

Public

CM097 Electromagnetic Transient (EMT) and Root Mean Square (RMS) Model Submission for Transmission Owners (TOs)

Workgroup 1 (Monday 16 December 2024)

Online Meeting via Teams

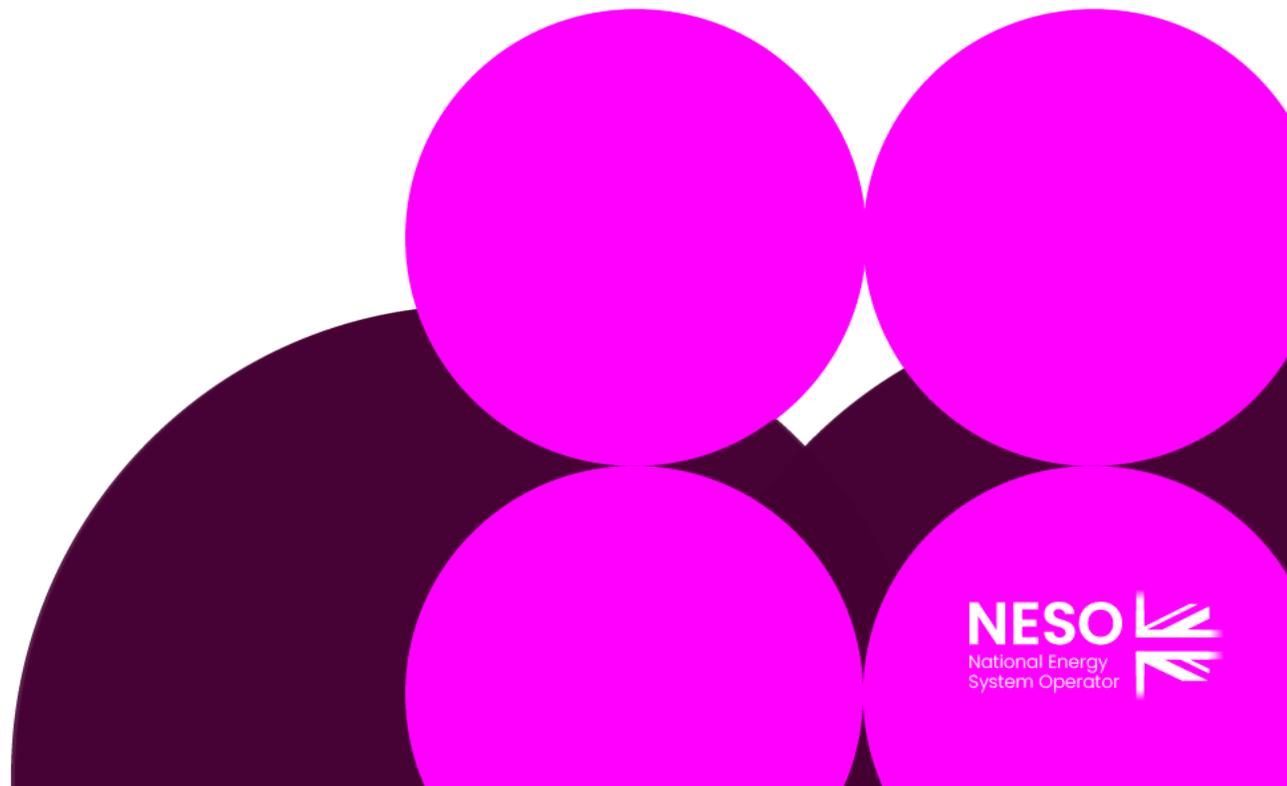
WELCOME

Agenda

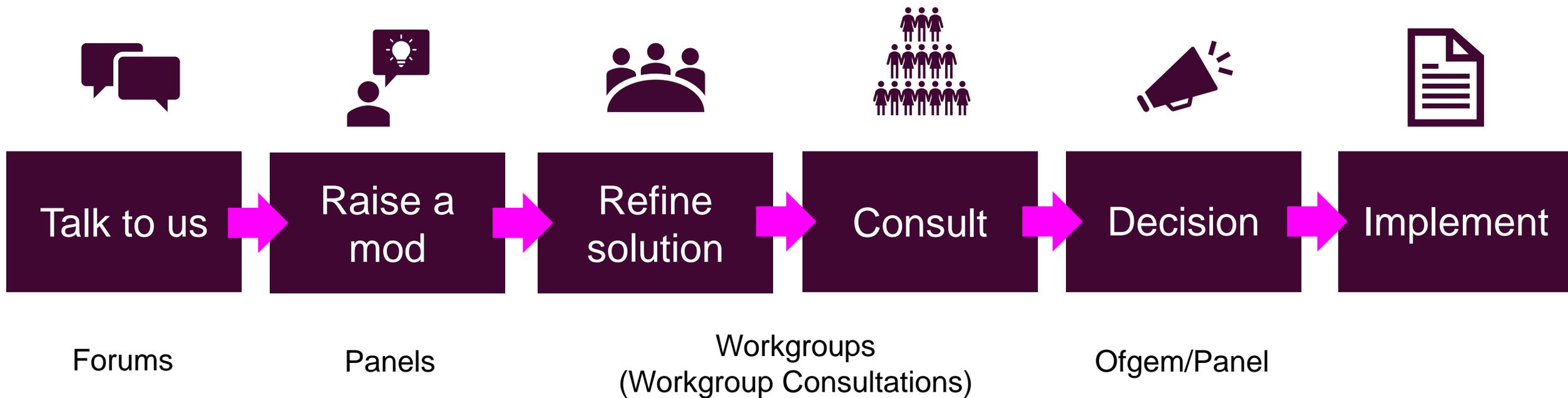
| Topics to be discussed | Lead |
|--|----------|
| Introductions | Chair |
| Code Modification Process Overview <ul style="list-style-type: none"> • Workgroup Responsibilities • Workgroup Alternatives and Workgroup Vote | Chair |
| Objectives and Timeline <ul style="list-style-type: none"> • Walk-through of the timeline for the modification | Chair |
| Review Terms of Reference | All |
| Proposer presentation | Proposer |
| Questions from Workgroup Members | All |
| Agree Terms of Reference | All |
| Cross Code Impacts | All |
| Any Other Business | Chair |
| Next Steps | Chair |

