

Grid Code Modification Proposal Form

GC0151:

Grid Code Compliance with Fault Ride Through Requirements

A letter issued by the ESO on 7th May 2021 and a presentation to be made to the 24th June 2021 GCRP have identified concerns about demonstrating compliance with the Fault Ride Through Requirements in the Grid Code. This proposal seeks to apply a workable, non-discriminatory, legally compliant solution based on Good Industry Practice to address this significant operational concern in an expedited manner.

Modification process & timetable



Status summary: The Proposer has raised a modification and is seeking a decision from the Panel on the governance route to be taken.

This modification is expected to have a: High impact

Generators, Transmission System Operators, Interconnectors, Transmission Owners, Distribution Owners

Modification drivers: Efficiency, EU Compliance, GB Compliance, Harmonisation, System Operability, System Security, Transparency

Proposer's recommendation of governance route	Urgent modification to proceed under a timetable agreed by the Authority (with an Authority decision)	
Who can I talk to about the change?	Proposer: Garth Graham garth.graham@sse.com 01738 456000	Code Administrator Contact: Nisar Ahmed Nisar.ahmed@nationalgrideso.com 07773 043068

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What is the issue?

The ESO's Head of Networks wrote to stakeholders on 7th May 2021 about "Grid Code Compliance with Fault Ride Through Requirements".

Fault Ride Through (FRT) is defined in the Grid Code as:

"The capability of Power Generating Modules (including DC Connected Power Park Modules) and HVDC Systems to be able to remain connected to the System and operate through periods of low voltage at the Grid Entry Point or User System Entry Point caused by secured faults."

In that letter it set out three actions and; in the Appendix to that letter; an interim process that the ESO was proposing be applied by them on Users and Network Operators.

Subsequently, following as we understand meetings on 10th June 2021 with stakeholders (Energy UK in the morning and the wind community in the afternoon) the ESO issued on 16th June 2021 (as part of the papers for the 24th June 2021 GCRP meeting) a short presentation which *seems* to set out amendments to the (7th May) interim process that the ESO was proposing be applied by them on Users and Network Operators.

These steps by the ESO have, inadvertently, given rise to concerns, by stakeholders, that if they were to follow this uncoded 'voluntary'¹ ESO interim process this would:

- 1) Be placing Users (and in particular Generators) in breach of a relevant **legal requirement**;
- 2) Have a significant **commercial impact** on Users and consumers;
- 3) Have a significant impact on the safety and **security of the electricity system**;
- 4) Apply an **unreasonable timing** obligation on some stakeholders;
- 5) Apply a **discriminatory process** to some stakeholders; and
- 6) Not ensure and **enhance transparency** of the FRT situation in GB.

Therefore, a codified process is required to ensure legal compliance and certainty whilst maintaining security of supply and minimising the significant commercial impact on stakeholders as well as providing a reasonably timed, non-discriminatory process and enhanced transparency for stakeholders.

1) Legal Compliance

It is highly relevant, when considering the ESO's proposed interim process, to note that generators that voluntarily reduce their MEL to zero² (or to an undefined 'safe³ level'⁴) whilst investigating the root cause of any FRT related issue would be at risk of being deemed to have physically withheld generation capacity, potentially in breach of the REMIT⁵ Article (5) prohibition of market manipulation.

¹ The ESO's 7th May 2021 letter and the 24th June 2021 GCRP presentation strongly infers that the ESO expects and requires Users (and Network Operators) to comply with the ESO's proposed interim process. This infers a 'voluntary' in name only approach for stakeholders – you are *damned if you do* (to suffer legal compliance and commercial impacts) and *damned if you don't* (to be vilified by the ESO - and possibly BEIS and Ofgem? - for not having followed the interim process).

² As noted in the 24th June 2021 GCRP presentation and elaborated in items 3 and 4 of Appendix 1 in the 7th May 2021 ESO letter [3] "*If this cannot be confirmed, the relevant Generator, HVDC System and Network asset(s) should remain out of operation.*" [emphasis added] [4] "*If there is a potential compliance issue, the ESO expectation is that the Generator, HVDC System, Network asset(s) should remain out of operation until a resolution is in place.*" [emphasis added]

³ It is not clear here to what the ESO is referring: 'safe' for the system only? 'safe' for the User(s) only? 'safe' for both the system and the User(s)?

⁴ As per the first bullet point on slide 3 of the ESO's June GCRP presentation "*Users are asked to restrict their output until a FRT issue is ruled out (either MEL to zero or to a safe level)*" [emphasis added]

⁵ Further details on REMIT can be found on the Ofgem website at: https://www.ofgem.gov.uk/energy-policy-and-regulation/policy-and-regulatory-programmes/remit-and-wholesale-market-integrity?sort=publication_date

This risk would be higher in scenarios where, during the period of reduced output, the system experiences a period of very tight generation margins.

