Electricity System Restoration

Assurance Framework

2024/2025

ESO

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Executive Summary

The Electricity System Restoration Standard (ESRS) prescribes new restoration targets effective from 31 December 2026, for the Electricity System Operator (ESO) to have sufficient capability in place, in the event of a Total System Shutdown, to restore:

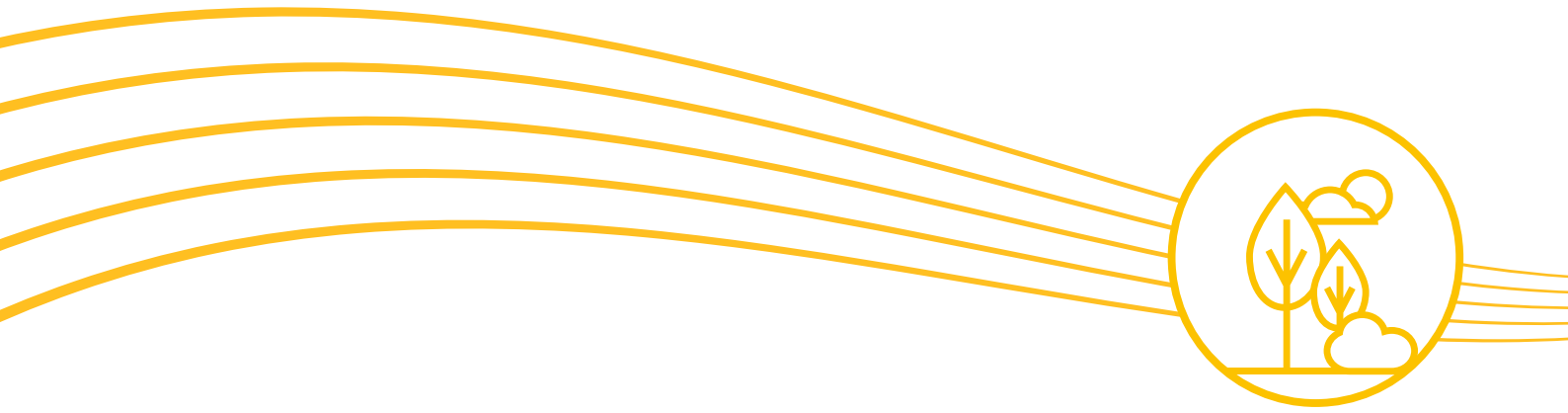
- 60% of National Demand within 24 hours across all the 7 Restoration Regions[1]
- 100% of National Demand within five days.

The ESO is also obligated under the ESRS to submit an assurance framework demonstrating how the ESO will comply with the ESRS to the Office of Gas and Electricity Markets (OFGEM) for approval annually. This is the *Assurance Framework 2024/25*, which is the third report since the Department for Energy Security and Net-Zero's (DESNZ) ESRS directive in 2021.

The ESO acknowledges that extensive work is required industry wide to comply with the ESRS. To ensure compliance, the ESO is implementing its adopted strategy and will now:

- tender for more Restoration Contractors (RCs) from onshore, offshore and embedded distributed energy resources (DERs)
- commence implementation of the provisions of modifications to regulatory frameworks to achieve compliance with the ESRS (Grid Code GC0156, STC CM089, STCP PM0128, SQSS GSR032, CUSC CMP398, BSC P451, D Code DCRP/MP/22/02)
- select a vendor to deliver the restoration decision support tool (RDST) to support Control Engineers during a restoration event
- commence the industry wide compliance monitoring of ESRS assurance activities
- provide targeted training for the industry.

We have also identified ESRS implementation risks in this iteration and proposed mitigations to the identified risks.



1 North Scotland, South Scotland, North East, North West, Midlands, South East, South West

1. Introduction

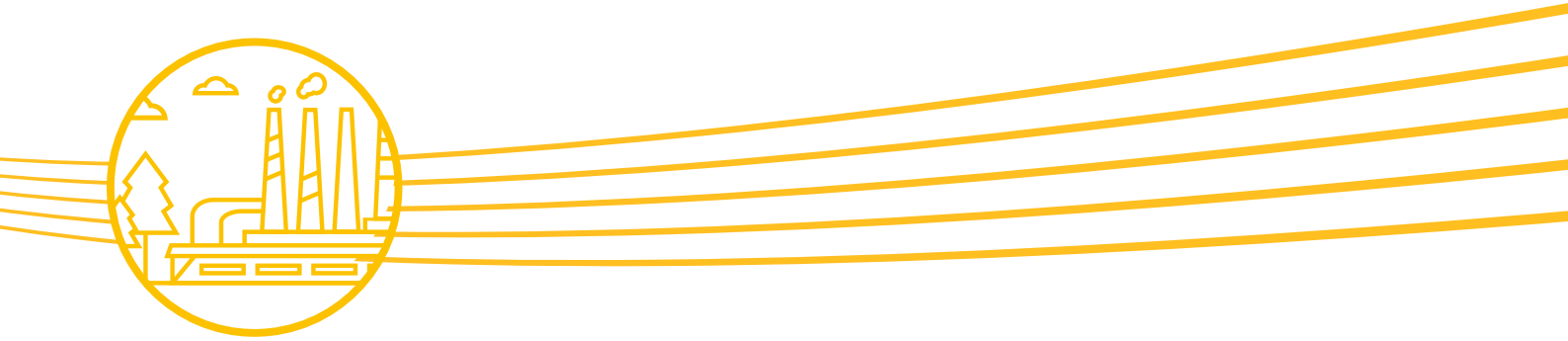
Electricity System Restoration (ESR) is the procedure to recover from a Partial or Total Shutdown of the National Electricity Transmission System (NETS), which has caused an extensive loss of supply. The ESO has Grid Code obligations (CC6.3.5 and ECC 6.3.5) to, at all times, be able to restore the NETS in the event of a Partial or Total Shutdown within the stipulated timeframes. This will be facilitated by agreeing commercial contracts with Restoration Contractors who have plants at a number of strategically located sites. For Restoration Contractors embedded in the distribution network, the contract terms will be agreed between the ESO, the relevant Network Operator and the Restoration Contractor.

A Total Shutdown in Great Britain has never occurred. It is categorised as a high impact, low probability (HILP) risk in the National Risk Register. This means that even though a Total Shutdown is unlikely to occur, its impact, should it occur, will be detrimental to the economy and society in general.

The Department for Energy Security and Net Zero (DESNZ)[2], aiming to mitigate this risk, issued a directive to the ESO, known as the Electricity System Restoration Standard (ESRS) in 2021. The ESRS directs the ESO to have the capability and arrangements in place by 31 December 2026 to restore 60% of peak National Demand across all System Restoration Regions within 24 hours and 100% peak National Demand in all System Restoration Regions within five days.

In Special Condition 2.2.1, the ESO is obliged to abide by DESNZ's directive and to also produce an ESR assurance framework detailing how the ESO will comply with the ESRS. This document presents the assurance framework for the regulatory year 2024/25 and includes, but is not limited to the following:

- the current and future strategies adopted by the ESO
- the progress of activities presented in the previous assurance framework reports, which can be found in Appendix 4
- the risks and mitigations to the proposed strategy
- modelling results and interpretation.



2 DESNZ was formally known as Department for Business, Energy and Industrial Strategy (BEIS)

2. Vision

The vision of the ESO is set out by our *RIIO-2 Business Plan 2023 – 2025* (published on 31 August 2022) and includes, but is not limited to:

- develop new, competitive market services to support operational needs
- maintain legacy systems, develop new systems and tools to future-proof the control centre
- deliver requirements of the new Electricity System Restoration Standard (ESRS)
- lead deeper and quicker reform of codes/regulatory frameworks
- build on our system insights
- improve visibility of DERs and focus on whole electricity system coordination
- develop networks fit for the future and improve network access.

The ESO is committed to implementing the ESRS by 31 December 2026 and is committed to investing in activities that will lead, organise and build consensus with the Government, Regulator and the industry to drive improvements to System Restoration capability.

3. Progress to Date

This section provides updates on the progress the ESO has made towards the implementation of the ESRS in areas such as the modification of industry codes, sensitisation and training of the industry, and ongoing competitive tenders including wind specific tenders.

