Purchase Specification Document for ERD1-09

Author: Duncan Glasby

Date: 15/10/2020

File Name: Purchase Specification Document for ERD1-09

Assembly lead: Chris Mann

Project lead: Duncan Glasby

Sign-off:

Role	Name	Date	Signature
Peer	Katie Shanks	15/10/2020	Agreed in meeting
Consultant-University of Exeter	Mohammed Abusara	15/10/2020	Agreed in meeting
Manager	Chris Mann	14/10/2020	Agreed in meeting after proposed changes

Quickbook codes

Project code	ERD1-09

Overview

As part of the European Regional Development Funded project, the Energy Independent Farm, Bennamann are seeking to procure one or several small to medium sized wind turbines to supply energy to a farm. The aim of the project is to demonstrate a proof of concept for replacing conventional fossil fuels with renewable alternatives. To do this we are installing a microgrid onsite, we will provide constant power to this grid using a combination of technologies. The wind turbines interface with the microgrid should be no different to the typical grid connection. The microgrid will be constantly powered and contains battery storage backup that will be used to collect the extra power generated by the renewables.

The turbine/s should aim to supply as much power as possible, but we have baselined 30kWe as a target power. The turbine/s will be located at a farm close to Shortlanesend near Truro. At this stage, the installation is part of an R&D project but if successful may be rolled out nationally. Bennamann are seeking to form a mutually beneficial relationship with the chosen supplier and as such will be open to sharing the data gathered by the project.

We are looking to research and develop a way to capture the largest amount of power out of the wind available. Thus, the wind solution should be able to provide as much energy as possible for the most amount of wind conditions as possible. Maximising the power for a wider range of wind speed. We are open to medium or multiple small turbines working to provide the best power to wind ratio. Power shaving is less important; however we would like to know what power will be lost due to generator capacity.

Technical specification

Power requirement on site: Target 30kWe

Maximum power tracking inverters/ controller. We consider them as uncontrollable power sources.

AC Grid connection. (interested in a DC bus of small wind turbines run through a single inverter)

The system is to be installed onsite at Bennamann ltd in a 3.8 Acre field in Cornwall.

Best Cost/power

See Figures 1 to 5 in the appendix for the wind data from Camborne Met office and from a weather station installed onsite in 2019.

See Figure 5 in Appendix for the demand profile of the site.

Deliverables

For the project: Installation of the system by the start of June 2021.

For your bid:

At least 2 case studies.

Your payment milestones.

High level Gantt chart.

Amount of power the turbine is dumping during high winds.

Yearly profile of power generation.

Average daily profile. (graph)

Power curve of turbine(s).

Usable Power generated per year. (excel sheet of output per year)

Applicable regulations

The product must comply with all regulations required to operate within the UK and EU.

Other Considerations

The clarification questions and answers will be distributed to all tenderers.

Key Dates

Spec release date: 15/10/2020

Tenderer to return clarification questions: 23/10/2020

Response to clarification question:30/10/2020

Tender return date: 06/11/2020

Date for clarification question: 13/11/2020

Contract date: 20/11/2020

Contract completion date: 01/06/2021.

Selection Criteria

This section need only be completed for purchases with expected budget >£25k. Fill in the table below

Criteria	Low Performance (1pt)	Medium Performance (2pts.)	High Performance (3pts.)
Ability to produce power at varied wind speeds. Power tracking			
Correlation with the demand model	*Low correlation*		*Mimics the daily average demand correlation factor??*
Total installed capacity	*<9.99kW*	*10kW< x <22.99kW*	*23kW<30kW*
AC Grid connection	*No*	*Yes 1 inverter per wind turbine*	*Yes with <1 inverter per wind turbine*
Fits in a 3.8 acre site	*No*		*Yes*

Usable Power generated per year			
Delivery Timescale			
Lifespan/warranty			
Willingness to experiment with novel ideas.			