1.1) ACER Guidance

When considering compliance with REMIT Article (5), it is necessary to take into account the 20th November 2020 (5th edition) version of ACER's guidance⁶ on REMIT and in particular section 6.4.1 ('*Examples of the various types of practice which could constitute market manipulation*') of which item (i) is directly relevant to the ESO's proposed approach with respect to the FRT interim process, namely:

- i) "Actions undertaken by persons that artificially cause prices to be at a level not justified by market forces of supply and demand (including actual availability of production, storage or transportation capacity)"

Manipulative capacity withholding occurs, for example, when a market participant with the relative ability to influence the price or the interplay of supply and demand of a wholesale energy product, decides, without justification, not to offer or to economically withhold the available production, storage or transportation capacity on the market. This includes the unduly limiting of infrastructure or transmission capacities, resulting in prices that likely do not reflect the fair and competitive interplay of supply and demand.

In particular, electricity generation capacity withholding refers to the practice of keeping available generation capacity from being competitively offered on the wholesale electricity market, even though offering it competitively would lead to profitable transactions at the prevailing market prices. Electricity generation capacity withholding can occur in two ways, namely via economic withholding³² [footnote 32: Actions undertaken to offer available generation capacity at prices which are above the market price and do not reflect the marginal cost (including opportunity cost) of the market participant's asset, which results in the related wholesale energy product not being traded or related asset not being dispatched] or physical withholding³³ [footnote 33: Actions undertaken in the form of not offering the available generation capacity at any price.]. Electricity generation capacity withholding may be performed by one or more market participants³⁴, acting independently or in collaboration. REMIT applies to electricity generation capacity withholding irrespective of whether competition law (also) applies. Electricity generation capacity withholding does not automatically amount to a breach of Article 5 of REMIT. A case-by-case analysis that takes into account the circumstances and specificities of the market³⁵ is therefore needed. REMIT does not prohibit prices to be high, provided that they reflect a fair and competitive interplay between supply and demand.

The following approach, based on two concurrent elements, can assess whether a behaviour involving electricity generation capacity withholding amounts to a breach of Article 5 of REMIT in view of the market manipulation criteria as defined in Article 2(2) of REMIT³⁶. The first element to assess is whether the market participant concerned is able, in the case specific circumstances, to influence the price or the interplay of supply and demand of a wholesale energy product by engaging in such behaviour³⁷. The second element to assess is whether

⁶ <https://extranet.acer.europa.eu/en/remit/Documents/5th-Edition-ACER-Guidance-updated.pdf>

⁷ Footnote 34 "For example, producer or storage asset owners."

⁸ Footnote 35 "For example, there are different timeframes and types of market places to be taken into account."

⁹ Footnote 36 "E.g., and not limited to, setting prices at an artificial level"

¹⁰ Footnote 37 "For example, but not limited to, being a 'pivotal supplier' i.e., a power supplier whose capacity must be used to meet peak demand and whose capacity exceeds the market's supply margin."

the market participant has no legitimate technical, regulatory³⁸¹¹ and/or economic³⁹¹², justification for its behaviour when it does not offer its available generation capacity or has offered it above marginal cost.⁴⁰¹³ In case of intent, any action involving capacity withholding, even beyond the issuing of orders to trade or the entering into transactions, can amount to an attempt to manipulate the market.” [emphasis added]

1.2) Conclusion on Legal Compliance

For the reasons set out above, and in order to give legal certainty as regards compliance with the REMIT Article 5 obligations, it is necessary to proceed with a code modification to ensure that generators are able to both follow a process set out in regulation in the circumstances described by the ESO and also be certain as to what a ‘safe level’ is.

2) Significant commercial impact on Users and consumers

If Users were to follow the ESO’s proposed interim process, it is not clear, following the 24th June 2021 GCRP update, as to whether they should go to zero output (as per the 7th May letter which stipulates a generator ‘remaining out of operation’ in item 3¹⁴ and item 4¹⁵ of Appendix 1) or a ‘safe level’ (as per 24th June 2021 GCRP update).

However, if they were to go to, and maintain, till the situation is resolved to the ESO’s satisfaction (as per Appendix 1 item 3 and item 4), a zero-output level this would amount to a significant commercial impact on Users.

This also needs to be considered in the context of the User being effectively treated, according to the ESO’s interim process, as being ‘guilty until proven innocent’, even though (i) they will, in the case of a FON, have proven to the ESO’s satisfaction Grid Code Compliance and (ii) in the case of a fault where there is an over-voltage situation the generator may actually be *required* to trip off according to Grid Code requirement CC¹⁶.6.3.15.3. – so rather than being non-compliant if they tripped off, they would actually be non-compliant if they did not trip off (in that situation).

Absent (a) the necessary technical information from the ESO as to what occurred on the NETS, and, (b) time to investigate the root cause; it will be difficult for the User to determine, within two hours, that non-compliance with the Grid Code has arisen and thus avoid going to zero output or an undefined ‘safe level’ with the associated significant commercial impact.

Notwithstanding the above, if Users (be that one or more generators or one or more interconnectors) or Network Operator(s) were to hold their plant and apparatus (including network assets) to zero output or a ‘safe level’ this could, particularly at times of market tightness (such as a winter peak or, as with the Bank Holidays in spring 2020, summer troughs), lead to additional, higher cost and actions needing to be taken by the ESO to maintain system balance.

