

GC0156 Markets and Funding Mechanisms Subgroup Proposals

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Acronyms, key terms

BSC	Balancing and Settlement Code
BMU	Balancing Mechanism Unit
BELLA	Bilateral Embedded Licence Exemptible Large Power Station Agreement
BEGA	Bilateral Embedded Generation Agreement
BSUoS	Balancing Service Use of System Charge
CUSC	Connection and Use of System Code
DER	Distributed Energy Resource
DNO	Distribution Network Operator
ECVNs	Energy Contract Volume Notifications
ESRS	Electricity System Restoration Standard
ESO	Electricity System Operator
MVRNs	Metered Volume Reallocation Notifications
NETSO	National Electricity Transmission System Operator
TO	Transmission Owner

1 Executive Summary

The ESO has been directed by the Secretary of State that in accordance with Special Condition 2.2 of the National Grid Electricity System Operator’s Transmission Licence, The Electricity System Restoration Standard is set at –

- a) 60% of electricity demand being restored within 24 hours in all regions, and
- b) 100% of electricity demand being restored with 5 days nationally.

It is an essential requirement for the NETS to have electricity system restoration capability. The ESO delivers this requirement by determining and procuring sufficient system restoration capability for the NETS on an ongoing basis.

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.

Note: In accordance with the advice from BEIS- at GC0156 “electricity demand” will be calculated by way of the forecast of the next peak transmission demand.

Objective

The objective of this report is to cover an appropriate level of detail on the likely costs (Capex and Opex) if possible and funding mechanisms for various stakeholders/parties including:

- Anchor and Top-Up Restoration Service Providers on Transmission Network
- Other CUSC parties.
- Anchor and Top-Up Restoration Service Providers on Distribution Network
- Other Distributed Energy Resources (Non-CUSC and Non-Contracted)
- Interconnectors
- Non-restoration Users
- All Network Owners (TOs, OFTOs, CATOs, DNOs)

Summary of existing funding and compensation mechanism for various stakeholders

Stakeholder	Funding Mechanism	Compensation Mechanism
Anchor and Top-up Restoration Service Providers on Transmission Network	Bilateral Commercial Contract	Section G3 of BSC
Other CUSC participants	No existing mechanism	Section G3 of BSC
Non-Restoration Users	Not applicable	Not Applicable
Network Owners (TOs, OFTOs, CATOs)	MSIP Reopener	
Anchor and Top-up Restoration Service Providers on Distribution Network- BSC parties	Tripartite Commercial Contract	Section G3 of BSC
Anchor and Top-up Restoration Service Providers	Tripartite Commercial Contract	No existing mechanism

Stakeholder	Funding Mechanism	Compensation Mechanism
on Distribution Network- Non-BSC parties		
DERs (Non-CUSC and Non-Contracted)	Not applicable	Business as Usual

Proposals

The major proposals which requires a need to raise BSC and CUSC modifications are described as follows.

- ✓ There is a proposal to place an amendment in BSC Section G to reflect the fact that lead parties and/or asset owner can claim compensation even if the asset owner is a non-BSC party. Only contracted (Anchor and Top-up Restoration Service Providers) non-BSC parties will be eligible for this compensation claim.
- ✓ There is a proposal to place a new framework within CUSC which will cover the actual resilience costs and assurance activities that will be stated in the Grid Code as part of GC0156, for CUSC Parties without a commercial contract.

Disagreements

In relation to additional cost required for resilient communication infrastructure, DNOs envisage a risk in the approval of recovery of this cost from Ofgem.

Alternatives

There was one alternative proposal made by subgroup members as defined below.

Resilient Communication Infrastructure cost for contracted DERs

DNOs proposed an alternative solution stating that since the ESO will be paying the contracted DERs for their services, the DERs should bill back the additional communication cost to the ESO.

2 Introduction

2.1 Secretary of State Direction

The ESO has been directed by the Secretary of State that in accordance with Special Condition 2.2 of the National Grid Electricity System Operator's Transmission Licence, The Electricity System Restoration Standard is set at –

- c) 60% of electricity demand being restored within 24 hours in all regions, and
- d) 100% of electricity demand being restored with 5 days nationally.

