

ESPS Implementation Guide

Grid Code Modification Report

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Summary

This report and the supporting documentation are in response to the consultation and feedback on the proposed incorporation of Battery ESPS Grid Code Implementation Note into the Grid Code, and the SONI Battery ESPS Compliance Test Procedures / SONI Signal List for Battery ESPS into the PPM Setting Schedule.

SONI has responded to the consultation feedback provided by ESI and updated the proposed modification where necessary.

In addition to this report and included in the supporting documentation is an updated red-line and green-line versions of the proposed modification and copy of consultation feedback.

The modification proposal is submitted for approval.

Modification Proposal: Incorporation of Battery ESPS Grid Code Implementation Note

Overview

The purpose of the modification proposal is to incorporate version 3 of SONI and EirGrid's Battery ESPS Grid Code Implementation Note into the Grid Code and to incorporate SONI Battery ESPS Compliance Test Procedures and SONI Signal List for Battery ESPS into the PPM Setting Schedule.

Background

Version 1 of the Battery ESPS Grid Code Implementation Note was first published in June 2019 and there was discussion of battery storage technology at the meeting of the SONI Grid Code Review Panel on October 26th, 2019. Industry feedback was collected and used to develop version 2 published in June 2020, and version 3 published in December 2021.

Both the Compliance Test Procedures and the Signal List have been used to aid all new Battery connections for over 3 years. Both documents are published online on the SONI Grid Code web-site.

An overview of this proposed modification was presented to the Joint Grid Code Review Panel (JGCRP) in June 2022 and the full modification proposal was presented at the November 2022 JGCRP including red-line and green-line versions of the impacted documents.

Analysis & Opinion

The key definition of Energy Storage Power Station (ESPS), which was introduced as part of the Sections under Common Governance of the Grid Code, is amended to ensure that it only applies to Battery Storage Units.

By taking an existing definition which is also part of a Controllable PPM when acting as a generator, the impact on the main body of the Grid Code of introducing the requirements of the Battery Implementation Note, is limited.

The decision to update the PPM Setting Schedule, which is currently used for RfG generation, was taken even though Battery Storage is currently excluded from RfG. Non-RfG generation are using WFPS Setting Schedule. However, this latter schedule hasn't been updated since 2015 and is no longer used for new connections. It is also understood that storage will be included in a future update of RfG, therefore, this decision ensures the PPM Setting Schedule remains the up to date schedule for new connections. The compliance procedures and signal list for ESPS have been added in their own chapter/appendix to maintain the separation between RfG and non-RfG generation.

Conclusion

This proposed modification provides connected users and potential users with the requisite connection requirements under the robust governance of the Grid Code instead of an unregulated Battery Implementation Note, Compliance Procedures and Signal List.

Consultation responses to proposed incorporation of Battery ESPS Grid Code Implementation Note

In this section of the report SONI summarises and responds to the consultation feedback to the proposed incorporation of Battery ESPS Grid Code Implementation Note.

Consultation Responses

One response from ESI was received by SONI to the consultation which ran from 25 November 2022 to 23 December 2022. The response covered multiple issues, in both the proposed modification to the SONI Grid Code and to the PPM Settings Schedule, which may be grouped into the following areas.

Grid Code - Definitions

ESI

ESI proposed a minor amendment to the definition of ESPS.

Energy Storage Power Station (ESPS): ~~is a~~ A collection of one or more ESU(s) that can automatically act upon a remote signal from the TSO to change its Active Power output.

ESI proposed to change 'Capacity' to 'Energy' in the new proposed definitions of 'Capacity Limit' and 'Capacity Limited Ramp Rate' as it is ambiguous.

ESI proposed an amendment to the existing definition of 'Active Power Control Set-Point Ramp Rate' to make it generic for all types of PPM, as it is based on that for wind and solar?

SONI Response

SONI accepts the minor amendment to the definition of ESPS.

SONI do not agree with the changes proposed to swap 'Energy' for 'Capacity' in the definitions of Capacity Limit, as we do not believe it is ambiguous and the 'Capacity Limit' has been used in this context for many years without any issues in the Battery ESPS Grid Code Implementation Note. SONI also noted ESI's proposal to amend the definition for EirGrid's Grid Code as well for consistency, however, we can confirm that our EirGrid colleagues did not receive any comments on these definitions and hence are not recommending any amendments.