3.1 Regulatory Framework Modification

To implement the ESRS, the ESO proposed modifications to the Grid Code. As a result of these Grid Code modifications, the ESO proposed consequential modifications to other industry codes such as the STC/STCP, the SQSS, the BSC and CUSC. Important industry codes and standards like the System Defence Plan, System Restoration Plan, System Test Plan and Electrical Standards (including the Control Telephony, Communication Standard and Distribution Restoration Zone Control System Standard) were also modified to align with the Grid Code changes. Table 1 shows the status of the various code modifications.

Table 1: ESRS Code modification changes and progress

Code	Modification	Progress	Status
Grid Code GC0156	Changes to include all requirements proposed by the Grid Code Working Group.	Final modification report submitted to Ofgem on 24 July 2023.	Modification approved on 5 February 2024.
STC CM089/091	Changes to include transmission owner (TO) specific requirements and to allow offshore transmission owners (OFTOs) to participate in restoration.	Final modification report submitted to Ofgem on 13 September 2023.	Modification approved on 5 February 2024.
SQSS GRS032	Changes to allow TOs' design-of their network to be ESRS compliant.	Final modification report submitted to Ofgem on 4 October 2023.	Modification approved on 5 February 2024.
BSC P451	Changes to allow RCs that are non-BSC (embedded within DNOs) to claim avoidable cost for their role during restoration.	Final modification report submitted to Ofgem on 15 December 2023.	Decision expected early 2024.
CUSC CMP398	CMP398 proposes to introduce a codified cost recovery mechanism to prevent the affected parties being commercially disadvantaged by the implementation of the new obligations.	Final modification report submitted to Ofgem on 11 July 2023.	CMP398 (WACM1) approved on 29 February 2024.
Distribution Code DCRP/MP/22/02	Changes to allow distributed restart.	Submitted to Ofgem on 22 August 2023.	Modification approved on 5 February 2024.

Relevant Industry Standards and Plans • System Defence Plan • System Restoration Plan • System Test Plan • Control Telephony Standard • Communication Standards • Distribution Restoration Zone Control System Standard	Consequential changes to align with GC0156 changes.	Submitted to Ofgem together with GC0156.	Decision expected early 2024.

3.2 Training and Sensitisation

As part of the ESO's strategy adopted to comply with the ESRS, the ESO has and will conduct additional industry wide training and sensitisation sessions. Additionally, the ESO will be conducting training sessions for Control Engineers focused on aspects of restoration critical to improving the ESO's ability to comply with the ESRS. Table 2 shows the ESO's training and industry workshop plans. It also captures major training already carried out.

Table 2: Training timelines

Training	Date
ENCC Control Engineers training	7, 14, 21, 26, 28 September 2023
Interactive webinar (Distributed Restart team) Redhouse Live Trial	11 October 2023
ESO, TO, DNO workshop (BAU)	9 November 2023
ESRS update for SO Control Engineers (ESRS Implementation team)	May 2024
Cross industry training (BAU team)	2024–2026

3.3 Distributed ReStart Project

The Distributed ReStart Project, which ended on 31 October 2023, was a Network Innovation Competition funded initiative that examined if embedded assets (such as Generators and batteries connected to distribution networks) can provide restoration services to the ESO in the event of a Partial or Total Shutdown. The conclusions of the project proposed the creation of Distribution Restoration Zones (DRZs) as a means for facilitating the restoration process with distribution connected assets. The creation of DRZs provides additional options for restoration and is partly the basis for the modification of the Grid Code and the Distribution Code. The conclusions of the Distributed ReStart project are that it is technically possible but not a mandatory requirement for DNOs, or potential Restoration Contractors to develop or participate in a DRZ. Nevertheless, following the live trials which have been established as part of the Distributed ReStart project, the information exists for DNOs to consider developing these capabilities to help support achieving the implementation of the ESRS.

Find out more details about the *Distributed ReStart* project.

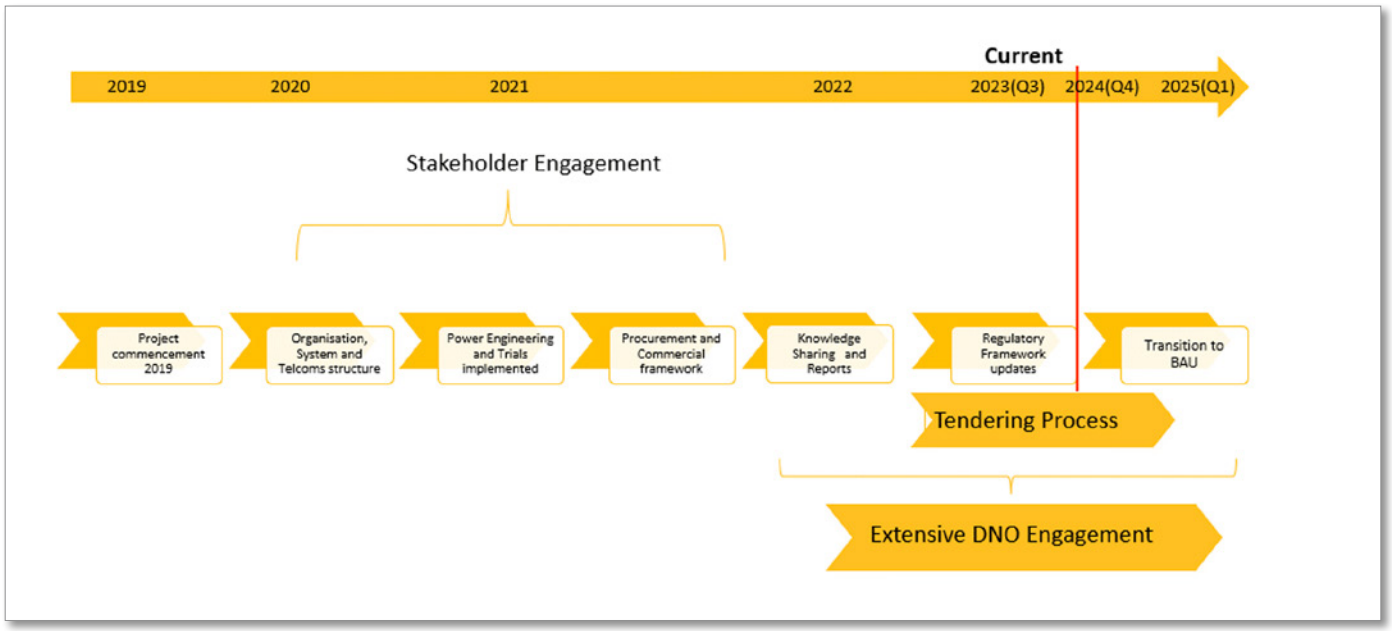


Figure 1: Distributed ReStart project timeline

The high-level findings from the Distributed ReStart project and their integration status are listed in Table 3.

Table 3: Distributed ReStart findings and ESO implementation

Findings	Integration to BAU as of Regulatory Year 2024/25
• **Distributed restoration can harness the growth of DERs to provide bottom-up restoration requirements** – Over the past three years, Distributed ReStart has proven this capability via thorough testing, live trials and stakeholder engagement discussing the commercial, technical, and organisational designs.	• In line with the new holistic approach to restoration, the ESO, through the South East and Northern tender rounds, is seeking to contract DERs to provide bottom-up restoration to complement top-down restoration.
• **DERs can contribute towards ESRS compliance** – Distributed restoration will be supplementing the traditional restoration service.	• ESRS implementation in progress.
• **Doing the right thing for all participants** – The proposed procurement process provides a more open and transparent route to market for DER providers, through a technology agnostic competitive tender route.	• The BSC Modification P451 seeks to provide non-BSC Restoration Contractors to claim avoidable cost in a restoration event.
• **The importance of being stakeholder led** – Co-creation with DER stakeholders, DNOs and other industry expertise through numerous webinars, bi-laterals, exercises, live trials and networking with various key industry forums.	• The final industry wide webinar organised by the Distributed ReStart project to engage industry on the project and its world-first Redhouse live trial was held on 11 October 2023.
• **Use of the automated Distribution Restoration Zone Controller system (DRZC)** – A pure 'manual' DER-based restoration will be slow and difficult to manage. Our DRZC design supports automation and acceleration of the process, which could help meet the ESRS regional restoration targets.	• The DRZC standard drafting in progress.

