

WELCOME

GC0156

Implementation of the Electricity System Restoration Standard

Meeting 2

19 May 2022

Online Meeting via Teams

nationalgridESO

Agenda

Topics to be discussed	Lead
Introductions	Chair
Review of Actions Log	Chair
ESO Updates	Antony Johnson & Sade Adenola
<ul style="list-style-type: none">• Summary of GC0148 Workgroup Consultation<ul style="list-style-type: none">○ Distribution restart• Summary of ESRS Working Group reports	
Workgroup Discussions	All
<ul style="list-style-type: none">• Review/discuss outcomes from previous working groups• Q&A: discuss responses from the ESO	
Review and agree Terms of Reference	All
AOB & Next Steps	Chair
<ul style="list-style-type: none">• ESRS and BP2 consultation update• Review high level options	

Members / Alternates & Observers

Role	Name	Representing
Chair	Banke John-Okwesa	Code Administrator (ESO)
Technical Secretary	Ruth Roberts	Code Administrator (ESO)
Observer	Milly Lewis	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	Brian Morrissey	SSE
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	Eric Leavy	SP Energy Networks
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	Gwyn Jones	Western Power Distribution
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
Observer	Mark Holland	Scottish & Southern Electricity Networks Transmissions
Observer	Mark Jones	NGESO
Workgroup Member	Michelle Macdonald	Scottish & Southern Electricity Networks Transmissions
Observer	Mike Kay	N/A
Observer	Neha Gupta	NGESO
Observer	Neil Sandison	Scottish & Southern Electricity Networks Transmissions
Workgroup Member	Nikhil Singh	NGET
Observer	Paul Murray	Scottish & Southern Electricity Networks
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	Scottish Power
Observer	Toktam Sharifian	KREC
Workgroup Member	Tolu Esan	Electricity North West Ltd
Authority Representative	Christopher Statham	Ofgem



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	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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ESO Updates:

Antony Johnson & Sade Adenola – National
Grid ESO



Summary of GC0148 Workgroup Consultation

Emergency and Restoration Code – Phase II

Summary

- GC0148 Workgroup Consultation issued on 28 March 2022 and Closed on 27 April 2022
- A total of 7 responses were received
 - 7 in the public domain (including the ESO)
 - 0 Confidential
 - 0 Alternatives
- Overall there is support for this modification but an overriding view (including that of the ESO) that Distributed Re-Start should be taken out of GC0148 and included in GC0156 (Electricity System Restoration Standard)
- A few additional minor comments received
- A number of comments received on the Legal Text
- NGESO would like to thank all Stakeholders who have contributed to this consultation

High Level Objectives of the GC0148 Workgroup

- Address those Articles of EU Emergency and Restoration Code (E&R) which have a Compliance Deadline of 18th December 2022
 - Art 15(5) – 15(8) – Low Frequency Demand Disconnection
 - Art 41 – Communications Systems
 - Art 42 (1)(2) and (5) – Critical Tools and Facilities
- Address the outstanding issues of E&R Phase I introduced in 2019
 - The Treatment of Electricity Storage Modules during low System frequencies
 - How non CUSC parties fall under the remit of E&R
- Consider the introduction or otherwise of Distributed Re-Start

Documents included in the GC0148 Consultation

- System Defence Plan (updated to include Distributed Re-Start)
- System Restoration Plan (updated to include Distributed Re-Start)
- Test Plan (updated to include Distributed Re-Start)
- Control Telephony Standard
- Legal Text – Critical Tools and Facilities and Governance Arrangements
- Legal Text – Electricity Storage Modules under low System Frequencies
- Legal Text – Distributed Re-Start
- Draft Distributed Re-Start Contracts
- Notification letters
- Code Mapping

