

24/09/2024

# JGCRP Meeting

24 September 2024



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# Agenda

## 1. Introduction: 10 minutes

- a. Welcome Members.
- b. Minutes and Actions from Previous Meeting (20 March 2024).

## 2. Modifications: 15 minutes

- a. MPID318 and SPID\_03\_2024 – ESPS Phase 2 (Revised Modification)
- b. MPID327 and SPID\_05\_2024 - DSU Notice to react

## 3. Discussion: 15 minutes

- a. Large Energy Users Fault-ride-through;

## 4. Updates: 10 minutes

- a. Incorporation of Synchronous Condenser Units;
- b. CRU; and
- c. Utility Regulator.

## 5. AOB: 10 minutes



# 1. Introduction: 10 minutes

- a. Welcome Members
- b. Minutes and Actions from Previous Meeting (20 March 2024)



## 2. Modifications: 15 minutes

- a. MPID318 and SPID\_03\_2024 - ESPS Phase 2 (Revised Modification)
- b. MPID327 and SPID\_05\_2024 - DSU Notice to react





# MPID318 and SPID\_03\_2024

## ESPS Phase 2 (Revised Modification)



# ESPS Phase 2 (Revised Modification)

- The purpose of this modification is to incorporate Energy Storage Power Station (ESPS) user type into all sections of the Grid Code that were not included in the previous modifications SPID\_03\_2022 and MPID304.
- This modification proposal was originally presented to the JGCRP on 20<sup>th</sup> March 2024. Members requested more time to review the proposed modification, and so were given until 17<sup>th</sup> April 2024 to provide feedback.
- The SONI ESPS Phase 2 modification proposal, SPID\_03\_2024, was subsequently recommended for approval to the UR following public consultation.
- The EirGrid ESPS Phase 2 modification proposal, MPID318, was not recommended to the CRU for approval due to industry feedback regarding the proposed frequency range for low Frequency Demand Disconnection of ESPSs.



# ESPS Phase 2 (Revised Modification)

- The original modification proposal suggested a frequency range of 47 - 50 Hz for low frequency demand disconnection of ESPSs.
- Upon further consultation with industry and a review of SOGL and NCER, this revised modification proposes that:

*ESPSs that cannot switch to Generation during a low Frequency event shall be capable of automatic low Frequency Demand Disconnection where the steady state System Frequency falls below 49.5 Hz for a sustained period of more than 1 minute.*

- This revised proposed requirement is aligned with SOGL, NCER, and feedback from industry.
- Additionally, we propose correcting a typo that was identified in SDC1.4.8.7 (SONI)/SDC1.4.7.7 (EirGrid)



