

Modification proposal:	Grid Code GC0147: Last Resort Disconnection of Embedded Generation – enduring solution		
Decision:	The Authority ¹ directs ² that the proposed modification to the Grid Code be made		
Target audience:	National Grid Electricity System Operator (NGESO), the Grid Code Review Panel, Grid Code users and other interested parties		
Date of publication:	14 May 2021	Implementation date:	17 May 2021

Background

During 2020 the electricity system experienced new challenges in balancing supply and demand with significantly reduced customer demand. This was due to the measures announced by the government in 2020 to attempt to flatten the curve of infection arising from the ongoing outbreak of COVID-19. The Electricity System Operator (ESO) has a range of commercial tools available to deal with these challenges, and is developing further tools specific to managing the transmission system through periods of extremely low demand³. However, in the unlikely event that these commercial tools fall short of what is required, the ESO can call on emergency action as a last resort to protect the integrity of the system.

GC0143, which we approved on 7 May 2020⁴, clarified the existing emergency instructions the ESO could issue to Distribution Network Operators (DNOs) to disconnect plant, and when such emergency instructions could be issued. GC0143 was a temporary solution in response to an urgent system need, and remained in effect until 25 October 2020. As part of our decision, we required the ESO to:

- Consider how the modification interacts with Article 13 paragraph 7 of Regulation (EU) 2019/943⁵ (the Clean Energy Package).
- Bring forward a further Grid Code modification to develop an enduring solution informed by the responses from GC0143 Code Administrator Consultation. These centred around compensation to generators, and transparency in determining which generation should be disconnected taking into account cost, safety and environmental concerns.
- Review the current commercial tools available for managing low levels of system demand and work with industry to develop a market-based enduring solution.

¹ References to the “Authority”, “Ofgem”, “we” and “our” are used interchangeably in this document. The Authority refers to GEMA, the Gas and Electricity Markets Authority. The Office of Gas and Electricity Markets (Ofgem) supports GEMA in its day to day work. This decision is made by or on behalf of GEMA.

² This document is notice of the reasons for this decision as required by section 49A of the Electricity Act 1989.

³ For example, Optional Downward Flexibility Management, an opt-in service for small scale renewable generators to reduce or cease generating electricity upon instruction of the ESO. It was introduced by the ESO in 2020 as a temporary solution to aid managing the system with low demand and inertia.

⁴ Our decision on GC0143 can be found on our website;

https://www.ofgem.gov.uk/system/files/docs/2020/05/gc143_d.pdf

⁵ Regulation (EU) 2019/943 can be viewed online;

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0943&from=EN>

We note that although GC0143 was progressed with urgency, no such emergency instructions were issued following its implementation as the ESO was able to put in place commercial arrangements to mitigate the need for embedded generation disconnection

The modification proposal

GC0147 was raised by National Grid Electricity System Operator on 15 July 2020. It seeks to implement an enduring emergency solution to clarify when and how the ESO can instruct DNOs to disconnect plant, and the actions the DNOs must take upon receipt of such instructions. In doing so, GC0147 seeks to address our concerns regarding the temporary solution implemented via GC0143.

The Grid Code currently allows the ESO to issue emergency instructions to instruct DNOs to “disconnect an item of Plant or Apparatus”, as per Balancing Code No.2 paragraph BC2.9.3.3(e). The Grid Code arrangements for such emergency action were considered ambiguous by DNOs.

The GC0147 original proposal proposes to:

- Remove the temporary changes to the Grid Code made under GC0143
- Introduce a new Grid Code section; Operating Code No.6B “Embedded Generation Control”.

This sets out that the ESO can instruct DNOs to achieve Active Power reduction; (1) from specific embedded generators, (2) in the form of total Active Power reduction, or (3) in the form of proportion of Active Power reduction. Such instructions can only be issued during emergencies after all commercial means or means through the Balancing Mechanism are exhausted and there is still a need to take action for security of supply purposes.

It also sets out that the ESO must issue a series of National Electricity Transmission System Warnings (System Warnings) to alert Users of instances where it considers: it has insufficient Active Power margin, embedded generation reduction may be required, or embedded generation reduction is imminent.