Summary of GC0148 Workgroup Consultation Responses

- In total 7 responses were received (including the ESO)
- 6 Respondents considered that Distributed Re-Start should be moved out of GC0148 and into GC0156 (Electricity System Restoration Standard). The one respondent who felt that Distributed Re-Start should be retained within GC0148 qualified their Statement with “*Distributed restart amendments could be included in either the GC0148 or GC0156 proposals*”
- A number of comments were received on the associated Distributed Restart Contracts
- One Respondent suggested aligning the governance arrangements of the System Defence Plan and System Restoration Plan with the Test Plan
- There was general support for a 72 hour mains independence resilience period (rather than the minimum 24 hour period in E&R) though a number of questions were raised as to how this would fit with the requirement to restore 100% of the demand in 5 days (120 hours). One respondent noted the 72 hour requirement was very onerous with another advising it should be codified rather than placed in an electrical standard.
- There was general support for the treatment of Non-CUSC Parties falling under the framework of E&R through contracts with the ESO so long as they are transparent, consistent and treated holistically in terms of the “Total System”
- One comment was raised in relation to Critical Tools and Facilities, in particular clarity over what level of control system redundancy is required.
- There were limited comments on the Notification letters though one respondent noted that the letter state there is no need to do anything but this may not necessarily be the case when the GC0148 and indeed GC0156 process has concluded

Next Steps

- Distributed Re-Start and associated work (e.g Contracts) to be removed from the GC0148 work and moved into the GC0156 modification
- Legal Text and documents associated with GC0148 to remove references to Distributed Re-Start
- National Grid ESO has written to each of the respondents thanking them for their comments
- National Grid ESO will also review the detail of the legal comments and share these with the Workgroup for discussion
- The next meeting is scheduled for 12 May where the consultation responses will be discussed
- A series of meetings have been scheduled between 16 – 18 May to discuss the legal text
- Workgroup Vote scheduled for 27 May 2022



ESO ESRS Working Group Report Summaries

Future Networks Working Group

Purpose:

To identify the development needs of networks to accommodate the changes in the generation mix across GB required

The report includes

- Analysis of how the generation mix evolves from now to 2050 with associated challenges.
- Network capabilities for Distribution Network Owners and Transmission Owners (Onshore & Offshore)
- Proposed 14 Restoration Zones (DNO License Areas)
- Commercial Service Options

Commercial Service	Restart Time
Phase 1 Electricity System Restoration	Within 2hrs
Phase 2 Electricity System Restoration	2-24hrs
Phase 3 Electricity System Restoration	24-72hrs

Next Steps:

- Review further network requirements for Network Operators (DNO & TOs including OFTOs).
- Codify requirements in the relevant Regulatory Framework

Markets and Funding Working Group

Procurement Principles

Purpose:

To establish the key procurement principles that the ESO will adhere to during the development and delivery of competitive procurement tenders where appropriate to support the ESRS in a way that does not commercially disadvantage individual parties.

There is also an expectation that all parties shall procure any services that will assist the provision of the ESRS efficiently and economically in accordance with Good Industry Practice.

Principles:

ESO shall continue to follow the over-arching Procurement Guidelines as prescribed in condition C16 of ESO transmission licence and shall also be guided by our general principles for procuring any restoration services, such as;

- A clear and transparent requirement.
- Enabling competition where appropriate to provide a fair and level playing field.
- Reducing and removing barriers for all to enable broader participation.

In addition, all parties shall not unduly discriminate to deliver the ESRS. This shall include and not be limited to

- ESO procurement of restoration services.
- TO and DNO funding through their respective price controls to facilitate the ESRS

Markets and Funding Working Group

Routes to Market:

1. Market Based Solutions: Tender Process for Primary Restoration Service Providers
2. Regulated Routes:
 - TO - Medium Sized Investment Projects (MSIP) reopener
 - DNO ED2 Re-Opener

Next Steps

Funding mechanism for the Secondary Restoration Service Providers – Whilst a one-off payment (capex) could be made for Secondary RSPs if there is any **additional** requirement to be met, the working group has challenged potential need for opex costs. Also, it is not yet clear what the funding mechanism would be.

