SPID_03_2025 Large Demand Customers FRT Modification

Grid Code Modification Report

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Summary

This report and the supporting documentation follows on from our recent consultation on a proposed Modification to the Grid Code with respect to the performance requirements for large demand facilities. This proposal follows comprehensive engagement with industry and other key stakeholders in cooperation with EirGrid. The need for this modification was triggered by observed performance of data centres in Ireland in response to network faults. If unaddressed, the proliferation of such response characteristics across Ireland and NI would pose a material threat to system security. As yet, no such connections have been made to the NI transmission network. One such offer has been accepted in NI and further interest has been expressed. Since the EirGrid Grid Code is applied retrospectively, their equivalent modification will impact several existing connections. We are aware that acceptable technical solutions have been identified and will be applied to ensure compliance as soon as the EirGrid modification is approved by CRU. In light of this development, we are keen to ensure that the NI Grid Code modification is applied to all future large demand connections in NI which are not currently connected.

SONI consulted on this Large Demand Customer Modification proposal earlier this year. We received several responses. These have been included with this report for your information. It is our opinion that the issues raised in the consultation responses do not present any grounds for any further amendment of the proposed text. This is based on the fact that no data centres are currently connected to the NI transmission network and that a remedial technical solution has already been identified for application to existing connections. On this basis, we can be certain that customers will have ready access to technical solutions that will enable them to fully comply with the SONI proposal.

The red-line and green-line versions of the proposed modification are embedded within this report, with all supporting documentation for the modification proposal listed in Appendix A. A detailed technical paper has been provided as supporting documentation. This provides information on the adverse impacts observed over recent years and extrapolates the expected outcomes if Grid Codes are not appropriately modified.

The modification proposal is submitted for approval.

Modification Proposal: Large Demand Customers Modification

Overview

This Grid Code modification proposes the incorporation of additional technical requirements for Large Demand Customers connecting to the transmission network. Current technical requirements do not adequately address the risks presented to system stability as this type of demand continues to grow over the coming years. Over recent years, there have been several network faults that have highlighted a need for more stringent standards.

Background

The integration of large demand facilities presents new challenges for grid stability during and immediately following network fault events in Ireland and Northern Ireland. Existing Grid Code Connection Conditions do not adequately address these risks since the observed behaviour has only arisen in recent years due to the connection of data centres. SONI and EirGrid has developed more stringent standards following significant engagement with stakeholders. To date, these Large Demand Facilities have largely been connected around the greater Dublin area. However, there has been significant interest in the development of data centres in Northern Ireland, with a one connection offer already accepted and one further application received. We have worked collaboratively with EirGrid and other stakeholders with the aim of ensuring that the proposed Grid Code modifications are adequate and proportionate.

Summary of recent stakeholder engagements include:

Industry Webinar held on 3 November 2025 with over 50 participants

Approximately 20 bi-lateral meeting with data centre developers and other transmission-connected customers

Updated information paper and Grid Code modification proposals issued on 17 November 2025

Final Grid Code modification proposal was presented to the Joint Grid Code Review Panel on 3 Dec 2025

In accordance with SONI Grid Code governance requirements, SONI conducted a public consultation of the proposed modification. This was open for a 4 week period closing on 20/02/2026.

Summary of the Proposed Changes to Grid Code in respect of Large Demand Facilities

- Fault Ride Through (FRT):

  Facilities must remain connected during and after voltage dips caused by faults in accordance with a specified voltage-time profile.

- Post Fault Active Power Recovery:
  Facilities must restore at least 90% of their pre-fault demand within 500 milliseconds after the voltage at their connection point to the transmission network recovers to 90% of nominal.

- Rate of Change of Frequency (RoCoF):

Facilities must remain connected during rate of change of frequency up to 1 Hz/s measured over 500 ms.

- Voltage and Frequency Ranges:
  The operational limits for transmission connected demand facilities have been updated.

- Compliance and Derogation:

  At present no such connections have been made to the NI transmission network and in principle SONI Grid Code Connection Conditions are not applied retrospectively. However, our colleagues in EirGrid are in the process of developing processes to manage the compliance of existing data centres in Ireland.