This in turn could lead to a significant commercial impact on Suppliers and, over time, to higher costs for end consumers.

¹¹ Footnote 38 “For instance, in situation of force majeure or localised transmission constraints. The validity of reasons for unavailability of a power plant could be assessed against the ‘would be’ behaviour of a competitive market participant.”

¹² Footnote 39 “I.e. opportunity costs. Opportunity costs represent the expected value of the most valuable choice that was not taken. In wholesale electricity markets, this can, for example, represent producing at a different point in time for energy-limited generation assets, e.g. reservoir hydropower units, or producing in a different sequential market for capacity-limited generation assets.”

¹³ Footnote 40 “ACER is committed to provide further clarifying guidance with respect to justifications mentioned in Section 6.4.1.(i)”

¹⁴ “If this cannot be confirmed, the relevant Generator, HVDC System and Network asset(s) should remain out of operation.” [emphasis added]

¹⁵ “If there is a potential compliance issue, the ESO expectation is that the Generator, HVDC System, Network asset(s) should remain out of operation until a resolution is in place.” [emphasis added]

¹⁶ And its ECC equivalent.

3) Significant impact on the safety and security of the electricity system

As noted under (2) above, if Users (be that one or more generators or one or more interconnectors) or Network Owners were to hold their plant and apparatus (including network assets) to zero output or a 'safe level' this could, particularly at times of market tightness (such as a winter peak or, as with the Bank Holiday's in spring 2020, summer troughs) lead to shortages of available plant and apparatus (including network assets) necessary to safely and securely operate the NETS. This, in turn, could significantly impact on the safety and security of the electricity system in GB.

4) Unreasonable timing obligation on some stakeholders

Notwithstanding the above, the ESO is proposing, with the interim process, to not provide stakeholders with a realistic timeframe for them to:

- (i) Carry out an initial investigation; and
- (ii) Perform the enduring investigation as, for example, was seen following the 9th August 2019 event in terms of how long Orsted and RWE had to report to ESO in that case, which, it be could argue sets 'Good Industry Practice' in terms of FRT reporting to the ESO.

In our view, in the event of a trip coincident with a system fault, more detail is required from the ESO and then more time is required for the User or Network Operator to investigate the situation with their plant or apparatus (including network assets).

We elaborate further on this in the 'What is the proposed solution' section below.

5) Apply a discriminatory process to some stakeholders

According to the ESO's 7th May 2021 interim process, as detailed in Appendix 1, a number of materially different (and, in our view, discriminatory) approaches are inadvertently proposed to be applied by the ESO where an FRT event occurs.

For example, the opening sentence of Appendix 1 sets out that the:

"ESO expects to follow the below steps to manage the system security risk following an unexpected generation loss/de-load coincided with a normally cleared transmission fault."
[emphasis added]

This is reinforced by the wording on slide 3 of the ESO's presentation to the 24th June 2021 GCRP meeting which states the:

"ESO's expectations of Users"

Notwithstanding the references to HVDC Systems and Network Operators etc., elsewhere in Appendix 1, this suggests that the ESO only actually intend that its interim process be applied to generators and not, for example, to interconnectors or Network Operators.

If so this would, in our view, be discriminatory.

Another example is shown in item 4¹⁷ of Appendix 1 where a User (but not a Network Operator) has to respond to the SIR from the ESO within two hours, whilst the Network Operator “*must respond as soon as reasonably practicable*”.

Depending on the timing of the event be that, for example, on a Friday morning, like the 5th September 2003 event or a Thursday evening or Friday evening like the 28th August 2003 and the 9th August 2019 events¹⁸ could mean that many or few staff are available either on-site or off-site for the User or Network Operator to provide the technical analysis etc., in order to determine the situation with the plant or apparatus (including network assets) and report back accordingly to the ESO.

In the case of the Network Operator, as they only have to respond as soon as reasonably practicable, they will be able to respond, timing wise, differently on, say, a Friday morning (like 5th September 2003) compared to a Friday evening (like 9th August 2019) or over the weekend or a Bank Holiday; whereas a User (such as a generator or interconnector) will not.

As such this, in our view, is discriminatory.

6) Ensure and enhance transparency of the FRT situation in GB

In respect of ensuring transparency of matters pertaining to FRT we are mindful that following the decision by the Authority to approve modification GC0105¹⁹, that the ESO has, to date, yet to issue the Grid Code Review Panel with a report of the ESO’s progress towards reporting of voltage transients as it is required under OC3.4.1(c)²⁰.

In addition to ensuring compliance with existing transparency requirements relating to FRT, we also believe that further enhancements; to the transparency requirements relating to FRT; are now required to be codified within the Grid Code in light of the concerns the ESO has raised in its 7th May 2021 letter and the 24th June 2021 GCRP presentation to ensure that Users, Network Operators, the ESO and Ofgem are fully aware of what is required of them and other parties.

