

WFPS Meteorological Equipment Requirements

[Insert Windfarm Name]



[Insert Name] WFPS Meteorological Equipment Requirements

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1 DOCUMENT VERSION HISTORY

Document Version History		
Version	Date	Comment
0.1	dd/mm/yyyy	First submission for review/approval

2 INTRODUCTION

The purpose of this document is to ensure that the WFPS records information pertaining to the meteorological equipment installed on-site. The WFPS shall maintain a hard copy of this document in the WFPS Control Room. The WFPS shall ensure the information in this document is up to date.

The WFPS shall submit the latest version of this document as published on the EirGrid website¹ to wind.forecasting@eirgrid.com.

If any requirements are unclear, or if there is an issue with meeting any requirements or carrying out any steps, please contact wind.forecasting@eirgrid.com.

Note:

Refer to the relevant 110 kV Station Operation Instruction for further information relating to the operation, voluntary and fault switching.

Refer to the Transmission Connected WFPS Communications Protocol for further information relating to communication with NCC.

3 ABBREVIATIONS

ESBN	ESB Networks
MEC	Maximum Export Capacity
MW	Mega Watt
NCC	National Control Centre
TSO	Transmission System Operator
WFCS	Wind Farm Control System
WFPS	Wind Farm Power Station
WTG	Wind Turbine Generator

¹ <http://www.eirgridgroup.com/library>

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4 GRID AND DISTRIBUTION CODE REFERENCES

Note: Clause PPM1.7.1.2 *Signals List #2* is currently in the process of being modified. The relevant Distribution Code clauses DCC11.5.1.6 and DCC11.5.2.5 have similar wordings and are also in the process of being modified. The text below is the proposed text.

PPM1.7.1.2 *Signals List #2*

PPM1.7.1.2.1 **Controllable WFPSs** with a **MEC** in excess of 10 MW shall make the following meteorological data signals available at the designated **TSO Telecommunication Interface Cabinet** for that **Controllable WFPS**:

- a) Wind speed (at hub height or as agreed with the **TSO**) - measurand signal;
- b) Wind direction (at hub height or as agreed with the **TSO**) - measurand signal;
- c) Air temperature- measurand signal;
- d) Air pressure- measurand signal.

PPM1.7.1.2.2 The meteorological data signals shall be provided by a dedicated **Meteorological Mast** located at the **Controllable WFPS** site or, where possible and preferable to do so, data from a means of the same or better accuracy. For **Controllable WFPSs** where the **WTG** are widely dispersed over a large geographical area and rather different weather patterns are expected for different sections of the **Controllable WFPS**, the meteorological data shall be provided from a number of individual **Meteorological Masts**, or where possible and preferable to do so, data from a source of the same or better reliability for groups of **WTG** (e.g. 1 set of meteorological data for each group of XX **WTG** within the **Controllable WFPS**). It is expected that **WTG** within an individual group shall demonstrate a high degree of correlation in **Active Power** output at any given time. The actual signals required shall be specified by the **TSO** at least 120 **Business Days** prior to the **Controllable WFPS's** scheduled **Operational Date**.

PPM1.7.1.6 **Time Delays and Data Quality**

PPM1.7.1.6.1 Digital signal changes from the **Controllable WFPS** shall be relayed to the **TSO Telecommunication Interface Cabinet** within 1 second of the associated change of state event. Analogue signal changes shall be relayed within 5 seconds and with an error of 0.5% or less, with the exception of the Meteorological Data required as per **PPM1.7.1.2.1**, which shall be updated within 5 seconds and shall be accurate at least 97.5% of the time over a rolling 12-month period.

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5 METEOROLOGICAL EQUIPMENT

5.1 Meteorological Data Equipment

As per Grid Code section PPM1.7.1.2 the WFPS shall provide meteorological data signals at the designated TSO Communication Interface Cabinet. The following requirements aim to record the source of those meteorological data signals within the WFPS, the initial set up of that meteorological equipment and subsequent changes which could influence the data quality. The requirements to record information only refer to the equipment associated with the provision of the meteorological data signals to the TSO Communication Interface Cabinet. The purpose is to ensure proper and timely maintenance, repair or replacement of equipment as per the manufacturer's recommendations to provide consistently high quality met data signals for wind forecasting.

5.1.1 Installation of Meteorological Equipment

On installation of the meteorological equipment the WFPS shall fill out a soft copy of Appendix A and B with the following information and e-mail a copy to the TSO (wind.forecasting@eirgrid.com) within 2 weeks of installation:

Appendix A:

- i. Source of meteorological data signals;
- ii. Position of equipment providing meteorological data signals;
- iii. Height of the equipment providing meteorological data signals;
- iv. High wind speed shutdown information

Appendix B:

- v. Setup calibration results and data ranges;
- vi. Description of data validation steps;
- vii. Description of data handling and sampling methods;
- viii. Copy of manufacturer's recommendations and guidelines for installation, calibration, testing and maintenance.