# ESPS Phase 2 (Revised Modification)

Originally Proposed	New proposal
<p>The <b>Synchronising</b> and <b>De-Synchronising</b> times (and, in the case of <b>Pumped Storage Plant Demand</b> and <b>Energy Storage Power Station Demand</b>, the relevant effective time) shown in the <b>Indicative Operations Schedule</b> are indicative only and it should be borne in mind by <b>Users</b> that the <b>Dispatch Instructions</b> could reflect more or different <b>CDGU, Aggregated Generating Unit</b> and/or <b>Controllable PPM, Pumped Storage Plant Demand, Energy Storage Power Station Demand</b> and/or <b>Aggregate Generating Unit</b> requirements than in the <b>Indicative Operations Schedule</b>. <b>With the exception of an Energy Storage Power Station, the TSO</b> may issue <b>Dispatch Instructions</b> in respect of any <b>CDGU</b> and/or <b>Aggregated Generating Unit, Controllable PPM, Pumped Storage Plant Demand, Energy Storage Power Station Demand</b> or <b>Aggregated Generating Unit</b> which has not declared an <b>Availability</b> or <b>Demand Side Unit MW Availability</b> of 0 MW in an <b>Availability Notice</b>. <b>Users with CDGUs and/or Aggregated Generating Units, Controllable PPM, or Pumped Storage Plant Demand or Energy Storage Power Station Demand</b> shall ensure that their units are able to be <b>Synchronised</b>, or in the case of <b>Pumped Storage Plant Demand and Energy Storage Power Station</b>, used at the times <b>Scheduled</b>, but only if so <b>Dispatched</b> by the <b>TSO</b> by issue of a <b>Dispatch Instruction</b>. <b>Users</b> shall, as part of a revision to the <b>Technical Parameters</b>, indicate to the <b>TSO</b> the latest time at which a <b>Dispatch Instruction</b> is required to meet the scheduled <b>Synchronising</b> time or in the case of <b>Pumped Storage Plant Demand or Energy Storage Power Station Demand</b>, the <b>Scheduled</b> relevant effective time.</p>	<p>The <b>Synchronising</b> and <b>De-Synchronising</b> times (and, in the case of <b>Pumped Storage Plant Demand</b> and <b>Energy Storage Power Station Demand</b>, the relevant effective time) shown in the <b>Indicative Operations Schedule</b> are indicative only and it should be borne in mind by <b>Users</b> that the <b>Dispatch Instructions</b> could reflect more or different <b>CDGU, Aggregated Generating Unit</b> and/or <b>Controllable PPM, Pumped Storage Plant Demand, Energy Storage Power Station Demand</b> and/or <b>Aggregate Generating Unit</b> requirements than in the <b>Indicative Operations Schedule</b>. <b>With the exception of an Energy Storage Power Station, the TSO</b> may issue <b>Dispatch Instructions</b> in respect of any <b>CDGU</b> and/or <b>Aggregated Generating Unit, Controllable PPM, Pumped Storage Plant Demand, Energy Storage Power Station Demand</b> or <b>Aggregated Generating Unit</b> which has not declared an <b>Availability</b> or <b>Demand Side Unit MW Availability</b> of 0 MW in an <b>Availability Notice</b>. <b>Users with CDGUs and/or Aggregated Generating Units or Controllable PPM, Pumped Storage Plant Demand or Energy Storage Power Station Demand</b> shall ensure that their units are able to be <b>Synchronised</b>, or in the case of <b>Pumped Storage Plant Demand and Energy Storage Power Station</b>, used at the times <b>Scheduled</b>, but only if so <b>Dispatched</b> by the <b>TSO</b> by issue of a <b>Dispatch Instruction</b>. <b>Users</b> shall, as part of a revision to the <b>Technical Parameters</b>, indicate to the <b>TSO</b> the latest time at which a <b>Dispatch Instruction</b> is required to meet the scheduled <b>Synchronising</b> time or in the case of <b>Pumped Storage Plant Demand or Energy Storage Power Station Demand</b>, the <b>Scheduled</b> relevant effective time.</p>





## ESPS Phase 2 (Revised Modification)

- The proposed low frequency demand disconnection changes sit outside Sections under Common Governance, so the details of how this requirement will be captured will be discussed in our respective GCRP meetings.
- SONI will re-submit their modification proposal with the changes to SDCs as outlined. The low frequency disconnection requirements will also be the same but will be addressed via a change to the PPM Settings Schedule and will be discussed at the SONI GCRP.



# Questions?

# MPID327 and SPID\_05\_2024 - DSU

## Notice to react



## Background



SONI and EirGrid are proposing modifications to their respective Grid Codes to include Notice to React Instructions for Demand Side Units.



It is essential that the MWs available to the system are provided when called upon. The purpose of this modification seeks to support the system security by the introduction of this change.



Generator units have similar modification (MPID 223) in place since early 2010s.



Other technology types were considered for inclusion in this modification and will be brought forward in parallel with upcoming system/change requests in conjunction with SDP workstream.



From time-to-time situations occur where a unit fails to instigate a response to a Dispatch Instruction, without this Modification, there are no assurances that the DSUs availability is reduced to zero as they don't receive the appropriate Fail instruction to their Dispatch Instruction.



Causing a negative impact on operating the system, resulting in additional costs

Requiring operational intervention where additional units are dispatched at higher costs

Inaccurate reflection of the MW available to meet system needs

Can influence Imbalance Pricing

DSU receive shutdown cost and Imperfections for duration of DI

Certain DS3 products considers FAIL instruction as part of scalars

Removed with implementation of this Modification

# IMPACT

Jan23 -April 24	No of DSU Dispatched	No DSU to Fail to react	Difference
EirGrid	387	26	7%
SONI	296	12	4%

Following each incident, the TSO engaged with the respective DSU Operator and the most common reasons given for the failure to react were:

- DSU Operator experienced Communication issues.
- DSU Operator requested Individual Demand Site to respond and got acceptance to do so but had an onsite issue which impacted it being able to provide any response.
- DSU Operator informed that IDS was unable to provide reduction at the time it was called upon, DSU operator working with them to provide better forecasting data.

