



WELCOME

GC0156

Implementation of the Electricity System Restoration Standard

Meeting 1

26 April 2022

Online Meeting via Teams

nationalgridESO

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
Timeline <ul style="list-style-type: none">• Walk-through of the timeline for the modification	Chair
Proposer presentation <ul style="list-style-type: none">• Updates from previous working groups	Antony Johnson & Sade Adenola
Workgroup Discussions <ul style="list-style-type: none">• Assess Proposer's Solution	All
Review and agree Terms of Reference	All
AOB & Next Steps <ul style="list-style-type: none">• Review Actions log• Review high level options• Consider outputs from related modifications (GC0148)	Chair

Members / Alternates & Observers

Role	Name	Representing
Chair	Banke John-Okwesa	Code Administrator (ESO)
Technical Secretary	Ruth Roberts	Code Administrator (ESO)
Proposer	Antony Johnson	NGESO
Proposer	Sade Adenola	NGESO
Workgroup Member	Abdi Osman	NGV Interconnectors
Workgroup Member	Alan Creighton	Northern Powergrid
Workgroup Member	Alastair Frew	Drax Power Station
Workgroup Member	Andrew McLeod	Northern Powergrid
Observer	Andrew Larkins	Sygensys
Workgroup Member	Andrew Vaudin	EDF Energy
Observer	Audrey Ramsey	NGESO
Workgroup Member (Alternate)	Brad Kent	NGET
Workgroup Member	Cefin Parry	Northern Powergrid
Workgroup Member (Alternate)	Chanditha Udalagama	NGV Interconnectors
Workgroup Member	Colin Foote	SP Energy Networks
Workgroup Member	David Adam	SP Energy Networks
Workgroup Member	Dozie Nnabuife	NGESO
Workgroup Member	Garth Graham	SSE Generation
Workgroup Member (Alternate)	Gavin Anderson	Electricity North West Ltd
Workgroup Member	Graeme Vincent	SP Energy Networks
Workgroup Member	Grace March	Sembcorp
Workgroup Member	Graz Macdonald	Waters Wye
Workgroup Member	Howard Downey	SP Energy Networks

Role	Name	Representing
Workgroup Member (Alternate)	John Costa	EDF Energy
Workgroup Member (Alternate)	Lisa Waters	Waters Wye
Observer	Mark Bingham	NGET
Workgroup Member	Mark Holland	Scottish & Southern Electricity Networks
Observer	Mark Jones	NGESO
Workgroup Member	Michelle Macdonald	Scottish & Southern Electricity Networks
Observer	Mike Kay	Self
Observer	Neha Gupta	NGESO
Workgroup Member	Neil Sandison	Scottish & Southern Electricity Networks
Workgroup Member	Nikhil Singh	NGET
Workgroup Member (Alternate)	Paul Youngman	Drax Power Station
Workgroup Member	Peter Couch	Joint Radio Company Limited
Workgroup Member	Priyanka Mohapatra	Scottish Power
Workgroup Member	Richard Poole	National Grid Ventures
Workgroup Member	Robert Longden	Eneco Energy Trade BV
Workgroup Member (Alternate)	Ross Strachan	
Observer	Toktam Sharifian	KREC
Workgroup Member	Tolu Esan	Electricity North West Ltd
Authority Representative	Christopher Statham	Ofgem

Modification Process

Banke John-Okwesa – National Grid ESO Code Administrator

Code Modification Process Overview



Talk to us



Raise a
mod



Assess
solution



Consult



Decision



Implement

Forums

Panels

Workgroups
(Workgroup Consultations)

Ofgem/Panel



Assess 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:
 - Assess and if necessary 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

Banke John-Okwesa – National Grid ESO Code Administrator

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

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

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Workgroup Alternatives and Workgroup Vote

Banke John-Okwesa – National Grid ESO Code Administrator

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

Stage 1 – Alternative Vote

- Vote on whether Workgroup Alternative Requests should become Workgroup Alternative Grid Code Modification.
- 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 Grid Code objectives than the Original then the potential alternative will be fully developed by the Workgroup with legal text to form a Workgroup Alternative Grid Code modification (WAGCM) 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 Workgroup Vote?