3.4 Wind

In the STC Modification CM089/CM091, new requirements were included to allow offshore Generators to participate in restoration. We believe these requirements will lead to an increase in the number of wind energy sources participating as Restoration Contractors. Any successful wind specific contracts will be awarded in March 2024 in line with published tender arrangements.

3.5 Tenders

Table 4: Procurement activities to date

Procurement Activities	Regulatory Year 2024/25
Northern	The Northern tenders cover North Scotland, South Scotland, North East and North West Restoration Regions. The tenders were launched in 2022. The contracts will be awarded in May 2024. Awarded contractors are to be in service by November 2025. Currently there are 66 potential NETS connected contractors and three potential embedded contractors in the competitive tendering process.
SW and Midlands	New SW and Midlands tenders will be launched within regulatory year 2024/25. The ESO is initially meeting with relevant stakeholders as part of tender kick offs.
South East	The South East tenders were launched in 2022. The contracts were awarded in December 2023. Awarded contracts are to be in service by July 2025. Nine contracts awarded: four Anchor services, three Top Up services and one DRZ (one Anchor generator and one Top Up service).
Wind – Great Britain	The wind specific tenders were launched in 2022. The contracts will be awarded in March 2024. Awarded contracts are to be in service by August 2025.

3.6 Restoration Decision Support Tool

As part of ESO's strategy to implement the ESRS, we will be developing a restoration decision support tool to deliver decision support capability and additional visualisation to the control room engineers during a restoration event to reduce restoration time and ease cognitive load on Control Engineers. The tool will do this by:

- taking inputs from existing control room systems, i.e. EMS, Balancing, Forecasting, Data Historian, and pre-agreed Plans (LJRP, DRZP, and Switching Strategy Workbook (SSW))
- processing the inputs and enabling route optimisation by running appropriate models and providing suggestions to the control room engineer
- enabling visualisation to depict situational awareness by forecasting the health of different zones
- generating appropriate alarms during critical conditions
- providing a logging ability for audit purposes
- integrating with other systems in the control room
- providing a non-real-time simulation environment for control room engineer training.

Key dates for the development of the tool can be found in Table 5.

Table 5: RDST Project timelines

Project Activities	Timelines
RDST tool delivery	01/10/2025

3.7 Inter-Control Centre Communications Protocol (ICCP) Links to DNO

As mentioned earlier, our strategy includes the creation of DRZs which would require an embedded generator as a Restoration Contractor. Currently, the ESO does not have the required visibility of the DNO networks to monitor the necessary parameters for the operation of the DRZs. As a result, the Distributed ReStart project recommended that the ESO set up resilient communication links with all 6 DNOs, covering all 14 DNO licence areas.

The Regional Development Program (RDP) project, under investment INVP5527C RDP N–3 Intertripping, has delivered three new links to:

- UKPN – UK Power Networks
- SSED (Southern) – Scottish and Southern Electricity Networks Distribution
- NGED – National Grid Electricity Distribution (formerly Western Power Distribution).

For restoration, the ICCP links to ENW, SPEN and NPG were to be delivered under investment INV6667.

- ENW – Electricity North West
- SPEN – Scottish Power Energy Networks
- NPG – Northern Powergrid

Key dates for the delivery of the ICCP links can be found in Table 6.

Table 6: ICCP links to project timelines

Project Activities	Timelines
ENW	Built test and go-live Q1 FY25 (June 2024)
SPEN	Built test and go-live Q2 FY25 (September 2024)
NPG	Built test and go-live Q3 FY25 (October 2024)

4. Restoration Strategy

On 28 August 2003, Great Britain experienced a Partial System Shutdown. Around 47,000 customers in South London experienced loss of supply. The public experienced major disruption to London rail and tube, with many commuters seeing themselves trapped in tunnels and on trains. The rails and tube services took several hours to return to normal. However, a Total System Shutdown event has never occurred in Great Britain; this makes it very difficult to test the performance of our restoration capability and arrangements in real time. As such, we rely on probabilistic modelling methods to measure the performance of our restoration capability. The latest modelling results shows that it will take an average of 32.0 hours to restore 60% of National Demand in 2024. The ESRS requires that 60% of National Demand is restored across all regions within 24 hours.

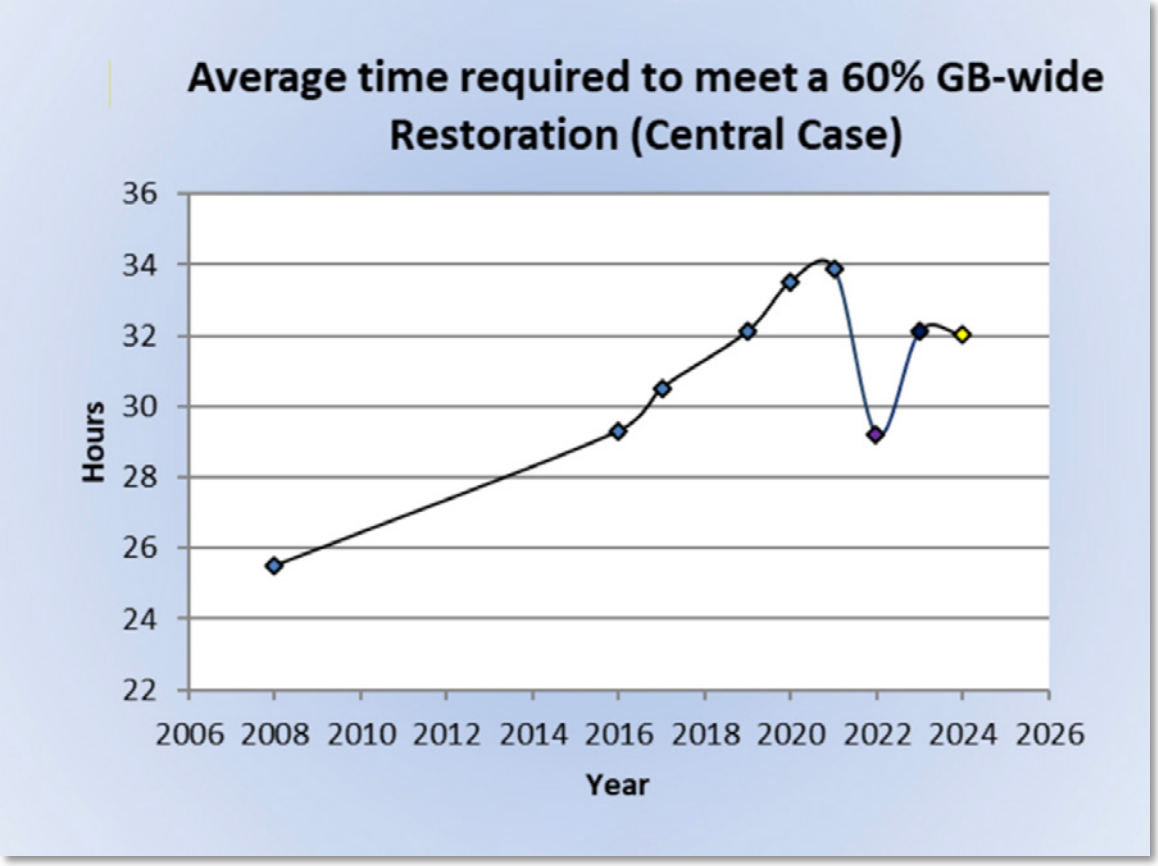


Figure 2: Modelled annual restoration times

We acknowledge that there is a significant amount of work to be done by all the relevant parties to be ESRS compliant by 31 December 2026. To achieve industry wide compliance, the ESO is implementing its adopted strategy as presented in Figure 3.