Modelling and Restoration Tool Working Group

Purpose:

To develop a framework that will give relevant industry parties confidence that the restoration model(s) outputs are a fair representation of restoration times in GB.

For network modelling, the ESO currently use a probabilistic tool based on Monte-Carlo simulation techniques to explore the range of possible outcomes for a set of central circumstances.

As part of ESO Business Plan, a new deterministic tool (Restoration Decision Support Tool), based on Realtime data which would recommend restoration routes to the ESO Control Engineer will be developed.

The working group report covers:

- Benefits and Limitation of both tools for modelling
- Recommendations from the probabilistic model audit and suggested improvements
- Technical and Non-Technical Parameters for the new Deterministic Tool
- Implementation Plan of the Deterministic Tool
- Risks and Mitigations to Restoration Tool Implementations

Following input from the working group, engagement with ESO IT team has commenced to define the scope of the new deterministic tool.

Modelling and Restoration Tool Working Group



Inputs

1

LJRP's

2

Pry Restoration
Service Providers
(inc state of charge)

3

Real time
data(Network
Control Mgt Sys)

4

Balancing
Programme

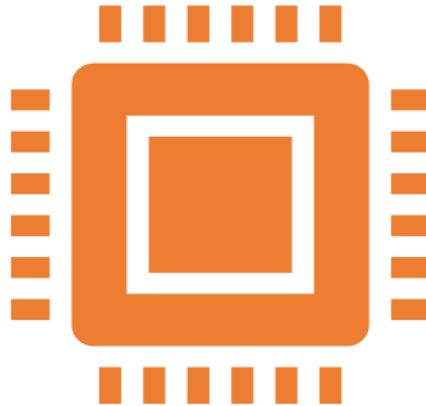
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DNO Network??

6

Sec RSP TTC
(manual input)

Restoration Decision Support Tool



Output

1

Recommended
Restoration
Route

2

Time & % Dd
restored per
region

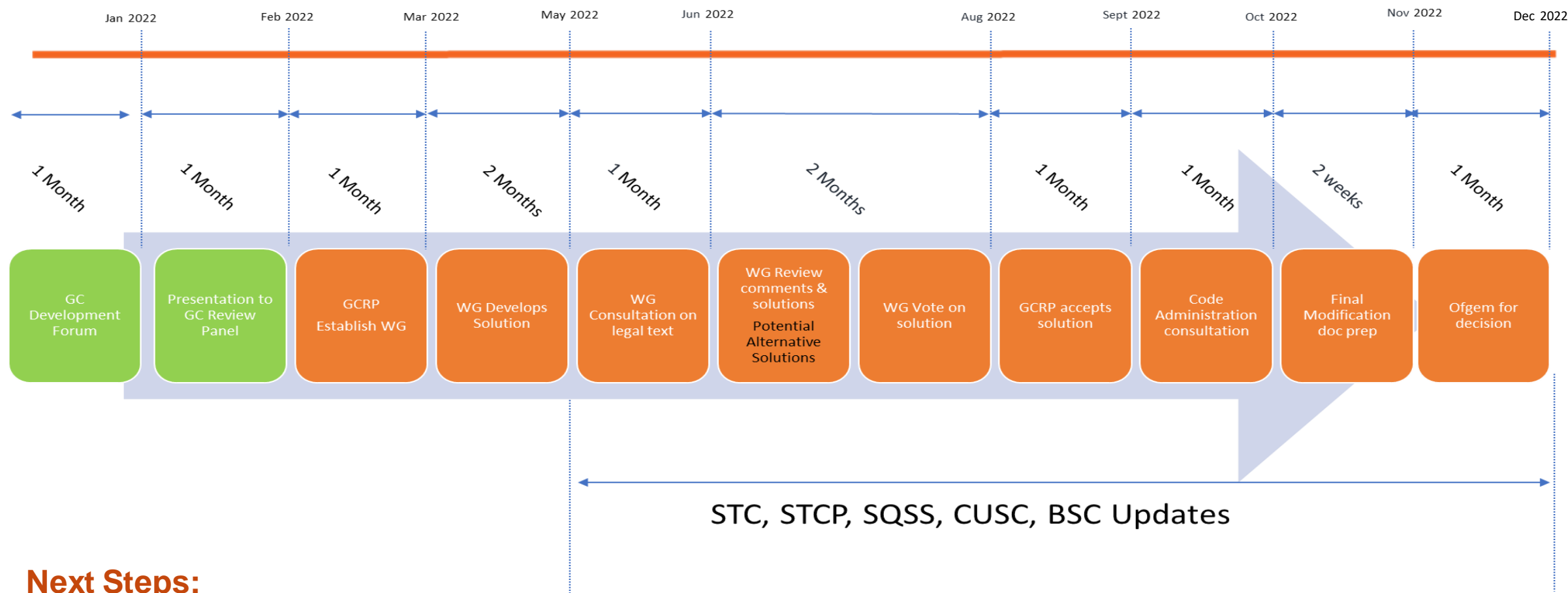
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Decision log