Modification Process

Deborah Spencer – ESO Code
Administrator



Code Modification Process Overview



Refine Solution Workgroups



- If the proposed solution requires further input from industry in order to develop the solution, a Workgroup will be set up.
- The Workgroup will:
 - further refine the solution, in their discussions and by holding a **Workgroup Consultation**
 - Consider other solutions, and may raise **Alternative Modifications** to be considered alongside the Original Modification
 - Have a **Workgroup Vote** so views of the Workgroup members can be expressed in the Workgroup Report which is presented to Panel

Consult Code Administrator Consultation

- The Code Administrator runs a consultation on the **final solution(s)**, to gather final views from industry before a decision is made on the modification.
- After this, the modification report is voted on by Panel who also give their views on the solution.



Decision



- Dependent on the Governance Route that was decided by Panel when the modification was raised
- **Standard Governance:** Ofgem makes the decision on whether or not the modification is implemented
- **Self-Governance:** Panel makes the decision on whether or not the modification is implemented
 - an appeals window is opened for 15 days following the Final Self Governance Modification Report being published

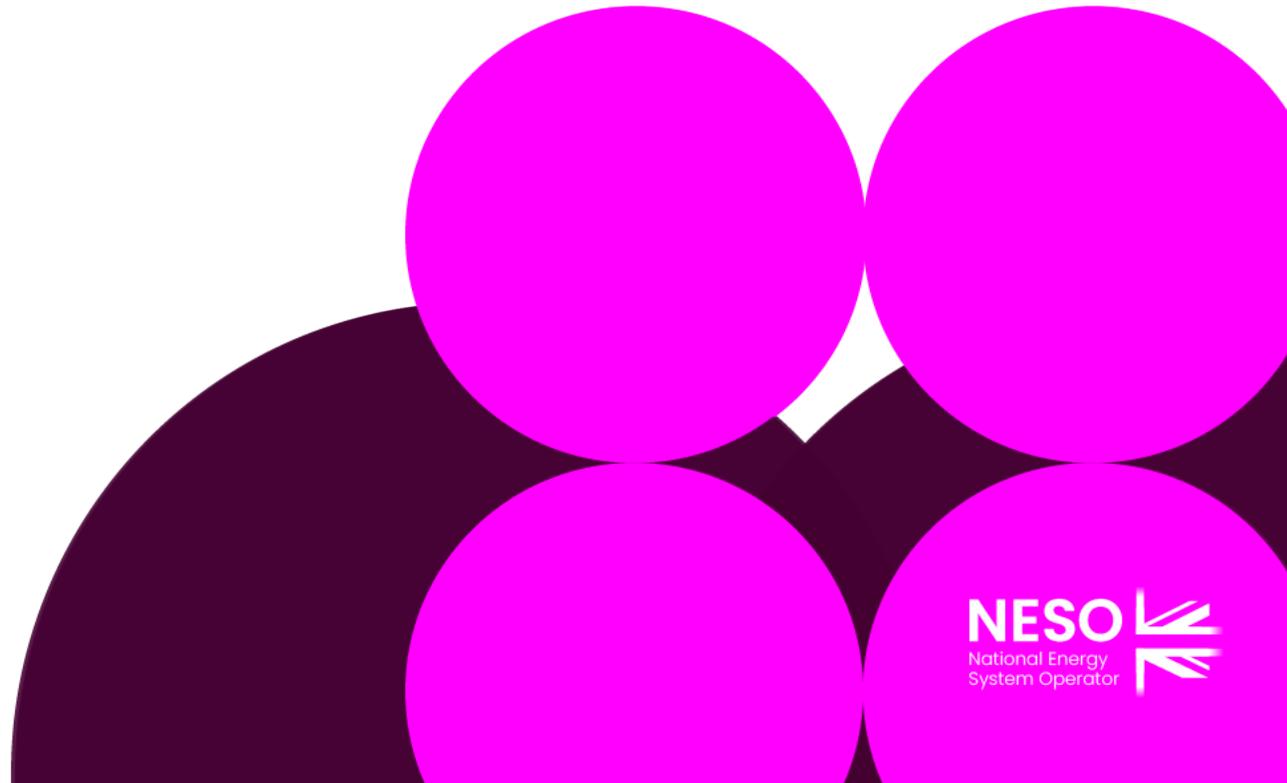
Implement

- The Code Administrator implements the final change which was decided by the Panel / Ofgem on the agreed date.