It is an essential requirement for the NETS to have electricity system restoration capability. The ESO delivers this requirement by determining and procuring sufficient system restoration capability for the NETS on an ongoing basis.

The purpose of this direction is to require that the ESO –

- c) Ensures and maintains an electricity restoration capability; and
- d) Ensures and maintains the restoration timeframe.

Note: In accordance with the advice from BEIS- at GC0156 "electricity demand" will be calculated by way of the forecast of the next peak transmission demand.

2.2 GC0156 & Markets and Funding Mechanisms Subgroup

ESO has raised Grid Code change GC0156 to ensure that the industry parties are aware of what they need to do to ensure and maintain an electricity restoration capability, and restoration timeframes and implementing the necessary grid codes.

This document presents the markets and funding requirements for various stakeholders involved in the implementation of the ESRS and the relevant changes which are required to be updated in CUSC and BSC codes.

2.2.1 Terms of References

Purpose/Scope

To estimate costs (if possible) associated with the activities to implement the ESRS requirements. To advise the CUSC/BSC Panels of the funding implications for relevant stakeholders/parties. To advise the GC0156 WG on costs for other parties involved in facilitating the implementation of ESRS and suggest how these should be accommodated.

Inputs

- ESRS Markets and Funding Mechanism working group recommendations.
- Outputs from other sub working groups.
- Relevant codes.

Outputs

A report to be delivered, covering an appropriate level of detail on the likely costs (Capex and Opex) and possible funding and compensation mechanisms for various stakeholders/parties including:

- Anchor and Top-Up Restoration Service Providers on Transmission Network.
- Other CUSC parties
- Anchor and Top-Up Restoration Service Providers on Distribution Network.
- Other Distributed Energy Resources (Non-CUSC and Non-Contracted).
- Interconnectors.
- Non-restoration Users.
- All Network Owners (TOs, OFTOs, CATOs, DNOs).
- Provide regular progress updates to general GC0156 group.

Note that draft legal text etc can only be developed by others, such as the CUSC/BSC panels, etc.

Members (Update based on Nominations list)

<u>Role</u>	<u>Name(s)</u>	<u>Organization</u>
Chair		NGESO
Technical secretary		NGESO
Generator rep		
TO Rep		
DNO Rep		
Other		
etc		

Standing Agenda

1. Safety/Wellbeing/inclusion moment
2. Actions update
3. Progress/project update
4. Analysis and discussion of issues within scope
5. Decisions/actions
6. Risk/Issues for escalation to GC0156
7. AOB

Logistics

- **Cadence** –Meetings scheduled bi-weekly.
- **Duration** – 4 hours.
- **Location** – Teams Meeting.
- **Submissions** due and pre-read – slides/papers with clear confirmation of input/decisions needed 5 business days prior. Papers are to be read ahead of the meeting.
- **Minutes** – to be taken and circulated with the Action/decision Log.
- **Quorum** – All members to attend. Deputies can attend with full decision-making authority delegated.
- **Disagreements** - Proposals will be based on majority decisions. Disagreements from the proposals shall be recorded.

3 Compensation as a consequence and related to Black Start incident - Brief on Section G3 of BSC

The BSC Section G3 contingency provisions aren't triggered until/unless the ESO notifies Grid Code Users that, under Grid Code OC9, a Total Shutdown or Partial Shutdown has occurred and that the ESO intends to implement a Black Start. It's also the ESO that monitors the Market Suspension Threshold under the BSC during a Partial Shutdown and notifies Elexon if it is met. The BSC section G3 only covers the compensation arrangement at the time of event. It doesn't cover the capex and opex cost of BSC parties.

3.1 Who is eligible to claim?

Each Party which:

- a) is the Lead Party of any BM Unit (whether or not comprising Plant or Apparatus which is comprised in a Black Start Station as defined in the Grid Code), and
- b) is given a black start instruction as defined in section 3.2,

may, within the period of 20 Business Days after the end of the Black Start Period, submit to BSCCo a claim for payment of compensation (Black Start compensation amount). This is the case regardless of whether the BM Unit relates to a Black Start Station as defined in the Grid Code.