Appendix

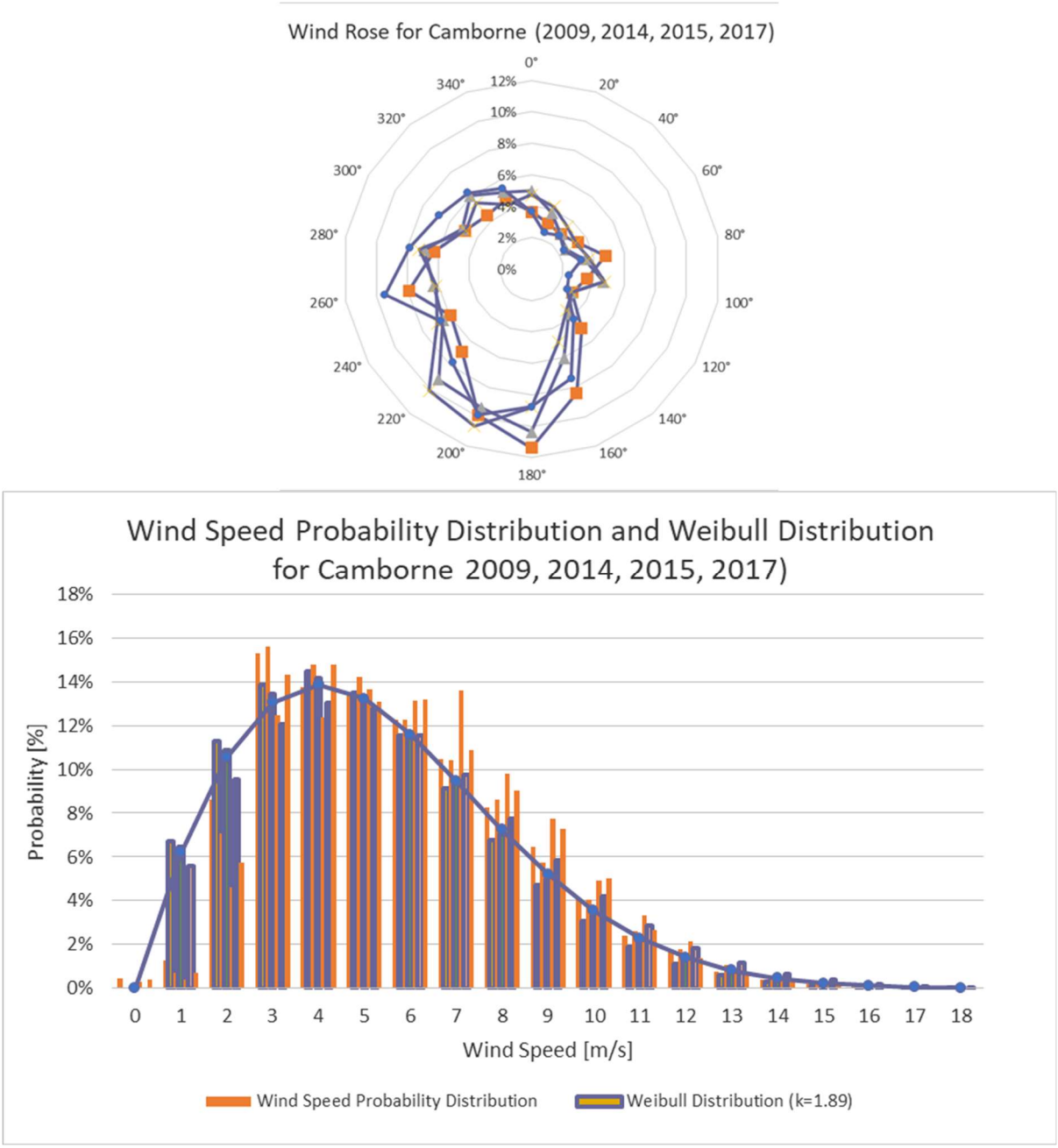

Figure 1: Wind rose and Weibull graphs for Camborne Met office (nearest weather station to site) to show historical wind data.

