SONI Consultation Paper:

Additional Solar PV Signals

Consultation Paper

09/11/22

# Introduction

* 1. Solar PV forecasting signal requirements were introduced to Grid Code in March 2019 (Appendix D of the PPM Setting Schedule). The signal list was developed in line with best practice.
  2. Since 2019, best practice in solar forecasting has moved forward. This proposed modification aims to provide SONI and its forecasting vendors with additional meteorological data required to improve Solar PV forecasting.
  3. By improving the forecast for variable generation sources such as Solar PV, SONI can improve the accuracy and confidence of the scheduling and dispatch process.
  4. The additional Solar PV signal requirements outlined in this modification can be accommodated by existing equipment used by SONI and NIE Networks and no additional TSO/ DSO hardware or software would be required to facilitate this proposed modification.
  5. This consultation period is proposed to be 6 weeks; the deadline for submission of comments is close of business on 21/12/2022. SONI will submit a copy of all responses to the Utility Regulator alongside a report on this consultation. If a response is required to remain confidential this should clearly be stated. The intention is to publish all non-confidential responses. Please note that, in any event, all responses will be shared with the Regulatory Authority.

# Background and Overview

* 1. Appendix D of the PPM Setting Schedule details the SCADA Signals and Controls between Power Park Module and SONI/NIE Networks.
  2. Appendix D of the PPM Setting Schedule states that the signals list may be subject to change should SONI/NIE Networks feel that additional controls/ indications are required from a PPM.
  3. To improve solar forecasting three additional signals are expected to be provided by Solar PV PPMs only, to improve solar forecasting.
  4. The proposed changes to Appendix D of the PPM Setting Schedule are highlighted in Section 3 below.

# Changes to the Grid Code – Additional PV Signals

**Red-line Version of Impacted Grid Code Section(s) - show proposed changes to text:**

Deleted text in strike-through blue font and new text highlighted in red font

## Power Park Module Setting Schedule Appendix D SCADA Signals and Controls between Power Park Module and SONI/NIE Networks