To participate in any votes, Workgroup members need to have attended at least 50% of meetings

Stage 2 – Workgroup Vote

- 2a) Assess the original and WAGCMs (if there are any) against the Grid Code objectives compared to the baseline (the current Grid Code)
- 2b) Vote on which of the options is best.



Timeline

Banke John-Okwesa – National Grid ESO Code Administrator

Timeline for GC0156

Milestone	Date	Milestone	Date
Proposal Presented to Panel	24 February 2022	Workgroup 10 – Review updated WG report and legal text following consultation responses, finalise solution(s) and legal text.	31 January 2023
Workgroup 1 – Understand / discuss proposal and solution, review and agree on Terms of Reference and Timeline, agree next steps.	26 April 2022	Workgroup 11 – Agree that Terms of Reference have been met, Review Workgroup Report and hold Workgroup Vote.	21 February 2023
Workgroup 2 – Review high level options and legal text, consider outputs from related modifications (such as GC0148).	19 May 2022	Workgroup Report issued to Panel (5 working days)	23 March 2023
Workgroup 3 – Review high level solutions / options	16 June 2022	Panel sign off that Workgroup Report has met its Terms of Reference	30 March 2023
Workgroup 4 – Develop solution(s)/options, identify/asses any possible alternative solutions	14 July 2022	Code Administrator Consultation	03 April 2023 – 03 May 2023
Workgroup 5 – Conclude on preferred options / consider and agree on alternatives	18 August 2022	Draft Final Modification Report (DFMR) issued to Panel	17 May 2023
Workgroup 6 - Develop WG consultation questions and report, assess alternatives (if applicable)	20 September 2022	Panel undertake DFMR recommendation vote	25 May 2023
Workgroup 7 – Refine WG consultation report and legal texts, agree alternatives	20 October 2022	Final Modification Report issued to Panel to check votes recorded correctly (5 working days)	29 May 2023 – 02 June 2023
Workgroup 8 – Finalise Workgroup Consultation and legal text	10 November 2022	Final Modification Report issued to Ofgem	05 June 2023
Workgroup Consultation (15 Working Days)	21 November 2022 – 09 December 2022	Ofgem decision	TBC
Workgroup 9 – Review/assess consultation responses	17 January 2023	Implementation Date	10 working days after Ofgem decision

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Modification Proposal:

Antony Johnson & Sade Adenola – National
Grid ESO

A landscape photograph of a green field at sunset. The sun is a bright, glowing orb in the upper right sky, casting a warm orange and yellow light. A dark line of trees is silhouetted against the horizon. Several bright green, curved light trails, resembling long-exposure light painting or energy flows, arc across the middle of the image. The foreground is a lush green field.

Implementation of the Electricity System Restoration Standard

Grid Code Modification Proposal

Sade Adenola / Antony Johnson

Summary

- Introduction to the ESRS
- ESRS implementation overview
- Assumptions
- Background:
 - EU Emergency & Restoration Code
 - Distributed Re-Start
- Content of the Grid Code modification
- ESRS Hierarchy and Working Groups

Introduction to the ESRS

- In October 2021, BEIS issued a direction in accordance with Special Condition 2.2 of National Grid's Electricity System Operator's Transmission Licence, the Electricity System Restoration Standard (ESRS) is set at–
 - a. 60% of electricity demand being restored within 24 hours in all regions;
and
 - b. 100% of electricity demand being restored within 5 days nationally.
- The purpose of this direction is to require that the ESO
 - a) Ensures and maintains an electricity restoration capability; and
 - b) Ensures and maintains the restoration timeframe.
 - c) Replace the definition of “Black Start” with “Electricity System Restoration”
- We aim to develop the requirements to implement in the Grid and Distribution Codes through a joint working group – Presented to the DCRP on 3rd February 2022
- It is also proposed to make a house keeping change to OC5.7.1(b)(i) which is a correction that needs to be addressed following the implementation of GC0108 (EU Code: Emergency & Restoration: Black start testing requirement)

Electricity System Restoration Standard Implementation – Overview

Mandate

ESO to have restoration capability to enable

60% of electricity demand being restored within 24 hours in all regions;
and
100% of electricity demand being restored within 5 days nationally.