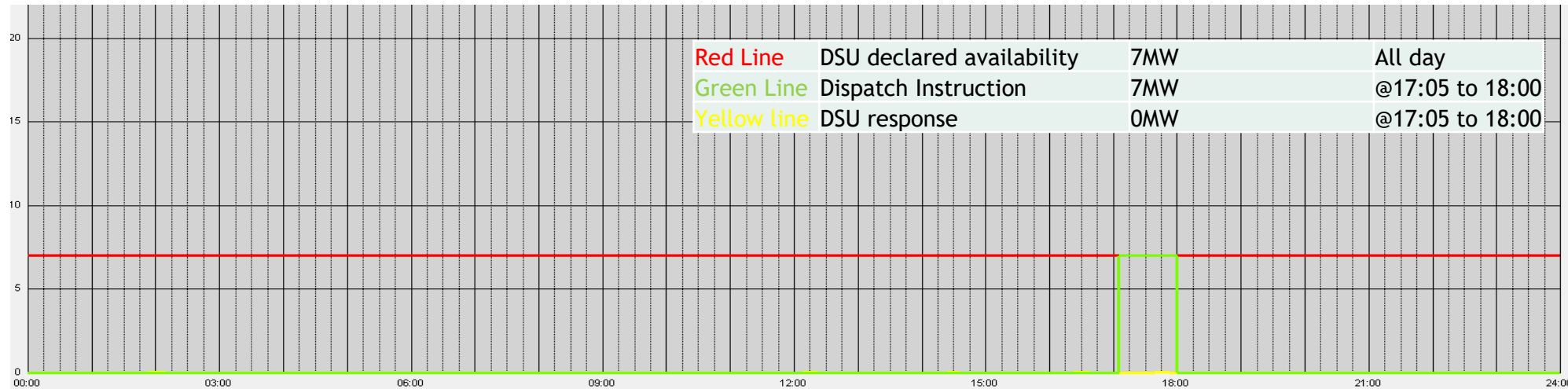
# Proposed Process

- ❖ Process can only be triggered following a Dispatch Instruction being issued to a DSU to react from 0MW status and failing to respond within 15mins of effective time as long as adequate Notice Time is taken into consideration.
  1. TSO Issue Fail to React Instruction to the DSU.
  2. The DSU Operator Declares Availability to 0MW at  $t_0$  or TSO complete on their behalf.
- ❖ The outlook of the Availability of the DSU is discussed between the TSO and the DSU operator.
  1. DSU Operator declares new Availability at a new effective time once its issue is resolved taking Notice Time into consideration.
  2. The TSO considers issuing the DSU with a new Dispatch Instruction, taking the units new Availability Declaration into account.

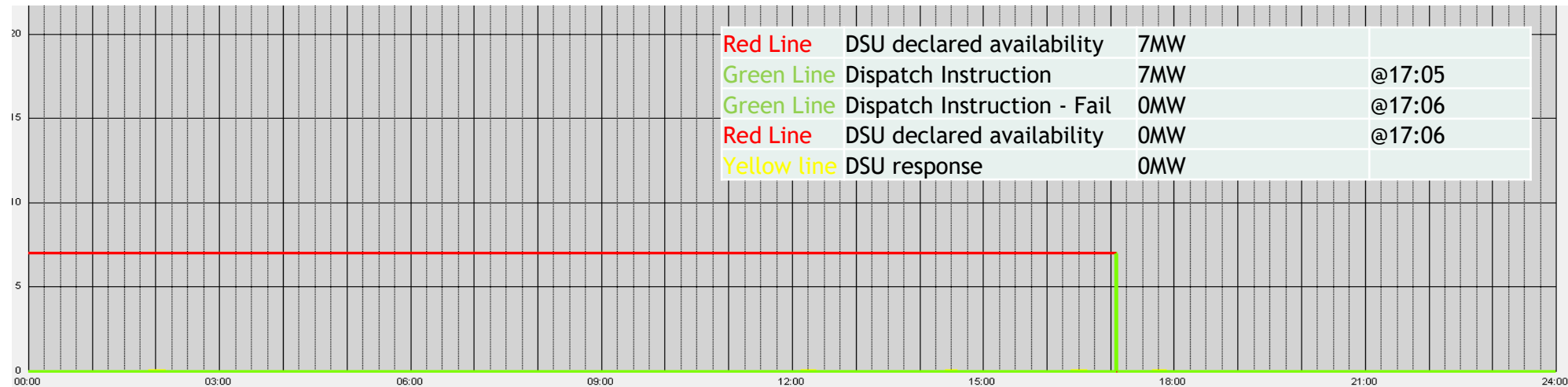


# Example of Declarations and Dispatches

Potential unintended consequence if modification is not implemented (can occur in some cases)