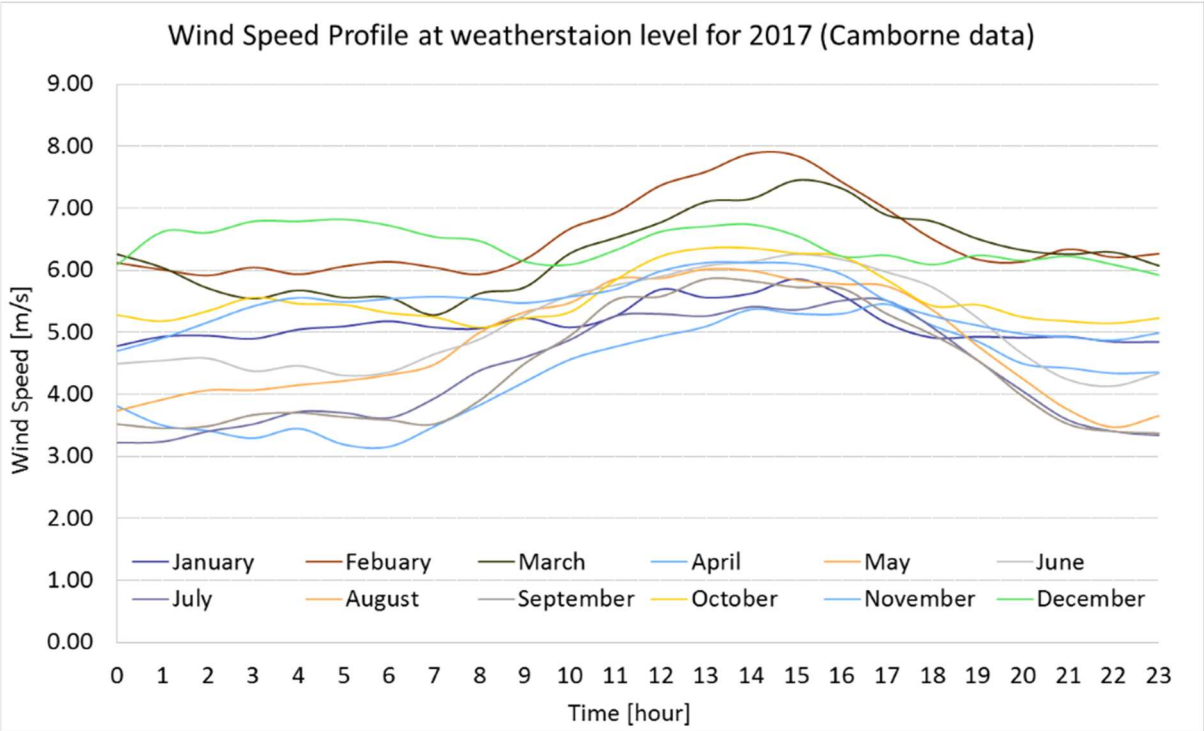

Figure 2: Average daily wind speed profile for each month of 2017. From Camborne weather station data.

