured Data Sources** such as the US Department for Energy *Atmosphere to Electrons* programme[2].
- The Carbon Trust will give each site a unique identifier known only to the Carbon Trust and (in the case of OWA Partners' data) the OWA Partner who owns the data. Data supplied by OWA Partners and data sourced from public domain resources will be treated in the same way, to maximise protection of OWA Partners' data.
- **Mesoscale Modellers / VMM Data Providers** will be required to sign a non-disclosure agreement before receiving any data. Once under NDA, the Carbon Trust will generate a specification for mesoscale modellers / VMM data providers consisting of, for each site: the unique identifier, the location (lat/lon), the start and end of the deployment period and the measurement heights relative to an agreed reference (e.g. mean sea level, MSL). They will not be told which developer has provided data for each site; nor will they be given access to any measured data. Mesoscale modellers / VMM data providers shall then provide a time-series of wind speed, wind direction and turbulence intensity at each location.
- Each data owner will be given access to the mesoscale model / VMM data for their sites, but not for any others.
- The **Validation Contractor** will receive the measured and modelled time-series data for each location, and its unique identifier. They will not be told which developer has provided data for each site, though the mesoscale model data providers will be named. They will be bound by the usual confidentiality constraints of the OWA Contractor's Terms and Conditions. The validation contractor will:
    - Clean up the measured data using an agreed, standardised approach.
    - Source reanalysis data from **Public Domain Reanalysis Data Sources** (e.g. Copernicus for ERA5) for each site
    - For each site, and for every mesoscale or reanalysis dataset available for that site, process the data to derive key statistics on the accuracy of the data. This is expected to include:
        - Gain, offset and r^2 from a two-parameter regression
        - Gain and r^2 from a one-parameter regression
        - Bias in Weibull A and k from the measured and modelled data
        - Other statistics to be agreed

      Any strong sensitivities, e.g. seasonality, sensitivity to wind direction for coastal sites, or sensitivity to height should be identified and explored.
    - Use these results to draw conclusions on:

[2] Offshore Wind Energy - Buoy Lidar Project

        - The overall predictive power of mesoscale models / VMMs in previously unvalidated areas;
        - The sensitivity of accuracy to key parameter, e.g. continent, latitude, distance from shore etc.;
        - The uncertainty that should be assigned to wind resource estimates based on mesoscale models / VMMs in the absence of any other information; and,
        - The potential for using an ensemble of such models to reduce uncertainty, the optimum strategy for doing so and the uncertainty reduction that can be achieved.
    - Deliver two versions of a final report summarizing all of the outcomes:
        - In both versions, the sites are referred to by their unique identifier
        - In one version, the mesoscale model / VMM datasets are named explicitly. This version is for circulation to the OWA Partners
        - In the other version, the mesoscale model / VMM datasets are anonymized, with each provider given a unique identifier. This version is for circulation to the mesoscale modellers / VMM data providers. Each data provider will be told which their model is, but will not be able to identify the results from their competitors.
- Any publications arising from the work would require the unanimous approval of all OWA Partners.

All data contributed by OWA Partners shall remain the property of the original owner. By contributing data, the OWA Partner grants the Carbon Trust a license to use the data for the purposes of this project in accordance with the final, agreed version of this document.

Data Access Summary

The rights of each stakeholder to access each data type is summarised in Table 1 below.

Summary of Data Access Rights for the WDMVA Project			Stakeholders					
			Data Owner / Contributor (OWA Partner)	Other OWA Partners	Carbon Trust	Mesoscale Modeller	Validation Contractor	Public
Data Types	For sites contributed by OWA Partners	Name of Data Owner / Contributor	**Yes**	No	**Yes**	No	No	No publications or public statements without unanimous approval of OWA Partners
		Site location (lat/lon)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	
		Measurement period (start/end dates)	**Yes**	No	**Yes**	**Yes**	**Yes**	
		Measured wind resource data	**Yes**	No	**Yes**	No	**Yes**	
		Wind data from mesoscale model(s)	**Yes**	No	**Yes**	**Yes**	**Yes**	
		Wind data from reanalysis dataset(s)	**Yes**	No	**Yes**	Can source	**Yes**	
		Statistics of correlation between measured & modelled data	**Yes**	**Yes**	**Yes**	**Yes** (for own model, others anonymised)	**Yes**	
	For sites with public-domain data	Name of Data Owner / Contributor	N/A	Can source	**Yes**	Can source	Can source	Measurements are already in the public domain, but no publications will be produced without unanimous approval of OWA Partners
		Site location (lat/lon)	N/A	**Yes**	**Yes**	**Yes**	**Yes**	
		Measurement period (start/end dates)	N/A	Can source	**Yes**	**Yes**	**Yes**	
		Measured wind resource data	N/A	Can source	**Yes**	No	**Yes**	
		Wind data from mesoscale model(s)	N/A	No	**Yes**	**Yes**	**Yes**	
		Wind data from reanalysis dataset(s)	N/A	Can source	**Yes**	Can source	**Yes**	
		Statistics of correlation between measured & modelled data	N/A	**Yes**	**Yes**	**Yes** (for own model, others anonymised)	**Yes**	

"Can source" denotes that the information is publicly available, so the stakeholder could source it independently, but it will not be provided to them under this project.

Table 1: Summary of Data Access Rights for the WDNVA Project