Regulatory Framework Working Group

Purpose:

To identify the changes needed in the relevant industry codes that will enable the implementation of a fit-for-purpose framework for the ESRS



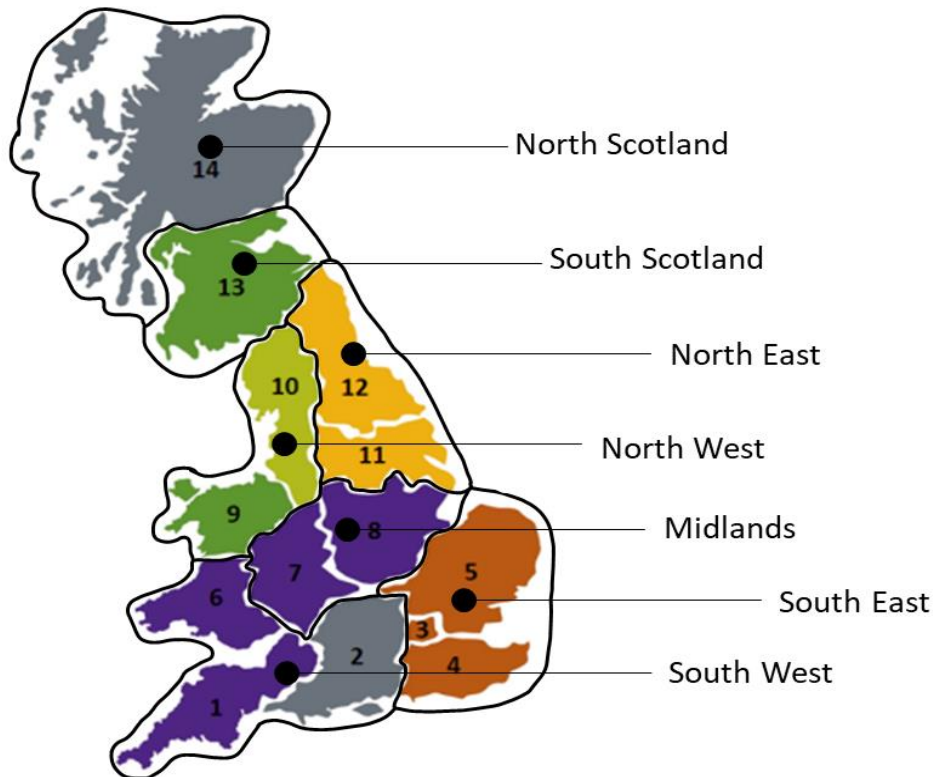
Next Steps:

- Develop solutions to ensure alignment for code changes required and submit to Ofgem for Approval.