5.1.2 Maintenance or Replacement of Meteorological Equipment

To ensure the submission of high-quality meteorological data appropriate routine maintenance of the meteorological equipment must be scheduled and carried out as per the manufacturer's recommendations. The WFPS shall maintain a log of the following information in Appendix C:

Appendix C:

- i. Time and date of maintenance.
- ii. Procedure of checks and maintenance.
- iii. Result of checks and maintenance.

If any maintenance, repair or replacement of meteorological equipment alters the data (i-iv listed in Appendix A) the WFPS shall update a copy of Appendix A. Please e-mail updated appendices to the TSO (wind.forecasting@eirgrid.com) within 2 weeks of the amendment.

If the replacement of meteorological equipment alters the data (v-viii listed in Appendix B) the WFPS shall update a copy of Appendix B. Please e-mail updated appendices to the TSO (wind.forecasting@eirgrid.com) within 2 weeks of the amendment.

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5.1.3 Installation or Maintenance of Nacelle-Sourced Meteorological Equipment

On installation of the nacelle-sourced meteorological equipment, the WFPS shall fill out a soft copy of Appendix D and e-mail a copy to the TSO (wind.forecasting@eirgrid.com) within 2 weeks of installation.

Similarly, if any maintenance, repair or replacement of the nacelle-sourced meteorological equipment alters the data the WFPS shall update a copy of Appendix D. Please e-mail updated appendices to the TSO (wind.forecasting@eirgrid.com) within 2 weeks of the amendment.

Appendix D:

- i. Nacelle-Sourced Meteorological Signals Certification

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6 APPENDIX A - STANDING DATA OF METEOROLOGICAL EQUIPMENT

Please provide detail on the source of the meteorological data signals provided to the TSO Telecommunications Interface Cabinet. Submit to the TSO (wind.forecasting@eirgrid.com) within 2 weeks of an update and also have available to the TSO upon request.

Source of meteorological data signals, e.g. meteorological mast, nacelle-sourced, Lidar:
Easting and Northing co-ordinates of the equipment providing the meteorological data signals:
Height of the equipment providing the meteorological data signals:
At what wind speed (in m/s) does high wind speed shut down occur?
In what manner do wind turbines cut out at high wind speed shut down; cut out abruptly or ramp down? Please provide a description if relevant of ramping slope and/or power curve where possible.
How is wind speed measured to trigger high wind speed shut down? Provide as much detail as possible e.g. average wind speed over 5 mins or sustained wind speed above 25 m/s for 5 mins

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7 APPENDIX B - METEOROLOGICAL EQUIPMENT INSTALLATION

Please provide the following detail on the relevant meteorological equipment on site. Submit to the TSO (wind.forecasting@eirgrid.com) within 2 weeks of an update and also have available to the TSO upon request.

Attach a copy of the protocol followed and results obtained for calibration of meteorological equipment following the manufacturer's guidelines.
Attach a copy of the manufacturer's recommendation for maintenance of meteorological equipment.
Provide detail of the accuracy and ranges (wind speed, wind direction, air temperature, air pressure) of the meteorological equipment:
Attach a copy of the data validation steps followed using the relevant manufacturer's guidelines.
Describe how the data is handled and sampled:

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8 APPENDIX C – METEOROLOGICAL EQUIPMENT MAINTENANCE

Please provide the following information on maintenance of meteorological equipment on site which should be carried out at intervals recommended by the manufacturer. WFPS may use multiple copies of this form to log all maintenance checks and shall make these records available to the TSO upon request.

Time and date of maintenance:
Maintenance completed by:
Equipment the maintenance was carried out on:
Procedure of checks and maintenance carried out:
Result of checks and maintenance:
Provide detail of the ranges (wind speed, wind direction, air temperature, air pressure) of the meteorological equipment if maintenance altered any equipment:
Next maintenance due per manufacturer's recommendation:

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9 APPENDIX D – NACELLE-SOURCED METEOROLOGICAL EQUIPMENT INSTALLATION OR MAINTENANCE

Nacelle-Sourced Meteorological Signals Certification

I, _____, on behalf of _____ <wind turbine manufacturer> certify that the equipment used to calculate the nacelle-sourced meteorological signals at _____ wind farm was installed correctly without any defects on _____ and maintained without any defects on _____.

I confirm that:

- the wind speed signal is accurate to ___ m/s across the full range of wind speeds from 0 to 50 m/s;
- the wind direction signal is accurate to ___° across the full range of wind direction from 0° to 360°;
- the air temperature signal is accurate to ___°C across the full range of air temperatures from -20°C to 35°C; and
- the air pressure signal is accurate to ___mBar across the full range of air pressures from 900 to 1,100 mBar.

Signed: _____

Dated: _____