

Transmission licensees, offshore transmission licensees, generators, suppliers, consumer groups and any other interested parties.

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Dear colleague

National Electricity Transmission System Security and Quality of Supply Standard: Normal Infeed Loss Risk (GSR015)

We are approving a modification to the National Electricity Transmission System (NETS) Security and Quality of Supply Standard (SQSS). This modification will clarify the frequency deviation¹ limits set out in the SQSS for loss of power infeed events. This will be done by revising specific defined terms in the SQSS.

Summary

The SQSS sets the frequency deviation limits that National Grid Electricity Transmission (NGET), as system operator (SO), must comply with for unplanned, feasible losses of power infeed.² This will usually be the loss of power from a generator. The operating criteria relating to a loss of power infeed are set out in chapters 5 (onshore) and 9 (offshore) of the SQSS. These provisions refer to three defined terms: normal infeed loss risk, infrequent infeed loss risk, and unacceptable frequency conditions. The SQSS Panel has submitted GSR015: Normal Infeed Loss Risk, to remove ambiguity and improve the clarity of these terms.

The panel considers that the definition of normal infeed loss risk could be interpreted to mean that the SO would need to provide additional frequency response services to accommodate larger potential losses of power than is currently necessary. The cost of these services would be borne by NGET and consumers.³

GSR015 would remove ambiguity in the SQSS, require NGET to procure an appropriate volume of frequency response services and, as a result, ensure the transmission system is managed efficiently while maintaining the security of electricity supplied. We have decided to approve the changes proposed by GSR015.

How NGET manages frequency

The SQSS sets the criteria that transmission licensees must follow when planning and operating the transmission system. Under the SQSS, NGET, as SO, must ensure the

¹ Frequency deviations are changes in frequency from 50.0Hz, which the NETS is required to operate at.

² Power infeed is the net power provided by generators and interconnectors to the electricity transmission system.

³ NGET receives an allowance for funding balancing services through the SO Incentives price control. NGET's allowance is paid through Balancing Services Use of System charges, which are passed on to consumers. In addition, for spending above or below the target, the cost/saving is shared between NGET and consumers.

security of the transmission system against the risk of unplanned events. One of these risks is an unexpected loss of power infeed to the transmission system, which, for example, could be due to a power station suddenly disconnecting. These unexpected losses will cause an imbalance between the supply and demand of electricity and, as a result, the frequency the electricity is transmitted at, known as system frequency, will start to fall. NGET has to respond to these situations and ensure that the transmission system is quickly brought back into balance. It does this through a service known as frequency response, which allows it to manage these deviations in frequency and restore the balance of supply and demand.

The SQSS defines two levels of infeed loss risk: *Normal Infeed Loss Risk* and *Infrequent Infeed Loss Risk*. The definitions of these terms, as well as *Unacceptable Frequency Conditions*, are fundamental to ensuring that NGET has clear criteria to apply in these situations. These definitions⁴ represent the following:

Normal Infeed Loss Risk: the level of power loss that the transmission system must be able to sustain without the system frequency falling below a defined level (since 1 April 2014, *Normal Infeed Loss Risk* is 1320MW).

Infrequent Infeed Loss Risk: a higher level of power loss that the transmission system must be able to sustain (since 1 April 2014, *Infrequent Infeed Loss Risk* is 1800MW). For this higher level of loss, system frequency may fall below the level for the *Normal Infeed Loss Risk* for a short period, currently no more than 60 seconds.

Unacceptable Frequency Conditions: the maximum permitted frequency deviations⁵ allowed on the transmission system, including for secured events⁶ such as infeed losses.

Together, these definitions effectively set the minimum level of frequency response that NGET must procure and hold to cover these risks.

The issues

There are two issues with the current definitions:

- The increase in *Normal Infeed Loss Risk* introduced in GSR007 (Review of Infeed Losses)⁷ can be interpreted to require NGET to procure additional frequency response that will not currently have a material benefit.
- The frequency deviation criteria used in *Normal Infeed Loss Risk* and *Unacceptable Frequency Conditions* definitions differ slightly.