SONI agree that the definition of Active Power Control Set-Point Ramp Rate requires clarification, however, we believe the simplest and most effective change is to remove the word 'curtailment' from the definition, see below.

Active Power Control Set-Point Ramp Rate: The rate of increase or decrease of Active Power Output of a PPM in response to an Active Power Dispatch Instruction sent by the TSO via SCADA when the PPM is operating in an Active Power control mode. This ramp rate will be calculated by the Generator each time an Active Power Dispatch Instruction is sent by the TSO via SCADA based on the change in Active Power required and the ~~curtailment~~ time interval set point.

The Active Power Dispatch Instruction shall be any MW value in the range 0 MW to Registered Capacity of the PPM. The ~~curtailment~~ time interval set point shall be any value in the range 1 to 30 minutes, as specified by the TSO via SCADA.

Grid Code – Diagram labelling

ESI

When considering the diagram and table showing the minimum Reactive Capability characteristics for ESPS PPMs (CC.S2.1.3.2), ESI suggested the addition of (kW) after Maximum Import Capacity (MIC) to prevent any confusion as MIC is defined as “The values (kW and/ or kVA) provided in accordance with the User’s Connection Agreement or DNO Demand Customer’s DNO Connection Agreement.”

SONI Response

SONI agrees and accepts this suggestion. The amendments are in the revised modification proposal.

Grid Code – Ramp Rates

ESI

ESI suggested removing the words ‘Ramp Rate’ when preceded by the words ‘Frequency Response’ in various paragraphs, as it is not a settable parameter.

SONI Response

SONI does not agree with ESI’s suggestion. ‘Frequency Response Ramp Rate’ is an existing defined term in the Grid Code and similar wording had been in place for many years for the current requirements applicable to PPMs. The Grid Code is referring to the minimum capability requirements for all PPMs.

PPM Settings Schedule - Definitions

ESI

ESI commented on the new definition of ‘Available Active Power’ being unsuitable for ESPS as it is based on wind and solar PPMs.

ESI suggested that the new proposed definition of ‘Operating Range’ should include any limitation due to maximum rapid MW changes.

SONI Response

While SONI acknowledge that the definition of ‘Available Active Power’ is generic for all types of Controllable PPMs (the definition has been borrowed from the EirGrid Grid Code), however, SONI do not accept that it is unsuitable for an ESPS due to the use of ‘if’ in the definition.

The use of Available Active Power (MW) in the PPM Settings Schedule is limited to capturing import/export signals for the compliance test results, however, in checking the use of the definition in the document, Appendix E has received some minor edits for consistency; ‘ESPS Active Power Export/Import Availability’ is now ‘ESPS Available Active Power Export/Import’.

SONI agree that the Operating Range should be reflective of any limitations and believe the current proposed definition is valid as any reduced Operating Range should be reflected to the TSO.

PPM Settings Schedule – Clarifications & labelling etc.

ESI

Within Section 7.1 – ESPS Compliance test procedures, ESI suggested a clarification the Note within the test procedures:

Providing there is Reactive Power capability available, SONI will also carry out a brief Reactive Power control test, which may include issuing MVar set points. (Note this will **only** apply for transmission connected units where SONI has control over reactive power output)

Continuing in the same section, ESI queried if SONI requests, following a review of commissioning results, an ESPS to “turn on frequency response and use reactive power control if required”; if this would trigger the commencement of ancillary service payments?

ESI queried why there wasn't any acceptance criteria for the ORC Dispatch Test?

ESI suggested that the Tables and Figures in section 7.3.1 were renumber to be consistent with the whole document.

ESI queries the need for the following signals in Appendix E

- Ambient Temperature on Site
- Average Battery Temperature

ESI commented that the effective date for implementation of the Battery Implementation Note into Grid Code should be added in the relevant section in section 2.2 of the Introduction.

SONI Response

SONI accepts the minor clarification in the test procedure note.

SONI can confirm that that if it is necessary to turn on frequency response this will not trigger the commencement date for DS3 services which is issued in accordance with the relevant agreement.

SONI confirms that the lack of acceptance criteria for the ORC Dispatch Test is correct and deliberate as there is a lower threshold to meet compliance at this stage. The Dispatch test is similar to 6.1 active power control test number 1, with Active power dispatch tested to 3 different dispatch levels.