Inputs

- Intact Network
- GC0148 (EU Emergency and Restoration)
- GC0137 (Grid Forming) Capability
- Distributed Re-Start
- Output from collaboration with industry stakeholders

Timescales

- From Oct 2021 to Dec 2026

As directed by BEIS:

- *The ESO is required to be compliant with the ESRS by Dec 2026*
- *Code changes are required to be completed no later than Sept 2023*

Outputs

- Compliant network with Restoration licence obligations
- Restoration decision support tool

Assumptions

- The aim of this work is to have 60% of demand restored within 24 hours (across all regions) and 100% restored within 5 days
- This can only be achieved on the basis that network assets and Customers Plant and Apparatus (e.g. generation, storage, HVDC etc) are in an operational and functional state.
- This will be achievable if there isn't any extensive and prolonged Network or Plant damage
- The requirements are aimed at making the System more respondent to restoration measures following a Power Outage condition and ensuring a minimum standard.

Background 1 - EU Emergency & Restoration Code

- In 2019, the ESO submitted its proposed solution to Ofgem for implementation of the European Emergency and Restoration Code
- This comprised of several submissions:-
 - Grid Code Modification GC0125 (EU Code Emergency & Restoration: Black Start testing requirements for Interconnectors) – *Approved – 5th February 2020*
 - Grid Code Modification GC0127 (EU Code Emergency & Restoration: Requirements resulting from System Defence Plan) – *Approved – 5th February 2020*
 - Grid Code Modification GC0128 (GC0128 EU Code Emergency & Restoration: Requirements resulting from System Restoration Plan) – *Approved 5th February 2020*
 - ❖ System Defence Plan – *SGU List and High Priority SGU List (which is part of the SDP) - Approved 13th July 2021*
 - ❖ System Restoration Plan – *SGU List and High Priority SGU List (which is part of the SRP) - Approved 13th July 2021*
 - ❖ Test Plan – *Approved 13th July 2021*
- Terms and Conditions related to Emergency and Restoration EU Network Code
- Market Suspension Proposals – *Grid Code Modification GC0144 – Approved 26th May 2021*
- A link to the above documents are available from the attached link:-
 - <https://www.nationalgrideso.com/industry-information/codes/european-network-codes/other-enc-documents>
- There are some elements of the EU Emergency and Restoration Code which have implementation dates of 18th December 2022 and these are currently being progressed through Grid Code Modification GC0148

Background 2 - Distributed Restart project

- The Distributed Restart Project is one which recognizes that the traditional suppliers of Black Start Services (Transmission Connected Thermal Plant) are becoming increasingly scarce
- The aim of this project is to look at the ability of:-
 - Other providers to provide Black Start Services including Embedded Generators
 - The ability of Distribution Network Operators to restart parts of their network during a Black Start Event using Embedded Generators which offer Restoration services
 - Encourage Smaller participants into the Restoration arena.
 - Where Non-CUSC Parties are providing such services, they would fall under the remit of the EU Emergency and Restoration Code
- The outcome of the Distributed Re-Start project (which is currently included within the provisions of Grid Code Modification GC0148) is an important element of the ESRS

