

Grid Code Development Forum

10:00-12:00

Wednesday 03rd June 2020

Digital only meeting via WebEx

Please register below to receive the details to join:

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Agenda

1. Introductions
2. Presentation:
GC0143 Last resort disconnection of embedded generation – Enduring Solution
(**Rob Wilson**, National Grid ESO)
3. Any other business
4. Close

Enduring Solution for GC0143:

Last resort disconnection of Embedded Generation

Rob Wilson

Grid Code Development Forum

3rd June 2020



Recap - GC0143 background and urgency

- Under emergency conditions the Electricity System Operator (ESO) may need to instruct a Distribution Network Operator (DNO) to disconnect embedded generators connected to its system
- Existing ability under the Grid Code to do this was felt to lack detail and be legally ambiguous
- GC0143 clarified the format of instructions and removed the ambiguity
- The requirement for this was due to the unprecedented societal changes brought about by the COVID-19 pandemic which has led to demands out-turning up to 20% lower than predicted
- During very low demand periods very few controllable larger generators will be running
- Urgency was required to achieve a solution before the Bank Holiday weekend on 8 May 2020
- Sunset clause included in solution to time out on 25 Oct 2020

GC0143 Timeline

Milestone	Date
Raised at Grid Code panel	1 May 2020
Ofgem agree urgency	1 May 2020
Code Administrator Consultation	1 May 2020 to 5pm on 5 May 2020
Panel meeting to approve Final Modification Report	6 May 2020
Ofgem approval	7 May 2020
Implementation	7 May 2020

Consultation responses – summary & key themes

Most respondents stated that they understand the reasoning behind the modification being raised and the threat to Security of Supply that the current situation (COVID-19) poses for the GB National Electricity Transmission System (NETS).

Whilst there was broad understanding of the issue facing National Grid ESO there were concerns raised around the approach outlined in this modification. Questions were raised around the approach through urgency and whether there would be unintended consequences to the modification being implemented as a result, plus the need for a more considered enduring solution.

Theme #1 - The development of modification GC0143

Concern	Detail
Time taken to raise the change	It was highlighted by some respondents that in their view the ESO could have raised this change earlier and that the ESO had the opportunity to do so in the lead up to the paper being raised on the 30 April 2020.
Use of urgency	<p>Concerns were raised at the modification being treated as urgent, the limited opportunity for industry engagement, and whether there would be unintended consequences of the modification being implemented as a result.</p> <p>Although there was broad support that the defect needed addressing, many respondents felt that it should have been done in a more thorough, considered way ahead of implementation.</p> <p>Some respondents also stated that there was not enough time to get plans in place ahead of implementation on 7 May 2020.</p>
Enduring solution required	<p>Many respondents highlighted the need for an enduring solution to be developed as soon as possible. It should address the points raised in the GC0143 discussions and consultation responses, and should ensure that all relevant stakeholders are both made aware of the proposal and given suitable opportunity to engage in developing the solution.</p> <p>Some also stressed that the temporary solution, having been approved and implemented, should not set a precedent for the enduring solution.</p>

Theme #2 - Carrying out emergency instructions

Concern	Detail
Clarity required over order of disconnection	<p>Clarity over the order in which generators would be disconnected, with some suggesting that certain generators, or types of generators, should not be subject to disconnection. Several factors were recommended as considerations that should be included:</p> <ul style="list-style-type: none">• The government's carbon net zero targets, with the view that renewable generation should not be disconnected ahead of fossil fuel generation.• Security of connection - those power stations providing the greatest level of security of supply should be the last to be disconnected.• The consequences for customers, particularly those for whom generation formed part of a more complex industrial site, or where de-energisation of generation would also mean cutting off local demand, or could have environmental impacts.
'Last resort' only	<p>Assurance that use would only be in an emergency situation and as a last resort after all other options had been exhausted. Several suggested that this should be included in the legal text. It was also felt that there should be more transparency over the steps that would be taken ahead of any instructions being given, and that these details should be in the public domain.</p>
DNOs' visibility	<p>Concern over the visibility that the DNOs have of the information required to carry out emergency instructions, and how they would know what to disconnect.</p>
Clarity over instruction	<p>Respondents wanted more clarity over the disconnection process, including what the instruction from the ESO would look like, how DNOs would comply with the instruction and how generators would be notified.</p>
Notice period before disconnection	<p>Clarity over how much notice generators could expect before disconnection.</p>
Reporting requested	<p>Responses included the request that reporting is made publicly available detailing any emergency instructions of this type that are given by the ESO, including the rationale.</p>