Workgroup Responsibilities and Membership

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Administrator



Public

Expectations of a Workgroup Member

Contribute to the discussion

Be respectful of each other's opinions

Language and Conduct to be consistent with the values of equality and diversity

Do not share commercially sensitive information

Be prepared - Review Papers and Reports ahead of meetings

Complete actions in a timely manner

Keep to agreed scope

Email communications to/cc'ing the .box email

Your Roles

Help refine/develop the solution(s)

Bring forward alternatives as early as possible

Vote on whether or not to proceed with requests for Alternatives

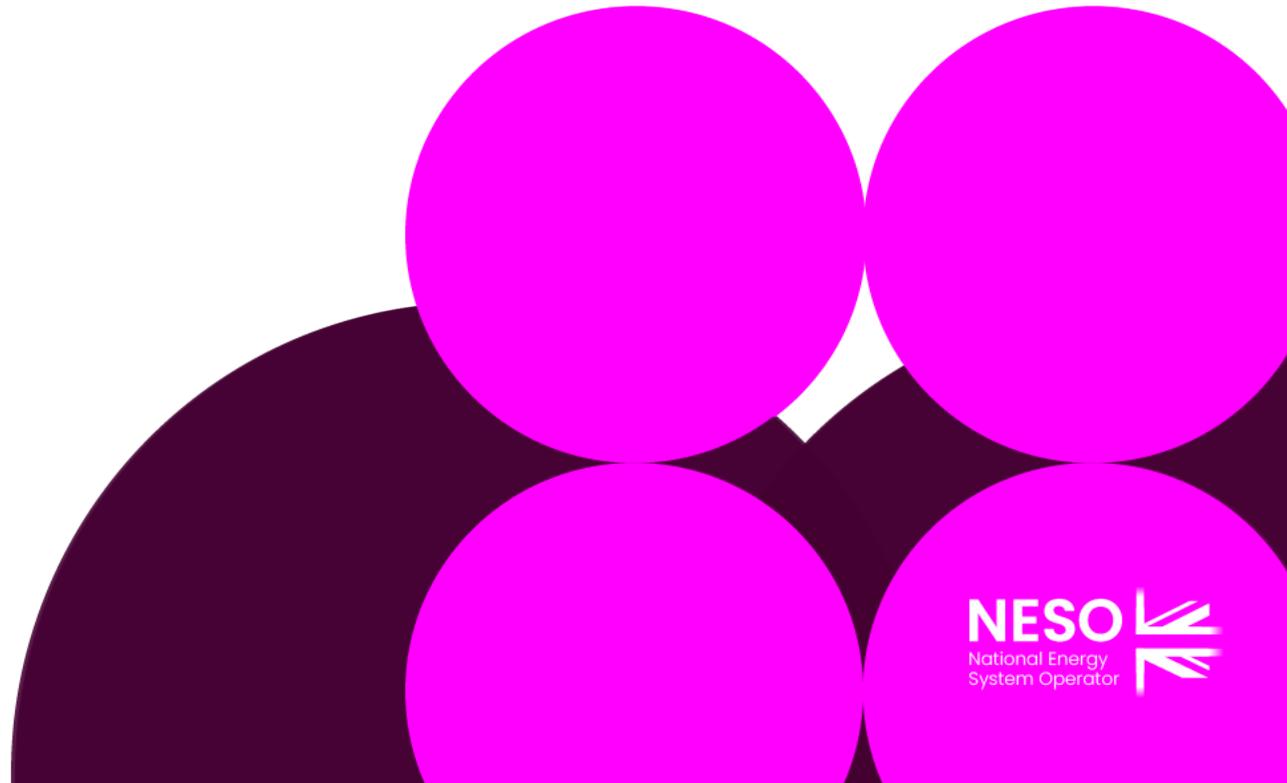
Vote on whether the solution(s) better facilitate the Code Objectives

Workgroup Membership

| Role | Name | Company | Alternate | Name |
|------------------|-----------------|---------------------------|-----------|--------------------|
| Chair | Deborah Spencer | NESO | | |
| Tech Sec | Sarah Williams | NESO | | |
| Proposer | Frank Kasibante | NESO | Alternate | Jay Ramachandran |
| | | | Alternate | Gopi Yericheria |
| Workgroup member | Joel Matthews | Diamond Transmission Corp | Alternate | TBC |
| Workgroup member | Calum Erentz | NESO | Alternate | Yuan Chen |
| Workgroup member | Darshak Shah | BP | Alternate | TBC |
| Workgroup member | Dewu Shu | GE Vernova | Alternate | Casadevall, Vicenc |
| Workgroup member | Bala Santhanam | Enercon GmbH | Alternate | David McMullin |
| Workgroup member | Graeme Vincent | SP Energy Networks | Alternate | Cornel Brozio |
| Workgroup member | Srinivas Edla | SSEN | Alternate | Annesh Rajeev |
| Observer | Maria Ebue | Volitalia UK Ltd | | |
| Observer | Wuxing Liang | The Crown Estate | | |
| Observer | Antony Johnson | NESO | | |
| Observer | Ramana Budha | Jacobs UK Ltd | | |
| Observer | Ife Garba | NESO | | |

Workgroup Alternatives and Workgroup Vote

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What is the Alternative Request?

What is an Alternative Request? The formal starting point for a Workgroup Alternative Modification to be developed which can be raised up until the Workgroup Vote.

What do I need to include in my Alternative Request form? The requirements are the same for a Modification Proposal you need to articulate in writing:

- a description (in reasonable but not excessive detail) of the issue or defect which the proposal seeks to address compared to the current proposed solution(s);
- the reasons why you believe that the proposed alternative request would better facilitate the Applicable Objectives compared with the current proposed solution(s) together with background information;
- where possible, an indication of those parts of the Code which would need amending in order to give effect to (and/or would otherwise be affected by) the proposed alternative request and an indication of the impacts of those amendments or effects; and
- where possible, an indication of the impact of the proposed alternative request on relevant computer systems and processes.

How do Alternative Requests become formal Workgroup Alternative Modifications? The Workgroup will carry out a Vote on Alternatives Requests. If the majority of the Workgroup members or the Workgroup Chair believe the Alternative Request will better facilitate the Applicable Objectives than the current proposed solution(s), the Workgroup will develop it as a Workgroup Alternative Modification.

Who develops the legal text for Workgroup Alternative Modifications? ESO will assist Proposers and Workgroups with the production of draft legal text once a clear solution has been developed to support discussion and understanding of the Workgroup Alternative Modifications.