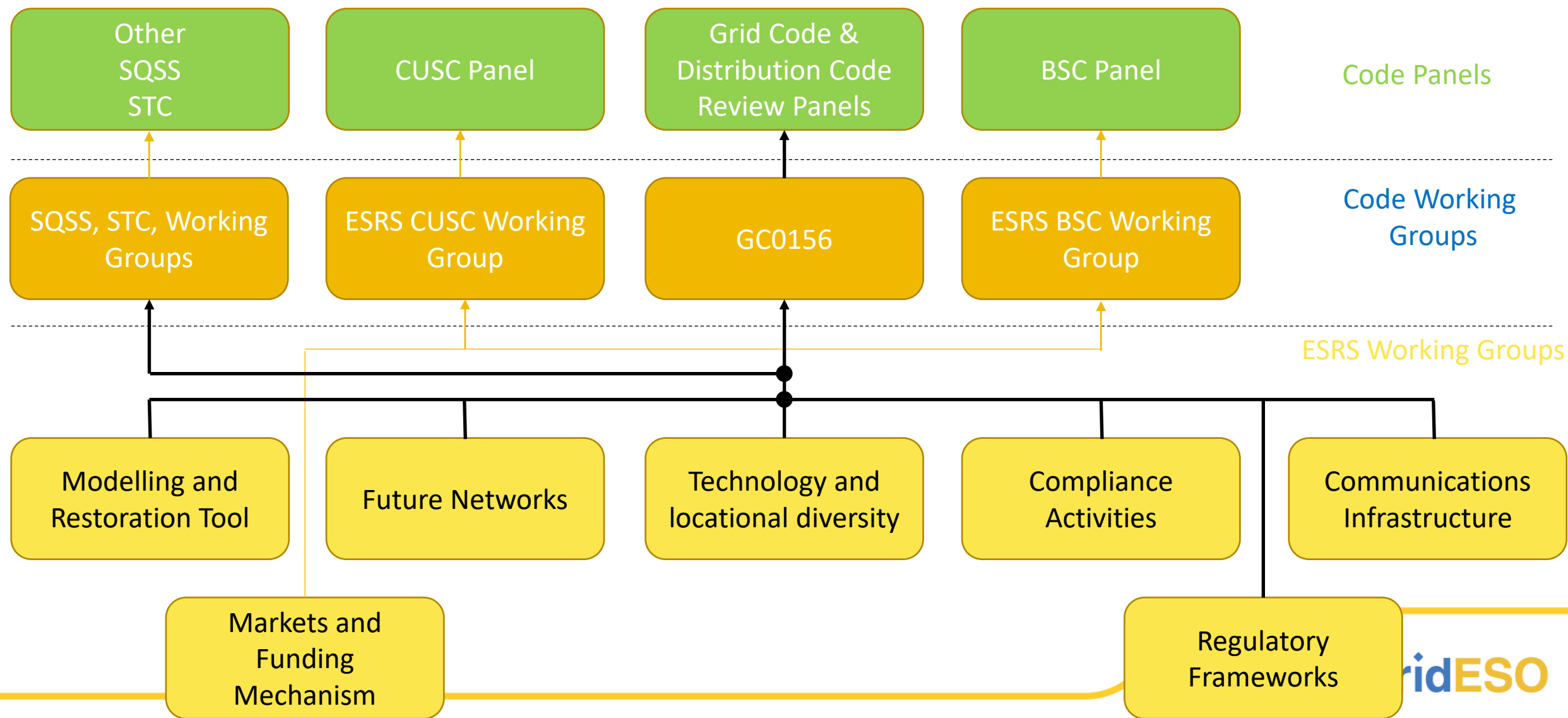
ESRS – Based on a Layered Approach

Tool	Purpose	Function
GC0137 Modification	Grid Forming	Enables Converter and Renewable based Generation to provide Restoration Services – Approved by Ofgem in January 2022
GC0148	Improved Communications resilience	72 hours communication resilience
	Participation from Non – CUSC Parties	More Parties are able to provide Restoration Services
	Distributed Restart	Ability to Energise Distribution Networks from Embedded Generators and Top up Services
		Workgroup Consultation issued on 28 th March 2022 and closes on 27 th April 2022 https://www.nationalgrideso.com/industry-information/codes/grid-code-old/modifications/gc0148-implementation-eu-emergency-and-0
GC0156 (ESRS)	60% Demand Restoration in 24 hours and 100% Demand Restoration in 5 days	