6.1) Safe Limit

In its presentation to the 24th June 2021 GCRP meeting, the ESO has made reference to “*Users are asked to restrict their output until a FRT issue is ruled out (either MEL to zero or to a safe level)*”. [emphasis added]

However, as noted under (1) ‘Legal Compliance’ above, there is no transparency (for Users or Network Operators or Ofgem) of what the ESO is referring to.

Is it, for example, (i) ‘safe’ for the system only; or (ii) ‘safe’ for the User(s) and / or Network Operator(s) only; or (iii) ‘safe’ for the system, the User(s) and / or the Network Operator(s)?

Given this uncertainty, we believe it important for Users, Network Operators, the ESO and Ofgem that there is transparency (in the form of it being set out in the Grid Code, having been approved

¹⁷ “For any SIR request, in line with Grid Code OC10.4.1.4 and STCP 03-1 Section 3.2.9, the User will have 2 hours to respond and Network Operators must respond as soon as reasonably practicable with a preliminary report into the loss of output.”

¹⁸ Further details on the two 2003 incidents can be found in the Ofgem report <https://www.ofgem.gov.uk/ofgem-publications/37681/sectoralinvestigations-36.pdf>

¹⁹ <https://www.nationalgrideso.com/document/169821/download>

²⁰ OC3.4.1 (c): “The Company shall prepare and submit to the Grid Code Review Panel monthly a report titled the System Incidents Report, which shall contain” ... “An outline of progress towards reporting events and associated data on the National Electricity Transmission System including: (i) three phase faults; (ii) three phase to earth faults; phase to phase faults; (iv) phase to earth faults; (v) the associated voltage dips – durations and spreads; over-voltages; (vii) under-voltages; (viii) voltage dips of >50%; and (ix) lightning strikes.”

by Ofgem, via this Modification proposal) of what the 'safe level' is along with when (and when not) it applies.

We elaborate further; in the 'What is the proposed solution' section below; what for the purposes of plant and apparatus (including network assets) could be considered as being a 'safe level' in our view.

6.2) Historic fault information

There is a lack of transparency for stakeholders of the historic fault data in GB and therefore, we propose that the ESO be obliged (in the Grid Code) to provide the industry with historic fault data (i.e. timestamped records of voltage dips at GSPs or key nodes) that would enable Users (and Network Operators) to check for any unexpected changes in station output (or network asset performance) that could signify an apparent FRT compliance issue.

The provision of this data by the ESO and the subsequent checking by the User (or Network Operator) of any unexpected changes in station output (or network asset performance) would provide significant confidence that a User's site (or network asset) was compliant and would be far more meaningful than, for example, a one-off confirmation letter.

Given that this is historical data that already exists and given the importance that the ESO attached to this matter (as witnessed, for example, by the statements in the 7th May 2021 letter itself) we would expect that the ESO would wish to make this historic fault data available to stakeholders with the utmost alacrity (and thus perhaps ahead of the change needing to be codified).

6.3) Real-time post-event data

It has come to our attention that when an FRT event occurs in Ireland that the system operator, EirGrid, provides to stakeholders, within 24 hours, the minimum retained / maximum voltage and duration associated with that event. This is not something that occurs in GB.

In our view, the ESO should be obliged (within the Grid Code) to provide to Users and Network Operators the waveform data (or at least the minimum retained / maximum voltage and duration) following any Fault Ride Through incident on the NETS in a timely manner, as EirGrid does.

This will allow Users and Network Operators to investigate and resolve the fault (if one has occurred on their equipment/asset(s)) and thus, in our view, is the starting point for the timeframe for reporting back to the ESO on matters pertaining to FRT compliance.

We also note that following the introduction of GC0105, the Grid Code now requires the ESO to report to the Panel its progress with reporting voltage transients²⁰.

In respect of items 6.2 and 6.3 above, we are also mindful of the current Ofgem consultation²¹ on the publication of data by Network Operators (including, in this case the ESO) where the emphasis on justification would switch from a presumption of not publishing (unless justified as to why to publish) to a presumption of publication (unless having justified why not).

For the avoidance of doubt, we believe that our proposed approach, in this Modification proposal, as regards data publication by the ESO in respect of both 'Historic fault information' and 'Real time post event data' conforms with the Ofgem's intentions (as set out in its consultation).

²¹ Further details on Ofgem's consultation can be found at: <https://www.ofgem.gov.uk/publications-and-updates/consultation-data-best-practice-guidance-and-digitalisation-strategy-and-action-plan-guidance>

6.4) After event reporting

It is important that lessons learnt from FRT events in terms of the impacts etc., on User or Network Operator plant or apparatus (including network assets) are shared with stakeholders as, for example, happened after the 9th August 2019 event where information on the lessons learnt by the two transmission connected generators was shared with the wider stakeholder community to ensure, collectively as well as individually, that steps were taken to learn from what went 'right' or 'wrong' on the day.

Therefore, in our view, the ESO should be obliged (within the Grid Code) to make available, in a timely manner, to Users and Network Operators any lessons learnt information that is provide to the ESO by any User(s) and / or Network Operator(s) after an FRT event.