3.2 What is a Black Start Instruction?

As per BSC Section G3.3.1C, the Black Start Instruction is:

- a) in relation to any Settlement Period(s) which fall within both a Black Start Period and a Market Suspension Period, an instruction given by the NETSO pursuant to OC9.4.7.4, BC2.7 or BC2.9 of the Grid Code; or
- b) in relation to any Settlement Period(s) which fall within a Black Start Period but not within a Market Suspension Period, an instruction given by the NETSO pursuant to BC2.9.1.2(e)(i) of the Grid Code.

3.3 What happens for Settlement Periods that fall within a Market Suspension?

Normal BSC market operations are suspended, including the Balancing Mechanism/TERRE market, credit/contract positions and normal imbalance pricing. A special **Contingency Imbalance Price**, derived from historic data and set by the BSC Panel, applies to all BM Units' Metered Volumes.

All generators will be despatched by the NETSO for the duration of the Market Suspension Period. All instructions given by the NETSO to Grid Code Users during the Market Suspension Period will represent black start instructions as defined in BSC Section G3.3.1C. They will also be deemed to be Emergency Instructions under the Grid Code (in accordance with OC9.4.7.4 and Balancing Code (BC) 2.9.2.2) unless the NETSO specifies otherwise.

The Lead Party's black start compensation amount is determined as its **Avoidable Costs minus the imbalance charges** received (or the reduction in the imbalance charges paid) for its **black start compensation volume**.

Black start compensation volume is the net change in the BM Unit's Exports or Imports resulting from the Lead Party's compliance with the black start instruction given by the NETSO.

The BSC's calculation for determining the amount of imbalance charges to deduct from the Lead Party's Avoidable Costs is based on the Contingency Imbalance Price.

The **Lead Party's Avoidable Costs** are determined by the BSC Panel. They represent the amount of net costs of operating the BM Unit which would not have been incurred but for the black start instruction. Costs are not counted unless they are directly incurred in the operation of the Plant and Apparatus comprised in the relevant BM Unit.

3.4 What happens for Settlement Periods that don't fall within a Market Suspension?

All normal BSC market operations will continue, including the Balancing Mechanism/TERRE market, ECVNs/MVRNs, normal credit and contract positions, and the normal imbalance pricing calculations.

The NETSO will be using a combination of Emergency Instructions and normal Bid Offer Acceptances (BOAs) to balance the system.

Only those instructions given by the NETSO in accordance with Grid Code BC2.9.1.2(e)(i) (the need to invoke the Black Start process or the Re-Synchronisation of De-Synchronised Island process under OC9) will represent black start instructions as defined in BSC Section G3.3.1C and Grid Code BC2.9.2.6. These will be Emergency Instructions under BC2.9.2 and, in accordance with BC2.9.2.3, will not be treated as BOAs.

The Lead Party of any BM Unit which is given a black start instruction by the NETSO under BC2.9.1.2(e)(i) will be eligible to submit a claim for a black start compensation amount under the BSC.

The following instructions from the NETSO will be deemed to be Black Start Instructions. They will also be deemed as Emergency Instructions under the Grid Code and will not be treated as BOAs (in accordance with OC9.4.7.4 and BC2.9.2):

- Any instructions to Black Start Stations and to Network Operators which are part of an invoked Local Joint Restoration Plan (unless the NETSO specifies otherwise); and
- In Scotland, any instructions to Gensets that are not at Black Start Stations, but which are part of an invoked Local Joint Restoration Plan and are instructed in accordance with the provisions of that Local Joint Restoration Plan.

If instructions are not issued under Grid Code BC2.9.1.2(e)(i), they will not represent black start instructions and the normal Grid Code, BSC and CUSC provisions for those Emergency Instructions will apply.

