



# **OFFSHORE WIND METOCEAN MEASUREMENT CAMPAIGN**

## **INVITATION TO TENDER**

# TABLE OF CONTENTS

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1. DEFINITIONS AND ABBREVIATIONS	3
2. INTRODUCTION	6
2.1 PROJECT BACKGROUND	6
2.2 SITE DESCRIPTION	7
3. SCOPE OF WORKS	9
3.1 OVERVIEW	9
3.2 TIMELINE	9
3.3 EQUIPMENT AND DATA SPECIFICATIONS	9
3.3.1 Data requirements	10
3.3.2 Data availability requirements	12
3.3.3 Equipment requirements	12
3.3.4 Data collection process requirements	17
3.4 DELIVERABLES	18
3.4.1 Scope of activities to be completed by campaign provider	19
3.4.2 Documentation and Reporting	20
3.4.3 Timeline for deliverables	22
4. BID SUBMISSION	25
5. TENDER EVALUATION CRITERIA	27
5.1 TECHNICAL EVALUATION (WEIGHTING: 80%)	27
5.2 PRICE EVALUATION (WEIGHTING: 20%)	27
5.3 COMBINED AND FINAL EVALUATION	27
SCHEDULE A	28
SCHEDULE B	29
SCHEDULE C	30

# 1. DEFINITIONS AND ABBREVIATIONS

Term	Meaning
°	Degrees.
°C	Degrees Celsius.
Bidder	A business or entity that submits to this tender to undertake a work to perform metocean measurements as described in this document.
BELCO	Bermuda Electric Light Company Ltd who is Bermuda's sole supplier of electricity, operating a generating plant and transmission and distribution systems.
Contracted measurement period	The duration of the measurement campaign required to collect metocean data that covers the 12 calendar months of the year and meets the requirements described in this document. To achieve this, the provider must undertake a campaign that therefore includes an equipment deployment period of 12 months <b>or more</b> to achieve the data requirements in this document.
CV	Curriculum vitae
ITT	Invitation to tender
RA	Regulatory Authority of Bermuda
RE	Renewable energy
LAT	Lowest Astronomical Tide.
LiDAR	Measurement system that uses light and the principles of radar; this is a widely used approach for undertaking offshore wind metocean measurement campaigns.
m/s	Meters per second.

Term	Meaning
Measuring equipment	The selected equipment that have the capability to measure wind speed, wind direction, ambient temperature and oceanographic data.
Metocean measurement campaign	Exercise designed to represent as much as possible the wind and wave conditions that the turbines will face in their lifetime.
Monthly post-processed data availability <sup>1,2</sup>	The Monthly Post-processed Data availability is the number of those data entries remaining after the subtraction of invalid data entries, for example, from system internal filtering, i.e. excluding flagged data entries (NaN or 999), from determined quality filters system or downtime from unexpected events (such as equipment failure or weather event) divided by the maximum possible number of datapoints for the parameter (10-minute data for wind, temperature, humidity, pressure, current, salinity and 30-minute data for wave) within the respective calendar month, regardless of the environmental conditions within this period.
Monthly system availability <sup>1,2</sup>	This is the number of data entries when the measurement system is deployed (e.g. not taken out for maintenance) and ready to function and deliver data, taking into account all time stamped data entries in the output data files including flagged data (e.g. by NaNs or 9999s) for the given month divided by the maximum possible number of datapoints for the parameter including periods of maintenance (10-minute data for wind, temperature, humidity, pressure, current, salinity and 30-minute data for wave) within the respective calendar month.
Overall post-processed data availability <sup>1,2</sup>	The Overall Post-processed Data availability is the number of those data entries remaining after the subtraction of invalid data entries, for example, from system internal filtering, i.e. excluding flagged data entries (NaN or 999), from determined quality filters system or downtime from unexpected events (such as equipment failure or weather event) divided by the maximum possible number of data entries (10-minute data for wind, temperature, humidity, pressure, current, salinity and 30-minute data for wave) within the

<sup>1</sup> IEA Wind Recommended Practices: 18 Floating LiDAR Systems: First Edition, 2017; September 2017. <http://community.ieawind.org/publications/rp>

<sup>2</sup> Carbon Trust Offshore Wind Accelerator: Roadmap for the Commercial Acceptance of Floating LiDAR Technology (Version 2.0, 9th October 2018)

Term	Meaning
	contracted measurement period regardless, of the environmental conditions within this period.
Overall system availability <sup>1,2</sup>	This is the number of data entries when the measurement system is deployed (e.g. not taken out for maintenance) and ready to function and deliver data, taking into account all time stamped data entries in the output data files including flagged data (e.g. by NaNs or 9999s) for the contracted measurement period divided by the maximum possible number data entries including periods of maintenance (10-minute data for wind, temperature, humidity, pressure, current, salinity and 30-minute data for wave) within the contracted measurement period.
Provider	The business or entity selected from this tender that undertakes the work to perform metocean measurements as described in this document.
TD&R	Transmission, distribution and retail

## 2. INTRODUCTION

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As a part of the [Integrated Resource Plan \(IRP\)](#), the Regulatory Authority of Bermuda (RA) have set an ambitious target of reaching 85% renewable energy (RE) generation by 2035. Offshore wind energy has been the selected technology for the decarbonisation initiative. As first steps towards achieving the RE target, an offshore windfarm of approximately 60MW is planned to be connected to the grid which would become operational by 2030.

RA is issuing an Invitation to tender (ITT) for the offshore metocean measurement campaign as an initial step for development of offshore wind energy in Bermuda. Bids should be sent by email to [renewables@ra.bm](mailto:renewables@ra.bm) by no later than 11:59 pm on 4 November 2025 (bid submission last date), at the latest. The details around the submission are presented in Section 4.

### 2.1 PROJECT BACKGROUND

Due to the novel nature and small scale of the offshore wind project, we believe that it will benefit from complementary studies to ensure positive engagement of potential developers. Therefore, as the next steps to de-risk the offshore wind project and provide potential developers with more certainty, a metocean measurement campaign is to be completed.