Can I vote? And What is the Alternative Vote?

To participate in any votes, Workgroup members need to have attended at least 50% of meetings. The vote shall be decided by simple majority of those present at the meeting at which the vote takes place (whether in person or by teleconference)

Stage 1 – Alternative Vote

- Vote on whether Workgroup Alternative Requests should become Workgroup Alternative STC Modifications.
- The Alternative vote is carried out to identify the level of Workgroup support there is for any potential alternative options that have been brought forward by either any member of the Workgroup OR an Industry Participant as part of the Workgroup Consultation.
- **Should the majority of the Workgroup OR the Chair believe that the potential alternative solution may better facilitate the STC objectives than the Original then the potential alternative will be fully developed by the Workgroup with legal text to form a Workgroup Alternative STC modification (WASTM) and submitted to the Panel and Authority alongside the Original solution for the Panel Recommendation vote and the Authority decision.**

Can I vote? And What is the Alternative Vote?

To participate in any votes, Workgroup members need to have attended at least 50% of meetings. The vote shall be decided by simple majority of those present at the meeting at which the vote takes place (whether in person or by teleconference)

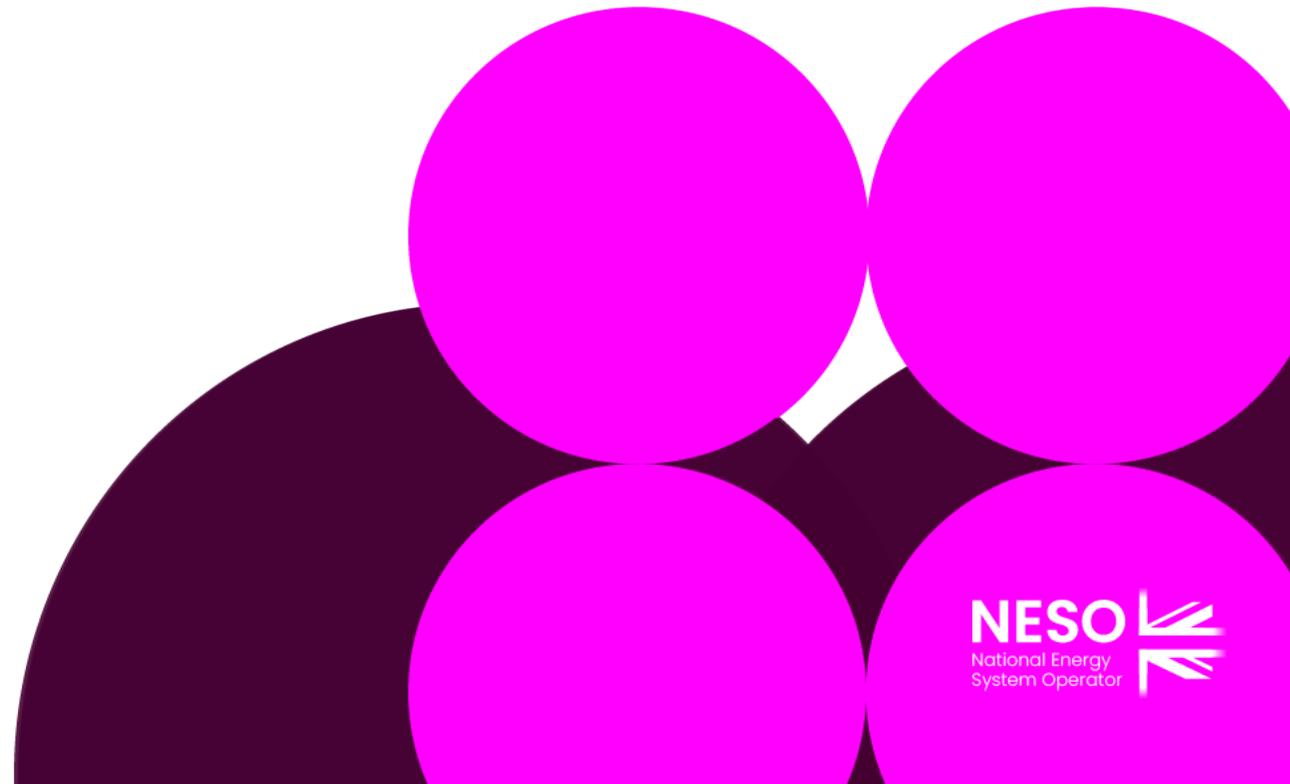
Stage 2 – Workgroup Vote

- 2a) Assess the original and Workgroup Alternative (if there are any) against the relevant Applicable Objectives compared to the baseline (the current code)
- 2b) Vote on which of the options is best.