6.5) Dynamic Largest infeed loss

There is currently no visibility to Users of the dynamic largest infeed loss that is being applied by the ESO to operate the NETS. Whilst it has been generally set to 1,320MW there are, we understand, periods of time, such as when inertia is low, where the level has dropped to circa 800MW. There is little real time visibility to stakeholders of this.

In our view, as we set out in 'What is the proposed solution' below, and in order to support system security it is appropriate for the ESO to be obliged (in the Grid Code) to provide the industry (via the BMRS?) with the current largest infeed loss level at any moment in time that the ESO is operating the NETS to.

Why change?

As we have set out above in 'What is the issue' there is a need to change the Grid Code with respect to the process followed by Users, Network Operators and the ESO in the event of a Fault Ride Through occurrence where a User's site or Network Operator's asset(s) coincidentally trips/de-loads.

This is to ensure that Users, Network Operators and the ESO have clarity and legal certainty as to the steps/actions etc., they need to take if an FRT event and coincident trip/de-load occurred.

This will:

- 1) Be placing Users (and in particular Generators) in compliance of a relevant **legal requirement**;
- 2) Have minimal **commercial impact** on Users and consumers;
- 3) Have a positive effect on the safety and **security of the electricity system**;
- 4) Apply a **reasonable timing** obligation on all stakeholders;
- 5) Apply a **non-discriminatory process** to all stakeholders; and
- 6) Ensure and **enhance transparency** of the FRT situation in GB.

Therefore, a codified process is required to ensure legal compliance and certainty whilst maintain security of supply and minimising the significant commercial impact on stakeholders as well as providing a reasonably timed, non-discriminatory process and enhancing transparency for stakeholders and that is why this change to the Grid Code should be made.

What is the proposer's solution?

1) Response in the event of an apparent trip/de-load coincident with a system fault

In the event of a User site²² or Network Operator asset trip/de-load *coincident with a system fault*, data is required from the ESO to help the User or Network Operator investigate the problem and time is required for the User or Network Operator to investigate the root cause of the trip/de-load.

Therefore, we propose the following process applies:

1. Where User's site or Network Asset TEC/ asset capability is < 100 MW; no immediate export limitation would be immediately applied but the User or Network Operator would have three months from the date of submission of waveform data by NGESO to investigate and if necessary, resolve the cause of any non-compliance.
2. Where Users' sites or Network Asset TEC/ asset capability is > 100 MW:

- a. Where the User or Network Operator is in receipt of an **ION**: a MW export constraint would be applied immediately to a level of either:
 - i) 70% of the *station* TEC/ asset capability; or
 - ii) the prevailing largest infeed limit (whichever is lowest)

Note – the export limit will not be reduced below 100 MW (i.e a User with 130 MW would only be constrained to 100 MW)

The User or Network Operator would have 3 months from the date of submission of waveform data by NGESO to investigate and if necessary, resolve the cause of any non-compliance.

- b. Where the User or Network Operator is in receipt of a **FON**: no immediate export limitation would be immediately applied but the User or Network Operator would have three months from the date of submission of waveform data by NGESO to investigate and if necessary, resolve the cause of any non-compliance
- c. Where the User or Network Operator is in receipt of a **LON**:
 - i. if the reason for the LON relates to equipment changes that could reasonably be expected to affect the FRT performance (e.g. a generator replacement or software update that fundamentally changes the FRT capability or protection settings that are tighter than were applied previously) then the User or Network Operator would be managed as for an ION (see (a) above).
 - ii. For all other reasons (e.g. a software upgrade that only affects a windfarm's central control unit) the User or Network Operator would be managed as for a User or Network Operator in receipt of a FON.
3. For **any** User or Network Operator: if the cause of the FRT non-compliance is not resolved after three months from issue of the waveform data by NGESO, the User or Network Operator would have to constrain the station TEC/ asset capability to 50% until the non-compliance was resolved

Justification for this process:

- **Three Months to Investigate**

The existing LON process permits generators/interconnectors up to two years to rectify grid compliance issues. We recognise this is unnecessarily long for a User or Network Operator to correct a fault that could present a risk to the system but in our experience²³ three months is the minimum reasonable time that User or Network Operator would need to complete the tasks that would be expected to fully investigate the fault, namely:

- gather relevant SCADA error logs and protection settings
- obtain system fault level data at the time of the fault

²² This could, for example, be a power station or an interconnector in the form of plant and / or apparatus.

²³ As well as by reference to the time permitted following the 9th August 2019 event.

- if required, commission consultants to provide the necessary modelling services to model generator/interconnector/network asset controls
- repeat required FRT modelling scenarios
- Implement any setting changes

- **100 MW Threshold**

The degree of constraint that should be applied is clearly dependent on the impact repeated FRT failures of a generator/interconnector/network asset could have on the wider system which in turn depends on the User's Transmission Entry Capacity or Network Operator's asset capability.

