Grid Code Modification Recommendation Form

Title of Recommended Proposal:

MPID 300 Solar PV Signal Requirements

MPID 300

Date:	18/02/2022
Recommended at GCRP Meeting No.:	The modification was presented at the Ireland GCRP Meeting dated 02 November 2021.
Grid Code Version:	9 This modification is subject to the CRU approval of MPID 296 – Correction of wind-powered Controllable PPMs.
Grid Code Section(s) Impacted by Recommended Proposal:	PPM1.7.1.2.2; PPM1.7.1.2.3; PPM1.7.1.2.4; PPM1.7.1.3.1; PPM1.7.1.3.3; and PPM1.7.1.3.4. New Grid Code Sections: PPM1.7.1.2.2.1; PPM1.7.1.2.2.2; PPM1.7.1.3.2.1; and PPM1.7.1.3.2.2.

The Reason for the Recommended Modification:

Given the proposed increase in large-scale solar development in Ireland it is necessary to include, in the Grid Code, the required solar farm meteorological and availability data signals. The current Grid Code only contains required specific wind farm meteorological and availability data signals.

The TSO propose to amend six existing Grid Code clauses; PPM1.7.1.2.2, PPM1.7.1.2.3, PPM1.7.1.2.4, PPM1.7.1.3.1, PPM1.7.1.3.3 and PPM1.7.1.3.4. The objective of amending these clauses is to specify whether the clause refers to:

i) Wind-powered Controllable PPMs with a MEC in excess of 10 MW only;
ii) Solar-powered Controllable PPMs with a MEC in excess of 10 MW only;
iii) both Wind-powered and Solar-powered Controllable PPMs with a MEC in excess of 10 MW; or
iv) Controllable PPMs in excess of 5 MW with the exception of wind-powered and solar-powered Controllable PPMs.

The TSO propose to add four new Grid Code clauses; PPM1.7.1.2.2.1, PPM1.7.1.2.2.2, PPM1.7.1.3.2.1 and PPM1.7.1.3.2.2. The objective of adding these clauses is to include the required solar farm meteorological and availability data signals and to specify how this data shall be provided.

The TSO consulted the National Renewable Energy Laboratory (NREL) *Best Practices Handbook for the Collection and Use of Solar Resource Data for Solar Energy Applications: Third Addition* Handbook to determine the required solar farm meteorological data signals.

History of Progression through GCRPs, Working Group and/or Consultation:

On the 02 November 2021 this modification proposal was presented to the EirGrid GCRP members.

It was noted at the meeting that the TSO had engaged with stakeholders from the solar industry, including ISEA, on the proposed requirement. The TSO received positive feedback.

Summary Note of any Objections to the Recommended Change from GCRP Members or Consultation Responses:

No objections were raised by the GCRP members.

Outcome of any GCRP Meeting Actions Relating to the Recommended Modification:

No actions were raised at the meeting.

Red-line Version of Impacted Grid Code Section(s) - show recommended changes to text:
Deleted text in ~~strike-through red font~~ and new text highlighted in blue font

PPM1.7.1.2.1 Wind-powered Controllable PPMs 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 PPM:

(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 above meteorological data signals (ref. PPM1.7.1.2.1) shall be provided by a dedicated Meteorological Mast located at the wind-powered Controllable PPMs site or, where possible and preferable to do so, data from a means of the same or better accuracy. For wind-powered Controllable PPMs where the WTG are widely dispersed over a large geographical area and rather different weather patterns are expected for different sections of the wind-powered Controllable PPM, 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 wind-powered Controllable PPM). 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 wind-powered Controllable PPM's scheduled Operational Date.

PPM1.7.1.2.2.1 Solar-powered Controllable PPMs 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 PPM:

(a) Global Horizontal Irradiance (GHI) - measurand signal;

(b) Diffused Horizontal Irradiance (DHI) - measurand signal;

(c) Direct Normal Irradiance (DNI) (required for solar tracking panels only) - measurand signal;

(d) Air temperature - measurand signal;

(e) Back panel temperature - measurand signal;

(f) Wind speed - measurand signal;

(g) Wind direction - measurand signal;

(h) Precipitation – measurand signal;

(i) Air pressure - measurand signal.

PPM1.7.1.2.2.2 The above meteorological data signals (ref. PPM1.7.1.2.2.1) shall be provided by measurement devices located at the solar-powered Controllable PPMs site. All meteorological data signals shall at a minimum meet accuracy levels defined by the TSO. For solar-powered Controllable PPMs where the solar arrays are widely dispersed over a large geographical area and rather different weather patterns are expected for different sections of the solar-powered Controllable PPM, the meteorological data shall be provided from a number of individual measurement devices. It is expected that solar arrays 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 solar-powered Controllable PPM's scheduled Operational Date.