The primary objective of this assignment is to provide high quality wind and ocean measurement data covering a full year (12 consecutive months) for the preferred site for the 60MW windfarm. The provider shall be responsible for the planning, commissioning, implementation and decommissioning of the metocean measurement campaign. The provider shall also, where necessary, engage with local partner(s), the Transmission Distribution and Retail (TD&R) licensee BELCO, and other related stakeholders to ensure the successful completion of the measurement campaign.

## 2.2 SITE DESCRIPTION

After a thorough process of examining and mapping various constraints, followed by engagements with the government, the RA identified a potentially suitable site for the offshore wind project located in the Lagoon, around 9km from shore, north of St. George's Island (see Figure 1).

Figure 1 Proposed site and two potential cable routes

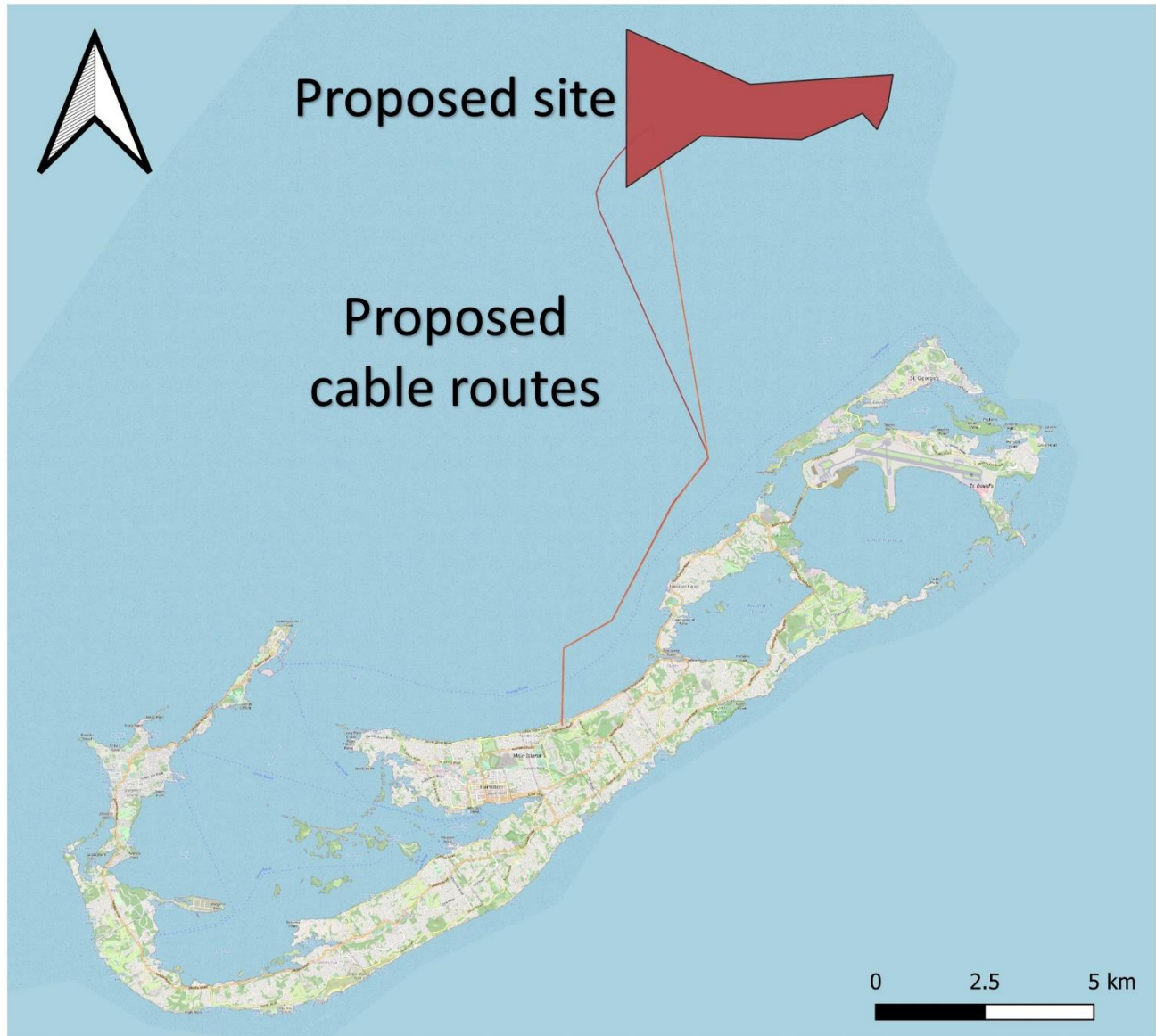


Table 1 provides details about the site characteristics.

Table 1 Site characteristics

Parameter	Description
Location	The site is located in the Bermuda Lagoon, within the Rim reef. The coordinates for the site are 32°26'N 64°44'W.
Area	A maximum 14km <sup>2</sup> (accounting for potentially increasing the capacity of the offshore wind project to 80MW).
Export cable route	Estimated to be around 17km to a point of connection at Tyne's Bay waste treatment facility. Shorter route could be possible as a conservative approach to bypassing environmental constraints was taken for the estimates.
Seabed	Flat, covered in sediment of currently unknown sheer properties.
Depth	Approximately 15m.

Further information on the site selection process that has been conducted thus far, the proposed site and environmental considerations can be found in the following consultations and publicly available studies conducted by the RA.

- Offshore wind farm public consultation<sup>3</sup>;
- Bermuda offshore wind public report<sup>4</sup>; and
- Bermuda offshore wind presentation<sup>5</sup>.

