

NATIONAL GRID ELECTRICITY SYSTEM OPERATOR LIMITED

ELECTRICITY TRANSMISSION LICENCE STANDARD CONDITION C17 REPORTING CRITERIA STATEMENT

1. INTRODUCTION

In accordance with Licence Condition C17 (Transmission system security standard and quality of service) of the Electricity Transmission Licence, this statement sets out criteria by which National Grid Electricity System Operator, shall report on the National Electricity Transmission System.

Licence Condition C17 dated 1 April 2022 (paragraphs 8 and 9) states that: -

(P8) The licensee shall at all times have in force a statement approved by the Authority following consultation with any relevant authorised electricity operator setting out criteria by which system availability, security and service quality of the national electricity transmission system may be measured and where such measurement is dependent on information provided to the licensee by a transmission owner, the statement shall specify the information to be so provided.

(P9) The licensee shall within 4 months after the end of each financial year submit to the Authority a report providing details of system availability, security and service quality of the national electricity transmission system during the previous financial year against the criteria referred to in paragraph 5 of this condition and shall publish the report if within 2 months of the date of submission the Authority does not give a direction to the licensee not to publish the report.

Licence Condition D3 (Transmission system security standard and quality of service) (paragraph 4) of the Transmission Owners' licence states that: -

(P4) The licensee shall no later than 2 months after the end of the financial year as required by the system operator, provide to the system operator all such information as may be necessary or as the system operator may reasonably require for the purpose of submitting a report to the Authority in compliance with paragraph 6 of standard condition C17 (Transmission system security standard and quality of service) of the transmission Licence.

The statement as approved by the Authority, sets out the format (see *Note 1) of the report and the information and data requirements on the Transmission Owners, so that National Grid Electricity System Operator can discharge its licence obligations.

2. REPORTING CRITERIA

Measures of reporting system availability, security and quality of service have been agreed with the Authority and are set out in this statement.

It will be necessary for National Grid Electricity System Operator, to include in the report factual information on system performance, instances and events relating to each Transmission Owner's system.

National Grid ESO's report will therefore relate to system performance, some of which is not within the Electricity System Operators control.

The accuracy and integrity of information in the report relating to each Transmission Owner's system will be dependent on the accuracy and integrity of information supplied by the Transmission Owners, and responsibility for such information will rest with each Transmission Owner.

3. AVAILABILITY

3.1 ONSHORE TRANSMISSION SYSTEMS

3.1.1 ~~System Circuit Availability~~

3.1.1.1 Availability

System availability is calculated in terms of the summation of the availabilities of individual circuits of the main interconnected transmission system expressed as a percentage of the total number of circuits. A circuit is defined as ~~an equipment on the transmission system, e.g. overhead line, cable, supergrid transformer, or any combination of these plant items controlled by one cable which either connects two bussing points or connects two~~ or more circuit breakers/disconnectors, excluding busbars.

System Availability = $\frac{\text{The sum for all circuits of hours available} \times 100 \%}{(\text{No. of circuits}) \times (\text{No. of hours in period})}$

Winter Peak Availability is defined as the average System Availability over the three months of December, January and February.

For the **GB 400/275/132kV Transmission System**, National Grid ESO will report on the availability for the NETS (GB Network) and each Transmission Owner's network for:

- (1) Annual System Availability for the reported year and preceding four years.
- (2) Winter Peak System Availability for the reported year and preceding four years.
- (3) Monthly System Availability for the reported year (see *Note 2).

3.1.1.2 ~~System Unavailability~~

Planned Unavailability is due to outages in accordance with OC2 of the Grid Code or planned on an opportunity basis. It is calculated on the same basis as for "Availability" above.

Unplanned Unavailability is due to outages occurring as the result of a plant breakdown, i.e. outages requested and taken immediately upon circuit failure, or planned at less than 24 hours' notice and is calculated on the same basis as Planned Unavailability.

Therefore, total System Unavailability i.e. Planned + Unplanned Unavailability = $(100 - \text{System Availability}) \%$

For the National Electricity Transmission System (NETS), National Grid ESO co-ordinates and facilitates the outage requirements of the relevant Transmission Owners, but the outages remain the responsibility of each Transmission Owner. Unavailability indices in this section therefore reflect, among other things, the Transmission Owner's system practices.