SONI accepts the numbering of Figure and Tables in section 7.3.1 is confusing and reference to them have been removed. In addition the Frequency Mode Settings table in the same section has received some edits to Mode 4 where both under and over frequency trajectories have changed from 2Hz to 0.3Hz. This is to ensure Mode 4 is an intermediate mode between Mode 1 and 2.

SONI have reviewed the need for the highlighted temperature signals in Appendix E and agree that they are unnecessary and have removed them from Appendix E.

SONI agree that the implementation date should be added to section 2.2 and will provide this once this date is available.

PPM Settings Schedule – Sampling Rates

ESI

For multiple tests, ESI queried the sampling rates SONI requires for the listed Active Power datasets?

SONI Response

SONI clarified that a sample interval of 100mHz or 10 samples a second is required. However, for DS3 service tests such as Fast Frequency Response, this may require a more stringent requirements be met.

PPM Settings Schedule – Ramp Rates

ESI

ESI have concerns over the requirement to demonstrate that the Capacity Limited Ramp Rate and Active Power Control Set-point Ramp Rate can each be set over a range between 1% and 100% of Registered Capacity per minute. ESI have discussed at length why 1%/minute Capacity Limited Ramp Rate is unfeasible due to the requirement to reserve large amounts of energy for this function. (see enclosed documents)

SONI Response

SONI notes that the current Implementation Note confirms that “The TSOs do not anticipate setting ESPS units to ramp rates as low as 1%”. However, this is providing users operational guidance and SONI believe it is not appropriate to include this in the Grid Code which is defining the minimum capability for all types of generating plant on the system. In coordination with ESI, SONI developed a new requirement for Capacity Limited Ramp Rate requirements, with the following requirements relevant:

Maximum Capacity Limited Ramp Rate: 100%

Minimum Capacity Limited Ramp Rate: The lower of 10% of Registered Capacity or 5 MW. If 5 MW is lower than 1% Registered Capacity, then minimum Capacity Limited Ramp Rate should be 1% of Registered Capacity."

Consultation Conclusion

SONI worked with ESI to update the proposed modification to add further clarity where required within the Grid Code modification and also to ensure Grid Code requirements were reflective of the technical capabilities and limitations of ESPS technology. By doing so, SONI believe the proposed modification we are putting forward for approval has been improved as a result.

Assessment against Grid Code Objectives

This modification proposal supports the Grid Code objective in permitting the development of an efficient, co-ordinated and efficient system by addressing the capabilities and limitations of a new technology not previously considered by the current version of the Grid Code. By providing clear requirements this promotes the security and efficiency of the system as a whole.

In addition, by accepting this modification while EirGrid provides for a similar modification, promotes effective competition for the generation of electricity on the Island of Ireland.

SONI requests for Utility Regulator approval of incorporation of Battery ESPS Grid Code Implementation Note Modification

SONI recommends that the Utility Regulator approve this Grid Code modification in its entirety.

SONI believes that the approval of this modification will:

- Ensure that the current Battery ESPS Grid Code Implementation Note is integrated into the Grid Code
- Provide the necessary clarity as to the Grid Code requirements for ESPS units
- Make provisions for the SONI Compliance Test Procedures and Signal List for Battery ESPS units within the PPM Settings Schedule.
- Provide robust Grid Code governance to connected users and future users of ESPSs

Proposed Implementation Date

SONI believe that an early implementation will benefit existing and potential future ESPS owners with certainly around Grid Code requirements and compliance testing procedures. A similar Grid Code modification is progressing through for approval in the EirGrid Grid Code and a consistent implementation across jurisdiction will benefit ESPS owners and developers across the All-island system.

Appendix – Supporting Documentation

- SGCRP_Mod_Battery ESI_SONI_Response_final_24042023
- SPID_03_2022_g_SGCRP_Mod_ESPS
- SPID_03_2022_g_PPM Setting Schedule Greenline_ESPS
- SPID_03_2022_g_PPM Setting Schedule RedLine_ESPS
- SPID_03_2022_g_SONI_GreenLine_CC.S2 PartI_II_ESPS
- SPID_03_2022_g_SONI_RedLine_CC.S2 PartI_II_ESPS