It also sets out the procedure DNOs must follow in implementing Embedded Generation Control instructions by way of a general order in selecting embedded generators to achieve the required Active Power reduction based on maximising the effectiveness of the action. It also requires DNOs to consider local requirements, environmental and safety concerns and interactions with other network considerations, when determining the order in which embedded generators are controlled.

- Amend Grid Code Operating Code No.7 “Operational Liaison” to include the new System Warnings.
- Add the definitions of new terms such as “Embedded Generation Control” and the new System Warnings to the Grid Code.
- Amend Grid Code Balancing Code No.2 “Post Gate Closure Process” to give rise to the arrangements as summarised above.

The GC0147 workgroup convened eight times to discuss the issue and consider the proposed solution. Seven Workgroup Alternative Grid Code Modifications (WAGCMs) were also raised and discussed, which can be summarised as:

- Financial compensation: WAGCM 1 and 2 raised by the ESO, and WAGCM 3 raised by SSE follows the original proposal and adds a requirement for embedded generators subject to emergency disconnection to be financially compensated. WAGCM 1 requires compensation as per arrangements in the Connection and Use of System Code (CUSC) and the Distribution Connection and Use of System Agreement (DCUSA). WAGCM 2 requires the compensation arrangement to be referred back to the Grid Code Panel should there be more than one event in any 12 month period. WAGCM 3 requires compensation as detailed in Article 13 of the Clean Energy Package.
- Development of a market mechanism: WAGCM 4 to 7 adds an obligation for the ESO to develop a market mechanism if the solution is to be implemented. WAGCM 4 follows the original proposal, WAGCM 5 follows WAGCM 1, WAGCM 6 follows WAGCM 2 and WAGCM 7 follows WAGCM 3.

Grid Code Review Panel recommendation

At the Grid Code Review Panel meeting on 25 March 2021, the Panel voted on their preferred solution. The Panel, by split majority, recommended that WAGCM 2 or WAGCM 7 be implemented, and were broadly consistent in their consideration that the solution(s) better facilitated Grid Code Objective (iii).

Our decision

We have considered the issues raised by the modification proposal and in the Final Modification Report dated 6 April 2021. We have considered and taken into account the responses to the industry consultation on the modification proposal which are included in the Final Report⁶. We have concluded that:

- implementation of the modification proposal (original proposal) will better facilitate the achievement of the objectives of the Grid Code;⁷ and
- approving the modification (original proposal) is consistent with our principal objective and statutory duties.⁸

Reasons for our decision

We note that the Grid Code Review Panel were split in their recommendation that WAGCM 2 or WAGCM 7 be implemented. We further note that there were a number of concerns highlighted within the GC0147 Workgroup, Workgroup consultation and Code Administrator consultation. The majority of the concerns have been addressed within the modification proposals (original proposal and WAGCM 1 to 7). The concerns can be broadly summarised into five categories. Our views on these are listed below.

⁶ Grid Code proposals, final reports and representations can be viewed on NGESO's website at: <https://www.nationalgrideso.com/industry-information/codes/grid-code/modifications>

⁷ As set out in Standard Condition C14(1)(b) of the Electricity Transmission Licence, available at: <https://epr.ofgem.gov.uk/>

⁸ The Authority's statutory duties are wider than matters which the Grid Code Panel Review must take into consideration and are detailed mainly in the Electricity Act 1989 as amended.

1. Compensation

We consider that the purpose of GC0147 is to clarify the existing emergency instructions the ESO could issue to DNOs to disconnect plant under the Grid Code. This is an option of last resort to ensure the integrity of the transmission system and can only be used once all commercial means are exhausted. We consider that compensation arrangements are outwith the scope of the Grid Code, and that they should be discussed and implemented by the CUSC and DCUSA Panels rather than in the Grid Code, in line with the functions of the respective codes. We therefore consider that the original proposal will better facilitate the Grid Code objectives when compared to the WAGCMs.

The Clean Energy Package

A number of consultation respondents and workgroup members considered Article 13 paragraph 7 of the Clean Energy Package requires the ESO to financially compensate embedded generators where non-market based redispatching is used. WAGCM 3 and WAGCM 7 include the requirement for the ESO to pay compensation for Embedded Generation Control as per Article 13 of the Clean Energy Package.