Technology and Locational Diversity Working Group

The report from this working group includes:

- Defined 7 Electricity Restoration Reporting Regions based on 14 Restoration Zones (DNO License Areas)



- List of Attributes and Proposed Mitigations for various technology types.
- Risks and Mitigations associated with the Technology and Locational diversity recommendations.

The recommendations includes:

- Minimum of 3 restoration service provider technology within each DNO license area (excluding UKPN London).
- 5 initial Distribution Restoration Zone Controllers in (SPEN Scotland, UKPN London, SSEN South East, WPD Midland West and ENW) based on transmission generation versus total demand imbalance using 2026 Winter Peak figures.

Assurance Framework Working Group

Purpose:

To develop assurance activities and framework for ESRS capability to be maintained.

The report includes assurance activities on:

- Restoration Service Providers (Primary, Secondary and Distribution Restoration),
 - Commercial Service capability
 - Resilience to damage following total shutdown
- Network Operators (TO, OFTO, DNO, iDNO),
 - Resilience of network plant
 - Design of network to enable restoration of assets
 - Network availability checks within the planning and operational planning time phases
- Communications Suppliers,
 - Resilience checks on services
 - Repair and maintenance performance
- Operational Processes (across Industry)
 - Completion of training for engineers and organisations working together for restoration

Assurance Framework Working Group

Next Steps:

- Update the assurance activities to include outcomes from other subjects as they are discussed.
- Build the reporting framework into codes with ESO coordinating.
- Build the requirements into codes, for assurance of the capability.

Communication Infrastructure Working Group

The working group report lists High-level requirements for communication infrastructure with emphasis on the following:

- Resilience of Data & Voice communications is required at all primary restoration sites (72 hrs mains independence).
- High bandwidth, low latency communications upgrades may be required at Distributed Network Operators Operational telecommunication network and interface to Primary restoration providers (new protocols introduced for Distributed Restoration Zone Controllers) for automation in DNO network.
- Inter-Control Centre Communications Protocol (ICCP) used to map Distributed Management System changes (DNO) to NG ESO's Energy Management System giving situational awareness.
- Recommendation on Primary Restoration Provider's technical and non-technical requirements for telecommunications infrastructure to support data and voice communication for the restoration process including the requirement for incorporating a Distribution Restoration Zone Control System in the distribution network.
- Proposal for all Primary Restoration Providers including Primary Distribution Restoration Providers that are not currently classified as Operators of Essential Services (OES) to be classified as such and hence subject to NIS regulations. It is also proposed that all other distributed energy resources should adopt the Distributed Energy Resource Cyber Security Connection Guidance published by Department of Business, Energy, and Industrial Strategy (BEIS) and Energy Network Association (ENA).

Communication Infrastructure Working Group

- Recommendations on list of Cyber security standards identified as essential in the setup of a Distribution Restoration Zone Control System, which is required for automated distribution restoration.
- Proposal for voice communication functional requirement to align with the Control Telephony Electrical Standard that is developed and being consulted on under GC0148.
- Analysis of the advantages and disadvantages of current Telecommunication provisions and their suitability to be used in the new restoration process.
- Analysis of the different technologies assessed for viability above against the functional requirements with a proviso that this ultimately depends on the configuration.
- Recommendations on the areas the Testing regime and service support for the telecommunication infrastructure should cover.
- Table of Risks and Mitigations to the provision of adequate Communication infrastructure for restoration.