PPM1.7.1.2.3 **Controllable PPMs**, in excess of 5 MW, with the exception of wind-powered and solar-powered **Controllable PPMs**, shall make relevant meteorological data signals available, which may include but are not limited to solar irradiance and tidal streams, at the designated **TSO Telecommunication Interface Cabinet** for that **Controllable PPM** as agreed with the **TSO**. The actual signals required shall be specified by the **TSO** at least 120 **Business Days** prior to the **Controllable PPM**'s scheduled **Operational Date**.

PPM1.7.1.2.4 The above meteorological data signals (ref. PPM1.7.1.2.3) shall be provided by a measurement device located at the **Controllable PPM** site, the exception of wind-powered and solar-powered **Controllable PPM** sites, as defined by the **TSO**. All meteorological data

signals shall at a minimum meet accuracy levels defined by the **TSO**.

For **Controllable PPM**s, with the exception of wind-powered and solar-powered **Controllable PPM**s, where the **Generation Units** are widely dispersed over a large geographical area and rather different weather patterns are expected for different sections of the **Controllable PPM**, the meteorological data shall be provided from a number of individual sources. It is expected that **Generation Units** 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 PPM**'s scheduled **Operational Date**.

PPM1.7.1.3.1 Wind-powered **Controllable PPMs** with a MEC in excess of 10 MW shall make the following signals available at the designated **TSO Telecommunication Interface Cabinet** for that **Controllable PPM**:

a) Wind-powered **Controllable PPM Availability** (0-100 % signal);

b) Percentage of **WTG** shutdown due to high wind-speed conditions (0-100 %);

c) Percentage of **WTG** not generating due low wind-speed shutdown (0-100 %).

PPM1.7.1.3.2 For wind-powered **Controllable PPMs** with a **MEC** in excess of 10 MW, where the **WTG** are widely dispersed over a large geographical area and rather different weather patterns are expected for different sections of the wind-powered **Controllable PPM**, the above data set (ref. PPM1.7.1.3.1) shall be provided for a number of groups of **WTG** (e.g. 1 signal for each group of XX **WTG** within the wind-powered **Controllable PPM**). 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 wind-powered **Controllable PPM's** scheduled **Operational Date.**

PPM1.7.1.3.2.1 Solar-powered **Controllable PPMs** with a MEC in excess of 10 MW shall make the following signals available at the designated **TSO Telecommunication Interface Cabinet** for that **Controllable PPM**:

a) Solar-powered **Controllable PPM Availability** (0-100 % signal).

PPM1.7.1.3.2.2 For solar-powered Controllable PPMs with a MEC in excess of 10 MW, where the solar arrays are widely dispersed over a large geographical area and rather different weather patterns are expected for different sections of the solar-powered Controllable PPM, the above data set (ref. PPM1.7.1.3.I) shall be provided for a number of groups of solar arrays (e.g. 1 signal for each group of XX solar arrays within the solar-powered Controllable PPM). It is expected that solar arrays 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 solar-powered Controllable PPM's scheduled Operational Date.

PPM1.7.1.3.3 **Controllable PPMs**, with a **MEC** in excess of 5 MW, with the exception of wind-powered and solar-powered **Controllable PPMs,** shall make the following signals available at the designated **TSO Telecommunication Interface Cabinet** for that **Controllable PPM**:

a) **Controllable PPM Availability** (0-100 % signal);

b) Percentage of **Generation Unit** shutdown due to high resource conditions (0-100 %);

c) Percentage of **Generation Unit** not generating due to low resource conditions (0-100 %).

PPM1.7.1.3.4 For **Controllable PPMs**, with an **MEC** in excess of 5 MW, with the exception of wind-powered and solar-powered **Controllable PPMs,** where the **Generation Units** are widely dispersed over a large geographical area and rather different weather patterns are expected for different sections of the **Controllable PPM**, the above data set (ref. PPM 1.7.1.3.3) shall be provided for a number of groups of **Generation Units** (e.g. 1 signal for each group of XX **Generation Units** within the **Controllable PPM**). It is expected that **Generation Units** 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 PPM's** scheduled **Operational Date.**

Green-line Version of Impacted Grid Code Section(s) - show recommended final text:

PPM1.7.1.2.1 Wind-powered Controllable PPMs 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 PPM:

(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 above meteorological data signals (ref. PPM1.7.1.2.1) shall be provided by a dedicated Meteorological Mast located at the wind-powered Controllable PPMs site or, where possible and preferable to do so, data from a means of the same or better accuracy. For wind-powered Controllable PPMs where the WTG are widely dispersed over a large geographical area and rather different weather patterns are expected for different

sections of the wind-powered Controllable PPM, 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 wind-powered Controllable PPM). 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 wind-powered Controllable PPM's scheduled Operational Date.

PPM1.7.1.2.2.1 Solar-powered Controllable PPMs 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 PPM:

(a) Global Horizontal Irradiance (GHI) - measurand signal;
(b) Diffused Horizontal Irradiance (DHI) – measurand signal;
(c) Direct Normal Irradiance (DNI) (required for solar tracking panels only) – measurand signal;
(d) Air temperature- measurand signal;
(e) Back panel temperature – measurand signal;
(f) Wind speed - measurand signal;
(g) Wind direction - measurand signal;
(h) Precipitation – measurand signal;
(i) Air pressure- measurand signal.