The ESO responded that the emergency instructions are meant to act as a 'last resort' and not as a commercial mechanism, to be issued solely during emergencies and after all commercial means or means through the Balancing Mechanism are exhausted. They further responded that compensation as per Article 13 paragraph 7 of the Clean Energy Package does not apply to generators with a connection agreement under which there is no guarantee of firm delivery of energy. They noted that by default, embedded generators do not have firm access rights to the transmission system and do not receive compensation for instances where the DNO is required to disconnect the generation for any number of reasons in order to comply with their licence requirements. All embedded generators can participate in the Balancing Mechanism which would give them firm access rights to the transmission system⁹. The ESO compensate generation participating in the Balancing Mechanism for actions outside of the Balancing Mechanism (eg. constraints or emergency instructions).

We consider that any compensation as per Article 13 of the Clean Energy Package, if engaged, will apply regardless of whether the Grid Code makes such provision. Therefore, we do not consider that WAGCM 3 and WAGCM 7 provide clarity in relation to compensation.

The DCUSA and CUSC

WAGCM 1 and WAGCM 4 include the requirement for the relevant provisions of the DCUSA and CUSC relating to compensation of embedded generators subject to Embedded Generation Control to apply.

We note that the DCUSA and CUSC currently have no relevant provisions for Embedded Generation Control. We consider that any applicable compensation as per the DCUSA and CUSC will apply regardless of the Grid Code requirements in relation to compensation.

⁹ Generators with capacity of 1MW or more can participate in the Balancing Mechanism directly. Generators with capacity of less than 1MW can only participate in the Balancing Mechanism via aggregators.

Therefore, we do not consider WAGCM 1 and WAGCM 4 to provide clarity in relation to compensation.

WAGCM 2 and WAGCM 6

Both WAGCM 2 and WAGCM 6 include the requirement for the ESO to refer to the Grid Code Review Panel to decide on whether compensation arrangements need to be progressed if Embedded Generation Control is instructed in relation to more than one event in any 12 month period.

We note that the ESO referring the issue of compensation to the Grid Code Review Panel will not necessarily lead to the progression of compensation arrangements. We consider that this does not prevent any further proposals regarding compensation from being raised. Therefore, we do not consider WAGCM 2 and WAGCM 6 to provide clarity in relation to compensation.

2. Commercial tools

A number of workgroup members and consultation respondents considered that a market mechanism (e.g. the Optional Downward Flexibility Management (ODFM) service¹⁰) must be in place to reduce the risk of emergency Embedded Generation Control instructions being issued. Many considered such a market mechanism should be in place prior to implementing GC0147. WAGCMs 4 to 7 all require the ESO to agree (with industry) and put in place an appropriate commercial mechanism prior to implementing Embedded Generation Control.

We note the ESO's response to such concerns highlighting that GC0147 aims to clarify existing Grid Code provisions, and that the emergency Embedded Generation Control is required for security of supply purposes. The ESO is also committed to developing all necessary market mechanisms. We also note the ESO's view that a long-term commercial solution is likely to involve wider access to the Balancing Mechanism for smaller users. Further, the ESO has put in place a new ODFM service to cover credible worst case scenarios in 2021 where ODFM would be required.

We consider that the emergency provisions clarified by GC0147 are an engineering requirement to protect the system. We consider it inappropriate to prevent the ESO from taking such emergency actions until such time as a commercial alternative is implemented. We also consider that there are sufficient licence obligations on the ESO requiring them to have in place appropriate commercial arrangements to manage the system in line with their forecasts, the renewed ODFM service being an example of this. Therefore, we do not consider WAGCMs 4 to 7 better facilitate the Grid Code objectives when compared to the original proposal.

We note that it has been made explicit in the legal text that the ESO's ability to exercise this option is only as a last resort in an emergency situation, after having exhausted all other commercially available options.

¹⁰ Optional Downward Flexibility Management is an opt-in service for small scale renewable generators to reduce or cease generating electricity upon instruction of the ESO. It was introduced by the ESO in 2020 as a temporary solution to aid managing the system with low demand and inertia.