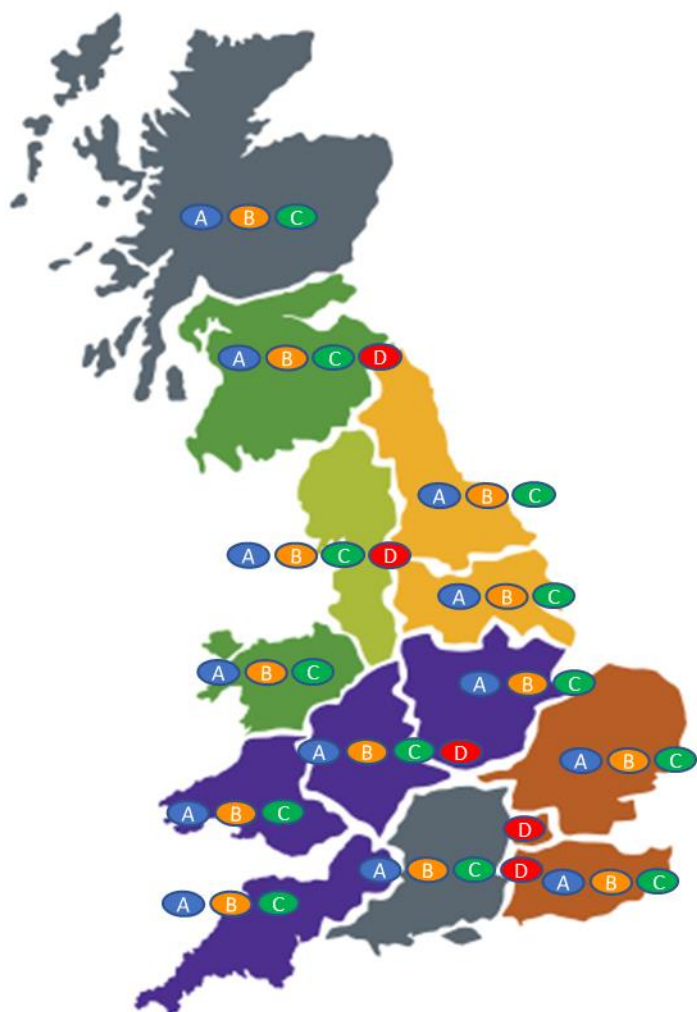
Next Steps

- Identify requirements for communication and visibility channel between ESO and all DNOs including necessary updates to Energy Management Systems – ICCP Link.
- Identify requirements for synchronisation between TO & DNO network – Synchronising Breakers or PMUs