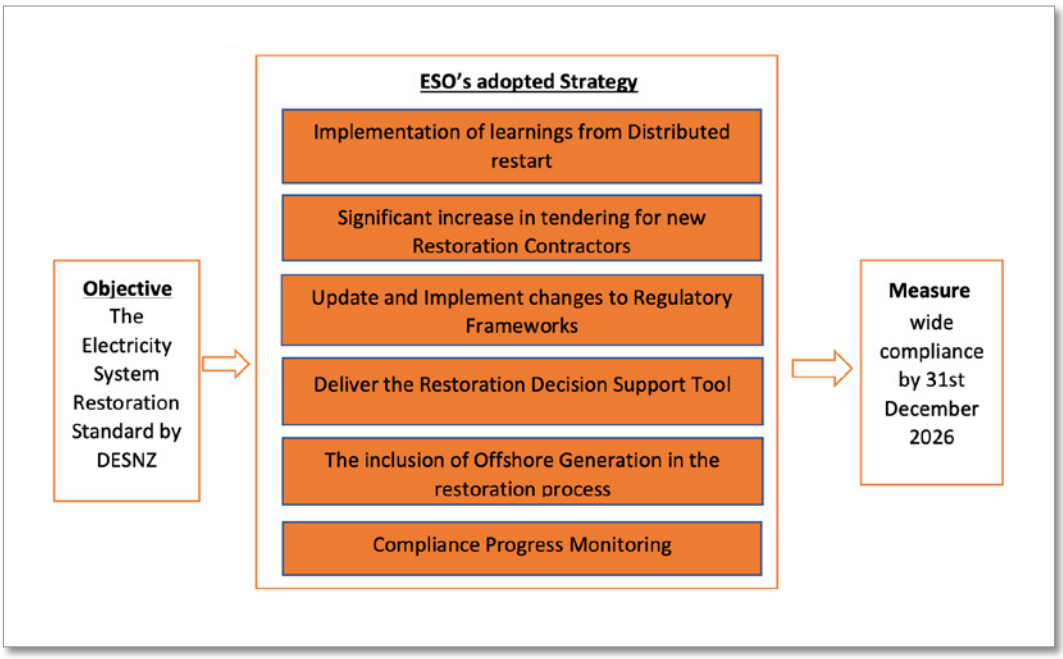


Figure 3: ESRS implementation strategy

- Implementation of learnings from Distributed ReStart: following successful implementation of the Distributed ReStart project, the world's first bottom-up restoration approach is being sought to compliment the traditional top-down restoration approach. The progress made so far is summarised in Table 3.
- Significant increase in tendering volumes for new Restoration Contractors: tenders are currently ongoing to contract several Restoration Contractors of diverse technologies, across the seven Restoration Regions[3], to allow for uniform restoration across Great Britain. The progress made so far is summarised in Table 4.
- Updates to regulatory frameworks: the ESO has proposed modifications to the Grid Code (GC), Distribution Code (DC), System Operator Transmission Owner Code (STC), Connection and Use of System Code (CUSC), Balancing and Settlement Code (BSC) and Security and Quality of Supply Standards (SQSS). The progress made so far is summarised in Table 1.
- Deliver the restoration decision support tool: this tool will provide decision support capability and additional visualisation to the control room engineers during a restoration event to reduce restoration time and ease cognitive load on Control Engineers.
- It will also provide real-time restoration progress on both the transmission and distribution network and log critical decisions during the restoration process. The progress made so far is summarised in Table 5.
- The inclusion of offshore generation in the restoration process: new requirements in the STC for developing an offshore transmission network will now enable offshore resources to participate in restoration.
- Compliance progress monitoring: the ESO will be coordinating the industry wide compliance to ESRS assurance activities. It will do so by receiving, assessing and reporting on both compliance and noncompliance to Ofgem. The ESO will also be reporting on its own activities to meet the ESRS.
- Training: the ESO will carry out targeted training on ESRS requirements industry wide.

3 North Scotland, South Scotland, North East, North West, Midlands, South East, South West

4.1 Risks to Strategy Implementation

We have identified several risks associated with the implementation of our adopted strategy to meet the ESRS by 31 December 2026. The ESO's mitigation strategy is to continuously analyse and assess all potential risks to identify any changes in their level of severity and propose adequate mitigation measures for them. Table 7 shows some of the identified risks to ESRS implementation.

Table 7: Risks affecting restoration strategy and mitigations

ESRS Strategy / Delivery Areas	Risks	Mitigation
Regulatory Framework/ Policy	1. Delays with approving code modifications leaving little to no time for industry to implement ESRS requirements before the deadline. 2. Send back code modification by Ofgem. 3. Risks arising from Programme Yarrow. 4. Time constraints for industry to implement new ESRS requirements. ***Redacted***	1. Offer support to Ofgem when required and promptly respond to queries to aid Ofgem's decision. 2. Continuously inform Ofgem with modification updates. 3. Continuously engage Regulator on any issues arising from Programme Yarrow. 4. Early decision from Ofgem and effective industry wide compliance monitoring.
Implementation of Distributed ReStart	1. Disproportionate nature of DERs location across Restoration Regions, e.g. Western Isles 2. DNOs may not be confident in setting up DRZ-Controllers.	1. Competitive tendering for DRZs as part of ongoing and future tender rounds. 2. Webinars on Distributed ReStart project with DNOs enlightening them on project outcomes and provide continuous support.
Tendering for Restoration Contractors	1. Not enough parties showing interest in tenders and not getting variety of technologies in the tenders or not enough access to potential contractors.	1. Targeted webinars to bring opportunities of being Restoration Contractors to suppliers.
Inclusion of Offshore Generators	1. No cost recovery mechanism for existing OFTOs to recover cost of providing ESRS compliant networks.	1. Engaging Ofgem for a solution before contracts are awarded.
RDST & ICCP Links	1. Delay in project dependencies such as NCMS project affecting the delivery of the RDST project. 2. The cost of delivering this project could be higher than the BP2 forecasts because the project budget has already been reduced due to scope change. 3. Slow paced of work by the chosen supplier.	1. Periodic review of project dependencies and by developing proper programme interlocks between dependencies. 2. Regular review of forecasted cost and actual spend throughout RIIO-2 period. 3. Ensure that the most qualified supplier is selected and by maintaining an effective agile project management throughout project delivery.
Compliance Progress Monitoring	1. Delay in implementing provisions of Grid Code Modifications. 2. Inadequate resources in place for compliance monitoring for the wider industry including the ESO.	1. Early initiation of changes to the ESO processes/systems to facilitate ESRS. 2. Prompt escalation of resource needs to management.

5. Restoration Approach

5.1 Current Restoration Approach

The current restoration approach is to use restoration contracted large power stations and interconnectors to energise sections of the transmission system using local Demand to establish stable Power Islands in line with pre-agreed Local Joint Restoration Plans (LJRPs). Subsequently, other Generators will join the growing system, and the synchronisation of Power Islands progressively takes place to re-energising the whole network and restore Demand across the country until full restoration is completed.

As the energy industry works to meet clean energy targets, DERs are replacing traditional large fossil fuel-based power stations. It has become necessary that these DERs are also able to contribute to the restoration process so the transition to renewable energy sources does not adversely affect restoration ability. The ESO is proposing a holistic restoration approach that considers both top-down and bottom-up approach to restoration.

5.1.1 Regulatory Year – 2024/2025

- Industry wide compliance monitoring commences in this regulatory year. TOs, Network Operators and Generators will be submitting their assurance activities and compliance reports as part of week 24 submissions to the ESO. The ESO upon receiving the reports will assess them and report both compliance and non-compliance to Ofgem. In the case where there are derogation requests, the ESO will follow the codified procedures in addressing them. The ESO will also be reporting on its own ESRS compliance to Ofgem. Figure 4 identifies the industry wide new compliance areas within the relevant codes.