Content of the Grid Code Modification

- i. Updating references from 'Black Start' to 'Electricity System Restoration' or similar
- ii. Ensuring measures are put in place in the Grid Code to facilitate the requirements of the ESRS (60% of Demand to be restored within 24 hours (across all regions) and 100% of Demand within 5 days) against the assumption that the Total System is in an operable state.
- iii. Build on the solutions set out through Grid Code modifications GC0137 (Grid Forming) and GC0148 (Implementation of Emergency and Restoration Code Phase II including the Distributed Re-Start Project- though it is likely the Distributed Re-Start work may move into GC0156) to achieve the requirements of the Electricity Restoration Standard
- iv. Consider what changes if necessary are required to the System Restoration Plan and Test Plan
- v. As part of this modification, take the opportunity to undertake a minor housekeeping correction to OC5.7.1(b)(i) that needs to be addressed following an error arising from the implementation of Grid Code modification GC0108 (EU Code: Emergency & Restoration: Black start testing requirement).
- vi. The Provisions of the ESRS would fall under the Emergency and Restoration Code

ESRS Hierarchy and Working Groups



Update on ESRS Working Groups

- In Nov 2021, the ESO set up 7 working groups to engage with the wider industry for initial recommendations on how to implement the new ESRS Licence Obligations.
- All the working groups will be disbanded by the end of April 2022 and working group reports will be shared with GC0156 for further development.
- Current Status
 - Future Networks – Disbanded
 - Compliance Activities – Disbanded
 - Modelling & Restoration Tool – Disbanded
 - Markets & Funding Mechanism – Disbanded
 - Regulatory Frameworks – Disbanded
 - Technology & Locational Diversity – Ongoing
 - Communications Infrastructure – Ongoing

Workgroup Discussions



Terms of Reference

Banke John-Okwesa – National Grid ESO Code Administrator

Workgroup Term of Reference	Location in Workgroup Report
a) Implementation and costs;	
b) Review draft legal text should it have been provided. If legal text is not submitted within the Grid Code Modification Proposal the Workgroup should assist in the developing of the legal text	
c) Consider whether any further Industry experts or stakeholders should be invited to participate within the Workgroup to ensure that all potentially affected stakeholders have the opportunity to be represented in the Workgroup.	
d) Consider Electricity Balancing Guideline (EBGL) implications	
e) Consider the following elements: <ul style="list-style-type: none"> (i) Updating references in the Grid Code from “Black Start” to “Electricity System Restoration”. (ii) Ensuring measures are put in place in the Grid Code to facilitate the requirements of the ESRS (60% of Demand to be restored within 24 hours (all regions) and 100% of Demand within 5 days) against the assumption that the Total System is in an operable state. (iii) Build on the proposed solutions set out in other Grid Code modifications such as GC0148 (Implementation of Emergency and Restoration Code Phase II) and other developments such as the Distribution Restoration NIA project to achieve the requirements of the Electricity Restoration Standard. (iv) Consider what changes if necessary are required to the System Restoration Plan and Test Plan. (v) As part of this modification, take the opportunity to undertake a minor housekeeping correction to OC5.7.1(b)(i) that needs to be addressed following an error arising from the implementation of Grid Code modification GC0108 (EU Code: Emergency & Restoration: Black start testing requirement). (vi) Clarify the interpretation of any definitions used in the Electricity System Restoration Standard (vii) Consider the need to update any associated RES documents, and whether such collateral should be included in the Grid Code. (viii) Clarify the implications for Restoration Service Providers and other User’s. (ix) Whilst commercial arrangements are out of scope, consideration should be given to how the ESRS obligations will be met in the event that there are insufficient market participants eg the need or otherwise for a mandated back stop. 	
f) Consider and address any cross code impacts on other codes especially Distribution Code (e.g. G99 requirements)	

Next Steps

Banke John-Okwesa – National Grid ESO Code Administrator

- Review Actions log
- Review high level options
- Review/discuss report from previous working groups
- Consider outputs from related modifications (GC0148)