<sup>3</sup> <https://www.ra.bm/public-consultations/offshore-wind-farm-consultation>

<sup>4</sup> <https://www.ra.bm/reports/bermuda-offshore-wind-public-report>

<sup>5</sup> <https://www.ra.bm/reports/bermuda-offshore-wind-presentation>



## 3. SCOPE OF WORKS

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### 3.1 OVERVIEW

A metocean measurement campaign is a critical step in the development of an offshore wind power plant. This data is essential to determine the optimal design and financial viability of the wind power plant.

Bidders are invited to provide submissions that demonstrate the ability to deliver the metocean measurement campaign as per the requirements and expected deliverables detailed in this section, while taking the necessary measures to minimise environmental impact.

Bidders shall state in their submission what standards or guidelines they comply with. This document references the following standards and guidelines:

- IRENA Wind Resource Measurement: Guidelines For Islands;
- IEA Wind TCP RP 18 Floating Lidar Systems;
- Carbon Trust Offshore Wind Accelerator: Roadmap for the Commercial Acceptance of Floating LiDAR Technology (Version 2.0, 9th October 2018);
- IEC 61400-12-1:2017;
- ISO-17025;
- IEC 60825;
- IEC 61400-50 (Wind energy generation systems - Part 50: Wind measurement – Overview); and
- International Standard ISO 19901-1, Part 1: Metocean design and operating considerations, Second edition 2015-10-15.

If bidders do not intend to comply with any one of these standards in their proposal, they must indicate this in their submissions and present alternative or equivalent standards and provide justification.

### 3.2 TIMELINE

The measurement campaign is envisaged to take place for the duration of one year beginning Q1 2027. The bidder is expected to provide a workplan detailing their plan for execution in their submission.

### 3.3 EQUIPMENT AND DATA SPECIFICATIONS

This section outlines the requirements the RA has with respect to the data collected from the measurement campaign and the equipment used in the campaign. This includes:

- Data to be provided;
- Data availability requirements;
- Equipment requirements; and
- Data collection process requirements.

The aim is to ensure the metocean measurement campaign produces data to support a bankable yield assessment, and inform design, operation and maintenance strategy for the windfarm.

The RA has carried out preliminary research which has suggested LiDAR based measurement as the most viable solution for the project. However, bidders are invited to propose any approach that they deem fit to meet the data specifications and site conditions of this campaign.

### 3.3.1 Data requirements

The metocean measurement data to be collected and provided to the RA is set out in Table 2 and Table 3. The providers shall supply **both** the raw recorded and cleaned or quality assured data sets.

The data in Table 3 shall comply with International Standard ISO 19901-1, Part 1: Metocean design and operating considerations, Second edition 2015-10-15 or equivalent. Raw measured data are to be provided such that wave frequency-direction spectra can be estimated. The method to perform the tidal correction for the water level recorded should be specified in the proposal.

Table 2 Meteorological data requirements for the metocean campaign

Meteorological Parameters	Type of data
Wind speed and corresponding wind direction at the following 10 heights relative to MSL: <ul style="list-style-type: none"> <li>• 30m</li> <li>• 60m</li> <li>• 80m</li> <li>• 100m</li> <li>• 120m</li> <li>• 140m</li> <li>• 160m</li> <li>• 180m</li> <li>• 200m</li> <li>• 250m</li> </ul>	1 Hz Raw
	10 minute mean
	10 minute standard deviation
	10 minute and 100 minute minimums
	10 minute maximum
Near surface wind speed and corresponding direction at measurement equipment level	1 Hz raw
	10 minute average
Ambient temperature at measurement equipment level	1 Hz raw
	10 minute minimum
	10 minute average

Meteorological Parameters	Type of data
	10 minute maximum
	1 Hz raw
	10 minute minimum
Barometric pressure at measurement equipment level	10 minute average
	10 minute maximum

Table 3 Oceanographic data requirements for the metocean campaign

Ocean Parameter	Type of data
	2 Hz raw significant wave height
Wave height	30 minutes significant wave height
	30 minutes maximum wave height
	30 minutes spectral peak wave period
Wave period	30 minutes mean zero-crossing wave period
	30 minutes mean
Wave direction	30 minutes peak
Directional spreading	30 minutes
Directional frequency spectrum: Energy density and mean direction for each frequency bin	30 minutes
Current speed at several positions <sup>6</sup> over the water depth	10 minutes average
Current direction at several positions <sup>6</sup> over the water depth	10 minutes average
Water level relative to Lowest Astronomical Tide (LAT)	10 minutes average

<sup>6</sup> If possible, with a higher resolution near the surface and the seabed. The final measurement elevations to be defined and agreed at the start of the project.

Ocean Parameter	Type of data
Seawater temperature	10 minutes average
Salinity	10 minutes average

For the datapoints above, corresponding timestamps, location and the corresponding height or sea level depths shall also be recorded. Any additional parameters that are used by the provider to complete data validation and quality assurance processes are also to be provided.

All measurements shall be in SI units unless otherwise specified and provided in the raw logger format and .TXT/.CSV file formats.

The data collected shall cover a minimum of 12 continuous months.

### 3.3.2 Data availability requirements

The measurement campaign shall be designed by the provider to ensure that for the contracted measurement period, the following data availability requirements for each of the data types with a frequency interval of 10 minutes or 30 minutes listed in Table 2 and Table 3, are met.

- Monthly system availability of 90%;
- Overall system availability of 95%;
- Monthly post-processed data availability of 80%; and
- Overall post-processed data availability of 85%.

It should be noted that the availability of wind speed and direction datasets must be considered separately at each height measured. Wind measurements at heights of greater than 200m are to be excluded from the availability calculation. The availability of current speed and direction data shall be considered by averaging the individual availabilities across the measured depths to produce a single value.

In the case of multiple (redundant) measurement instruments determining one parameter value, the availability of at least one parameter value determines the data availability.