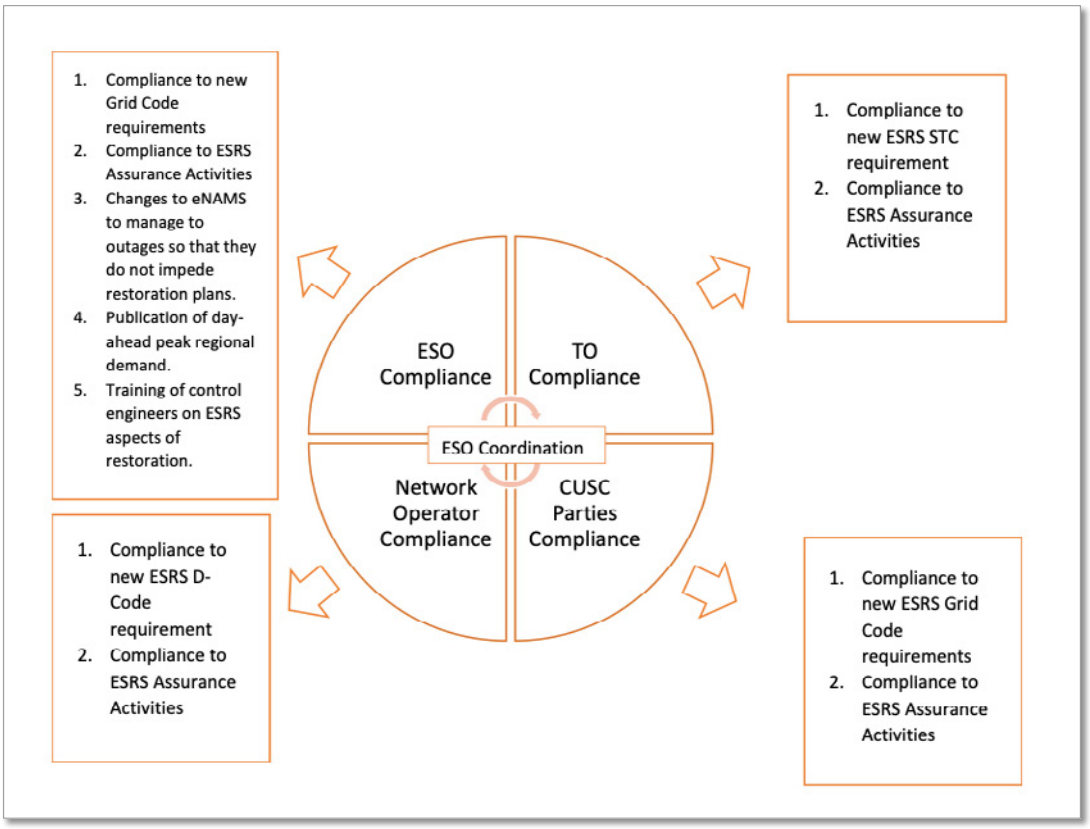


Figure 4: the ESO's role in compliance progress monitoring

- In this regulatory year, the development of ICCP links to ENW, SPEN and NPG will be completed however, the RDST project will be ongoing.
- The ESO will be working in conjunction with Elexon to publish forecast peak national and Restoration Regional Demand on BMRS that would be used as the restoration targets during System Restoration events. A modification will be raised to modify the BSC to this effect within this regulatory year.
- The ESO will be modifying its Electricity Network Access Management System (eNams) platform within this regulatory year enable TOs/DNOs to indicate whether their planned outages in their system will impact restoration plans.
- The ESO will be sensitising the industry on ESRS requirements and obligations in this regulatory year.

5.1.2 Regulatory Years – 2025/2026, 2026/2027

- The ESO will continue to monitor both the industry and its own compliance within regulatory year 2025/26 and report to Ofgem.
- The ESO will be organising training in conjunction with all TOs for Control Engineers where they will practice scenario-based simulations to achieve ESRS targets.
- The RDST will be delivered within 2025/26. Training on the tool will be organised for Control Engineers.
- Restoration Contractors who will receive contracts under the South East and Northern tender rounds will be expected to be in service within these regulatory years. This means there will be new LJRPs as well as the first DRZPs within these regulatory years.
- Ongoing assurance visits to Restoration Contractors, TOs and Network Operators' facilities.
- ESRS compliance deadline falls within the regulatory year 2026/27. The ESO will assess its ESRS implementation performance and report to Ofgem.

5.1.3 Subsequent Regulatory Years (Beyond 2027)

The ESRS should be fully incorporated into normal business operation within this period. The ESO's post compliance activities will include:

- managing Restoration Contractors via competitive tendering
- ESRS assurance activities
- assessing ongoing compliance and feedback to Ofgem.

6. Monitoring Compliance

The structure of oversights in ensuring compliance to the ESRS is shown in Figure 5. The ESO will be monitoring industry wide performance by collating and assessing assurance activities reports furnished by relevant parties. The reports frequency as well as the type of testing required is in DRC Schedule 16 as attached in Appendix 1.

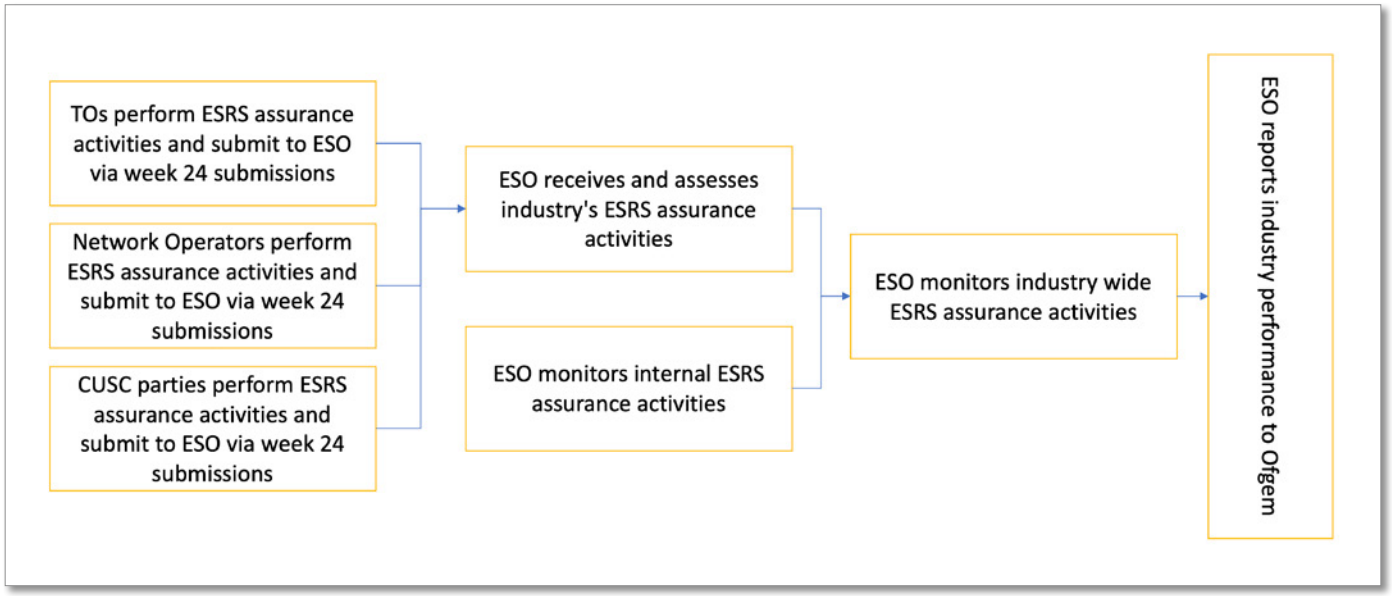


Figure 5: Levels of assurance activities monitoring and reporting

From 2024, Generators and Network Operators will be submitting evidence that they are working towards achieving ESRS compliance as indicated in PC.A.5.7.3 below:

"… From 1st January 2024 until 31st December 2026, evidence to support the work Generators, HVDC System Owners, DC Converter owners, Non-Embedded Customers, and Network Operators are making to how they will achieve these requirements on or after 31st December 2026 shall be provided in their Week 24 submission ".

The industry will be submitting evidence to the ESO that they are working towards achieving ESRS compliance by the stipulated compliance deadline. The ESO is working on how to collate and assess the evidence submitted as well as assess any derogations.