Examples of Emergency Instructions that aren't considered black start instructions and so aren't eligible for BSC compensation include:

- Maximum Generation Instructions (which aren't treated as BOAs under Grid Code BC2.9.2.3, and which receive Maximum Generation Energy Payments under Grid Code BC2.9.2.4 and CUSC Section 4.2); and
- Emergency De-energisation Instructions (which aren't treated as BOAs under Grid Code BC2.9.2.3, and which receive Interruption Payments for loss of transmission access under Grid Code BC2.9.2.5 and CUSC Sections 5.2 and 5.10).

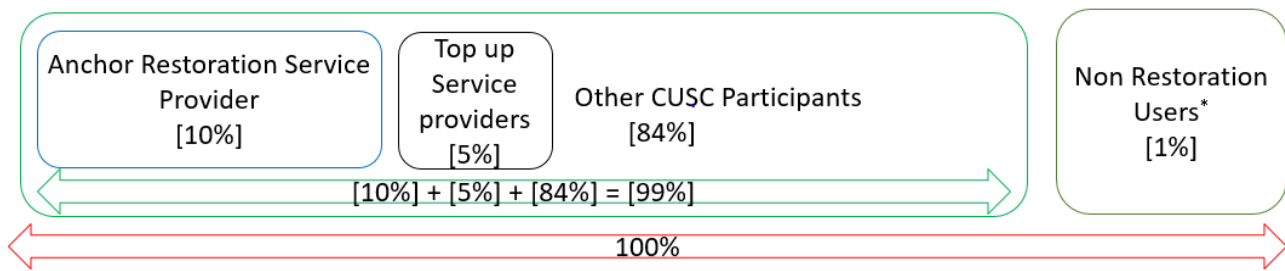
The Lead Party's black start compensation amount is still determined as **its Avoidable Costs minus its imbalance charges** received (or the reduction in its imbalance charges paid) as result of complying with the black start instruction given by the NETSO.

The BSC's calculation for determining the amount of imbalance charges to deduct from the Lead Party's Avoidable Costs will be based on the relevant imbalance price (as calculated under the normal imbalance pricing rules).

Where there's a MVRN in place, the BSC's compensation calculation also takes account of the imbalance charges incurred/paid by both the Lead Party and Subsidiary Party(ies) to that MVRN and is based on the relevant imbalance price and the Parties' contract positions. The compensation is claimed by the Lead Party and any redistribution of funds between the Lead Party and Subsidiary Party(ies) is outside the BSC arrangements.

4 Generation Categories

4.1 Transmission Network



Anchor Restoration Service Providers are a subset of CUSC participants and have additional Restoration Service/Commercial Contract.

Top up service providers are a subset of the CUSC Participants that have a contract to provide some services, excluding self-starting capability, over and beyond the CUSC obligations.

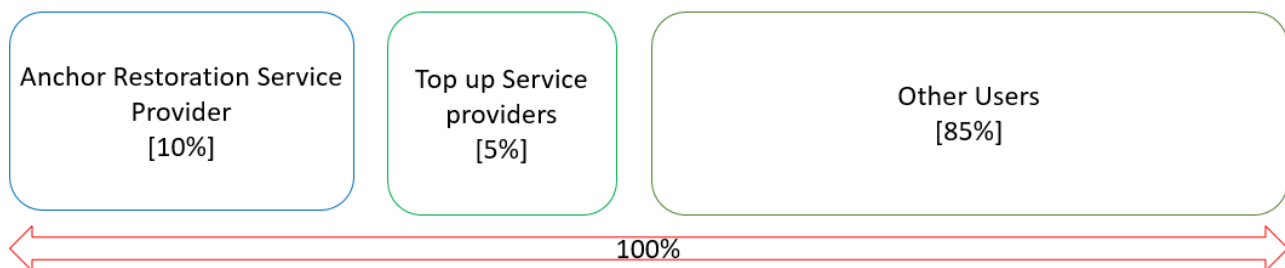
Other CUSC participants would, with the proposed GC0156 solution, be legally bound to satisfy the requirements of the revised Grid Code with specific additional remuneration over and above that provided for under the existing arrangements within BSC Section G (that applies only during an event).

Non-Restoration Users Do not have obligation to contribute to restoration.

* Users as defined in the G/D Codes.

% shown in the figure are indicative numbers.