3. Notice Periods for DNOs and Generators

Workgroup members noted that giving DNOs and Generators as much notice as possible would allow for better adherence to guidelines. We note that GC0147 includes requirements regarding the issuing of System Warnings by the ESO and that these will be issued on a reasonable endeavours basis. We consider that such System Warnings are appropriate, noting the ESO expects circa. 30 minute warnings but cannot guarantee this, reflecting the emergency nature of the instruction.

4. Generator priority order

A number of workgroup members and consultation respondents noted concern over how Active Power reduction would be enacted by DNOs and the consequence of this for different types of generation. We note the ESO's response to such concerns highlighting that GC0147 requires DNOs to consider local requirements, environmental and safety concerns and interactions with other network considerations, when determining the order in which embedded generators are controlled. We consider the procedures the DNOs are required to follow are sufficient. We expect DNOs to engage with their generator stakeholders and put in place suitable arrangements for safe and secure implementation of any emergency instructions from the ESO.

5. Independent post-event reporting

A number of consultation respondents noted that should emergency Embedded Generation Controls be triggered, an independent review should be conducted to assess the appropriateness of actions taken. We expect that significant events of the system would be reviewed independently, including by us. We further note that should it be deemed that the ESO did not take appropriate actions (e.g. did not exhaust all commercial means available to them, or commercial means were inadequately designed or forecast for), we may choose to take forward enforcement action. We require the ESO to notify us should they issue any Embedded Generation Controls.

Our views against the Grid Code objectives

We consider the original proposal of GC0147 better facilitates Grid Code objectives (i), (iii) and (v), and has a neutral impact on the other objectives. Our views against each relevant Grid Code objective are listed below.

(i) to permit the development, maintenance and operation of an efficient, co-ordinated and economical system for the transmission of electricity

The principal aim of GC0147 is to clarify the Grid Code provisions to support security of supply and system operation in emergency situations as discussed in earlier sections, assisting system co-ordination. We therefore consider that the original proposal will have a positive impact against this objective.

We consider that WAGCMs 1, 2, 3, 5 and 7 do not better facilitate this objective when compared to the original proposal. This is because we consider that compensation

arrangements (as per the Clean Energy Package, CUSC and DCUSA) will be applicable regardless of the Grid Code text. Further, as mentioned earlier, it's not clear that the Clean Energy Package requires compensation for all embedded generators, and there are currently no applicable compensation arrangements relating to Embedded Generation Control in the CUSC and DCUSA. We therefore consider that the proposals do not add clarity with respect to compensation.

We consider that WAGCMs 4, 5, 6 and 7 do not better facilitate this objective when compared to the original proposal. This is because in requiring the ESO to put in place an alternative commercial mechanism prior to implementing Embedded Generation Control, they delay facilitating the principal aim of GC0147.

(ii) to facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity)

We note that a number of stakeholders considered that GC0147 may have a negative impact on competition in the generation of electricity, most notably between distribution and transmission connected generators. We acknowledge these concerns, however we note that GC0147 clarifies an existing power of instruction to be used only in an emergency situation. We consider that any possible negative impact on competition is mitigated by the limits to the extent of when and under what circumstances this instruction may be used. We note that to the best of our knowledge, the ESO has never issued emergency instructions for DNOs to disconnect embedded generation in this manner. This, we consider, outweighs any negative impacts on competition and is justified by the benefit of ensuring security of supply (under Grid Code objective (iii)).

Given the above we consider the issue is limited and that the original proposal and WAGCMs 1 to 7 have a neutral impact against this objective.

(iii) subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole

The principal aim of GC0147 is to clarify the Grid Code provisions to support security of supply and system operation in emergency situations as discussed in earlier sections. We consider this to be vital in protecting system integrity as a last resort in emergency situations. We therefore consider that the original proposal will have a positive impact against this objective.

We consider that WAGCMs 1, 2, 3, 5 and 7 do not better facilitate this objective when compared to the original proposal. This is because we consider that compensation arrangements (as per the Clean Energy Package, CUSC and DCUSA) will be applicable regardless of the Grid Code text. Further, as mentioned earlier, it's not clear that the Clean Energy Package requires compensation for all embedded generators, and there are currently no applicable compensation arrangements relating to Embedded Generation

Control in the CUSC and DCUSA. We therefore consider that the proposals do not add clarity with respect to compensation.