This requirement was caught for TOs in STCP 08–3 3.1.5 as shown below:

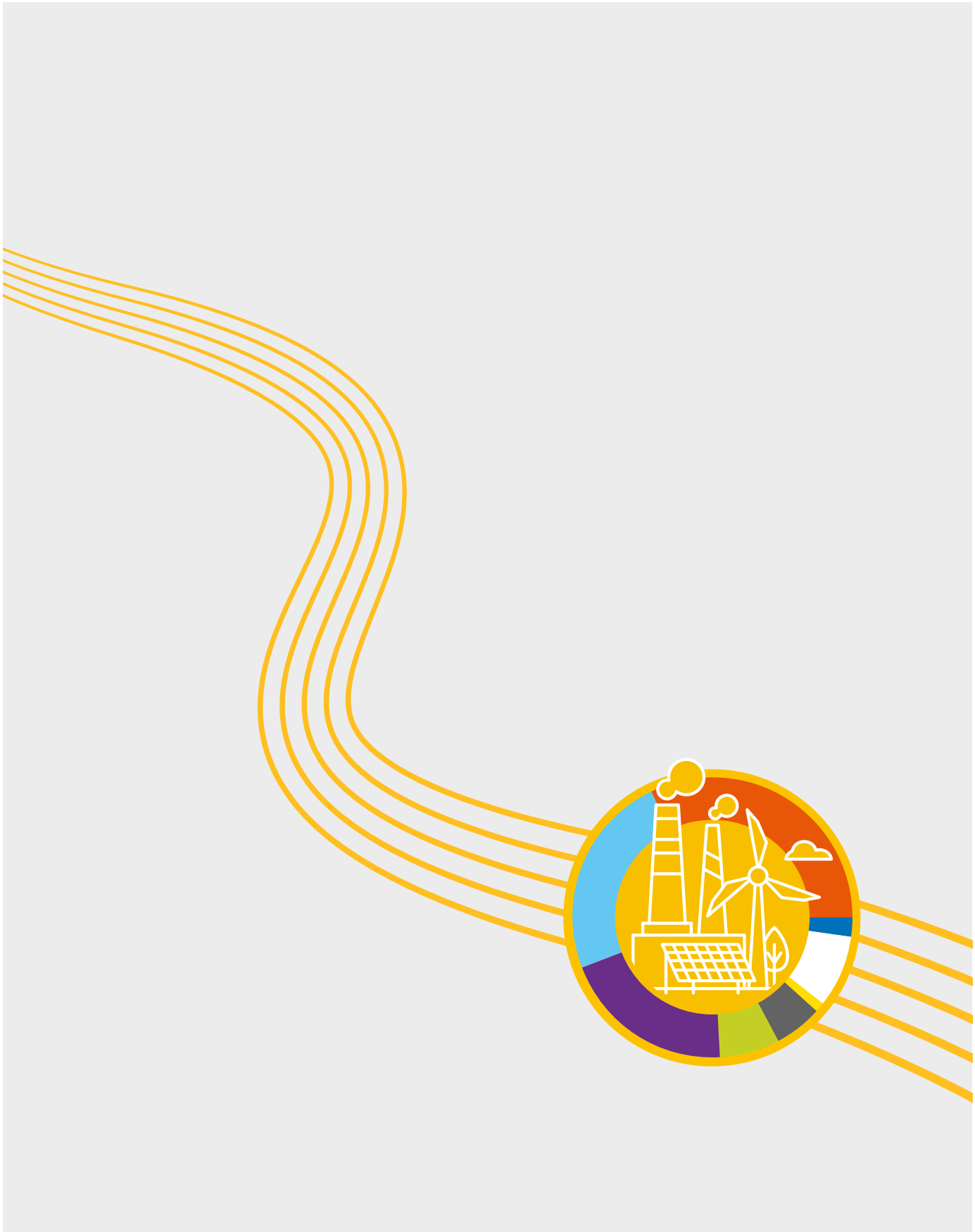
"…From 1st January 2024 until 31st December 2026, evidence to support the work TO's are making as to how they will satisfy these requirements shall be provided by submitting Part III of DRC Schedule 16 of the Grid Code…This data shall be provided in accordance with STCP 12–1 annually during calendar week 24."

As a result of these requirements, the ESO is working with the timeline presented in the table below to monitor and ensure progress towards ESRS compliance by the implementation deadline. The overall ESRS implementation timeline is presented in Appendix 3.

Table 8: Assurance activities timelines

ESRS Assurance Activities Progress Monitoring	Timeline
ESO Assurance Activities • Adopting regional restoration approach (2023–2025). The new Restoration Regions are shown in Appendix 2. • Development of the RDST/ICCP Links (2023–2025). • Compliant to activities in DRC Schedule 16 (2024–2026). • Training on ESRS (2023–2026). • Compliant to Demand publication requirement under ESRS on BMRS (2023–2024). • Develop internal processes to coordinate industry outages (2023–2024).	2023–2026
Wider Industry Assurance Monitoring	
TO Assurance Activities • Compliant to activities and reporting timelines in DRC Schedule 16 (2024–2026). • Compliant to Appendix 1 of the SQSS (2024–2026). • Compliant to new STC/STCP ESRS additions (2024–2026).	2024–2026
Network Operator Assurance Activities • Compliant to activities and reporting timelines in DRC Schedule 16 (2024–2026).	2024–2026
CUSC Parties Assurance Activities • Resilience of critical tools and facilities (2024–2026). • Compliant to activities and reporting timelines in DRC Schedule 16 (2024–2026).	2024–2026

7. Probabilistic Modelling (Redacted)



Appendices

Appendix 1: Assurance Activities Template

Table 9: Assurance activities template

Assurance Activity	Grid Code Reference	Parties Involved	Frequency of Assurance Activity	The Company Witness Required	Date of Test Result Submission /Visit	Annual Statement of Compliance (Y/N)
System Restoration Power Island Review	OC.9.4.7.6.1 OC.5.7.4 (iv)	Relevant Transmission Licensees, Network Operators and The Company	Every three years	Not applicable		
System Restoration Power Island Availability Assessment	OC.9.4.7.6.1 OC.5.7.4 (iv)	Relevant Transmission Licensees, Network Operators and The Company	Yearly	Not applicable		
Remote Synchronisation Test – TO/DNO	OC.5.7.2.1 (g) OC.5.7.2.3 (d)	Relevant Transmission Licensees, relevant Network Operators, Restoration Contractors and The Company	Every three years	No		
Low Frequency Demand Disconnection Relay Test	CC.A.5.4.3/ ECC.A.5.4.3	Relevant Transmission Licencees, relevant Network Operators, Non-Embedded Customers and The Company	Every three years although this may be extended to no more than every five years if considered to be required for operational purposes	No		
Anchor Restoration Contractor Test	OC.5.7.2.1/ OC.5.7.2.2/ OC.5.7.2.3	Relevant Transmission Licensees, Network Operators, Anchor Restoration Contractors and The Company	Every three years	Yes		

Top-Up Restoration Contractor Test	OC.5.7.2.4	Relevant Transmission Licensees, Network Operators, Top Up Restoration Contractors and The Company	Every three years	Yes		
Resilience to Partial Shutdown or Total Shutdown of Restoration Contractor	OC.9.4.7.6.2 OC.5.7.4.2 (iv)	Restoration Contractors and The Company	Yearly	No		
Quick Resynchronisation Unit Test	OC.5.7.2.5	EU Generators in respect of Type C and Type D Power Generating Modules, relevant Network Operators and The Company	Yearly	Yes		
Distribution Restoration Zone Control System Test	OC.5.7.2.6 Electrical Standard – Distribution Restoration Zone Control System High Level Functional Specification	Network operators, Restoration Contractors and The Company	Every three years	Yes		
Dead Line Charge Test	OC.5.7.2.1 (g)(a) OC.5.7.2.3 (d)(a)	Transmission Licensees, relevant Network Operators, Anchor Restoration Contractors and The Company	Every three years	Yes		
Remote Synchronisation Test – Restoration Contractor	OC.5.7.2.1 (g)(b) OC.5.7.2.3 (d)(b)	Relevant Transmission Licensees, relevant Network Operators, Restoration Contractors and The Company	Every three years	Yes		