Assurance with modification implemented





# Proposed addition to the SDCs

Clause	Context	Red-line Version text: Deleted text in <del>strike-through red font</del> and new text highlighted in blue font	Green-line Version text:
SDC2.4.2.11 Action Required from Users	Inform TSO of issue and estimated resolution	(e) Where the TSO issues a Notice to React Instruction via a Dispatch Instruction to a Demand Side Unit Operator and the Demand Side Unit Operator identifies that such Demand Side Unit will not be providing Demand Side Unit MW Response within -15/+15 minutes of its effective time, the Demand Side Unit Operator must immediately (at the time the discrepancy is identified) inform the TSO of the situation and estimate the new Notice to React time.	(e) Where the TSO issues a Notice to React Instruction via a Dispatch Instruction to a Demand Side Unit Operator and the Demand Side Unit Operator identifies that such Demand Side Unit will not be providing Demand Side Unit MW Response within -15/+15 minutes of its effective time, the Demand Side Unit Operator must immediately (at the time the discrepancy is identified) inform the TSO of the situation and estimate the new Notice to React time.
SDC2.4.2.11 Action Required from Users	FAIL instruction issued and Availability reduced to 0 MW	(f) If the Demand Side Unit has not reacted by reducing Demand within 15 minutes of the Notice to React Instruction, the TSO will issue a Failure to Follow Notice to React Instruction and the Demand Side Unit Operator shall re-declare, by Electronic Interface or by other form, as the TSO may reasonably notify to Demand Side Unit Operator from time to time, its Availability to 0 MW for the effective time of the original Notice to React.	(f) If the Demand Side Unit has not reacted by reducing Demand within 15 minutes of the Notice to React Instruction, the TSO will issue a Failure to Follow Notice to React Instruction and the Demand Side Unit Operator shall re-declare, by Electronic Interface or by other form as the TSO may reasonably notify to Demand Side Unit Operator from time to time, its Availability to 0 MW for the effective time of the original Notice to React.



# Proposed addition to Definition section

Clause	Context	Red-line Version text: Deleted text in <del>strike-through red font</del> and new text highlighted in blue font	Green-line Version text:
Definition Notice to React		<i>A Dispatch Instruction issued by the TSO to a Demand Side Unit Operator to initiate Demand Side Unit MW Response from a zero MW value at the stated effective time.</i>	<i>A Dispatch Instruction issued by the TSO to a Demand Side Unit Operator to initiate Demand Side Unit MW Response from a zero MW value at the stated effective time.</i>
Definition Failure to Follow Notice to React Instruction		<i>A Dispatch Instruction issued by the TSO to a Demand Side Unit Operator in respect of its Demand Side Unit confirming that it has failed to provide a Demand Side Unit MW Response within 15 minutes after the Notice to React instruction, subject to Demand Side Unit Notice Time.</i>	<i>A Dispatch instruction issued by the TSO to a Demand Side Unit Operator in respect of its Demand Side Unit confirming that it has failed to provide a Demand Side Unit MW Response within 15 minutes after the Notice to React instruction, subject to Demand Side Unit Notice Time.</i>



**Thank you!**

**Questions?**



### 3. Discussion: 15 minutes

#### a. Large Energy Users Fault-ride-through





# Fault Ride-Through Requirements for Demand Facilities

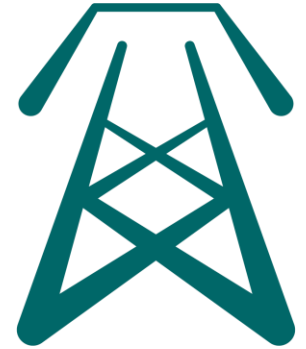
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# Summary

- Some large Demand Facilities are automatically reducing and restoring their demand in response to remote system faults.
- This behaviour is a characteristic of some new, large-scale, inverter-based demand facilities.
- The issue has the potential to exacerbate the impact of transmission system faults, leading to cascade trips and a significant system incident.
- The issue will continue to grow as this type of demand ramps up and, unless resolved, these behaviours will significantly impact on our ability to:
  - a) operate the power system securely, and
  - b) evolve operational policy to facilitate higher levels of renewable generation.
- The TSOs are proposing the inclusion of Demand Facility Fault Ride-Through Requirements in the Grid Codes to address this issue.



# Background

- By end of 2022, there was 734 MVA of Data Centre and new large energy user demand.
- In Ireland, there is approximately 2000 MVA of demand capacity that is contracted to data centres and other new technology loads at the transmission level, and approximately a further 300 MVA contracted at the 110 kV distribution level.
- A significant proportion of this demand is connected or expected to be connected in the Dublin area.