4.2 Distribution Network



Anchor Restoration Service Providers have a Restoration Service/Commercial Contract.

Top up service providers have a Restoration Service/Commercial Contract to provide some services, excluding self-starting capability.

Other Users have no commercial contract, no resilience, no resilient comms and could potentially re-synchronise sporadically. Bound by the requirements of the DCode (G99/G98).

* Users as defined in the G/D Codes.

% shown in the figure are indicative numbers.

5 Funding and Compensation Mechanism for various stakeholders on Transmission Network

5.1 Anchor and Top-up Restoration Service Providers

Anchor and Top-up Restoration Providers will be a BSC party on transmission network.

Existing Funding Mechanism

Bilateral commercial contract between the NGENSO and the providers should cover capex and opex cost for the provision of any service.

Existing Compensation Mechanism

The BSC parties are eligible for compensation during an event as per section G3 of BSC as explained in Section 3 of this report.

Proposal

No additional funding is required.

Disagreements

None.

Alternatives

None.

5.2 Other CUSC participants

Existing Funding Mechanism

There is no existing funding mechanism to cover capex and opex cost for other CUSC participants.

Existing Compensation Mechanism

If CUSC participant is a BSC party (lead party or asset owner) then that is eligible to claim under Section G3 of BSC as explained in Section 3 of this report.

Proposal

- BSC Section G is to be amended to reflect the fact that lead parties or asset owner can claim compensation even if the asset owner is a non-BSC party.
- There is a new requirement as part of ESRS implementation on CUSC participants to have 72hours power resilience and some Assurance activities are proposed which are covered in detail within the Assurance Activities Report.
- ✓ It was proposed that a new framework is introduced within CUSC which will cover the actual resilience costs and assurance activities that will be stated in the Grid Code as part of GC0156, for CUSC Parties without a commercial contract.

Disagreements

None.

Alternatives

None.

5.3 Non-Restoration Users

These parties are not obliged to support restoration therefore, no funding mechanism is required.

5.4 Network Owners (TOs, CATOs, OFTOs)

Currently, CATOs are in the emerging stage, in future CATOs will have the same obligation as other TOs to support Restoration.

Existing Funding Mechanism

There is an existing price control mechanism known as Medium Sized Infrastructure Projects (MSIP) Reopener which TOs can use to request additional funding required to facilitate the implementation of ESRS.

Existing Compensation Mechanism

Compensation mechanism is not applicable for Network Owners.

Proposal

- TOs should engage with Ofgem for any further additional funding outside of MSIP.
- CATOs should engage with Ofgem for funding mechanism.
- OFTOs were historically excluded from providing restoration which means the existing designs are not fit for restoration purpose. Hence, legal text needs to be placed in Grid Code to cover how we harness the restoration from existing Offshore Generation.
- OFTOs should engage with Ofgem for funding mechanism.

Disagreements

None.

Alternatives

None.

6 Funding and Compensation Mechanism for various stakeholders on Distribution Network

6.1 Anchor and Top-up Restoration Service Providers

Providers with BEGA/BELLA are CUSC participants. Anchor and Top-up Restoration Service Providers can be a BSC party or non-BSC party on distribution network.

Existing Funding Mechanism

Tripartite commercial contract between the NGESO, the DNO and the providers to cover capex and opex cost.

Existing Compensation Mechanism

Providers which are BSC parties; lead parties or asset owners are eligible for compensation under section G3 of BSC as explained in Section 3 of this report.

Proposal

Non-BSC parties: Providers who are non-BSC parties and have a tripartite commercial contract would be eligible to claim under section G3 of BSC. Hence, BSC Section G is to be amended to reflect the fact that lead parties can claim compensation even if the asset owner is a non-BSC party.

Disagreements

None.

Alternatives

None.

6.2 DERs (Non-Contracted and Non-CUSC)

These are distributed energy resources which are non-contracted and non-CUSC. These DERs don't have resilient communication infrastructure. There are different resynchronisation options available for DERs to re-connect.