The FRT requirements apply to interconnectors and all 'Large' generators, i.e those above 10 MW in the north of Scotland but do not apply to many distribution connected generators < 50 MW in England and Wales.

Therefore, for simplicity we propose the Licence threshold of 100 MW is used since this was chosen to imply that below this level the User's asset (or, by inference, Network Operator's asset) would not have a significant impact on the system.

- **Degree of Forced Constraint: Lowest of 70% TEC or Largest Infeed Limit**

The sudden loss of a large User (or large network asset) will erode frequency response the ESO holds to cater for the loss of a normal infeed. The larger the User's site (or network asset(s)), the greater the risk that the response holding could be eroded and therefore it could be argued that some action is needed to mitigate the potential risk that the generator (or interconnector or Network Operator) could be non-compliant and could trip again, in effect requiring the ESO to hold 'extra' response at a cost that would be passed through to BSUOS and the end customer.

However, there is also the possibility:

- the User's site (or Network Operator asset) had received a FON (i.e deemed by the ESO to have satisfactorily demonstrated Grid Code FRT compliance) and the resulting investigation shows it had tripped for valid reasons but the investigation takes several days/weeks to conclude (e.g > 50% turbines unavailable, network over-voltages, repeated network faults). Imposing a hasty constraint on a User site that it turns out is (and was at the time of the event in question) Grid Code FRT compliant could put the User at risk of infringing REMIT Article 5 obligations and would be unreasonable given that the User may have operated for many years without issue and the balance of probability is that they are Grid Code FRT compliant.

Conversely, a User (or Network Operator) in receipt of an ION is likely to be for a new generator or interconnector (or new network asset) with limited operational history and has by definition not demonstrated to the ESO's satisfaction full compliance; including Grid Code FRT compliance. Therefore the balance of probability suggests that it is possible the User's site (or Network Operator's asset) could be non-compliant and some export limitation is justified.

- Any forced outage of an in-merit generator or interconnector (or forced outage of network assets) will lead to higher costs to the end customer. Where this applies to a large generator (e.g one with a low CfD) or interconnector or substantial network asset this could add significantly to balancing costs and/or erode system margins creating other system security risks
- On many windfarms, operating at a reduced output should improve the FRT capability such that, even though a windfarm may not be compliant *at full output*, the additional 'headroom' obtained from operating at a lower output (such as 70%) will increase the likelihood of a non-compliant windfarm (if that is actually the case) riding through faults.
- If the constrained User is a windfarm then by setting the windfarm to Frequency Sensitive Mode (FSM) rather than applying a fixed MW, the 'headroom' could be

used to obtain additional frequency response, which while it cannot be fully relied upon, would be fast-acting and would generally be expected to contribute to the stability of the system in the event of a fault of another User site or Network Operator asset.

In summary, a forced constraint to a maximum of 70% of the station's TEC / network asset capability or Largest Infeed Limit (whichever is lower) for a User or Network Operator in receipt of an ION seems a reasonable compromise between the cost of holding additional response due to a potential FRT non-compliance and the cost impact on the User or Network Operator and end consumers from unnecessarily constraining a User site or Network Operator asset.

We expect these parameters, and particularly the process of notifying the user of the value of the largest infeed limit, will be the subject of Workgroup discussions.

We, as the Proposer, believe:

1. By taking a pragmatic and 'risk-based approach' to the likelihood of a non-compliance, this process strikes the right balance between ensuring the security of the system whilst also minimising the cost to Users or Network Operator and the consumer.
2. It also provides certainty to all Users and Network Operators (as well as the ESO and Ofgem) of what is required such that they (as well as the ESO and Ofgem) can be confident they are meeting their licence obligations.
3. It uses existing established processes in the Grid Code; if the issue of a FON cannot be relied upon to have confidence of a User's site or Network Operator's asset FRT capability then it suggests there could be a defect in the application of the Compliance process. Similarly, it highlights that until a FON is issued, the User or Network Operator is at risk of potential restrictions in its output/operation – which may in turn, encourage Users and Network Operators to complete the ION stage more quickly than has historically been the case.

2) Further Clarity on Voltage Protection Settings

Whilst the Grid Code defines in detail the FRT requirements for voltage dips, it is silent on the need for Users or Network Operators to remain connected for transient over-voltages, particularly those that are expected to occur after the clearance of a fault. Therefore it's possible, for example, that currently a generator or interconnector may successfully ride through a voltage dip, but trip when the fault is cleared as the resulting over-voltage transient is sufficiently high or sustained that it could trigger over-voltage protection that would ordinarily be expected to be fitted by the User (or Network Operator) to protect their equipment.

As it currently stands, the Grid Code is silent on what over-voltage settings are permissible that would not conflict with requirement to ride through faults and in particular the over-voltage that could be expected upon fault clearance.

Similarly, it is also possible a User site or Network Operator asset could ride through a low-voltage fault but incorrectly configured protection settings result in the User site or Network Operator asset(s) tripping or de-loading.