## Current System Demand

- Peak: 7.0 GW
- Minimum: 2.5 GW

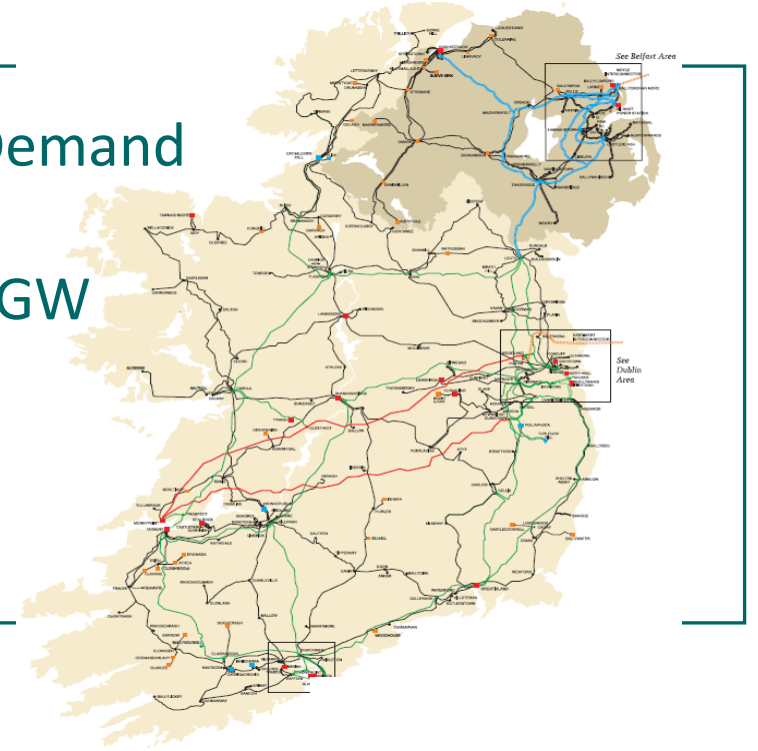


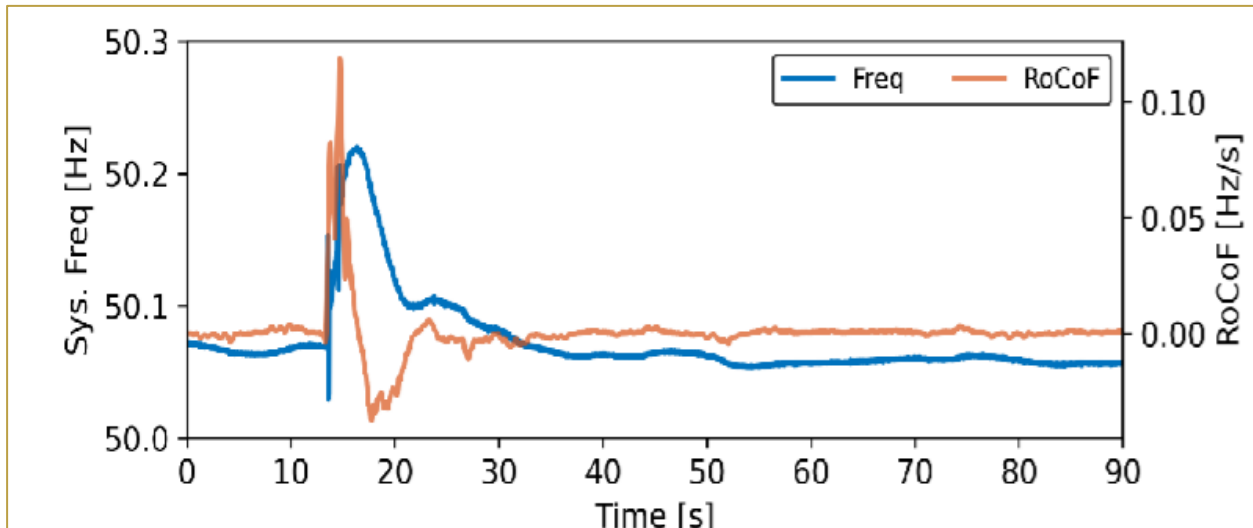
Table 1: Data centre and new large energy users demand, additional to the 734 MVA of existing demand by the end of 2022

Forecast scenario	Growth from 2022–2032 (MVA)	2032 demand (MVA)
Low	304	1,038
Median	810	1,543
High	1,276	2,010