The signals list shown below may be subject to change should SONI/NIE Networks feel that additional controls/indications are required from a **PPM.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Analogue Input Signals (to SONI/NIE Networks) from* ***Power Generating Facility*** | | | | | |
| *Signal Description* | *Description* | *Range* | *Units* | *Scale* | *Display Units* |
| **MW**\* | Indication of the **Active Power Output** at **PPM Connection Point** | 4 - 20 | mA | TBA | **MW** |
| **MVAr**\* | Indication of the **Reactive Power** Flow at the **PPM Connection Point** | 4 - 20 | mA | TBA | **MVAr** |
| Voltage\* | Indication of the Voltage at the **PPM Connection Point** | 4 - 20 | mA | TBA | kV |
| Wind Speed | For wind **PPM**s only: Indication of the highest wind speed at any instant measured by a **Generating Unit** comprised within a wind **PPM**. All measurements shall be at **Generating Unit** hub height. | 4 - 20 | mA | TBA | m/sec |
| Wind Direction | For wind **PPM**s only: Indication of wind direction at wind **PPM** at hub height | 4 - 20 | mA | 0-3591 | deg |
| Global Horizontal Irradiance (GHI) | For Solar PV PPMs only: Indication of the highest Global Horizontal Irradiance (GHI) at any instant measured by a **Generating Unit** comprised within a **PPM**. All measurements shall be at **Generating Unit** panel height. | 4 - 20 | mA | ~~TBA~~  0-4000 | ~~m/sec~~ W/m2 |
| Diffuse Horizontal Irradiance (DHI) | For Solar PV PPMs only: Indication of the highest Diffuse Horizontal Irradiance (GHI) at any instant measured by a **Generating Unit** comprised within a **PPM**. All measurements shall be at **Generating Unit** panel height. | 4 - 20 | mA | 0-4000 | W/m2 |
| Back Panel Temperature | For Solar PV PPMs only: Indication of Back Panel Temperature at any instant measured by a **Generating Unit** comprised within a **PPM** | 4 - 20 | mA | -30 - +50 | °C |
| Precipitation | For Solar PV PPMs only: Indication of Precipitation at any instant measured by a **Generating Unit** comprised within a **PPM** | 4 - 20 | mA | 0-11 | mm/min |
| Ambient Temperature | Indication of ambient temperature on **PPM** met mast | 4 - 20 | mA | ~~TBA~~  -30 - +50 | °C |
| Atmospheric Pressure | Atmospheric Pressure on **PPM** met mast | 4 - 20 | mA | 735-1060 | mBar |
| **PPM MW Availability** | The amount of **Active Power** that the **Controllable PPM** could produce based on current generation resource conditions and network conditions. The **MW Availability** shall only differ from the **MW Output** if the **Controllable PPM** has been curtailed, constrained or is operating in a Curtailed **Frequency** Response mode, as instructed by SONI via the SCADA interface. By way of clarification, limitations placed on **PPM Output** due to 33kV Dynamic Line Rating schemes are NIE Networks actions only and these should be reflected in the **MW Availability**. | 4 - 20 | mA | TBA | **MW** |
| **PPM** % shutdown | For wind **PPM**: Indication of the % of **Generating Unit**s shutdown due to high wind speed | 4 - 20 | mA | TBA | % |
| **MW** Set Point | Confirmation of **MW** set point signal | 4 - 20 | mA | TBA | **MW** |
| **MVAr** Set Point | Confirmation of **MVAr** set point signal | 4 - 20 | mA | TBA | **MVAr** |
| Voltage Set Point | Confirmation of voltage set point signal | 4 - 20 | mA | TBA | kV |
| Power Factor Set Point | Confirmation of power factor set point signal | 4 - 20 | mA | TBA | Decimal |
| % **MW** Curtailment Set Point2 | Confirmation of % curtailment **MW** set point when providing reserve | 4 - 20 | mA | TBA | % |
| Curtailment Time Interval | Confirmation of time to reach set point | 4 - 20 | mA | TBA | Min |
| **PPM** Active Set Point3 | Indication of the **MW** set point to which the **PPM Output** is limited | 4- 20 | mA | TBA | **MW** |
| % **Generating Unit**s Available4 | Indication of the % Available **Generating Unit**s at the **PPM** | 4 - 20 | mA | TBA | % |
| Droop | The frequency response droop characteristic to which the PPM is currently operating, depending on frequency response mode | 4 - 20 | mA | 2-12 | % |
| Deadband | The frequency response deadband currently in operation, depending on frequency response mode | 4 - 20 | mA | 0 – 0.5 | Hz |

# Benefits and Impacts

* 1. The International Energy Agency (IEA) working group conducted research and subsequently published a paper which details the recommended practice for the implementation of renewable energy forecasting solutions. Ireland and Denmark were used as bases for this study. Based on the recommendations of this report, three additional solar signals are required for best practice in renewable energy forecasting.
  2. SONI would like to adopt the IEA working group recommendations as the additional signals could improve SONI’s ability to accurately conduct the scheduling and dispatch process, through improvements to Solar PV forecasting.
  3. This modification is expected to have minimal financial implications for customers, with the additional meteorological data able to be accommodated using existing TSO/ DSO hardware and software.

# Next steps

* 1. The consultation period will run for 6 weeks. Users are invited to send their comments to SONI via email to [Catriona.kelly@soni.ltd.uk](mailto:Catriona.kelly@soni.ltd.uk) by close of business on Wednesday 21/12/2022. Should any Users have any queries, they should contact SONI via [Catriona.kelly@soni.ltd.uk](mailto:Catriona.kelly@soni.ltd.uk).
  2. Following receipt of comments in relation to this Consultation Paper and the expiration of the period for making comments, SONI will, in accordance with Condition 16 of its Licence, send to the Utility Regulator a report on the outcome of this review.
  3. If you require your response to remain confidential you should clearly state this on the coversheet of the response. We intend to publish all non-confidential responses. Please note that, in any event, all responses will be shared with the Utility Regulator.
  4. Following the end of the consultation period and subject to discussions to be held with the Utility Regulator, the approved modification to the Grid Code (with amendments as described in this consultation paper) will be incorporated into the code.