To provide further clarity to Users and Network Operators, it is proposed that wording along the following lines would be added to Section CC.6.3.15.3 and ECC.6.3.15.10 ('Other Fault Ride Through Requirements'):

- Users and Network Operators shall ensure voltage sensitive relays installed to protect the User's plant and / or apparatus or Network Operator's asset are configured such that they

will not prevent correct operation of the Fault-Ride-Through capability of the User's equipment (or Network Operator's assets) against the relevant Voltage-Time curves. For example,

- Over-voltage protection shall be configured to be insensitive to transient over-voltages of at least 1.20pu for at least 0.5 seconds.
- Under-voltage protection shall be configured to be insensitive for transient under-voltages of below 0.8pu for at least 3 seconds

Note – appropriate values or wording to be agreed by the Workgroup with support from the ESO.

We, as the Proposer, believe that by providing this clarity and communicating this change to the industry that:

1. Users and Network Operators can proactively check their settings to confirm that they do not conflict with the minimum Fault-Ride-Through requirements
2. By enabling Users and Network Operators to be pro-active, would ensure a more resilient and robust system by reducing the likelihood of FRT non-compliance.

Draft legal text

We have not prepared draft legal text as this is not required to be provided at this stage.

However, we will seek to prepare, ahead of the first Workgroup meeting, an initial version of the draft Business Rules to help (a) the Workgroup and (b) the Code Administrator in the future production of the legal text for this proposal (whilst also assisting stakeholders to have a better understanding of the principles of the proposed solution).

What is the impact of this change?

Proposer's assessment against Grid Code Objectives

Relevant Objective	Identified impact
(a) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity	<p>Positive</p> <p>Takes a risk-based approach to managing the cost of constraints from potential FRT non-compliance.</p> <p>Minimises risk of unnecessary constraints being applied to Users or Network Operator that could otherwise lead to higher costs to the end consumers.</p>
(b) Facilitating effective 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);	<p>Neutral</p> <p>No impact</p>

(c) 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;	Positive Places a time-limitation on Users and Network Operators to quickly correct FRT compliance issues.
(d) 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; and	Positive Clarifies the action expected by a User in the event their station or Interconnector trips or de-loads coincident with a fault so they can fulfil their REMIT obligations
(e) To promote efficiency in the implementation and administration of the Grid Code arrangements	Neutral No impact.

Proposer's assessment of the impact of the modification on the stakeholder / consumer benefit categories

Stakeholder / consumer benefit categories	Identified impact
Improved safety and reliability of the system	Positive Reduces the risk to the system from Users or Network Operators failing to ride through faults by either: <ul style="list-style-type: none"> - Requiring a restriction in output by Users or Network Operators who have tripped and are likely to be new Users/ new network assets without a proven operational history - Providing a three-month time-limitation for smaller and established Users / Network Operators to investigate and correct faults (significantly faster than the two years currently permitted).
Lower bills than would otherwise be the case	Positive Avoids unnecessary constraints being applied to 'in-merit' generators or interconnectors and associated re-despatch of out-of-merit generators or interconnectors. Reduces likelihood of tight system margins occurring with associated higher prices.
Benefits for society as a whole	Positive Provides clarity to Users so they are able to fulfil their licence obligations more easily and provide clarity to the market under the REMIT obligations.
Reduced environmental damage	Positive

	Avoids unnecessary redispatch of carbon-based generation or interconnectors that would inevitably occur if precautionary constraints are placed on renewable generation.
Improved quality of service	<p>Positive</p> <p>Reduces the likelihood of a re-occurrence of a 9th August 2019 type event by requiring all generators, interconnectors and Network Operators to quickly remedy any FRT non-compliance, which in turn will place the onus on NGEESO to improve their monitoring of system faults and generator/interconnector network asset response so that such events are detected and any non-compliance issue is dealt with before it has the chance to occur for a wider system incident.</p>

When will this change take place?

Implementation date

Within one Working Day of an Authority decision.

Date decision required by

In light of the ESO's statement²⁴ in its 7th May 2021 letter, a decision is required as soon as reasonably practicable.

Implementation approach

Changes to systems and processes are expected to be required as clarified; by the Workgroup and in the Business Rules; in due course based on the broad outline of the solution.

Proposer's justification for governance route

Governance route: Urgent modification to proceed under a timetable agreed by the Authority (with an Authority decision)

We are mindful of the ESO's statement in the 7th May 2021 letter as regards the need to act quickly on this matter:

"An inability of generation, interconnector or Other transmission connected plant and apparatus being able to ride through 'normal' faults on the NETS is a situation that we cannot tolerate and is a serious risk that we need to manage quickly and effectively." [emphasis added]

This, in our view, points to an imminent or current issue that if not urgently addressed will cause:

- (a) A significant commercial impact on Users, Network Operators, Suppliers, other market participants and consumers or other stakeholder(s); and
- (b) A significant impact on the safety and security of the electricity system; and
- (c) Users to be in breach of a relevant legal requirements (REMIT Article 5).