Assurance Visits	OC.5.7.4 OC.5.7.5	The Company, relevant Transmission Licensees, relevant Network Operators to visit Restoration Contractors	Every three years	Yes		
Voice Systems Resilience Test or Equivalent	OC.5.7.4.2 (vi)	CUSC Parties, relevant Network Operators, relevant Transmission Licensees, Restoration Contractors and The Company	Yearly	No		
Critical Tools and Facilities Control systems resilience demonstration – power resilience including power resilience demonstration & connectivity and alarm event handling	OC.5.7.2.6 OC.5.7.4.2 (iii) OC.5.7.4.2 (ix) OC.5.7.4.3 CC.7.10 ECC.7.10	CUSC Parties, relevant Network Operators, relevant Transmission Licensees, Restoration Contractors and The Company	Yearly	No		
Control systems resilience demonstration – diagram & topology	OC.5.7.2.6 OC.5.7.4.2 (iii) OC.5.7.4.2 (ix)	CUSC Parties, relevant Network Operators, relevant Transmission Licensees, Restoration Contractors and The Company	Yearly	No		
Cyber security	CC.7.10.6 ECC.7.10.6 OC.5.7.4.2 (iii) OC.5.7.4.2 (x)	CUSC Parties, relevant Network Operators, relevant Transmission Licensees, Restoration Contractors and The Company	Yearly	No		

Telephony services test per month as per CC/ECC.6.5.4.	CC.6.5.1–CC.6.5.5 ECC.6.5.1–ECC.6.5.5 OC.5.7.4.2 (vi) OC.5.7.4.2 (xi) OC.5.7.4.2 (xii)	CUSC Parties, relevant Network Operators, relevant Transmission Licensees, Restoration Contractors and The Company	Yearly	No		
Resilience to Partial Shutdown or Total Shutdown of CUSC Parties	OC.5.7.4 OC.5.7.5	CUSC Parties and The Company	Yearly	No		
Restoration Procedure Review	OC.9.4.7.6.2 OC.5.7.4.2 (iv)	The Company, relevant Transmission Licensees, relevant Network Operators, CUSC Parties and Restoration Contractors	Every three years	Not applicable		
LJRP & DRZP Reviews	OC.9.4.7.6 OC.5.7.4.2 (iv)	The Company, Network Operators, Transmission Licensees and Restoration Plan signatories	Every three years	Not applicable		
Awareness Training for Restoration Contractor and CUSC Parties	OC.9.4.7.6.2 OC.5.7.4	The Company, relevant Network Operators, Transmission Licensees, CUSC Parties and Restoration Contractors	Every three years	Not applicable		
Cross Industry Training	OC.9.4.7.6.2 OC.5.7.4	The Company, Network Operators, Transmission Licensees, CUSC Parties and Restoration Contractors	Every three years	Not applicable		

Appendix 2: Restoration Regions

There are seven Restoration Regions. The Restoration Regions are shown in the diagram below.