For the **GB 400/275/132kV Transmission System**, National Grid ESO will report on the unavailability for the NETS (GB Network) and each Transmission Owner's network for:

- (1) Monthly Planned and Unplanned Unavailability (see *Note 3) for the reported year including outage information according to:
 - Maintenance Outages
 - System Construction Outages
 - User Connection Outages
 - ~~Unplanned Unavailability~~

3.1.2 Reactive Compensation Equipment Availability

3.1.2.1 Availability

System availability is calculated in terms of the summation of the availabilities of individual reactive compensation equipment on the main interconnected transmission system expressed as a percentage of the total number of reactive compensation equipment. Reactive compensation equipment is defined as all shunt and series reactive compensation equipment including but not limited to mechanically switched capacitors, shunt reactors, SVCs, dynamic reactive compensators, synchronous condensers.

$$\text{System Availability} = \frac{(\text{Total MVarh}^* \text{ system is capable of delivering} - \text{MVarh}^* \text{ unavailable}) \times 100\%}{\text{Total MVarh}^* \text{ system is capable of delivering}}$$

* meaning the absolute value

Summer Peak Availability is defined as the average System Availability over the three months of June, July and August.

For the GB 400/275/132kV Transmission System, National Grid ESO will report on the availability for the NETS (GB Network) and each Transmission Owner's network for:

- (1) Annual System Availability for the reported year and preceding four years.
- (2) ~~Winter-Summer~~ Peak System Availability for the reported year and preceding four years.
- (3) Monthly System Availability for the reported year (see *Note 2).

3.1.3 Unavailability

Planned Unavailability is due to outages in accordance with OC2 of the Grid Code or planned on an opportunity basis. It is calculated on the same basis as for "Availability" above.

Unplanned Unavailability is due to outages occurring as the result of a plant breakdown, i.e. outages requested and taken immediately upon reactive compensation equipment failure, or planned at less than 24 hours' notice and is calculated on the same basis as Planned Unavailability.

Therefore, total System Unavailability i.e. Planned + Unplanned Unavailability
= (100 - System Availability) %

For the National Electricity Transmission System (NETS), National Grid ESO co-ordinates and facilitates the outage requirements of the relevant Transmission Owners, but the outages remain the responsibility of each Transmission Owner. Unavailability indices in this section therefore reflect, among other things, the Transmission Owner's system practices.

For the GB 400/275/132kV Transmission System, National Grid ESO will report on the unavailability for the NETS (GB Network) and each Transmission Owner's network for:

- (2) Monthly Planned and Unplanned Unavailability (see *Note 3) for the reported year including outage information according to:
 - Maintenance Outages
 - System Construction Outages
 - User Connection Outages
 - Unplanned Unavailability

3.2 OFFSHORE TRANSMISSION SYSTEMS (OFTOs)

For OFTO systems the availability will be reported in terms of:

- Annual System Availability for the reported year and preceding four years.
- Winter Peak System Availability for the reported year and preceding four years.
- Monthly System Availability.
- Monthly Planned and Unplanned Unavailability.
- Outage Details (see *Note 4) with reason i.e. OFTO or Non-OFTO.

OFTO system availability is calculated by using the following formula:

$$\frac{(\text{Total MWh system is capable of delivering} - \text{MWh unavailable})}{(\text{Total MWh system is capable of delivering})} \times 100\%$$

3.3 INTERCONNECTORS

The availability of HVDC interconnectors between the NETS (GB Network) and other countries will be reported in terms of:

- Annual Availability for the reported year.
- Annual Availability for the reported year and preceding four years.
- Monthly Unavailability for the reported year on a monthly basis.
- Planned and Unplanned Outages for the reported year on a monthly basis.

The interconnectors with Northern Ireland and the Republic of Ireland are excluded as they are regulated by the Northern Ireland Authority for Utility Regulation (NIAUR) and the Commission for Regulation of Utilities (CRU) respectively.

4. SECURITY

The Grid Code and NETS Security and Quality of Supply Standard (NETS SQSS) define the required security level to which the system is planned. The required security level at a substation increases with the amount of demand connected to the substation and so the planned level of demand security is normally higher for 400kV and 275kV transmission voltages than for 132kV. Additionally, the 132kV network is, in parts, less interconnected than the higher voltage systems and so losses of 132kV transmission circuits (for example due to weather related transient faults) are more likely to lead to temporary losses of supply.

For each Transmission Owner, all Transmission System related incidents in the reported year resulting in a loss of supplies, will be tabulated individually giving:

- (1) the date, time and location of the event
- (2) demand lost
- (3) duration
- (4) an estimate of energy unsupplied
- (5) relevant factual information relating to the event.

4.1 Loss of Supply Incidents

A loss of supply incident is defined as any incident on the transmission system that results in an actual unsupplied energy incident to a customer or customers including ~~pumped and pumped storage storage units operating in charging mode when importing energy.~~ ~~units operating in pump mode.~~

All transmission system incidents that resulted in a loss of supplies are reported individually giving the date, time and location of the event, duration, demand lost, an estimate of unsupplied energy and relevant factual information relating to the event.

Since 1st April 2013, loss of supply incidents is governed by the Energy Not Supplied (ENS) scheme. The scheme aims to incentivise the Transmission Licensees to minimise the impact of any loss of supply to their customers, that is, to restore supplies as soon as possible after an incident.