Bidders shall clearly explain in their bid submission their proposed methodology to achieve the data availability requirements. It is expected that this proposed methodology will include considerations of the campaign design, equipment selection, allowances for redundancy such as a secondary measurement system as well as sustainability and environmental impact. If during the campaign, any of the above data availability requirements are not met, it shall be the responsibility of the provider to extend the campaign until all the data availability requirements are achieved for a dataset that covers the 12 calendar months. Bidders shall include sufficient provisions in their submission to allow for this.

### 3.3.3 Equipment requirements

The measuring equipment used by the provider shall be capable of providing all the data specified in Data requirements for the contracted measurement period. To ensure this, the provider needs to ensure their proposed measurement system meets the requirements described in this section.

### 3.3.3.1 Operating tolerances

The provider shall ensure the equipment used will be suitable for the expected environmental conditions at the chosen site location. If further information is required about the site or environmental conditions to ensure their equipment remains within designed operating tolerances for the duration of the campaign, the provider shall request this in a Request For Information (RFI) after the kick-off.

As a minimum, the provider shall use equipment that has considered the following environmental conditions:

- Relative humidity (up to 100%);
- Ambient temperature range ( -40 to 60°C);
- Ocean temperature range (0 to 40°C);
- Ocean depth of approximately 20m;
- Offshore ocean salinity of up to 38ppt<sup>7</sup>;
- Wind speeds up to category 4 hurricanes (up to 70m/s).

### 3.3.3.2 Wind Measurement

The equipment used to obtain the wind measurements must meet the minimum specifications as stipulated in Table 4.

Table 4: Wind speed measurement equipment specifications

Wind characteristic	Parameter	Unit	Value
Wind speed	Measurement range	m/s	0-70
	Measurement starting threshold	m/s	≤0.1
	Accuracy	%	≤1
	Resolution	m/s	≤0.01
Wind direction	Direction measurement range azimuthal angle	°	0 – 360
	Wind direction bin	°	≤5
	Measurement starting threshold	m/s	≤0.1
	Accuracy	°	≤5
	Resolution	°	≤1

### 3.3.3.3 Atmospheric Temperature measurement

The equipment used to obtain the temperature measurements shall meet or exceed the precision level set out in Table 5.

<sup>7</sup> <https://www.frontiersin.org/articles/10.3389/fmars.2023.1289931/full>

Table 5: Temperature measurements equipment specifications

Parameter	Unit	Value
Resolution	°C	0.1
Accuracy	°C	0.5

#### 3.3.3.4 Atmospheric pressure measurement

The precision of the equipment used to obtain atmospheric pressure recordings shall meet the specifications in Table 6.

Table 6: Atmospheric pressure measurements equipment specifications

Parameter	Unit	Value
Resolution	kPa	≤0.2
System accuracy	kPa	≤1

#### 3.3.3.5 Status reporting

The measuring equipment shall report status information on the operational state of the measuring equipment and clearly identify any problems to ensure that data continuity and quality assurance requirements for the campaign are met.

#### 3.3.3.6 Power supply requirements

For the mode(s) of power supply chosen, the status of the onboard stored energy or fuel levels shall be reported to the offsite monitoring system. The power supply system (combined with backup) shall be designed, operated and maintained to ensure the requirements in Section 3.3.3.9 are met for the full duration of the measurement campaign.

#### 3.3.3.7 Safety and protection requirements

The provider shall be responsible for ensuring the electrical safety and protection of the installed measuring equipment by:

- Ensuring equipment complies with relevant Bermuda regulations and standards;
- Ensuring appropriate grounding and lightning precautions;
- Ensuring the immunity level of the equipment is appropriate to help prevent other equipment in the vicinity from affecting the integrity of the measurements;
- Class 1 or 1M as per IEC 60825 pertaining to safety classification if LiDAR equipment is proposed;
- All other parts of IEC 60825 if LiDAR equipment is proposed;
- Appropriate enclosures and measures to prevent the equipment being affected by insects, marine life and/or birds; and

- Ensuring the equipment used complies with other relevant CE, EMC requirements and IEC standards as appropriate (bidder to specify what standards and certifications they abide by).

#### **3.3.3.8 Warning Lighting**

The installed equipment shall have sufficiently visible lighting to warn other ocean users of its presence to minimise the risk of collision with vessels.

#### **3.3.3.9 Continuity and redundancy**

The RA requires the provider of the metocean measurement campaign to implement the appropriate measures to ensure continuity of operation and redundancy in the system to achieve the stated Data availability requirements. The full methodology of how the provider plans to implement these needs to be provided in their bid. These could include, but are not limited to:

- Measures to prevent equipment failure in line with the operating environment;
- Regular maintenance plan;
- Unplanned maintenance procedures – addressing equipment failure, component replacements etc.; and
- A secondary (backup) measurement system correlated to the primary system.

Maintenance shall be carried out in such a way that it does not negatively impact the continuity of measurement i.e. if maintenance requires the removal of equipment from its installed location, replacement equipment shall be temporarily installed.

The provider shall manage the replacement of damaged components so that Data availability requirements will still be met. Any equipment failures and their duration shall be reported to the RA.

#### **3.3.3.10 Pre-campaign validation requirements for LiDAR equipment**

If LiDAR equipment is proposed, it shall be in either pre-commercial (stage 2) or commercial stage (stage 3) according to the Carbon Trust<sup>2</sup> and this must be confirmed in the bid submission.

LiDAR equipment proposed shall also be fully validated according to industry best practice recommendations as described by the IEA<sup>1</sup> and Carbon Trust<sup>2</sup>.