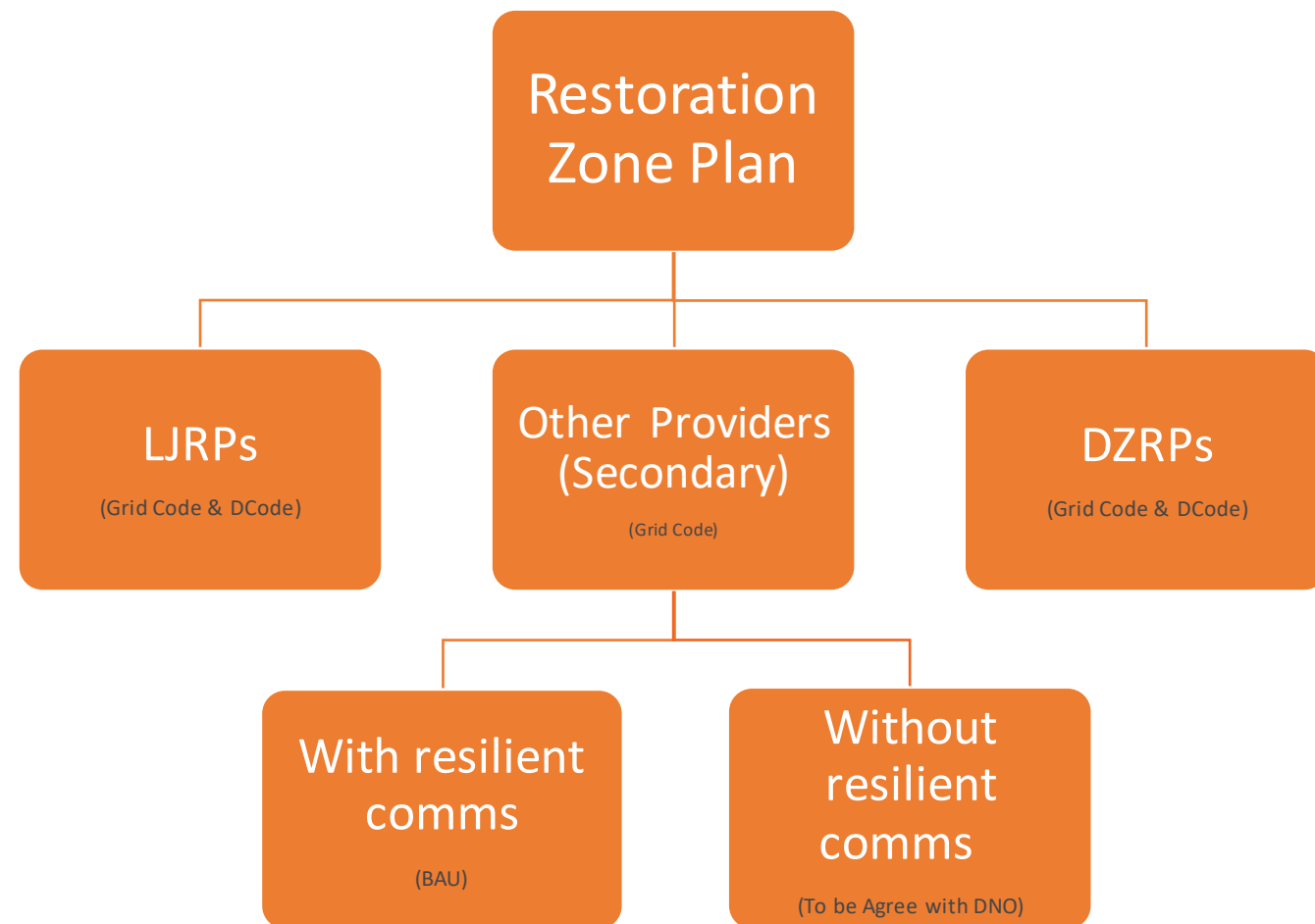
Proposed High Level Restoration Strategy

Restoration Zone Plan by 2026

Possible 2026 Outcome



- A Technology A
- B Technology B
- C Technology C
- D Distribution Restoration



Potentially 39 Transmission Restoration service Providers & 5 Distribution Restoration Zone Controllers

Proposed Next Steps

The following ESRS Working Groups have recommended that further work is required therefore, ESO is suggesting that we create the following sub-groups reporting to GC0156:

- Future Networks
- Assurance Framework – not immediately
- Communication Infrastructure – nominations from all TOs & DNOs is essential
- Markets and Funding Mechanism (*reports to CUSC & BSC*)

Following review of the reports, are there other sub-groups that the group believes we should have?

If agreeable, could we have nominations so we can issue appointments for Bi-weekly meetings?

Workgroup Discussions

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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

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AOB

ESRS & BP2 Consultation – Amy Brooks

National Grid ESO's second RIIO-2 Business Plan (BP2)



Our 2019 RIIO-2 Business Plan set out ambitious goals for the **five-year period 2021-2026**.

Business Plan 2 (BP2) is a refresh of our RIIO-2 plans and details what we will deliver from **April 2023 – March 2025**. **ESRS** proposals are covered in the Role 1 elements of the plan.

Draft BP2 consultation started on **Friday 29 April 2022**

Consultation **closes Friday 10 June**

Consultation feedback will inform our final BP2, which we will submit in **August 2022**

We held an introductory webinar **Wednesday 4 May** – a recording of this is available on our website

Information on how to respond to our consultation is on our website – this can be done via email, a web form, or by feeding back to the team through engagements.

Asks

- Will Workgroup members like to engage to provide feedback on ESRS activities set out in the BP2 plan.
- How will members prefer to engage:
 - To attend a drop-in session
 - One-to-one meeting between the ESO and their organisation
 - Respond/feedback in writing

- Are face to face meetings needed?