Alternate Requests cannot be raised after the Stage 2 – Workgroup Vote

Objectives and Timeline

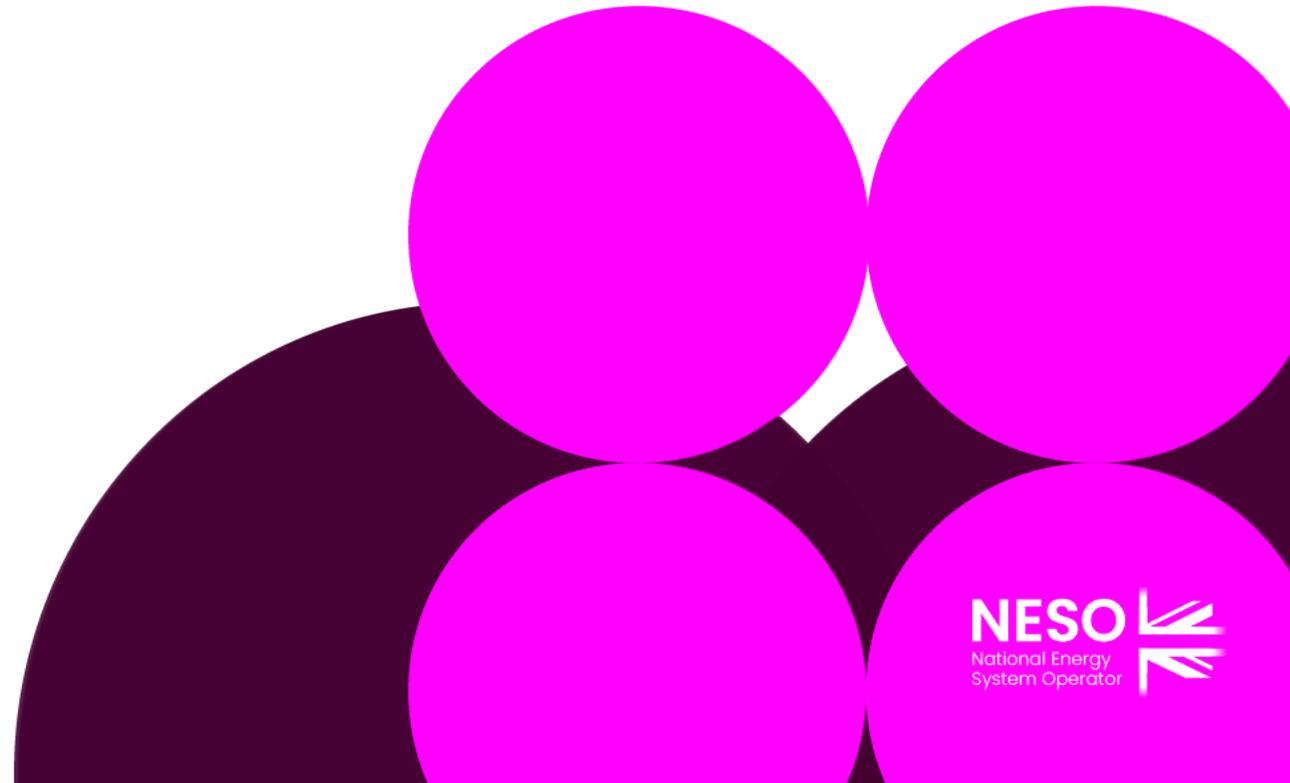
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| Milestone | Date | Milestone | Date |
|---|--|--|--|
| Modification presented to Panel | 29 May 2024 | Code Administrator Consultation (15 business days) | 01 September 2025 to 19 September 2025 |
| Workgroup Nominations (15 business Days) Second Workgroup Nominations | 03 – 24 June 2024 14 October to 6 November 2024 | Draft Final Modification Report (DFMR) issued to Panel (5 business days) | 22 October 2025 |
| Workgroup 1 <i>Review Proposers solution, timeline and Terms of Reference</i> Workgroup 2 <i>Review legal text and any actions from previous Workgroup</i> Workgroup 3 <i>Confirm legal text complete. Review Terms of Reference</i> Workgroup 4 Review Workgroup Report and agree to issue for consultation | 16 December 2024 16 January 2025 18 February 2025 06 March 2025 | Panel undertake DFMR recommendation vote | 29 October 2025 |
| Workgroup Consultation (15 business days) | 13 March 2025 to 03 April 2025 | Final Modification Report issued to Panel to check votes recorded | 30 October 2025 to 05 November 2025 |
| Workgroup 5 <i>Review consultation Responses</i> Workgroup 6 <i>TBC</i> Workgroup 7 <i>TBC</i> Workgroup 8 <i>TBC</i> Workgroup 9 <i>TBC</i> | 17 April 2025 15 May 2025 05 June 2025 26 June 2025 17 July 2025 | Final Modification Report issued to Ofgem | 07 November 2025 |
| Workgroup report issued to Panel (5 business days) | 20 August 2025 | Ofgem decision | TBC |
| Panel sign off that Workgroup Report has met its Terms of Reference | 27 August 2025 | Implementation Date | TBC |

CM097 - Background and Proposed Solution

Frank Kasibante – NESO



Background

As Great Britain's (GB) power system moves towards a net zero carbon operation; the number of Inverter-Based Resources (IBR) is expected to increase, with the amount of synchronous generation in the grid to decline which will significantly change the characteristics of the GB network. These changes give rise to the need for more accurate dynamic modelling and the need for analysing the effect of potential control interactions between the devices across the network leading to risks of oscillations and inverter stability.

Proposed Solution

This modification seeks to require Transmission Owners (TOs) to provide NESO with Electromagnetic Transient (EMT) and Root Mean Square (RMS) models to carry out the required analysis.

Scope [\(CM097 Legal Text\)](#)

- Additional requirement (STC Section D Part 1, 2.1.2.8 & 2.2.6.3)
- Additional requirement (STC SCHEDULE THREE, 2.1 (I))

Term of Reference (e)

- STC Panel advised that CM097 Workgroup should consider STCP 12-2 alongside CM097
- A new STCP 12-2 has been drafted for Workgroup to review and share their comments ahead of proposing a STCP change