PPM1.7.1.2.2.2 The above meteorological data signals (ref. PPM1.7.1.2.I) shall be provided by measurement devices located at the solar-powered Controllable PPMs site. All meteorological data signals shall at a minimum meet accuracy levels defined by the TSO. For solar-powered Controllable PPMs where the solar arrays are widely dispersed over a large geographical area and rather different weather patterns are expected for different sections of the solar-powered Controllable PPM, the meteorological data shall be provided from a number of individual measurement devices. It is expected that solar arrays 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 solar-powered Controllable PPM's scheduled Operational Date.

PPM1.7.1.2.3 **Controllable PPMs**, in excess of 5 MW, with the exception of wind-powered and solar-powered **Controllable PPMs**, shall make relevant meteorological data signals available, which may include but are not limited to solar irradiance and tidal streams, at the designated **TSO Telecommunication Interface Cabinet** for that **Controllable PPM** as agreed with the **TSO**.

The actual signals required shall be specified by the **TSO** at least 120 **Business Days** prior to the **Controllable PPM**'s scheduled **Operational Date**.

PPM1.7.1.2.4 The above meteorological data signals (ref. PPM1.7.1.2.3) shall be provided by a measurement device located at the **Controllable PPM** site, the exception of wind-powered and solar-powered **Controllable PPM** sites, as defined by the **TSO**. All meteorological data signals shall at a minimum meet accuracy levels defined by the **TSO**.
For **Controllable PPM**s, with the exception of wind-powered and solar-powered **Controllable PPM**s, where the **Generation Units** are widely dispersed over a large geographical area and rather different weather patterns are expected for different sections of the **Controllable PPM**, the meteorological data shall be provided from a number of individual sources. It is expected that **Generation Units** 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 PPM**'s scheduled **Operational Date**.

PPM1.7.1.3.1 Wind-powered **Controllable PPMs** with a MEC in excess of 10 MW shall make the following signals available at the designated **TSO Telecommunication Interface Cabinet** for that **Controllable PPM**:
a) Wind-powered **Controllable PPM Availability** (0-100 % signal);
b) Percentage of **WTG** shutdown due to high wind-speed conditions (0-100 %);
c) Percentage of **WTG** not generating due low wind-speed shutdown (0-100 %).

PPM1.7.1.3.2 For wind-powered **Controllable PPMs** with a **MEC** in excess of 10 MW, where the **WTG** are widely dispersed over a large geographical area and rather different weather patterns are expected for different sections of the wind-powered **Controllable PPM**, the above data set (ref. PPM1.7.1.3.1) shall be provided for a number of groups of **WTG** (e.g. 1 signal for each group of XX **WTG** within the wind-powered **Controllable PPM**). 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 wind-powered **Controllable PPM's** scheduled **Operational Date.**

PPM1.7.1.3.2.1 Solar-powered **Controllable PPMs** with a MEC in excess of 10 MW shall make the following signals available at the designated **TSO Telecommunication Interface Cabinet** for that **Controllable PPM**:
a) Solar-powered **Controllable PPM Availability** (0-100 % signal).

PPM1.7.1.3.2.2 For solar-powered Controllable PPMs with a MEC in excess of 10 MW, where the solar

arrays are widely dispersed over a large geographical area and rather different weather patterns are expected for different sections of the solar-powered Controllable PPM, the above data set (ref. PPM1.7.1.3.I) shall be provided for a number of groups of solar arrays (e.g. 1 signal for each group of XX solar arrays within the solar-powered Controllable PPM). It is expected that solar arrays 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 solar-powered Controllable PPM's scheduled Operational Date.

PPM1.7.1.3.3 **Controllable PPMs**, with a **MEC** in excess of 5 MW, with the exception of wind-powered and solar-powered **Controllable PPMs,** shall make the following signals available at the designated **TSO Telecommunication Interface Cabinet** for that **Controllable PPM**:

a) **Controllable PPM Availability** (0-100 % signal);

b) Percentage of **Generation Unit** shutdown due to high resource conditions (0-100 %);

c) Percentage of **Generation Unit** not generating due to low resource conditions (0-100 %).

PPM1.7.1.3.4 For **Controllable PPMs**, with an **MEC** in excess of 5 MW, with the exception of wind-powered and solar-powered **Controllable PPMs,** where the **Generation Units** are widely dispersed over a large geographical area and rather different weather patterns are expected for different sections of the **Controllable PPM**, the above data set (ref. PPM 1.7.1.3.3) shall be provided for a number of groups of **Generation Units** (e.g. 1 signal for each group of XX **Generation Units** within the **Controllable PPM**). It is expected that **Generation Units** 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 PPM's** scheduled **Operational Date.**