Procuring unnecessary additional frequency response

A previous SQSS modification, GSR007 (Review of Infeed Losses), increased the levels of *Normal Infeed Loss Risk* from 1000MW to 1320MW, and *Infrequent Infeed Loss Risk* from 1320MW to 1800MW. This increase allows larger generators to connect to the NETS. These new levels applied from 1 April 2014.

These levels are upper limits and NGET does not need to procure frequency response to cover these risks until they actually exist on the transmission system. For example, if a new 1600MW generator were to connect, it would become the largest potential loss of power

⁴ The current definitions and the proposed changes are set out in Annex 1.

⁵ A loss of power infeed will cause frequency to fall, but the *Unacceptable Frequency Conditions* covers more than a loss of power infeed, including the general operation of the NETS, which is why it sets limits for both falls and increases in frequency from 50.0Hz, which are referred to as deviations.

⁶ Secured events are contingencies that the NETS must be able to withstand so that it continues to operate safely.

⁷ <https://www.ofgem.gov.uk/publications-and-updates/decision-proposal-modify-security-and-quality-supply-standard-sqss-increasing-infeed-loss-risk-limits>

infeed on the transmission system. NGET would then need to procure additional frequency response to cover an *Infrequent Loss Risk* of 1600MW.

The panel considers that the definition of *Normal Infeed Loss Risk* is ambiguous, and one interpretation is that NGET should now (ie since April 2014) cover infeed loss risks between 1000MW to 1320MW as a *Normal Infeed Loss Risk*. To illustrate, the largest potential loss of power infeed on the transmission system both pre and post 1 April 2014 is 1200MW from the Sizewell B power station. Pre 1 April 2014, this power infeed would have been considered an *Infrequent Infeed Loss Risk*. Post 1 April 2014, the definition could be interpreted to mean that this power infeed should be considered as a *Normal Infeed Loss Risk*. If so, this would require NGET to procure additional frequency response⁸ in excess of that required before 1 April 2014. This would incur additional costs, which would be passed on to consumers. NGET believes this additional frequency response would provide little benefit as the risk of infeed losses has not changed significantly.

Inconsistent frequency deviation criteria

The definitions of *Normal Infeed Loss Risk* and *Unacceptable Frequency Conditions* both set the maximum frequency deviations allowed on the transmission system. However, they specify these deviations in different ways. The *Normal Infeed Loss Risk* refers to the magnitude of the deviation; there should not be a "deviation of system frequency by more than 0.5Hz". In contrast, the *Unacceptable Frequency Conditions* refers to frequency limits; frequency should not fall outside "statutory limits of 49.5Hz to 50.5Hz".

These definitions are therefore not entirely consistent. For example, consider these situations if there was a normal infeed loss:

- If system frequency is 49.9Hz and drops to 49.5Hz NGET would be in compliance with both the *Normal Infeed Loss Risk* and *Unacceptable Frequency Conditions*.
- If system frequency is 49.9Hz and drops to 49.4Hz NGET would be in compliance with the *Normal Infeed Loss Risk* but not the *Unacceptable Frequency Conditions*.
- If system frequency is 50.1Hz and drops to 49.5Hz NGET would be in compliance with the *Unacceptable Frequency Conditions* but not the *Normal Infeed Loss Risk*.

NGET's practice has been to comply with the frequency criteria in the *Unacceptable Frequency Conditions*, which is consistent with its statutory obligations (the Electricity, Safety, Quality and Continuity Regulations 2002).

Proposed changes to the SQSS

To address these two issues, GSR015 proposes to change the definitions of *Normal Infeed Loss Risk*, *Infrequent Infeed Loss Risk* and *Unacceptable Frequency Conditions*. The main changes are to:

- Clarify that NGET should secure the system against the actual loss of infeed risk as conditions change into the future. This will take account of the capacity of the largest infeeds and of their connections to the transmission system.
- Revise the three definitions so the frequency deviation criteria are only specified in the definition of *Unacceptable Frequency Conditions*.