Proposed STCP 12-2 Process

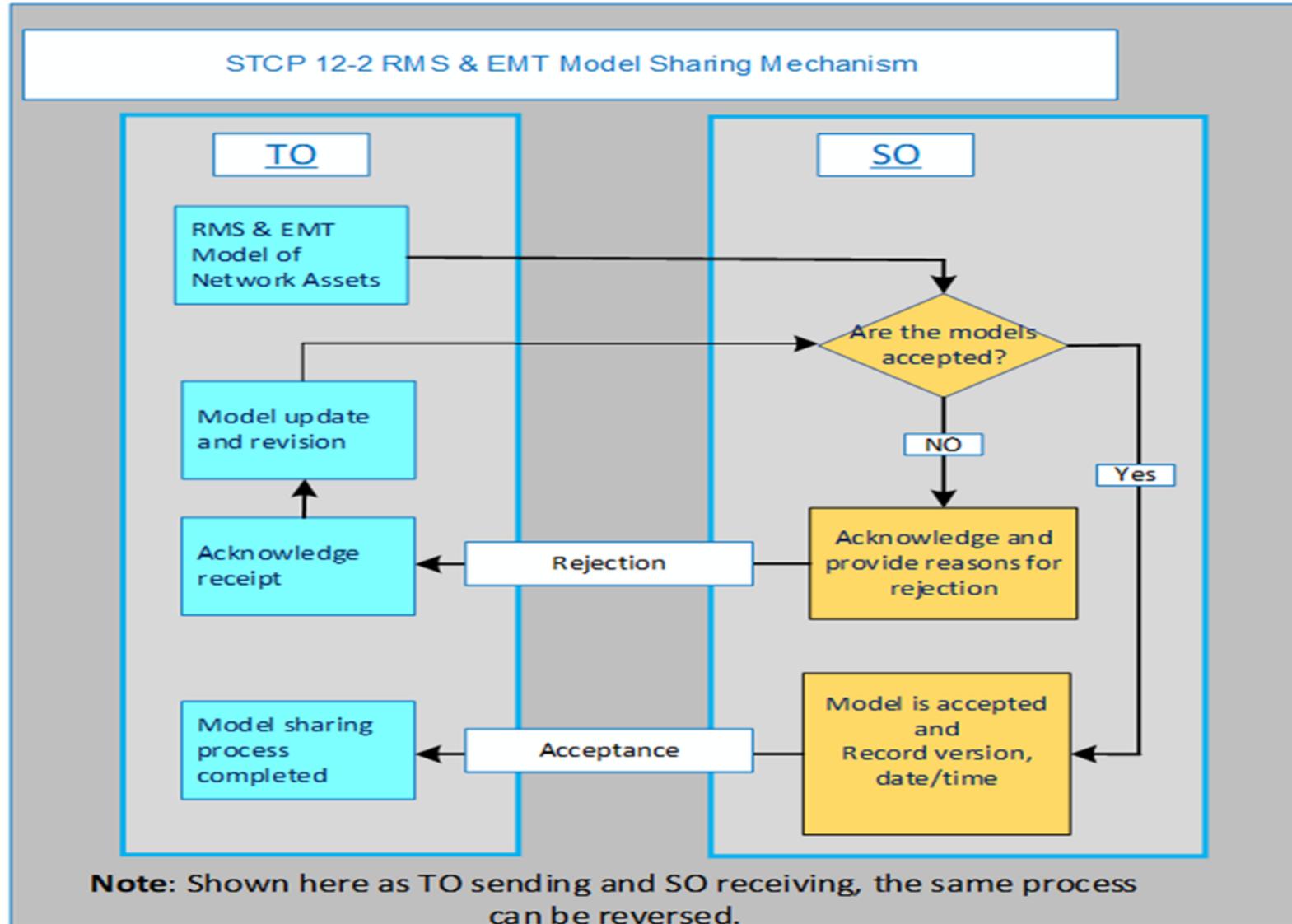
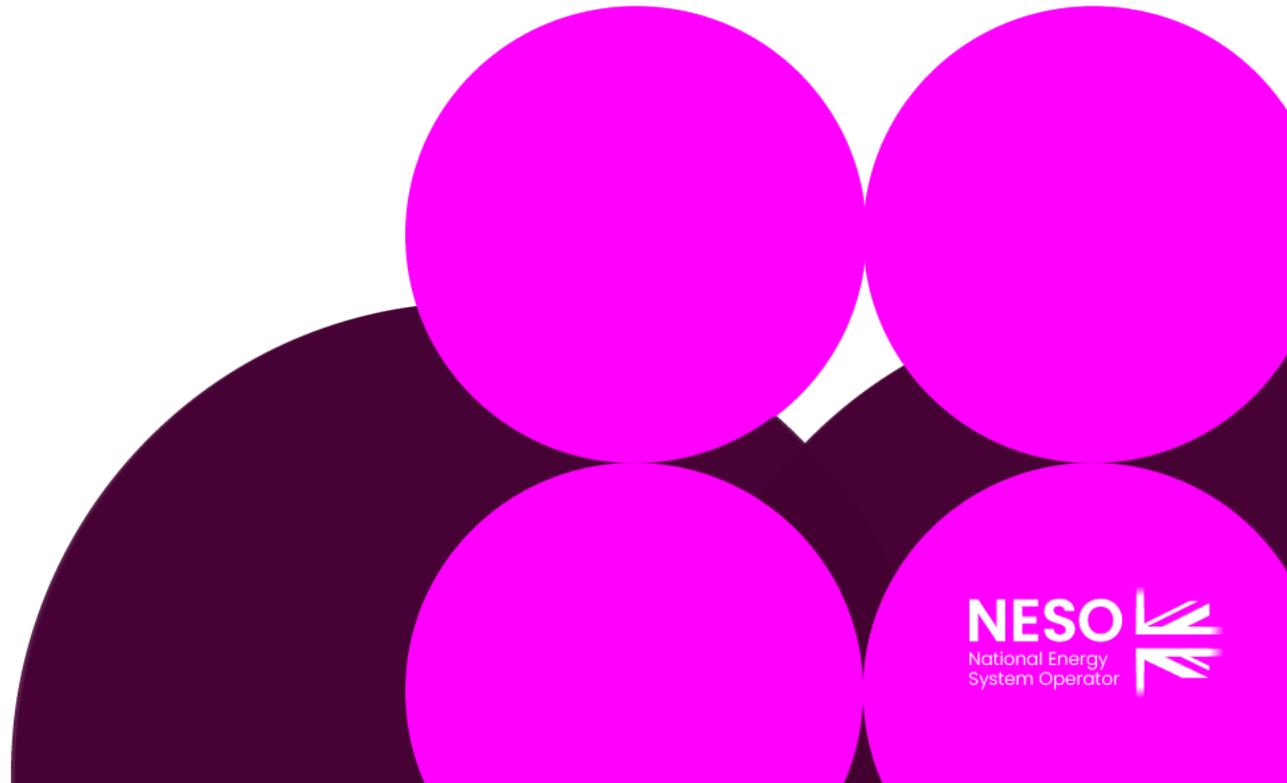