Therefore, to demonstrate the bidder's proposal will meet validation requirements, the following documentation shall be included in the bid submission:

1. LiDAR System Classification report and, if available, Floating LiDAR Classification report;
2. Valid Independent report on LiDAR component performance against a suitable fixed mast reference. The report should be via a reputable and recognised third party organisation;
3. Valid Independent report on Floating LiDAR system performance and accuracy against a suitable fixed mast reference including the measurement of turbulence intensity. The report should be via a reputable and recognised third party organisation and confirm the systems commercialisation level as according to the Carbon Trust<sup>2</sup>;
4. Proposal for validation of system performance and accuracy during deployment phase;

5. If the proposed floating LiDAR system has only achieved **Stage 2 pre-commercial status** as per [2], a valid **Type validation report** for the proposed system (reviewed and approved by an independent and accredited institute according to international guidelines) is to be provided in the bid submission. This report shall validate the capability of the system to measure wind speed and direction accurately and reliably in accordance with one or both of the following:
  - Chapters 5 and 7 of IEA's guide<sup>1</sup>; and
  - 3.5.2 of the Carbon Trust guide<sup>2</sup>.
6. If the proposed floating LiDAR system has only achieved **Stage 2 pre-commercial status** as per [2], following the award of the campaign, as part of the project implementation documentation, a **pre-deployment unit validation report** that validates the actual LiDAR measurement system(s) to be used (confirmed by an independent and accredited institute according to international guidelines) is to be provided. This report shall include uncertainty assessment and validate the actual LiDAR measurement system according to one or both of the following:
  - The wind resource assessment campaign design of chapter 6 and 8 of the IEA guide<sup>1</sup> and
  - 3.4.3 & 2.5.3 of the Carbon Trust guide<sup>2</sup>.
7. If the proposed floating LiDAR system has achieved **Stage 3 commercial status** as per [2] a valid **classification report** (reviewed and approved by an independent and accredited institute according to international guidelines) is to be provided in the bid submission. This report shall validate the capability of the system (setup) to accurately and reliably measure wind speed and direction in accordance with one or more of the following:
  - Chapters 5 and 7 of the IEA guide<sup>1</sup>; and
  - 3.5.2 of the Carbon Trust guide<sup>2</sup>.

#### **3.3.3.11 Pre-campaign validation requirements for anemometer/wind vane equipment**

If anemometer or wind vane equipment is proposed, it must pass the following acceptance testing as per Section 9.2 of the IRENA guide<sup>8</sup>.

1. If calibrated anemometers were purchased, consult each calibration certificate to ensure sensor behaviour is within normal bounds;
2. Inspection for any signs of mechanical friction or defects; and
3. Check the data logger correctly outputs the values measured from this equipment across a sample of the expected wind conditions measurement range.

#### **3.3.3.12 Oceanographic instrumentation pre-campaign validation and calibration**

For oceanographic measurement instrumentation, the calibration of instrumentation is to be performed where possible by an accredited calibration laboratory accredited to ISO-17025 or national equivalent. The provider shall confirm the instruments provide accurate measurements for the deployment conditions for the entire period of the campaign and give an indication of accuracy for summer and winter seasons. This information is to be included in a calibration report included as part of the project implementation documentation.

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<sup>8</sup>IRENA Wind Resource Measurement: Guidelines For Islands



The oceanographic measurement system proposed shall have had undergone validation. In the bid submission, the bidder shall provide a validation report or plan on how the validation will be undertaken before the start of the campaign. This report shall include details and evidence of the validation that took place and could come from trial campaigns or previous validations of other systems of the same design that use the same oceanographic measurement equipment. The report shall confirm the system design, measurement equipment and firmware during the validation is the same as that proposed for the metocean campaign.

#### **3.3.3.13 Additional Standards and certifications**

Depending on the solution proposed by the bidder, additional performance or safety standards may also apply. If this is the case, the bidder shall declare in their submission what additional standards their selected equipment also complies with.

### **3.3.4 Data collection process requirements**

The data shall be recorded and meet data availability requirements for not less than a continuous 12 month period.

A process diagram explaining the data inputs and outputs in their conversion from raw data to processed data shall be provided as part of the project implementation documentation.

#### **3.3.4.1 Data Logging**

Bidders can propose any logger considered suitable for the application. Loggers shall continuously log data for 24 hours a day, 7 days a week for each measured parameter, as specified in Section 3.3.1. The raw measurement data shall be logged and included as part of monthly measurement reporting to the RA, in CSV, TXT and the native file format of the measurement system.

Data shall be logged in a sequential format with corresponding time and date stamps. Loggers shall have equipment such as real-time clock, battery back-up and non-volatile memory storage to meet data continuity and redundancy requirements.

The resolution and error of the signal conditioning and data processing of the data logger shall meet the requirements stated in Sections 3.3.3.2, 3.3.3.3, 3.3.3.4.

Diagnostic data such as system performance, health and other relevant information shall also be logged to support the reporting requirements of the campaign as detailed in Section 3.4.2.

#### **3.3.4.2 Data transmission and storage**

The measured data shall be remotely transmitted in near real time (every 10 or 30 minutes depending on the type of data parameter) alongside diagnostic data to be stored remotely in the provider's data repository and or monitoring platform which will be accessible to the RA via a web portal.

On-board storage capacity shall be sufficient for the planned duration of the deployment with appropriate redundancy and mitigations to prevent data loss.

A reliable communications system shall be used that preferably has more than one communication channel (e.g. cell phone network protocols, satellite communications, radio) that can be switched automatically or via remote control.

For the offsite storage, a primary data storage system and another backup storage system of the transmitted data shall be provided for redundancy and avoidance of data loss. At least one of the backups shall be a secure physical device that can be accessed offline when necessary.

#### **3.3.4.3 Data validation and quality assurance**

There shall also be data quality control procedures in place for data collection to ensure quality assurance and bidders shall describe these processes in their bid submission. This shall also be fully documented in a Data Quality Control Plan and submitted as part of the campaign deliverable project implementation documentation.

To provide data quality assurance for the duration of the campaign, collected data shall be validated each month to produce processed data. The validation process shall be defined by the provider based on their experience and manufacturer recommendations, but shall at a minimum, include the removal of non-valid data or flagged data. The validation process shall be explained in the Data Quality Control Plan.