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

Clause	Red Line Version Text Deleted text in ~~strike-through red font~~ and new text highlighted in blue font
CC.14.1.5	**Demand Facilities** shall remain connected to the **Transmission System** during rate of change of Transmission System Frequency of values up to and including 1Hz per second as measured over a rolling 500 milliseconds period. (Voltage dips may cause localised RoCoF values in excess of 1 Hz per second for short periods, and in these cases, the Fault-Ride Through clause CC.14.1.6 supersedes this clause (CC.14.1.5)
CC.14.1.6	**Demand Facilities** shall remain connected to the **Transmission System** during and following any **Fault Disturbance** on the **Power System** which results in a **Voltage** deviation which remains on or above the voltage-against-time profile specified in Figure CC.14.1.6 at the **Connection Point**. Following clearance of the **Fault Disturbance**, the **Demand Facility** should return to at least 90% of its prefault **Active Power Demand** within 500 milliseconds of the **Transmission System Voltage** recovering to 90% of the nominal **Voltage.** The post **Fault Disturbance** ramp up rate for the **Demand Facility**, shall be coordinated and agreed between the **TSO** and the **Demand Facility** owner. The voltage-against-time profile specifies the required minimum capability as a function of voltage and **Fault Ride-Through Time** at the **Connection Point** before, during and after the **Fault Disturbance**.

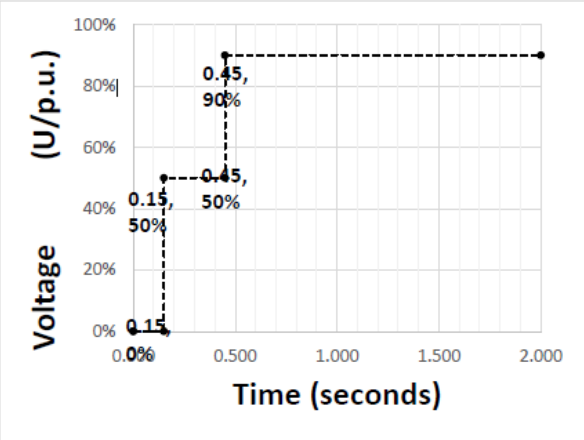

Figure CC.14.1.6: Voltage-against-time profile at the connection point for fault condition

Clause	Green Line Version Text
CC.14.1.5	**Demand Facilities** shall remain connected to the **Transmission System** during rate of change of Transmission System Frequency of values up to and including 1Hz per second as measured over a rolling 500 milliseconds period. (Voltage dips may cause localised RoCoF values in excess of 1 Hz per second for short periods, and in these cases, the Fault-Ride Through clause CC.14.1.6 supersedes this clause (CC.14.1.5)
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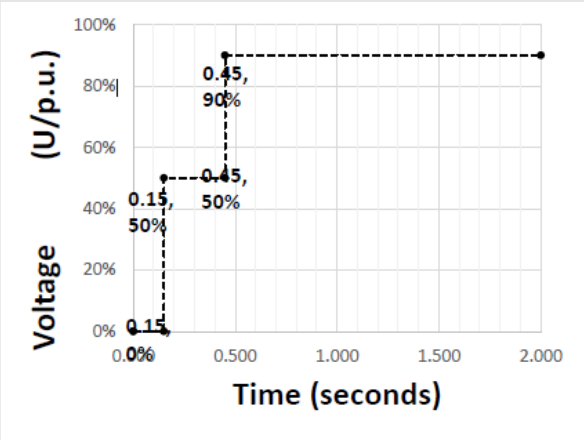

Figure CC.14.1.6: Voltage-against-time profile at the connection point for fault condition

Benefits of the Proposed changes

- Mitigates a material threat to system stability caused by the proliferation of demand centres with their current performance characteristics.
- Facilitates the development of large demand customers in Northern Ireland.
- Support the reputations of Ireland and Northern Ireland as leaders in sustainable energy growth.

Industry Feedback Raised and Considered.

Over the course of our engagement with stakeholders, ~~a number of~~several concerns were raised. In addition, we also received feedback from the public consultation on the SONI Grid Code modification proposal. Similar issues were raised, and copies of the feedback has been included with as supplementary materials with this report.

- Concerns Raised by demand facility stakeholders:
    - A lack of compliant market-ready solutions.
    - Timelines for compliance are tight.
    - There is a risk of widespread non-compliance and reputational impact.
- TSO Responses:
    - Compliant OEM solutions are expected to become available in 2026.
    - The original Active Power recovery requirement was revised down to 90% of the pre-fault level from the initial proposal of 95%.
    - Compliance/derogation processes largely impact the existing connections in Ireland since Grid Code Connection Conditions are not typically applied retrospectively in NI. At present there are no existing datacentre connections to the transmission network in NI. SONI connection offers already issued for demand centres have included the requirement for additional technical performance capabilities. Customers in question have been invited to all stakeholder engagements and kept informed of the proposals

throughout their development. In principle, SONI believe that it would not be appropriate to enforce compliance in the absence of market ready technical solutions from OEMs. Following bilateral discussions with developers, we don't believe that we are likely to face this situation. SONI understands that the earliest data centre connection to the NI transmission network will not be made before 2030. SONI has also been informed that OEMs are actively developing suitable equipment. Given the extent of the intervening period, SONI is of the opinion that this gives sufficient time for OEMs to bring compliant solutions to market.