4.2 Loss of Supply Incidents – Incentivised

An Incentivised loss of supply event is an event on the Licensee's Transmission System that causes electricity not to be supplied to a customer, subject to the exclusions defined in the Special Conditions of the Transmission Licence.

4.3 Loss of Supply Incidents – Non-Incentivised

The Non-Incentivised category covers loss of supply incidents that are less than 3 minutes in duration, the energy not supplied is calculated and recorded but not included in the incentivised energy not supplied figure and is reported separately. The Non-Incentivised category also applies to connection arrangements that are chosen by the customer and often have a level of design and operational security below that normally required to satisfy the NETS SQSS. This may be reflected in a reduced cost of the connection. In some cases, customers have also chosen to secure their supplies using their own generation to compensate for this reduced level of transmission security. Loss of supply initiated on a DNO network are not included within this category.

4.4 Overall Reliability of Supply

The Overall Reliability of Supply figure for the NETS and each Transmission system will be provided as a percentage of the total energy transmitted each year i.e.

$[1 - (\text{Estimated Unsupplied Energy} / \text{Total energy that would have been supplied by transmission system})] \times 100\%$

5. QUALITY OF SERVICE

This will be reported in terms of excursions of system voltage and frequency outside of Statutory and/or Grid Code limits.

5.1 Voltage Excursions

The Electricity Safety, Quality & Continuity Regulations (ESQCR) 2002 permit variations of $\pm 10\%$ of nominal voltage, for levels of 132kV and above. For voltages, less than 132kV a variation not exceeding $\pm 6\%$ of the nominal voltage is permissible.

The Grid Code reflects these limits, and imposes a further constraint for the 400kV system in that voltages can only exceed +5% for a maximum of 15 minutes.

The number of times that the voltage at a GB Transmission System Grid Entry Point or Grid Supply Point exceeds these limits (see *Note 5) will be displayed for each Transmission Owner in a bar chart. Any voltage excursions in excess of 15 minutes will be reported. This information will be supplied for the reported year together with the preceding four years.

A brief summary will be provided in tabular form for each event giving:

- (1) the date, time and location of the event

- (2) the nominal system voltage level and the actual voltage excursion limit
- (3) duration of the excursion
- (4) relevant factual information relating to the event.

5.2 Frequency Excursions

The Electricity Safety, Quality and Continuity Regulations 2002 permit variations in frequency not exceeding 1% above and below 50Hz: a range of 49.5 to 50.5Hz. Any frequency excursions outside these limits for 60 seconds or more will be reported. A bar chart displaying the number of frequency excursions outside statutory limits on the GB Transmission System will be provided. This information will be supplied for the reported year together with the preceding four years.

A brief summary will be provided in tabular form for each event giving:

- (1) the date and time of the event
- (2) actual frequency and the time taken to return to within permitted limits
- (3) relevant factual information relating to the event.

Specific frequency events that affect the GB Transmission System in part, for instance localised islanding events, may be referenced for additional information where appropriate.

5.3 Frequency Standard Deviation

Additionally, a chart of standard deviation from 50Hz, on a weekly basis for the reported year will be provided.

6. Information to be provided by each Transmission Owner

- (1) Each TO, OFTO and Interconnector owner shall provide National Grid ESO with the following data:
 - (a) Information requested by National Grid ESO to augment their knowledge of Availability/Unplanned Unavailability.
 - (b) Information on circumstances causing Loss of Supply, Voltage and Frequency (Islanding) events as applicable.
- (2) National Grid ESO will agree arrangements and a timetable for provision of this information to enable all licensees to satisfy the relevant licence requirements.

Note 1 – Format in accordance with published reports on the NGESO website, see <https://www.nationalgrideso.com/industry-information/industry-data-and-reports/system-performance-reports>

Note 2 – Reported year means the financial year commencing 1st April annually to which the report applies.

Note 3 – Unavailability falls into 4 categories, 3 of which are planned and the other unplanned:

- 1. Maintenance Outages are planned outages required for maintenance.*
- 2. System Construction Outages are planned outages required to construct or modify assets which are not provided for the exclusive benefit of specific users.*
- 3. User Connection Outages are planned outages required to construct or modify assets which are provided to facilitate connection for the exclusive benefit of specific system users.*
- 4. Unplanned Unavailability is due to outages occurring as a result of plant or equipment failure, i.e. outages required and taken at less than 24 hours' notice.*

Note 4 – Offshore system outages are calculated using MW of offshore transmission capacity unavailable not generation lost.

Note 5 – Reportable excursions will be those at a Connection Point on the NETS with a Grid Code User. Exceptions may be where the TO or OFTO also own the LV busbars at a Connection Site.

Consumers may expect the voltage to remain within these limits, except under abnormal conditions e.g. a system fault outside of the limits specified in the NETS SQSS.

Normal operational limits are agreed and monitored individually at connection points with customers to ensure that voltage limits are not exceeded following the specified credible fault events described in NETS SQSS.