We consider that WAGCMs 4, 5, 6 and 7 do not better facilitate this objective when compared to the original proposal. This is because in requiring the ESO to put in place an alternative commercial mechanism prior to implementing Embedded Generation Control, they delay facilitating the principal aim of GC0147.

(iv) to efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency.

We note that one stakeholder expressed concerns on a potential conflict between GC0147 and some elements of the "System Defence Plan" established by the ESO in accordance with Regulation (EU) 2017/219610 (NCER Regulation, which was adopted on the basis of the Electricity Regulation). We believe that this decision is consistent with the NCER regulation and consequentially with the Electricity Regulation. We further note that currently Ofgem has not approved i) the list of Significant Grid Users (SGUs) or ii) the list of measures that the SGUs need to comply with, in accordance with the NCER Regulation. We will take into account our decision on GC0147 when making a decision pursuant to the NCER and engage with the ESO.

Given the above we consider that the original proposal has a neutral impact against this objective.

We consider that WAGCMs 1, 2, 3, 5 and 7 do not better facilitate this objective when compared to the original proposal. This is because we consider that compensation arrangements (as per the Clean Energy Package, CUSC and DCUSA) will be applicable regardless of the Grid Code text. Further, as mentioned earlier, it's not clear that the Clean Energy Package requires compensation for all embedded generators, and there are currently no applicable compensation arrangements relating to Embedded Generation Control in the CUSC and DCUSA. We therefore consider that the proposals do not add clarity with respect to compensation. Further, they place a potential obligation on the ESO to compensate embedded generators with whom they have no contractual arrangements in place.

We consider that WAGCMs 4, 5, 6 and 7 do not better facilitate this objective when compared to the original proposal. This is because in requiring the ESO to put in place an alternative commercial mechanism prior to implementing Embedded Generation Control, they delay facilitating the principal aim of GC0147. We note this may conflict with the ESO's licence conditions where such a commercial mechanism is not deemed economic or efficient.

(v) to promote efficiency in the implementation and administration of the Grid Code arrangements

GC0147 provides clarity and further detail on the ESO's emergency instructions to the DNOs for plant disconnection, which promotes efficiency in the implementation of Grid

Code arrangements. We therefore consider that the original proposal will have a positive impact against this objective.

We consider that WAGCMs 1, 2, 3, 5 and 7 do not better facilitate this objective when compared to the original proposal. This is because we consider that compensation arrangements (as per the Clean Energy Package, CUSC and DCUSA) will be applicable regardless of the Grid Code text. Further, as mentioned earlier, it's not clear that the Clean Energy Package requires compensation for all embedded generators, and there are currently no applicable compensation arrangements relating to Embedded Generation Control in the CUSC and DCUSA. We therefore consider that the proposals do not add clarity with respect to compensation.

We consider that WAGCMs 4, 5, 6 and 7 do not better facilitate this objective when compared to the original proposal. This is because in requiring the ESO to put in place an alternative commercial mechanism prior to implementing Embedded Generation Control, they delay facilitating the principal aim of GC0147.

Decision notice

In accordance with Standard Condition C14 of the Transmission Licence, the Authority hereby directs that the original proposal of Grid Code modification proposal Grid Code GC0147 'Last Resort Disconnection of Embedded Generation – enduring solution' be made.

We note that the proposed Operating Code No.6B does not cross-reference OC6.B.3 'scope' to OC6B.5 'priorities for implementation of embedded generation control instructions'. We consider that such a cross-reference would clarify that embedded generation control is expected to be implemented in line with OC6B.5 'priorities for implementation of embedded generation control instructions'. Specifically, we suggest amending OC6B3.2.2 to "In any case, reasonable endeavours shall be employed by the Network Operator to ensure that the reduction in Active Power output specified in the instruction is achieved, considering also the principles relating to prioritisation set out in OC6B.5.1...". We expect the Grid Code Review Panel to consider making this suggested change in the proposed GC147 legal text by way of a housekeeping self-governance modification.

Martin Queen

Principal Engineer, Analysis and Assurance

Signed on behalf of the Authority and authorised for that purpose