Option 1: Synchronise automatically once the power system is restored

- Small capacity generators (up to 50 MW) may use this approach already as part of business as usual and do not have an obligation to inform the DNO before connecting.
- It is advised that as part of creating a Distribution Restoration Zone Plan, the total capacities and location of such generators should be captured so that the DRZC can be sized and structured to cater for the effect of the generators connecting automatically.

Option 2: Hold off synchronisation until communication network is restored

- This option is available to other users who do not have resilient communication infrastructure and could not communicate with the DNOs when the site has been energised.
- Generators whose operation due to safety considerations would require communication with the DNOs to facilitate synchronisation will fall into this category.

- They would hold off synchronising to the network even when their sites are energised until communication with the DNO is restored.
- This class of generators/providers who fall under this category would be captured in the DNO licensed area plan as part of the design of the Distribution Restoration Zone.

Existing Funding Mechanism

This will follow their metered output as part of business as usual process (generator supplier contract).

Existing Compensation Mechanism

This will follow their metered output as part of business as usual process (generator supplier contract).

Proposal

No additional funding is required.

Disagreements

None.

Alternatives

None.

6.3 Resilient Communication Infrastructure cost for contracted DERs

This section describes the additional cost required for building resilient communication infrastructure for contracted DERs (Anchor and Top up Restoration Service Providers). There are different options for communication link between DNO and DER as mentioned below:

Case 1: DNO-DER point of presence is in between the DNO and the DER premises.

Case 2: DNO-DER point of presence is in the DNO property.

Case 3: DNO-DER point of presence is in the DER property.

Existing Funding and Compensation Mechanism

Currently, DERs don't have resilient comms.

Proposal

- If the communication infrastructure is a part of DNO property, then the cost should be incurred by DNO which they can recover through the ED2 price control mechanism.
- If the communication infrastructure is part of DER property, then the cost can be incurred by DER which they can bill back to the DNO and DNO can recover that cost through their ED2 price control mechanism.

Disagreements

DNOs envisage a risk in the approval of recovery of Communication infrastructure cost from Ofgem.

Alternatives

DNOs proposed an alternative solution stating that since the ESO will be paying the contracted DERs for their services, the DERs should bill back the additional communication cost to the ESO.

6.4 Network Owners (DNOs)

Existing Funding Mechanism

There is an existing price control mechanism known as RIIO-ED2 Reopener which DNOs can use to request extra funding required to facilitate the implementation of ESRS.

Existing Compensation Mechanism

Compensation mechanism is not applicable for Network Owners.

Proposal

No other funding framework was proposed.

Disagreements

None.

Alternatives

None.

7 Funding and Compensation Mechanism for Interconnectors

Interconnectors Restoration Service Providers contract is a bilateral commercial contract between the ESO and the interconnector owner. There is no obligation on the other TSO to fulfil the commercial contract.

Existing Funding Mechanism

- Commercial contract covers the capex and opex cost of interconnectors.
- If Interconnectors fail to supply the contracted MW at the day of event they will be penalised as per their contract's terms and conditions.
- The actual MWs exchanged on the day of event will be settled through the Settlement Agreement between the ESO and the Interconnector party.
- There is no restoration obligation on the other TSO to support restoration. There can be an Emergency Assistance as described in BC2.9.6 which states that:

*The **Company** may request that an **Externally Interconnected System Operator** takes any available action to increase the **Active Energy** transferred into the **National Electricity Transmission System**, or reduce the **Active Energy** transferred into its **External System** by way of emergency assistance if the alternative is to instruct a **Demand reduction** on all or part of the **National Electricity Transmission System**. Such request must be met by the **Externally Interconnected System Operator** providing this does not require a **reduction of Demand** on its **External System** (or on the system of **Interconnector Users** using its **External System**), or lead to a reduction in security on such **External System** or system or Vice-Versa.*

Proposal

No other funding framework was proposed.

Disagreements

None.

Alternatives

None.

8 Likely Cost

The subgroup arrived at a conclusion that the requirement for likely cost will be revisited once Ofgem approves the set of requirements proposed by GC0156 for the regulatory frameworks and at that point it might be more appropriate for the generators to provide an indicative cost.