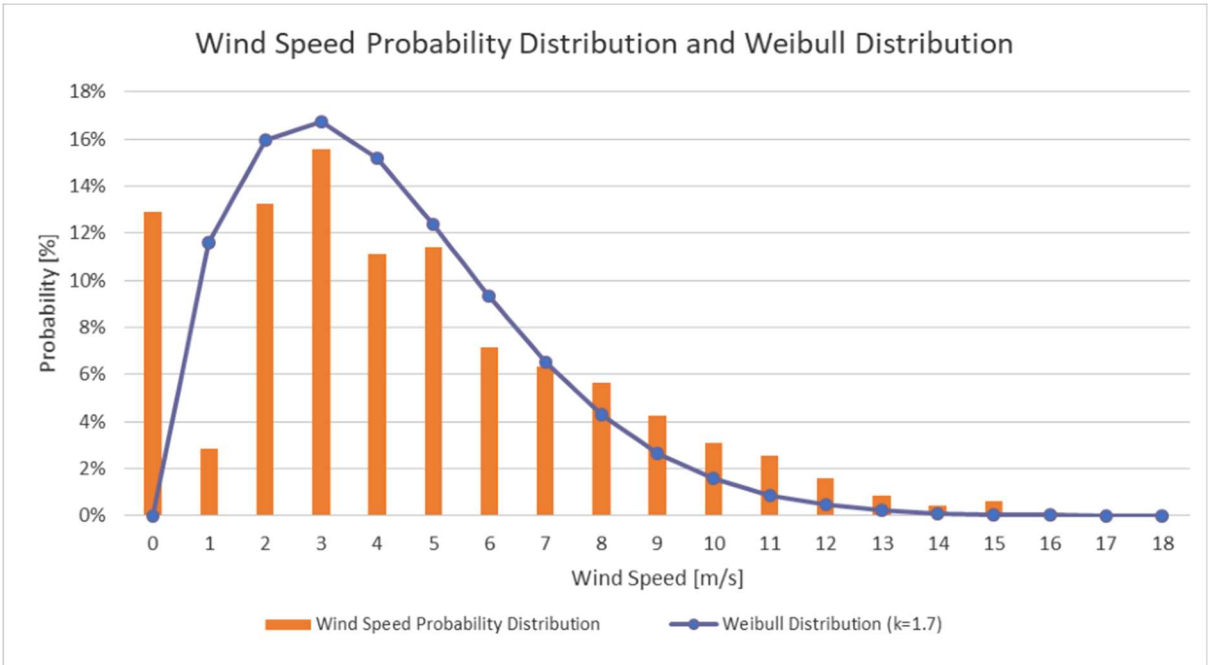

Figure 3: Oct. 2019- Sept. 2020 Weibull distribution. Weatherstation data recorded on site at 3m height

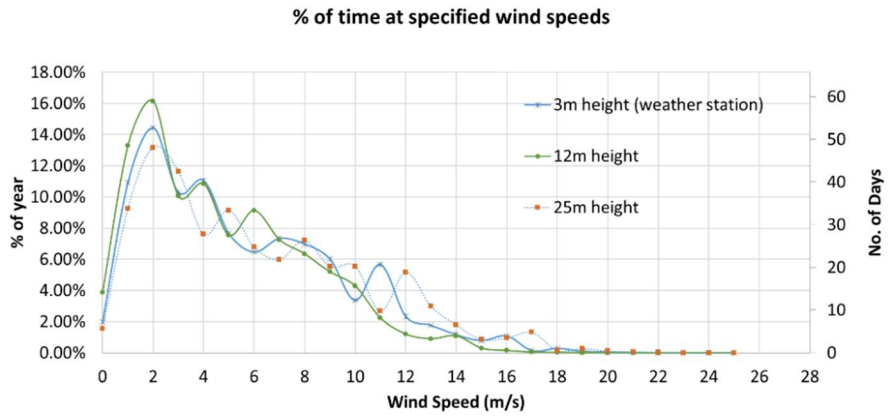

Figure 4: Oct. 2019- Sept. 2020 Wind speed summary. Weatherstation data recorded on site at 3m height. Calculation for wind speed at increased heights, 12m and 25m, using the Log law and a roughness length of 0.1.

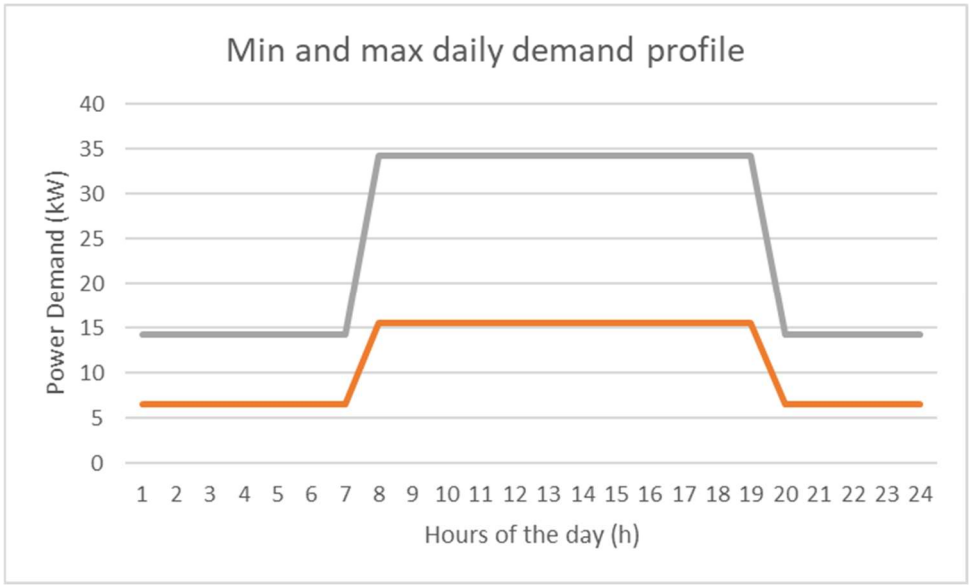

Figure 5: Daily power demand profile with minimum and maximum kW loads. The maximum demand profile includes some energy storage which will help offset some of the time when there is insufficient wind energy generation.