During the measurement campaign, monthly validation reports shall be provided to the RA and shall at a minimum contain information and metadata on:

1. The cumulative and month's data availability per main parameters;
2. The instruments and measurement configuration, maintenance and incidents;
3. Analysis comparing the data collected with a secondary measurement system, other local measuring systems or models for the vicinity of the site if available, with explanation for any deviations in order for the data to be qualified as validated;
4. Information from any reference data source(s); and
5. The provider shall be responsible for performing post-deployment inspection and checks as needed/when an event occurs which casts doubt on the collected data during the campaign<sup>1</sup>. If there are any issues identified, the provider shall organise for a post-deployment validation to be undertaken by a suitably qualified third party against a secondary measurement device or other trusted reference that complies with Section 5.4 of the IEA guide<sup>1</sup>.

## **3.4 DELIVERABLES**

This section describes the minimum requirements of all the deliverables the provider is required to provide at different stages of the measurement campaign. If bidders understand there to be additional scope of works required to deliver a campaign that meets the requirements described in Equipment and data specifications, they shall include this in the methodology section of their proposal and clearly explain what the additional scope includes and the benefit they provide to the campaign.

### **3.4.1 Scope of activities to be completed by campaign provider**

#### **3.4.1.1 Confirmation of equipment installation location(s)**

Following the award of the project, the provider shall identify appropriate locations for installation of the measurement equipment. This shall be informed by the provider's experience and is expected that at least the following factors will be considered:

- Consideration of environmental constraints (including shipping lane and aviation restrictions);
- Consideration of technical requirements;
- Engagement with relevant local authorities;
- Consultation with the RA; and
- Co-ordination with local stakeholders.

The provider will be responsible for co-ordinating with the RA to arrange any site visits required. Bidders are to include sufficient allowance for the coordination and completion of any site visits in their financial offer.

#### **3.4.1.2 Undertaking the metocean measurement campaign**

The provider shall undertake the measurement campaign. This includes, but is not limited to:

- Obtaining and arranging all necessary licences or permits through the Department of Environment and Natural Resources and or notifications required throughout the duration of the campaign – the RA's support will be available;
- Collection of any outstanding data about the site and environmental conditions required to ensure a successful campaign via desktop study, engagement with local third parties and site visits;
- Supply of the measurement equipment, including importation and transportation arrangements to the site (discussion with country officials may be required);
- Installation, testing, commissioning of measurement system including acceptance testing as per Section 9 of the IRENA guide<sup>8</sup>;
- Data collection and processing of the metocean campaign;
- Supply of required documentation and reporting before, after and during the campaign deployment as described in Section 3.4.2;
- Undertaking operations and maintenance activities for the full duration of the campaign;
- Maintaining a project log that meets IRENA guidelines<sup>8</sup> which includes documentation of all adjustments, assumptions, and observations made during the data validation process, equipment locations and any other pertinent information for third party recipients of the measurement data;
- Quality assurance activities as per a submitted quality control plan for the full duration of the campaign;
- Preparing and carrying out contingency measures as required; and
- Decommissioning and removal of equipment at the end of the campaign.

Any other activities the provider deems necessary in addition to the above, shall be included in their submission and financial offer.

All activities undertaken by the provider must be undertaken in accordance with Health and Safety Executive (HSE) management processes (defined by the provider and agreed with by the RA and other relevant stakeholders) and adhere to applicable local regulatory codes and standards.

### **3.4.2 Documentation and Reporting**

The provider shall ensure that all relevant data and processes undertaken in the campaign are captured in documentation and reports are written in English and able to be understood easily by third parties including offshore wind developers and investors. All documentation and reports shall be in searchable PDF format, while data deliverables shall be submitted in CSV format. The documentation and reporting provided to the RA shall follow the guidelines stipulated in this section.

#### **3.4.2.1 Confirmation of equipment installation location plan**

This is a document detailing the installation location selection methodology the bidder will follow. This is to be included as part of the bid submission.

#### **3.4.2.2 Project implementation documentation**

The project implementation documentation for the preferred site shall be submitted to and accepted by the RA before the implementation of the metocean campaign commences. This shall include, but not be limited to the following:

- Measurement location(s) GPS coordinates;
- Documentation of required approvals from relevant local authorities for the campaign to take place;
- Calibration report for oceanographic instrumentation;
- Project Health, Safety and Environment Plan;
- Operations and maintenance plan;
- Equipment technical specifications;
- Documentation to confirm that systems have been recently maintained according to manufacturer's guidelines, the systems have been through a new independent validation, and the latest relevant firmware has been applied;
- Pre-deployment unit validation report for the measurement system to be used (if the proposed floating LiDAR system has only achieved stage 2 pre-commercial status as per Carbon Trust guidelines<sup>2</sup>);
- Description and process diagram explaining the data collection process taken to produce processed data outputs from raw sampled inputs;
- Weather risk management plan during measurement campaign;
- The Data Quality Control Plan which should include, but not be limited to:
  - Description of best practice followed during equipment selection;
  - Equipment classifications undertaken;
  - Complete description of the entire data processing chain (incl. the algorithms used in each step);
  - System filtering that will be applied to data;
  - Quality tests to be performed;
  - The quality flagging system;
  - Plan for data validation processing and analysis and how invalid data due to downtime is to be identified and removed (due to equipment failure, maintenance, severe weather, damage, malfunction, theft, or any other events);
  - Explaining how the risk of data loss will be mitigated; and

- Any other appropriate measures to ensure data completeness, accuracy and reliability.
- Continuity and redundancy plan – measures in place to prevent lost data and ensure continuity of measurements in the event of system malfunction, damage or loss; and
- Decommissioning and removal plans.

#### **3.4.2.3 Site installation report**

A consolidated site installation report shall be provided immediately after the commissioning of all measuring equipment including details and descriptions of:

- The site location;
- Equipment technical specifications;
- High quality photographs of the installation(s) ;
- Completed acceptance testing results as per the IRENA guide<sup>8</sup>;
- Site information log as per as per the IRENA guide<sup>8</sup>; and
- Any other relevant information that allows third parties to fully understand the site and associated measurement data.