Theme #3 - Impacts of emergency disconnection

Concern	Detail
Commercial impact / lack of compensation	<p>One of the most frequent concerns raised in the responses was the lack of compensation that would be provided to any embedded generators that were disconnected via this process.</p> <p>This was seen to be a financial risk to generators, with many believing this demonstrated the absence of a level playing field and that the process was detrimental to competition since, in contrast, transmission connected generators and those that are in the Balancing Mechanism would receive compensation should the instruction be enacted.</p>
Damage to assets	<p>Potential for emergency disconnection to cause health and safety risks, damage to assets and the need for significant maintenance intervention. In some cases, forced disconnection could lead to wider plant shutdowns and disruption to industrial processes. They could be followed by further shutdowns after the system was restored. Some respondents wanted assurance from DNOs that essential infrastructure sites would not be affected.</p> <p>Respondents wanted clarity over the reconnection process, and suggested that, where restarting plants would require a site visit, this would be more difficult now due to the COVID-19 restrictions.</p>
Risk to network stability	<p>There were concerns at the impact to network stability if certain generators that provide services such as inertia and voltage control were disconnected.</p>

What has been done to address concerns?

Action	Progress
Work with DNOs on communication that can be published to improve transparency	Joint guidance agreed and published*
Letter to be published from the ESO on their position on GC0143	Published*
Review all responses ahead of raising a modification for the enduring solution involving all stakeholders in its development	Report required by Ofgem – completed and published*
Establish new ODFM service to provide commercial alternative to disconnection	In place
Repeat consultation to comply with EBGL A18 requirements	1 month consultation started 21 May
Develop enduring solution following normal governance including engagement and consultation	Needs to be in place by Spring 2021; aim to raise at June/July Grid Code Review Panel

*Documents published under the 'decision' tab on the [GC0143 web page](#)

Optional Downwards Flexibility Management (ODFM)

- The ESO balances balance generation and demand in real time.
- To allow us to do this we need to hold enough reserve to turn generation up or down to meet demand second by second.
- When demand is low, we would expect embedded generation to be running along with nuclear, any transmission connected renewable generation, interconnectors and some conventional generation running at minimum stable export limit (SEL).
- With this profile, there may be a requirement for additional flexibility to balance generation and demand, as well as to achieve sufficient negative reserve and high frequency response.
- ODFM is a new optional service for non-BM parties to allow the ESO to access the flexibility that is not currently accessible in real time.

<https://data.nationalgrideso.com/ancillary-services/optional-downward-flexibility-management-odfm1>

Use of Emergency Instructions and ODFM in May 2020

Use of Emergency Instructions:

None – EIs are a last resort to be used only when all commercial alternatives are exhausted

Use of ODFM:

Sunday 10 May

- Demand of 15.5GW, 238MW used for 3 hours

Saturday 23 May

- Demand of 14.8GW over 1B period (1GW of ODFM used)
- Demand of 16.7MW over 3B period (1938MW of ODFM used)

Sunday 24 May

- 1B demand of 14.5GW (800MW of ODFM used)
- 3B demand of 17GW (no ODFM used)

Monday 25 May

- 1B demand of 16.8GW (no ODFM used)
- 3B demand of 16.45GW (1020MW of ODFM used)

1B – night/early morning minimum
(i.e. low demand but no solar)
3B – afternoon minimum
(slightly higher demand but with solar)

Joint ESO/DNO Guidance - High Level Principles

The following high-level principles will be adhered to where possible and practical. However, it is also recognised that in a developing situation there may be circumstances that prevent either NGESO and/or DNOs from doing this. As experience of this and NGESO's requirements develop, the means of implementing an EI will evolve.

NGESO will observe the following conditions:

An NRAPM will be issued at the earliest opportunity and prior to requesting EI

The NRAPM will detail total volume shortfall of downward regulation, applicable time period(s) and time of next review

Total volume of emergency instruction requested across GB will typically be in blocks of 500-700MW over a 30min period

Emergency instruction of embedded generation will be:

Equal across all DNO license areas

The aggregate registered capacity of the embedded generation associated with an EI will be the same for all DNO license areas

Likely to cover a whole DNO license area

The aggregate registered capacity of the embedded generation associated with an EI will be requested at a DNO GSP or GSP group level

Requested in 50MW blocks

The aggregate registered capacity of the embedded generation will be in 50MW blocks per GSP, GSP group or DNO license area

Unlikely to exceed 50% of the combined forecast of embedded wind and PV

The volume of EI requested per DNO license area is unlikely to exceed 50% of the combined forecast of embedded wind and PV within that area