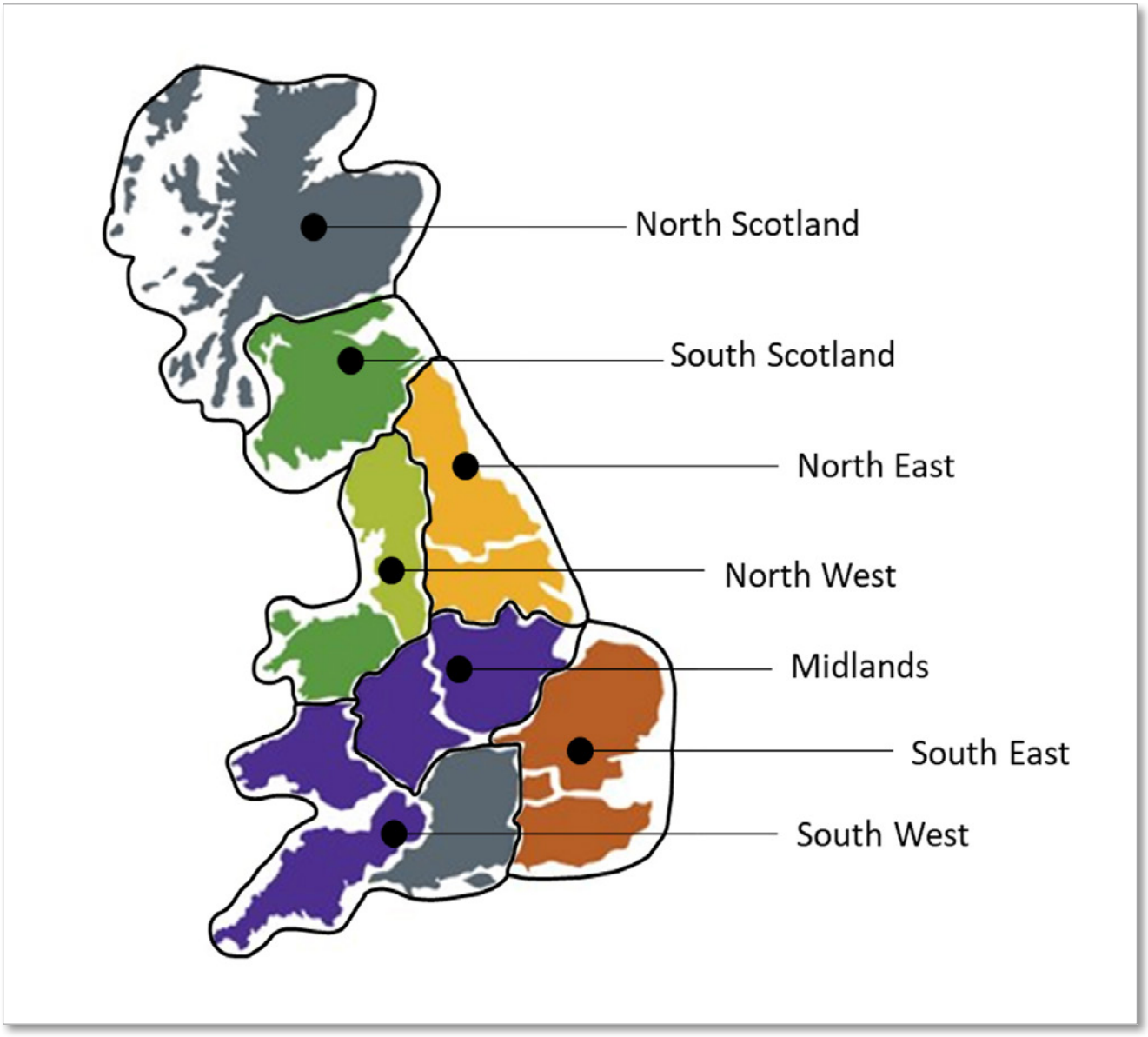


Figure 6: Restoration Regions

Appendix 3: ESRS Implementation and Assurance Activities Timeline

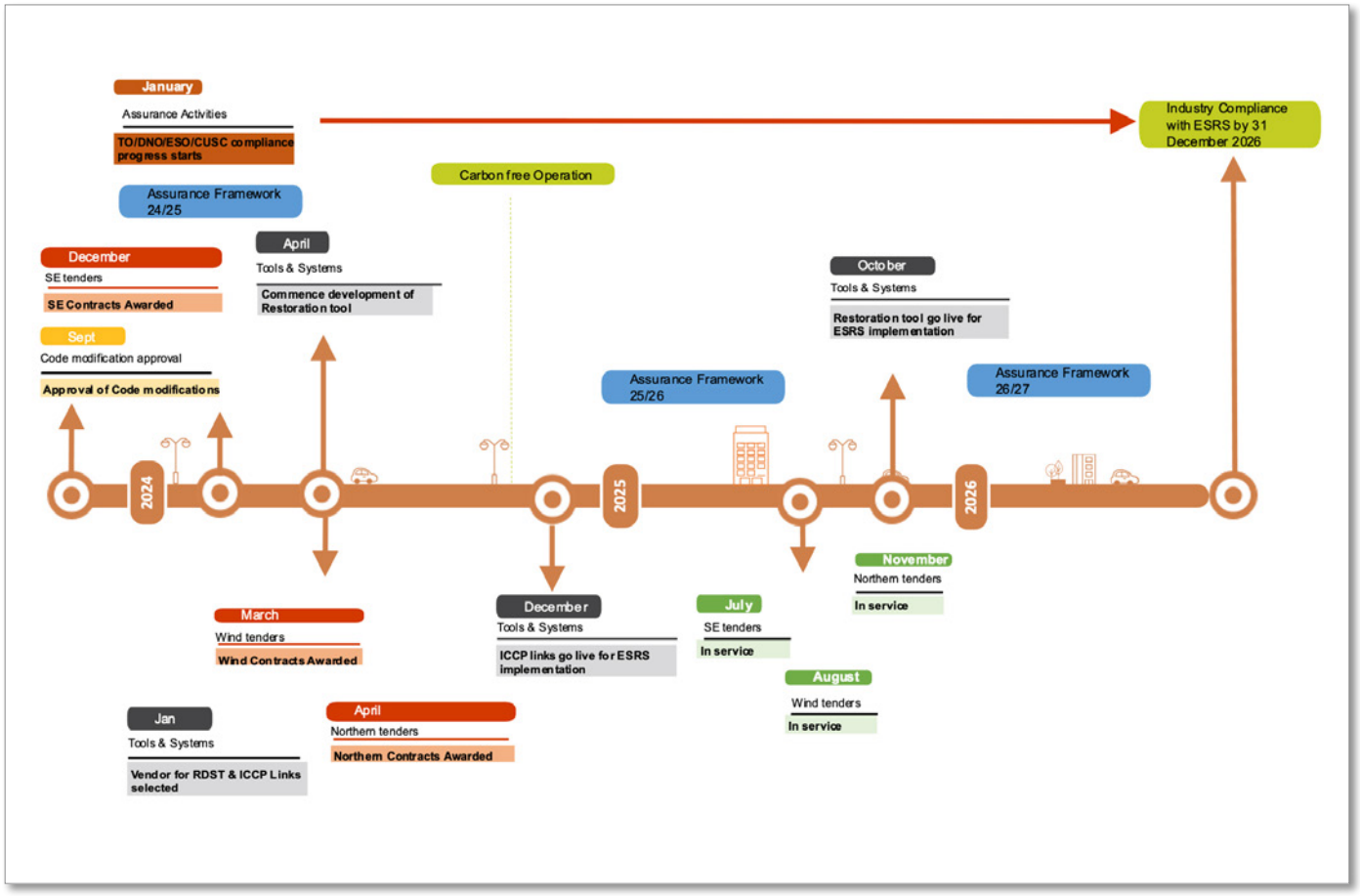


Figure 7: ESRS implementation and assurance activities timeline

Appendix 4: Progress Update on Activities in Assurance Framework 23/24

Table 10: Progress update on activities

Activities under Regulatory Year 22/23	Progress as of 2023/24	Anticipated Progress within 2024/25
1. **Transition from the current strategy to the ESRS.**	• The ESO continues to identify the gaps in the current strategy and propose a more holistic strategy that will ensure compliance to ESRS which includes implementing the recommendations from the Distributed ReStart project.	• The implementation of the adopted ESRS strategy will be ongoing in 2024/25. • The ESO will continue to work on the RDST and ICCP projects. The timelines of these projects are in Table 5 and 6.
2. **Improving the restoration time, while broadening participation for ESR services.**	• The restoration times as shown in the model for GB is 32.1 hours for 2023 which is worse than the 29.2 hours achieved in 2022. This is due to a changing portfolio of contracted services and changing market conditions including levels of unit warmth at some key locations. • However, it is crucial to note that implementing the new restoration strategy will reduce the restoration time to comply with ESRS. See Probabilistic Modelling section.	• The ESO will be monitoring its strategy implementation as well as the industry's performance towards ESRS compliance.
3. **Increase both the market awareness of the service and open the service to a wider range of providers.**	• We increased awareness about the service via several industry engagements and have launched three tenders in 2022 with significant interest from a range of providers. In addition, our strategy is to have a minimum of three different technologies in each DNO licence area, but we acknowledge this may be challenging.	• We will continue to engage with the industry on the awareness of ESRS services via the tender processes.
4. **Categorise providers' capability according to their contribution to different phases of restoration. This will be further reviewed, evolved, and enhanced as the industry workgroups (formed to deliver ESRS implementation) are progressed.**	• The thinking has evolved around the use of different phases as specified in the ESR Assurance Framework 2022/23, however, transmission connected Restoration Contractors are expected to respond within two hours while distribution connected Restoration Contractors within eight hours. • The terms ''Anchor" and ''Top Up" have also been introduced into the Grid Code legal text drafting (GC0156) to differentiate between parties contracted to provide restoration services based on their level of involvement in the restoration process.	• The ESO is securing the services of both Anchor and top-up services for both LJRPs and DRZPs in the ongoing tenders.

5. Have sufficient secondary levels of generation[1] available for an efficient and sustainable restoration following the initial stages.	• The restoration strategy has evolved since the last assurance framework. To achieve ESRS, all CUSC Parties are proposed to have 72 hours resilience following Partial or Total System Shutdown. This will ensure sustainable restoration following initial stages.	• Ofgem approved GC0156 confirming 72 hours resilience requirements on both new and existing Generators and DC Converter owners (including storage and interconnectors) who are either transmission connected, form part of a Embedded Large Power Station, or are balancing mechanism participants (except where a specific derogation is obtained).
6. Develop a restoration tool as per RIIO-2 business plan. Initial discussions on this tool commenced in October 2021 with an expectation to further develop from early 2022.	• We have held various external and internal stakeholder workshops to collate requirements and develop user stories to support the delivery of the restoration decision support tool. • We have also viewed prototypes from other organisations with restoration tools. • We are in the process of launching Request for Interest.	• Timelines for the RDST provided in Table 5.
7. A full tender for the South East (SE) region will be launched from Q1 2022.	• New SE tender launched in June 2022 which included the recommendations of the Distributed ReStart project for the first-time round. • The ESO progressed 48 unique offerings across 7 technology types during ITT Part 1. The final stage of the tender launched in Q1 of 2023.	• Successful tenders were awarded contracts in December 2023.
8. Competitive tendering process for Northern regions.	• New Northern tender launched in October 2022 to replace the previously awarded tenders when they come to an end. • The ESO has been inundated with over 202 unique offerings across 11 different technology types. This tender will run until contract awarded in April 2024 with a service start date of November 2025.	• Successful tenders will be awarded contracts in May 2024.

1 Secondary level of generation is now referred to as non-restoration CUSC Parties

9. Wind	• The ESO launched a one-off initiative to demonstrate that offshore or onshore wind generation can also meet primary service technical requirements for restoration services at transmission level in August 2022. • We received good amounts of interest from different wind providers across the nation, the intention is to have service delivery by Q3 2025 but following feedback from multiple potential providers who explained about their investment project timelines, we provided another option for go-live by 2028 for those able.	• Successful tenders will be awarded contracts in March 2024.
10. Distributed Restart	• The tenders mentioned above included potential providers from the DNO network (Distributed ReStart) to support the strategy which is bottom-up and top-down approach to restoration.	• The tenders mentioned above includes potential contractors from the DNO network (Distributed ReStart) to support the strategy which is bottom-up and top-down approach to restoration.
11. Ongoing industry collaboration to implement the ESRS alongside the obligations in the Network Code on Emergency and Restoration (NCER).	• Comprehensive industry collaboration commenced in April 2022 for the Grid Code Modification (GC0156) and consequential modifications are being progressed for STC, SQSS, BSC, CUSC and Electrical Standard for Control and System Telephony.	• Industry engagement sessions and training plans in the pipeline.
12. Changes to Grid Code, SO-TO Code Procedures (STCP), potential expansion of SGUs (Significant Grid User) to ensure a more resilient restoration and updates to the Electrical Standards for Control and System Telephony.	• Modification processes to Grid Code (GC0156), STC (CM089), STCP (PM0128), CUSC (CMP398), BSC (P451) and Electrical Standard for Control and System Telephony are ongoing.	• Ofgem approved GC0156, CM089 and PM0128 5 February 2024. • Approval for BSC P451 expected in early 2024. • Ofgem approved CMP 398 (WACM 1) on 29 February 2024.