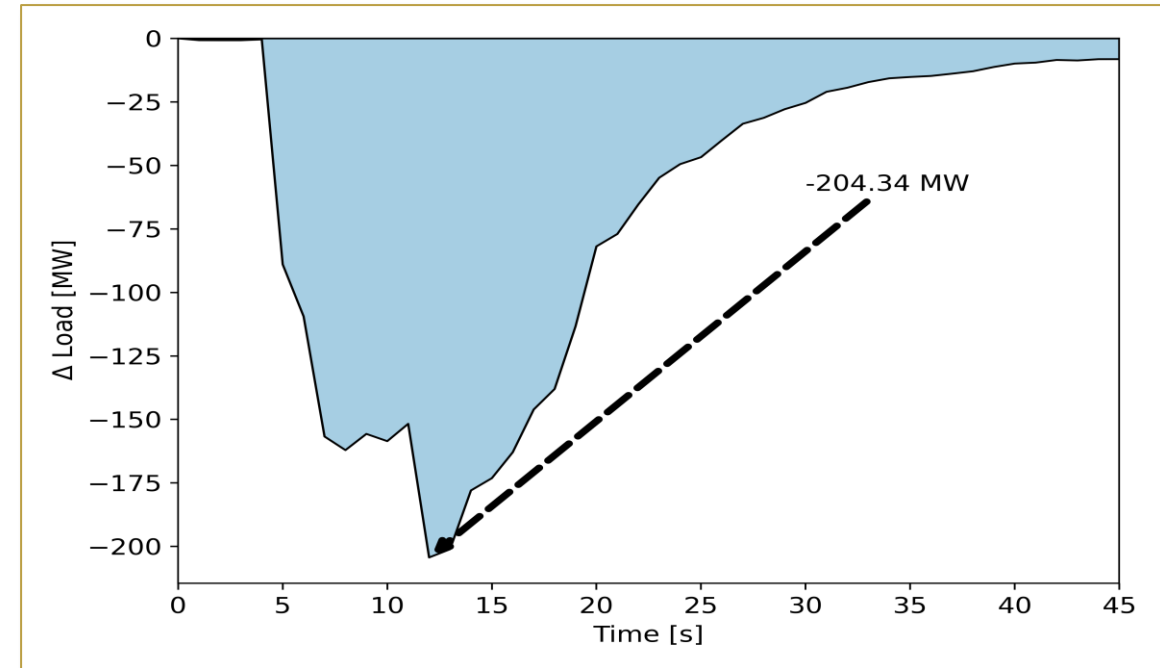
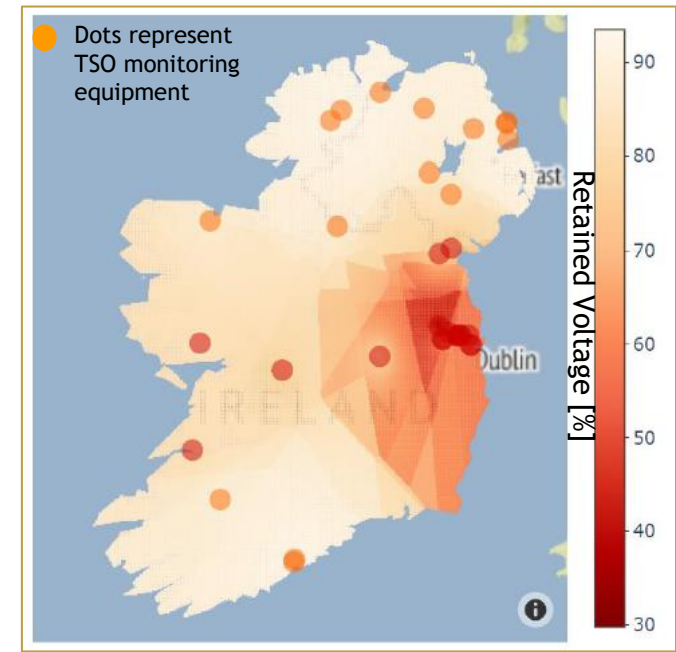
Source: [EirGrid & SONI Generation Capacity Statement 2023-2032](#)

# Example of Observed Response

- Following a transmission system fault that causes a transient voltage dip on the power system, data centre demand has been observed to reduce for a prolonged period before being automatically restored.
- This demand reduction causes a significant imbalance on the power system leading to a positive RoCoF and frequency rise.
- Similar responses have been observed by other TSOs in Europe and the USA.