The first change is done through additional drafting in the definition of *Unacceptable Frequency Conditions*. This qualifies the minimum levels of loss of power infeed risk as being: the risk present at connections planned in accordance with the normal/infrequent infeed loss risk criteria (respectively).

⁸ NGET would have to procure additional frequency response for a *Normal Infeed Loss Risk*, compared to an *Infrequent Infeed Loss Risk* of the same size, to ensure that frequency does not drop below 49.5Hz if the NETS lost that power infeed.

We understand that this additional drafting means that NGET will review the actual loss of power infeed risk whenever either:

- a new infeed that is greater than 1000MW is connected, or
- new generators connect to existing circuits, increasing those infeeds to greater than 1000MW.

This approach will ensure that NGET will only procure additional frequency response services when connections of larger capacity cause an increase in the risk of infeed losses above 1000MW. It will also ensure that the risk of *Unacceptable Frequency Conditions* will not change as a result of GSR007.

The second change will ensure the drafting of the frequency criteria is consistent between all three definitions.

Our decision

We have considered the issues raised by this modification and taken into account the views and arguments put forward in the panel's consultation. We have decided to approve the changes proposed by GSR015 as:

1. implementing the proposal will better facilitate the objectives of the SQSS
2. the modification is consistent with the Authority's principal objective and statutory duties.

Reasons for our decision

We agree with the panel that GSR015 would better achieve relevant objective (i) of the SQSS. We consider that it would have a neutral impact on the other objectives. Relevant objective (i) is to:

"... facilitate the planning, development and maintenance of an efficient, coordinated and economical system of electricity transmission, and the operation of that system in an efficient, economic and coordinated manner."

GSR015 removes ambiguity in the SQSS drafting which could be interpreted as requiring the SO to procure additional frequency response to cover risks on the transmission system that have not changed. This would occur without justification and would be due to the interpretation of the *Normal Infeed Loss Risk* definition requiring all infeed losses up to 1320MW to be treated as normal infeed losses. GSR015 also removes another inconsistency between the frequency criteria in the definitions of *Normal Infeed Loss Risk* and *Unacceptable Frequency Conditions*. We agree that clarifying the text and moving the detail to the *Unacceptable Frequency Conditions* definition is appropriate.

Amending the definitions will clarify how NGET should respond to infeed losses, remove the ambiguity over the level of frequency response that NGET needs to procure and ensure NGET does not procure frequency response that would not provide any significant benefit. This will promote the operation of the transmission system in a secure, efficient and economic manner.

Monitoring frequency response of the NETS

Respondents to the industry consultation on GSR015 supported the proposal. One respondent said there was a lack of transparency over how NGET determines how much frequency response it requires. As a result, the panel recommended that frequency control performance is reviewed 12 months after the implementation of GSR015 to ensure that it has not deteriorated as a result of the change.

We are aware of the significant challenges that the transmission system will need to address going forward. Frequency control is one of these challenges. We therefore agree that frequency control performance should be reported. We consider that the SQSS Panel may require that NGET continue to report frequency control performance to it on an ongoing basis. This would make the panel aware of situations where frequency deviations on the transmission system become larger so that it could consider whether further SQSS modifications might be necessary.

Respondents to the consultation commented on other aspects of frequency response, including interactions with the European Union Load Frequency Control and Reserves Network Code and the impact on wind farms and embedded generation. In our view, these are outside the scope of GSR015. However, we would expect to see the SQSS panel, and the other code panels, consider these issues as appropriate.