Figure 1 - RMS & EMT Model Sharing Mechanism

Review Terms of Reference

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Administrator



Terms of Reference – CM097

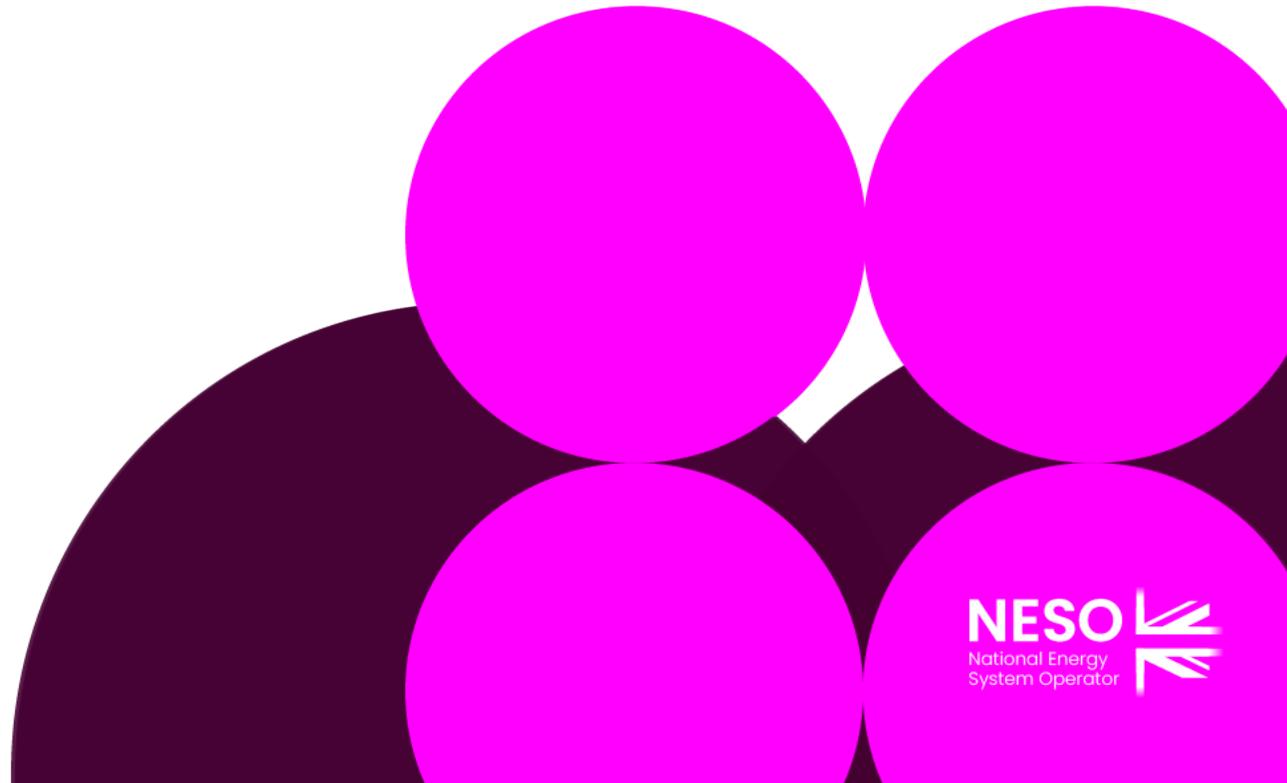
| Workgroup Term of Reference |
|--|
| a) Implementation |
| b) Review and support the legal text drafting; |
| c) Ensure the appropriate Industry experts or stakeholders are engaged in the Workgroup to ensure that all potentially affected stakeholders have the opportunity to be represented in the Workgroup |
| d) The Cross Code impacts this Modification has, in particular the CUSC |
| e) Consider STCP 12-2 alongside CM097 |
| f) Consider how to produce/gather models for existing assets |
| g) Assess the materiality of costs/resources needed for STC Parties to comply with additional requirements brought forward by the proposer's solution. |

Proposer's Solution: Background; Proposed Solution; Scope; and Assessment vs Terms of Reference