Analysis & Opinion

Failing to implement suitable technical performance requirements whilst continuing to Datacentres comprising data centres is not a tenable approach due to the material threats to security of supply. The "do nothing" option is not without serious consequences based on observed impacts on system performance to date. This modification will ensure that the anticipated development of data centre connections to the NI transmission network comply with a set of technical standards which are aimed at safeguarding the stability and security of supply on the all-island power system. We are aware that EirGrid has developed similar requirements for connections in Ireland and are progressing these with CRU. The impact of connecting datacentres with non-compliant characteristics is cumulative and impacts the entire synchronous power system in Ireland and Northern Ireland. Since the impact is not voltage specific, we would intend to develop a further Grid Code modification proposal which will require the application of similar standards by the DNO.

Conclusion

This modification will ensure that Grid Code requirements for datacentres prevent the installation of customer equipment that is likely to cause severe disturbance of the All Island power system and potentially threaten security of supply.

Consultation responses to proposed Modification and SONI commentary

SONI received three responses following the public consultation. These have been included in the supplementary documentation that accompanies this report.

The first response focused on specific technical queries regarding the expected performance of a datacentre as it rides through a network fault. We have prepared an answer to this query, and this will be provided directly to the responder.

The other two responses raised similar issues. They welcomed SONI's stance of not seeking to retrospectively enforce new technical requirements. However, concerns were raised about the implementation and enforcement of the new requirements when OEMs have not yet brought a range of compliant equipment to the market. This concern was raised during the previous interactions with industry and SONI appreciates that this consultation presented a further opportunity to focus on the issue. Fundamentally, this is an implementation issue, not a dispute about the proposed technical performance requirements. The crux of the issue raised in consultation responses is the identification of an appropriate trigger point for deciding if the modification should, or indeed, can be delivered to facilities under development. Responses clearly expressed a preference for applying the Grid Code standards that are in force at the time of Connection Offer acceptance. One Connection Offer has indeed been accepted and the likely requirement for enhanced technical performance was highlighted but not detailed within that offer. All stakeholders who have expressed interest in connecting to the NI transmission network were invited to all workshops/webinars on the proposed Grid Code modifications and were provided with technical documentation throughout the process. We understand that OEMs are continuing to work on compliant solutions with a suggestion that a range of options would come to market in 2026/27. Even if this forecasted time cannot be met, we are aware that the earliest connection/energisation date of a datacentre to the transmission network will not be before 2030. We believe that this provides sufficient time for a selection of compliant equipment to become available so it can be used on NI projects. SONI would express a strong preference that the applicability of these new Grid Code requirements be assessed at a future point before the connection agreement is— If compliant solutions are generally available at that stage, then there should be no reason to develop a non-compliant facility. We would suggest that the Connection Agreement execution date could be used as a suitable check point for determining the applicability of the new technical requirements. Connection Agreements already contain the obligation on the connecting party to comply with Grid Code. For these instances, we could potentially make a direct reference to the enhanced technical performance requirements for datacentres. This would be more appropriate than arbitrarily using the acceptance of a Connection Offer as the determining factor for assessing the obligation to comply with the technical standards in this modification proposal.

Assessment against Grid Code Objectives

This modification supports the Grid Code objectives by enabling the secure and efficient operation of the Northern Ireland transmission system in accordance with Condition 16 of the License to Participate in the Transmission of Electricity[1].

The proposed modification supports the objectives of the Grid Code as it;

- will permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity;
- facilitates competition;
- promotes the security and efficiency of the Northern Ireland electricity transmission systems; and
- promotes efficiency in the implementation and administration of the Grid Code arrangements.

[1] https://www.uregni.gov.uk/files/uregni/documents/2022-11/2022-11-18%20SONI%20TSO%20Consolidated.pdf

SONI requests for Utility Regulator approval of Grid Code Modification in Respect of Large Demand Customer technical performance

SONI recommends that the Utility Regulator approve this Grid Code modification in its entirety and also approves its enforcement on all installations that are yet to be connected at the date of modification approval. SONI would request that this proposed modification can be enforced on developments which have already accepted connection offers but have not been connected. Derogation from the new requirements should be tied to their ability to comply at the time of executing the connection agreement.

SONI believes that the approval of this modification will:

- Ensure the accuracy of the Grid Code.
- Ensure that the connection and ongoing operation of large demand customers, particularly data centres, will not introduce risks to power system stability during and following network faults.

Proposed Implementation Date

SONI would suggest that this modification is approved at the earliest opportunity so that Grid Code Users have a clear indication of the requirements for datacentres. Customers are entitled to seek derogation from the Grid Code using the approved process.

Appendix – Supporting Documentation

- Supporting Technical Paper developed by SONI and EirGrid.
- Responses to the Grid Code Public Consultation.