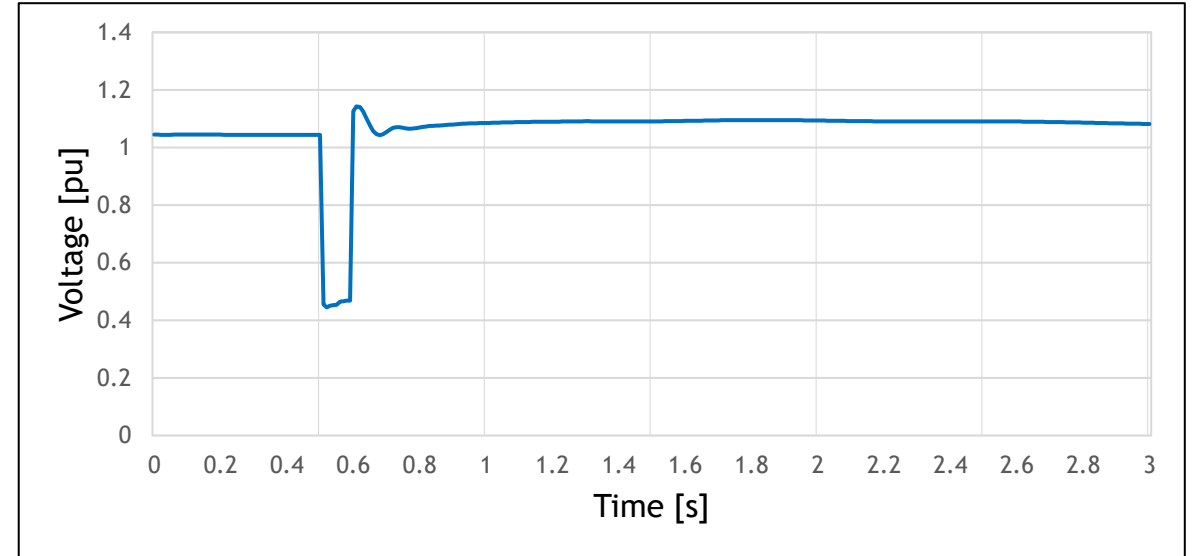
Disturbance propagation (contour map) and collective Data Centre Response (13 Dec. 2022, 220 kV fault in Dublin)



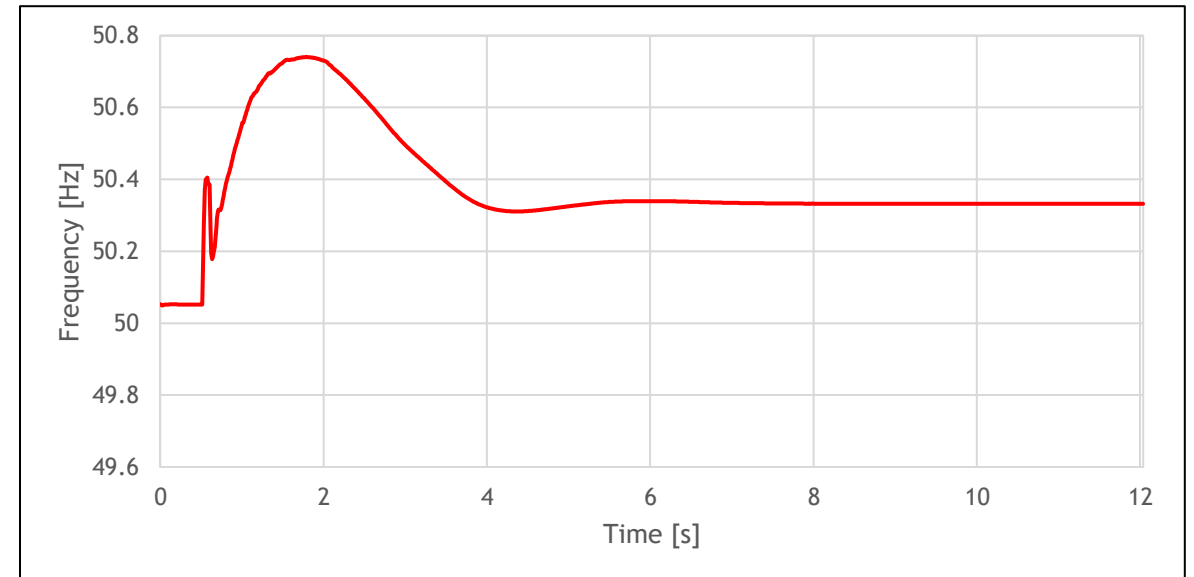


# 2025 Scenario

- The example presented here is based on simulation of a 2025 scenario with additional data centre demand with performance characteristics reflective of existing behaviour.
- The impact of a three-phase fault on the Dublin transmission system was modelled in our power system dynamic simulation tool.
- The fault results in a voltage dip that triggers a high level of demand reduction at data centres causing a significant power imbalance and high frequency. In the model approximately 800 MW of data centre demand reduction was observed which triggered an equivalent 900 MW tripping of wind generation to maintain stability.
- Additional data centre demand with similar performance characteristics will further exacerbate this issue.