Frank Kasibante – NESO

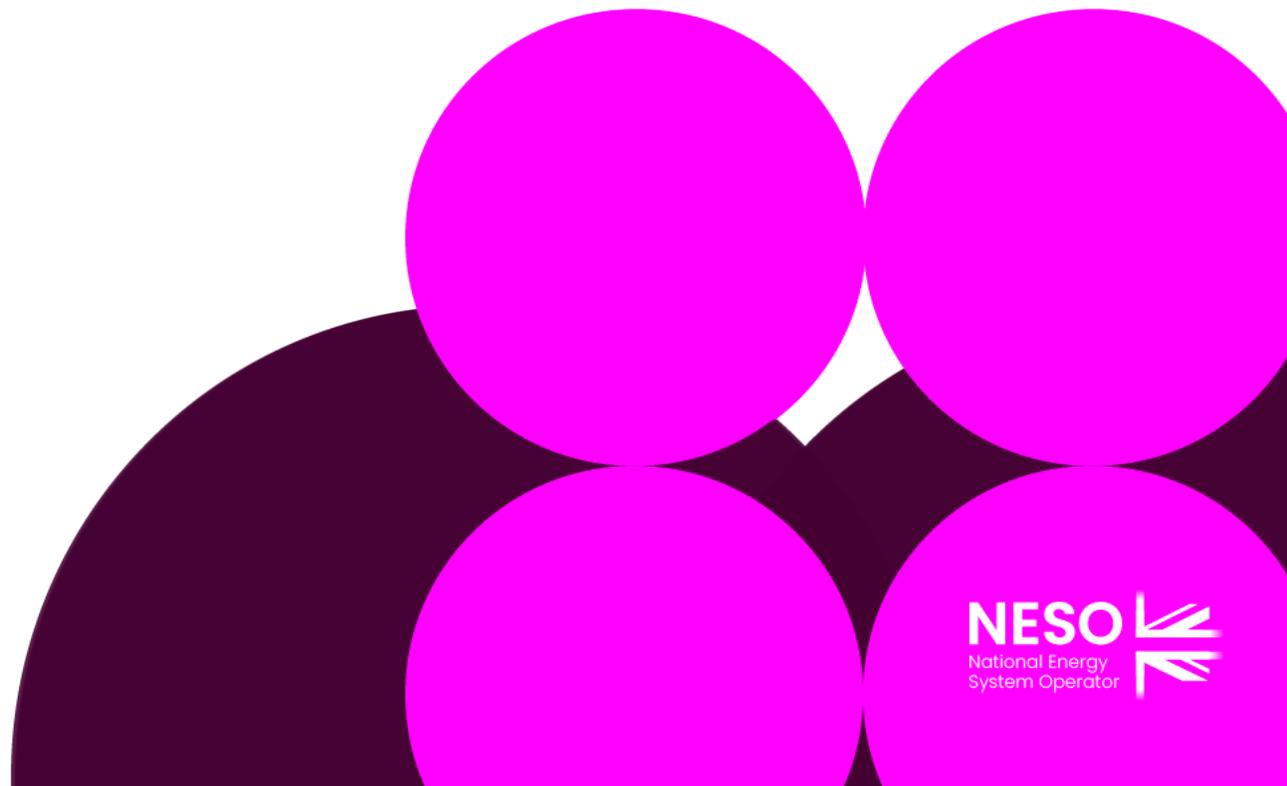
Agree Terms of Reference

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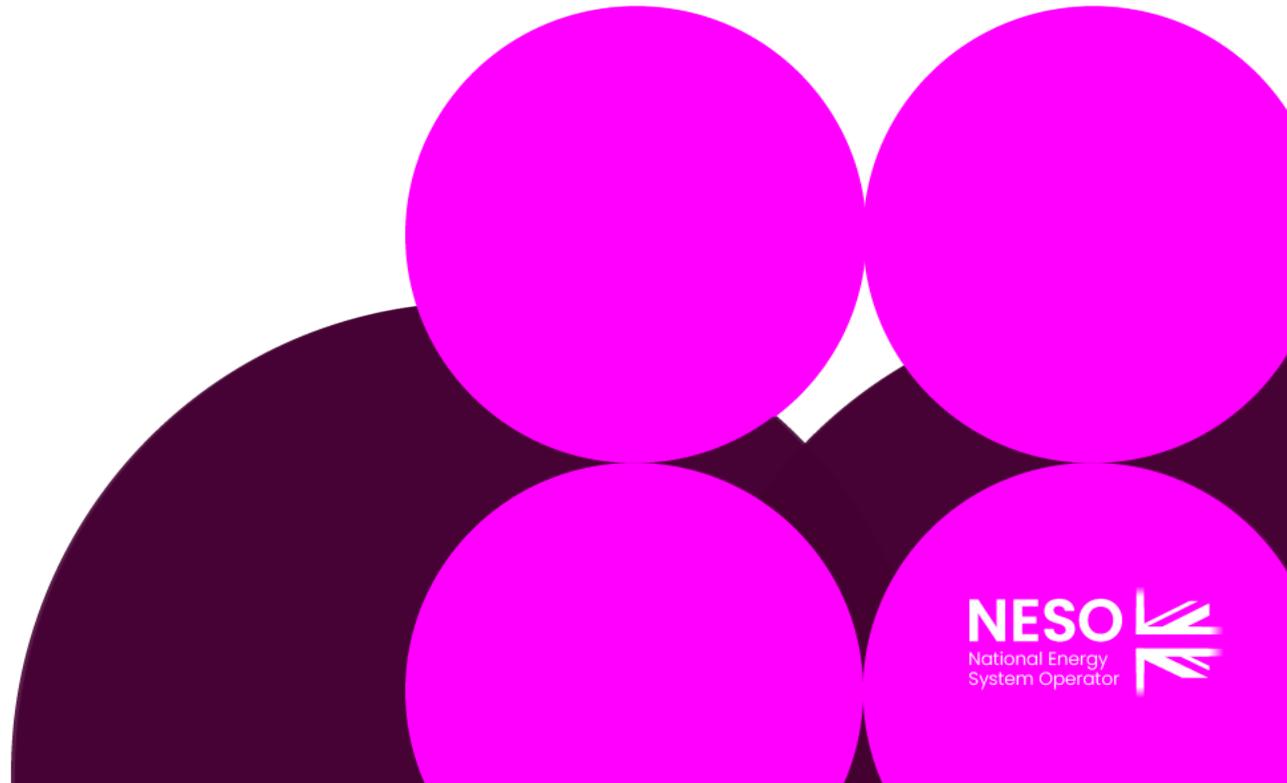
Cross Code Impacts

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Any Other Business

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Next Steps

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