#### **3.4.2.4 Monthly measurement and data validation reporting**

Throughout the duration of the campaign, the RA shall be provided with access to the provider's data repository or monitoring platform for real-time analysis.

In addition, for the duration of the campaign, the provider shall submit the following deliverables on a monthly basis:

- All measured data for the month in processed forms (data parameters with a frequency interval of 10 minutes or more).
- A measurement report shall also be submitted to the RA on a monthly basis containing the following:
  - A description of the activities carried out, including reference to any specifications or standards used;
  - Metadata including description of the format of the data supplied;
  - Recorded status information (uptime, available data, carrier to noise ratio (CNR), status flags, etc), timestamp and location;
  - A detailed description of all post-processing or data quality control procedures applied to the raw data with the aim to make this reproducible, as well as reporting on the outcome of these activities;
  - The monthly system and post-processed data availability parameters(for the month and cumulative) for each dataset as specified in Section 3.3.2;
  - A logbook of any system issues, including measurement system status flags, issue description, level of risk to measurements and mitigation; and
  - An overview table showing dates of maintenance activities and or replacements of systems.
- Data validation report containing the following data and associated metadata:
  - Data availability per parameter for the month and cumulative;
  - Instrument and measurement configuration, maintenance and incidents if any;

- Compare the data across installations, and with other measured or modelled data for the vicinity of the deployment location, if available;
- Evaluate how much the data lies within the expected range, analyses or explanation of data lying outside the expected range;
- Results of the data validation or quality control procedure applied to process the raw data and explanation for the rejection or removal of any data;
- Assurance that there is no physical fault or defects with the deployed measurement system;
- Highlight other relevant information as a result of the provider's quality control procedure e.g. missing records precipitation, signal to noise ratio, signal amplitude, battery voltage, system level indicator.

#### **3.4.2.5 Raw measurement data**

All raw measurement data logged by the measuring system shall be provided on a 6 monthly basis to the RA through a system suitable for sharing large quantities of data in a secured way. The process and system bidders intent to use to provide this shall be described in their bid submission under the proposed methodologies section.

#### **3.4.2.6 Completion report**

The provider shall deliver a consolidated site measurement report at the end of the measurement campaign, which shall include all the consolidated raw data, quality assured datasets, associated metadata. The report shall summarise the previous monthly reports and highlight any lessons learnt. Any further measurements, if required, shall be justified in this report.

#### **3.4.2.7 Decommissioning report**

After the measurement data has been accepted by the RA, the provider shall decommission the measuring equipment, safely remove it from the site, and return the sites to their previous conditions in accordance with the local regulations and good practice.

A decommissioning report shall be provided within 30 days after the decommissioning. If any entity wishes to continue measurements at one or more sites, these arrangements shall be done bilaterally by the provider outside of this assignment.

### **3.4.3 Timeline for deliverables**

The milestones and deliverables required in this campaign are summarised in Table 7 below.

Table 7: Key deliverables

	Milestone	Deliverables	Indicative due date
1.	Pre-campaign works	<ul style="list-style-type: none"> <li>Kick-off meeting</li> <li>Site visits</li> <li>Stakeholder engagements as needed</li> <li>Obtain local permissions</li> <li>Finalise measurement site installation location</li> </ul>	4 Weeks from contract award
		<ul style="list-style-type: none"> <li>Project implementation documentation (submitted and accepted by the RA)</li> </ul>	6 Weeks from contract award
2.	Installation and commissioning	<ul style="list-style-type: none"> <li>Supply, installation, testing and commissioning of measurement system</li> </ul>	4 Months from contract award
		<ul style="list-style-type: none"> <li>Site installation report submitted to the RA for acceptance of satisfactory commissioning</li> </ul>	2 Weeks from site commissioning
3.	Data collection	<ul style="list-style-type: none"> <li>Monthly measurement reports (submitted to and accepted by the RA)</li> <li>Monthly data validation reports (submitted to and accepted by the RA)</li> </ul>	Monthly from site commissioning
		<ul style="list-style-type: none"> <li>Operations and maintenance activities as required</li> <li>Project log</li> <li>Test reports (if any)</li> <li>Data quality and continuity assurance activities</li> </ul>	Throughout the campaign
		<ul style="list-style-type: none"> <li>Completion report (submitted to and accepted by the RA)</li> </ul>	Within 18 months of contract award and within 30 days of delivering 12 continuous months of quality assured data

	Milestone	Deliverables	Indicative due date
4.	Decommissioning	<ul style="list-style-type: none"> <li>Site decommissioning and removal of equipment</li> </ul>	Within 30 days after the RA's acceptance of all deliverables produced up to and including the completion report
		<ul style="list-style-type: none"> <li>Decommissioning report (submitted to and accepted by the RA)</li> </ul>	Within 30 days after the site decommissioning



## 4. BID SUBMISSION

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Bidders are to submit a financial offer and a methodology for the completion of the scope of works described in this document. Bids should be sent by email to [renewables@ra.bm](mailto:renewables@ra.bm) by no later than 11:59 pm on 4 November 2025 (bid submission last date), at the latest. All queries and clarifications shall be addressed to [renewables@ra.bm](mailto:renewables@ra.bm) and should be submitted by 11:59 pm on 24 September 2025. Apart from queries and clarifications, bidders are invited to share comments on the terms of reference and timeline. The responses to the clarifications and comments shall be published by 5:00 pm on 30 September 2025. The RA shall select a preferred and a reserve bidder and shall notify all bidders of the outcome by 18 January 2026.