Drafting of the modification

GSR015 is very specific: it removes ambiguity in the SQSS by changing three definitions. Despite the narrow scope of the modification, the changes generated significant discussion – the modification report and responses to the SQSS consultation highlight both the importance of the definitions and many of the issues that interact with the definitions in question, such as frequency control, the need to procure additional frequency response, the validity of changes proposed by GSR007, and the future impact of the Load Frequency Control and Reserves Network Code.

We believe it is essential that the panel continues to consider the wider issues of any modification. However, we view that future modification reports will benefit from being drafted to clearly highlight the core issues that a modification handles as well as the areas it does not affect or change. This would make the intent of modifications clearer, and make it easier for industry to get involved with the modification process.

Minor drafting error

Under the proposed definitions of both *Normal Infeed Loss Risk* and *Infrequent Infeed Loss Risk* the words “*loss of power infeed risk*” are italicised. However, “*loss of power infeed*” is the defined term within the SQSS, not “*loss of power infeed risk*”. The word “*risk*” should not be in italics. We suggest that this error is corrected in the revised SQSS.

Implementation and future work

In this letter we have set out our decision to approve the changes to the SQSS proposed in GSR015. For these changes to take effect we will need to modify the electricity transmission licences so they refer to the new version of the SQSS. As this modification is not time-critical we have not yet issued a statutory consultation to modify the licences. We will be doing this at an appropriate stage in the future, such as when we issue a decision on other SQSS modifications.

If you have any questions about our decision please contact Aled Moses (020 7901 3850; aled.moses@ofgem.gov.uk).

Yours faithfully,

Kersti Berge
Partner, Electricity Transmission

Annex 1 – List of Definitions

These are the changes to the definitions proposed by GSR015. These do not include the changes we suggest to fix a minor error set out in our decision.

Term	Definitions with changes tracked
Normal Infeed Loss Risk	<p>That level of loss of power infeed risk which is covered over long periods operationally by frequency response to avoid a deviation of system frequency by more than 0.5Hz. Until 31st March 2014, this is a <i>loss of power infeed risk</i> of 1000MW. From April 1st 2014, this is a <i>loss of power infeed risk</i> of 1320MW.</p>
Infrequent Infeed Loss Risk	<p>The level of loss of power infeed risk which is covered over long periods operationally by frequency response to avoid a deviation of system frequency outside the range 49.5Hz to 50.5Hz for more than 60 seconds. Until 31st March 2014, this is a <i>loss of power infeed risk</i> of 1320MW. From April 1st 2014, this is a <i>loss of power infeed risk</i> of 1800MW.</p>
Unacceptable frequency conditions	<p>These are conditions where:</p> <ul style="list-style-type: none"> i) The <i>steady state</i> frequency falls outside the statutory limits of 49.5Hz to 50.5Hz; or ii) A transient frequency deviation on the <i>MITS</i> persists outside the above statutory limits and does not recover to within 49.5Hz to 50.5Hz within 60 seconds. <p>Transient frequency deviations outside the limits of 49.5Hz and 50.5Hz shall only occur at intervals which ought reasonably be considered as infrequent.</p> <p><i>In order to avoid the occurrence of Unacceptable Frequency Conditions:</i></p> <ul style="list-style-type: none"> a) The minimum level of <i>loss of power infeed risk</i> which is covered over long periods operationally by frequency response to avoid frequency deviations below 49.5Hz or above 50.5Hz will be the actual <i>loss of power infeed risk</i> present at connections planned in accordance with the <i>normal infeed loss risk</i> criteria; b) The minimum level of <i>loss of power infeed risk</i> which is covered over long periods operationally by frequency response to avoid frequency deviations below 49.5Hz or above 50.5Hz for more than 60 seconds will be the actual <i>loss of power infeed risk</i> present at connections planned in accordance with the <i>infrequent infeed loss risk</i> criteria. <p>It is not possible to be prescriptive with regard to the type of <i>secured event</i> which could lead to transient deviations since this will depend on the extant frequency response characteristics of the system which <i>NGET</i> shall adjust from time to time to meet the security and quality requirements of this Standard.</p>