Voltage magnitude of a relevant transmission bus following a three-phase fault in Dublin based on a 2025 Scenario.



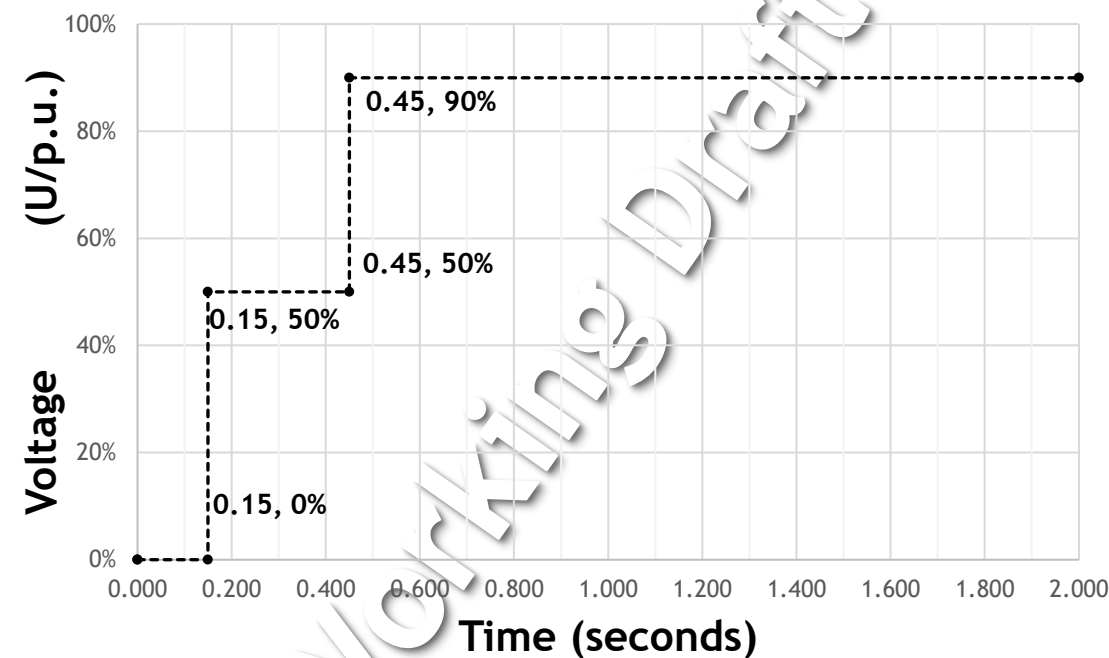
System Frequency following a three-phase fault in Dublin based on a 2025 Scenario.

# Working Draft of the TSOs' Proposal

Demand Facilities shall remain connected to the Transmission System and continue to operate stably 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 the figure at the Connection Point.

Following clearance of the Fault Disturbance, the Demand Facility should return to pre-fault conditions and maintain its Demand above 95% of pre-fault value unless otherwise agreed with the TSO.

The voltage-against-time profile specifies the required capability as a function of voltage and Fault Ride-Through Time at the Connection Point before, during and after the Fault Disturbance.



# Next Steps

- The TSOs are proposing to host an online industry webinar on this proposal.
  - **Date/Time: Tuesday 22 October 2024, 10:00 to 12:00**
- The TSOs intend to return to the December 2024 JGCRP, and individual EirGrid and SONI GC panels, to seek recommendations for the proposal.



# Open Discussion

## 4. Updates: 10 minutes

- a. Incorporation of Synchronous Condenser Units;
- b. CRU; and
- c. Utility Regulator.





# Incorporation of Synchronous Condenser Units

- Aiming to incorporate the Synchronous Condenser Unit (SCU) user type into all sections of the Grid Code.
- A draft modification proposal was originally presented as a discussion item to the JGCRP on 20<sup>th</sup> March 2024. Members had until 3<sup>rd</sup> May 2024 to submit feedback on the draft version of the modification.
- Upon receiving feedback from industry, the TSO issued a response document on 26<sup>th</sup> July 2024 and requested further feedback by 16<sup>th</sup> August 2024.
- After TSO review of additional feedback, further engagement is required between the TSO, industry and OEMs to solidify voltage regulation requirements for SCUs.
- TSOs are aiming to complete this engagement and submit a revised draft modification to members at the December 2024 JGCRP/GCRPs.





# CRU Update

# UR Update

# AOB

Meeting Minutes will be issued by COB 08 October 2024