Additionally, the bidder shall submit the following documentation:

1. Cover letter;
2. Legal company registration and tax documentation for past 3 years;
3. Filled out Statement of Financial Information Disclosure (below) stating readiness to provide the following:
  - Evidence of financial health (company accounts, turnover);
  - Statement of ability to deliver the project;
4. Proposed technology and alignment with data and equipment requirements specified in Section 3.3;
5. Proposed methodologies for:
  - Project management;
  - Determining measurement equipment installation locations and undertaking site visits;
  - Equipment supply, delivery, installation;
  - Achieving data availability requirements including data quality control processes, operations and maintenance plan;
  - Validation of measurement system performance and accuracy during deployment phase.
6. System classification, validation reports and plans
  - LiDAR System Classification report and if available Floating LiDAR Classification report;
  - Valid Independent report on LiDAR component performance;
  - Valid Independent report on LiDAR measurement system setup using a trial campaign;
  - Valid Independent report on Floating LiDAR system performance;
  - Valid classification or Type validation report for floating LiDAR system proposed;
  - Validation report or plan for validation of the oceanographic measurement system proposed.
7. Gantt chart outlining the timeline the bidder intends to follow to complete all the deliverables and milestones;
8. Demonstration of relevant experience by providing details of projects (as per SCHEDULE A) and supporting documentation (such as sample reports/data). Documentation shall demonstrate experience in:
  - Designing and undertaking measurement campaigns, including determining equipment installation sites;
  - Producing and reporting on metocean measurement data;
  - Data validation and quality control similar to the requirements described in Section 3.3.4.3.
9. Curricula vitae (CV) and contact details of key personnel in a uniform format. Bidders should have a skilled team with expertise in metocean measurement technologies and methodologies. The qualifications and roles of key personnel should be highlighted, including those that will be involved in the deploying and management of measurement instruments for the campaign;

10. Agreement to Terms and Conditions as included in SCHEDULE B.

## 5. TENDER EVALUATION CRITERIA

The bids will be scored on the technical and financial criteria as described in this section.

### 5.1 TECHNICAL EVALUATION (WEIGHTING: 80%)

The bid will be evaluated based on the bidder's relevant experience, proposed methodology and CV of its key personnel. Bidders must score a minimum of 50 marks or more out of 100 to qualify for the financial offer to be considered. The scoring criteria to be used for evaluation shall be as follows.

Table 8 Technical evaluation criteria

No.	Description	Marks
1	Proposed technological approach and proposed methodologies	40
2	Demonstration of relevant experience and CV of key personnel	30
3	System classification and validation reports and plans (6 total)	15
4	Gantt chart work plan, including key milestone dates	15
	<b>Total possible technical score (TS)</b>	<b>100</b>

### 5.2 PRICE EVALUATION (WEIGHTING: 20%)

The budget for this project is **\$2,000,000** (US).

In the price evaluation each eligible bid will be assigned a price score (PS).

The lowest price bid ( $P_M$ ) will be given a price score (PS) of 100 points. The price scores of other proposals will be computed as follows:  $PS = (P_M / P) * 100$  where P is Bidder price.

The cost indicated in the price bid shall be deemed as final and reflecting the total cost of services. Omissions in costing any item shall not entitle the provider to further compensation or absolve it from its responsibility to fulfil its obligations as per the TOR.

### 5.3 COMBINED AND FINAL EVALUATION

Proposals will finally be ranked according to their combined TS and PS scores as follows:

Combined score =  $(TS \times 0.8) + (PS \times 0.2)$

Based on the combined scores rankings, a preferred and reserve bidder will be selected. The reserve bidder will be invited for negotiations in case the preferred bidder's submission is withdrawn.

# SCHEDULE A

- Complete the table below and provide supporting documentation as required to demonstrate relevant experience which includes the following:
  - Designing and undertaking measurement campaigns, including determining equipment installation sites
  - Data validation and quality control similar to the requirements described in Section 3.3.4.3
  - Producing and reporting on metocean measurement data
  - Stakeholder collaboration
- Exhibit only those projects undertaken in the last seven years from bid submission last date.

Table 9 Project details

RA Name, Name of work & location of project	Contract Value in USD	Date of start of work	Scheduled completion date	Actual completion date	Details of work	Remarks	Supporting documentation provided?

## SCHEDULE B

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- Non-binding: Submission of an ITT does not create a binding agreement or obligation for either the RA nor the interested party
- Liability: The RA assumes no liability for any costs incurred by bidders in the preparation of their submissions
- Right to amend: The RA reserves the right to amend or withdraw this ITT at any time without notice or liability
- Right to reject: The RA reserves the right to reject any or all ITTs without providing reasons
- No guarantee: Submission of an ITT does not guarantee participation in the project's subsequent phase
- Regulatory compliance: Bidders are responsible for ensuring compliance with all local laws and regulations
- Independent review: Bidders should conduct independent due diligence before participating in the Project

# SCHEDULE C

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## CONFIDENTIALITY JUSTIFICATION STATEMENT

**To:** Regulatory Authority of Bermuda

**From:**

**Date:**

**Re: Request for Confidential Treatment of Information**

Pursuant to section 33 of the Regulatory Authority Act 2011 (RAA), [Applicant Name] (**Applicant**) hereby requests that the enclosed information, submitted to the Regulatory Authority of Bermuda (**RA**) as part of the Invitation to Tender for the Offshore Wind METOCEAN Measurement campaign, be treated as confidential.

**1. Confidential Information**

The information contained in my submission is confidential.

**2. Basis for Confidentiality Request**

The Applicant submits that the information qualifies for confidential treatment on one or more of the following grounds:

- a. Example: *The information contains trade secrets;*
- b. Example: *The disclosure of the information would destroy or diminish its commercial value;*
- c. Example: *The release of the information could reasonably be expected to have an adverse effect on the commercial interests of the Applicant;*

[Please select which of the above qualifiers apply to your information.]

**3. Public Version**

Please provide a redacted version of the submission, with all confidential material removed or anonymized, is attached and labelled “Public Version”, and may be made available by the RA.

**4. Declaration**

The Applicant declares that the justification provided is accurate and made in good faith, and requests that the RA issue an order granting confidential treatment pursuant to section 33 of the RAA.

Signed:

[Full Name]

[Title / Position]

[Company / Organization Name]

[Date]