²⁴ "An inability of generation, interconnector or Other transmission connected plant and apparatus being able to ride through 'normal' faults on the NETS is a situation that we cannot tolerate and is a serious risk that we need to manage quickly and effectively." [emphasis added]

We are also aware that the ESO's presentation to the 24th June 2021 GCRP meeting inadvertently contradicts elements that are set out in the ESO's 7th May 2021 letter by, for example, referring to an (undefined) 'safe level'; whilst the letter itself has elements of uncertainty as regards, for example, legal compliance on the part of generators.

There is a need for Users, Network Operators, the ESO and Ofgem to have certainty on the ability of generation, interconnector or other transmission connected plant and apparatus being able to ride through 'normal' faults on the NETS and this is what this Modification proposal seeks to do.

In our view (as we have detailed further under 'What is the Issue' above) currently the Grid Code is defective as it does not codify how Users, Network Operators or the ESO should act in the event of an FRT situation as described in the ESO's 7th May 2021 letter / the 24th June 2021 GCRP presentation.

Without this certainty and clarity there is an imminent or current issue as this could:

- 1) Be placing Users (and in particular Generators) in breach of a relevant **legal requirement**;
- 2) Have a significant **commercial impact** on Users and consumers;
- 3) Have a significant impact on the safety and **security of the electricity system**;
- 4) Apply an **unreasonable timing** obligation on some stakeholders;
- 5) Apply a **discriminatory process** to some stakeholders; and
- 6) Not ensure and **enhance transparency** of the FRT situation in GB.

Guidance on governance routes		
Timescales	Route	Who makes the decision (Governance type)
Normal	Proceed to Code Administrator Consultation*	Authority (Standard Governance) or Panel (Self-Governance)
	Assessment by a Workgroup**	
Urgent	Proceed to Code Administrator Consultation	Authority (Standard Governance)
	Assessment by a Workgroup	
Fast-track	Straight to appeals window, then implementation	Panel (Self-Governance)

* This route is for modifications which have a fully developed solution and therefore don't need to be considered by a Workgroup.

** For modifications which need further input from industry to develop the solution.

Self-Governance Criteria

It depends on the material effect of the modification as to whether it should be subject to Standard or Self-Governance. If you are proposing that your modification should be subject to Self-Governance, you must explain how it meets the below criteria.

The modification is unlikely to discriminate between different Grid Code Parties and is unlikely to have a material effect on:

- Existing or future electricity customers;
- Competition in the generation, distribution, or supply of electricity or any commercial activities connected with the generation, distribution or supply of electricity,
- The operation of the National Electricity Transmission System
- Matters relating to sustainable development, safety or security of supply, or the management of market or network emergencies
- The Grid Code Panel's governance procedures or the Grid Code Panel's modification procedures

Urgency Criteria

If you are proposing that your modification is Urgent, you must explain how it meets Ofgem's Urgent criteria (below). When modifications are granted Urgency, this enables the us to shorten the standard timescales for industry consultations. Note that the we (Code Admin) must seek Authority approval for this option.

Ofgem's current guidance states that an urgent modification should be linked to an imminent issue or a current issue that if not urgently addressed may cause:

- A significant commercial impact on parties, consumers or other stakeholder(s); or
- A significant impact on the safety and security of the electricity and/or gas systems; or
- A party to be in breach of any relevant legal requirements.

Fast-Track Self-Governance Criteria

This route is for modifications which are minimal changes to the code. E.g. Typos within the codes. If you are proposing that your modification should be subject to Fast-Track Self-Governance, you must explain how it meets the below criteria.

The modification is a housekeeping modification required as a result of an error or factual change, such as:

- Updating names or addresses listed in the Grid Code;
- Correcting minor typographical errors;
- Correcting formatting and consistency errors, such as paragraph numbering, or;
- Updating out of date references to other documents or paragraphs.

Interactions

- ☐ CUSC ☐ BSC ☐ STC ☐ SQSS
☐ European Network Codes ☐ EBGL Article 18 T&Cs²⁵ ☐ Other modifications ☒ Other

There is an interaction with REMIT.

Acronyms, key terms and reference material

Acronym / key term	Meaning
BSC	Balancing and Settlement Code
CUSC	Connection and Use of System Code
EBGL	Electricity Balancing Guideline
GC	Grid Code
STC	System Operator Transmission Owner Code
SQSS	Security and Quality of Supply Standards
T&Cs	Terms and Conditions
FRT	Fault Ride Through

Reference material

NGESO's letter of 7th May 2021 "Grid Code Compliance with Fault Ride Through Requirements"

NGESO's presentation to June 2021 Grid Code Review Panel meeting "Unexpected Generation Failure Management"

²⁵ If your modification amends any of the clauses mapped out in Annex GR.B of the Governance Rules section of the Grid Code, it will change the Terms & Conditions relating to Balancing Service Providers. The modification will need to follow the process set out in Article 18 of the European Electricity Balancing Guideline (EBGL – EU Regulation 2017/2195). All Grid Code modifications must be consulted on for 1 month in the Code Administrator Consultation phase, unless they are Urgent modifications which have no impact on EBGL Article 18 T&Cs. N.B. This will also satisfy the requirements of the NCER process.