Implemented by DNOs in pre-prepared blocks within 5 to 30 min

Emergency Instructions should be implemented 'without delay' and using reasonable endeavours. Where a pre-prepared switching schedule is used this should take between 5 and 30 min. Implementation of a more specific emergency instructions via a bespoke switching routine could take longer but will still be on a best endeavours basis

Implemented by DNOs in such a way as to deliver a reduction in export, as a consequence of disconnection, as close to 50MW per block as is practicable (ideally between 80 and 100%)

Where practicable and recognising the real-time challenges of this since EIs are for disconnection of registered capacity and need to be implemented 'without delay', the reduction in export as a consequence of disconnection should be as close to 50MW per block as is practicable (ideally between 80 and 100%), preferably with reference to actual output where this can be established in reasonable timescales

Joint ESO/DNO Guidance - Priorities for maintaining connection

The priority for maintaining connection to the network must consider whole system impact. These specific priorities will be kept under review in line with, for example, expectations for the season ahead. Priorities should reflect the general and specific information available to DNOs at the time with the aim of meeting the following objectives:

- 1) Maximising value to the total system and local networks by reducing the requirement for other balancing actions; and
- 2) Minimising plant, environmental or system impact on the local network and/or provider

The following guidance has been developed between NGESO and DNOs, taking into account system conditions this summer:

The order that embedded generation is disconnected will be at the discretion of the DNO

Under Grid Code BC2.9.3.3 (f) (i) NGESO may requested disconnection of a specific embedded generator

This will take into account, where practicable, the effectiveness of the disconnection to address the issues trying to be resolved, wider system issues and the potential consequences for the embedded generators

It will be broadly in line with the following:

ORDER	CATEGORY OF GENERATION	COMMENT
1	Non-synchronous generation	In order to maintain system inertia. The export from these technology types could be weather dependent. Although the instruction would be to disconnect 'registered capacity', it is still expected that this will deliver actual MW output change of between 80% and 100% of requested volume
2	Synchronous generators without any associated demand	Lower down the list due to the need to maintain system inertia wherever possible
3	Synchronous generators with associated demand	For example, CHP installation waste management facilities, other industrial facilities with substantial on-site demand
4	Critical DG support of COVID and CNI sites	

The reconnection of embedded generation will be:

Not completed until notified by NGESO

Delivered by a 'consent to reconnect' by NGESO, to be completed as soon as reasonably practicable

Recognising that the process to reconnect embedded generation may not be straightforward, NGESO will issue a consent to reconnect, and expect this to happen as soon as practicable

Areas to Address in Enduring Solution

- Symmetry with demand control instructions and protocols in section OC6 of the Grid Code
- System warnings as covered under section OC7.4 of the Grid Code
- Compensation arrangements – not covered under the Grid Code but need to be considered. Also whether Article 13 paragraph 7 of the Clean Energy Package applies.

NB This requires that “where non-market based redispatching is used, it shall be subject to financial compensation by the system operator requesting the redispatching....except in the case of producers that have accepted a connection agreement under which there is no guarantee of firm delivery of energy”.

- Definition of last resort. There is a balance on this and implementation in that in an emergency and as a last resort the ESO and DNOs need to maintain some flexibility to avoid worse disruption for consumers.
- How an instruction will be implemented. Including:
 - Order of priority
 - Considerations around damage to equipment/environmental impact
 - Restoration process
- Reporting post-event

Timeline for Development of Enduring Solution

Milestone	Date
Raise modification at Grid Code Review Panel	25 June 2020
Workgroup nominations sought	July 2020
Workgroup meetings x 3	Aug – Sept 2020
Workgroup consultation (normally 15 working days)	Oct 2020
Workgroup report presented to panel	Nov 2020
Code Administrator consultation (1 month)	Dec 2020
Draft final modification report presented to panel	Jan 2021
Submission of final modification report to Ofgem	Feb 2021
Ofgem decision (25 working day KPI)	March 2021
Implementation	+ 10 days

Code Administrator General Updates



Dates for your diary

	June	July	August	September
GCDF Submission Date	22/05/2020	29/06/2020	27/07/2020	21/08/2020
GCDF Papers Day	27/05/2020	01/07/2020	29/07/2020	25/08/2020
GCDF	03/06/2020	08/07/2020	05/08/2020	02/09/2020
New Modification Proposal Submission Date	10/06/2020	15/07/2020	12/08/2020	09/09/2020
GCRP Papers Day	17/06/2020	22/07/2020	19/08/2020	16/09/2020
Grid Code Review Panel	25/06/2020	30/07/2020	27/08/2020	24/09/2020

Any Other Business (AOB)



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