

NATIONAL GRID GAS

OPERATING MARGINS STATEMENT 2019/20

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1 About this Document

National Grid Gas purchases Operating Margins (OM) on an annual basis in line with both the Uniform Network Code (UNC)¹ and obligations described in the National Grid Gas Safety Case in respect of the NTS (the Safety Case). The Safety Case places an obligation on National Grid Gas to maintain OM at levels and locations determined throughout the year.

The OM service is used to maintain system pressures in the period before other system management services become effective (e.g. national or locational balancing actions). A further quantity of OM is also procured to manage the orderly run-down of the system in the event of a Network Gas Supply Emergency (NGSE) whilst firm load shedding takes place.

This document is published pursuant to National Grid's obligations under the UNC, which requires National Grid to publish the following information:

- The assumptions used in the determining Operating Margins Requirements
- The aggregate amount of Operating Margins
- The maximum rate of deliverability required for Operating Margins
- The Operating Margins profile

The terms and conditions of the UNC apply to the contents of the document.

The resultant Operating Margins booking also meets National Grid Gas requirements to conform to its current Safety Case.

For information on Operating Margins, please take a look at our website at:

<https://www.nationalgridgas.com/balancing/operating-margins-om>

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¹ This document is published pursuant to National Grid's obligations under Part 2.2.3 of Section K of the Transportation Principle Document of the UNC.

2 Background Information

2.1 Use of Operating Margins

The criteria for the use of Operating Margins are set out in the System Management Principles Statement available at:

<https://www.nationalgridgas.com/sites/gas/files/documents/System%20Management%20Principles%20Statement%20-%20v6.0.pdf>

2.1.1 Triggers for the use of Operating Margins

The triggers for the use of Operating Margins are as follows:

1. Primarily, Operating Margins will be used in the immediate period following operational stresses such as beach supply failure as a result of a failure offshore, unanticipated demand changes or unexpected pipeline and/or plant unavailability to maintain system pressures in the period before other balancing measures become effective.
2. Orderly Shutdown requires a quantity of Operating Margins stock to ensure safe shutdown of the system in the event of a Network Gas Supply Emergency while firm load shedding takes place as required in our Safety Case.
3. Operating Margins will also be used to support system pressures within 24 hours following a compressor trip, pipe break, or other failure or damage to transmission plant. Following this period, any reduction in capacity resulting from the event becomes equivalent to a planned maintenance activity, and therefore is unlikely to be supported by the use of Operating Margins.

2.1.2 Refilling of Operating Margins

If the volume of Operating Margins, at any point in the winter, falls below the monitor level calculated by National Grid at individual sites, National Grid may seek to refill Operating Margins to the extent of the published monitor where it is practical to do so.

2.2 Safety Case Operating Margins Requirements

Besides meeting our UNC requirements for Operating Margins, the Operating Margins booking must also satisfy our current Safety Case requirements for Operating Margins. These are broadly similar and for reporting purposes we use terminology that is consistent with our Safety Case definitions for Operating Margins.

3 Overview of the Operating Margins Methodology

National Grid has determined its Operating Margins requirement by consideration of all available storage facilities, LNG importation facilities, direct connected loads and supplies on the NTS.

National Grid Gas procures Operating Margins services from storage and LNG importation facilities and their capacity holders as well as offtake reduction and supply increase services. To that end, National Grid Gas has recently completed a tender to procure storage capacity and gas delivery offers.

This year's methodology is consistent with that used last year, with the total booking being split between Group 1, Group 2 and Group 3 as broadly defined in our Safety Case.

GROUP 1 – Beach supply failure and forecast demand change

GROUP 2 – Compressor failure and pipeline failure

GROUP 3 - Orderly Rundown

Operating Margins is primarily calculated by network analysis of the system and to a lesser extent by using various analytical models. Section 4 provides a more detailed explanation of the calculation of the individual elements.

4 Assumptions used in the determination of Operating Margins

4.1 Assumptions used in the Operating Margins calculations

1. Other storage, NTS compressors and pipelines have 100% availability (apart from the specific failure condition being considered).
2. Relevant facilities respond within 2 hours of an event being confirmed.
3. If operating conditions require Operating Margins stocks to be depleted they may be refilled² to the stock profile shown in Section 6.
4. The OM space requirement in each group is the highest OM space requirement of all the operating conditions at each location.
5. The aggregate group space requirement is the sum of the individual locational space requirements.

4.1.1 Operating Margins requirements for Group 1

The determination of the requirements for Group 1 include assessment of the loss of largest single point supply to the NTS using historic and forecast data.

Group 1 Operating Margins requirement is calculated by network analysis of the system.

4.1.2 Operating Margins requirements for Group 2

The requirements for Group 2 include compressor failures and pipeline failures. The operating conditions have been grouped so that the Operating Margins volume and deliverability for this group will satisfy any of the operating conditions of the group individually but not necessarily simultaneously.

Group 2 Operating Margins requirement is calculated by network analysis of the system with the most severe impacting scenario of compressor failure or pipeline failure being applied to the network and by using a range of analytical models using historic and forecast data.

² This may need to be effected by transfer of gas in store if there is limited injection capacity.

4.1.2.1 NTS Compressor failure assumptions

1. Full compressor station failure will be considered.
2. The failed compressor station will be unavailable for use for at least 24 hours.
3. Compressor reliability, running hours, asset age, location with respect to vulnerable areas of the NTS were factors considered when deciding the particular event to be analysed.

4.1.2.2 Pipeline Failure Assumptions

1. The failed section of pipeline will be unavailable for use for at least 24 hours.
2. Asset age, location with respect to vulnerable areas of the NTS, and overall impact of the pipeline failure were considered.

4.1.3 Operating Margins requirement for Group 3

Orderly rundown is Operating Margins stock to ensure safe rundown of the system in the event of a Network Gas Supply Emergency while firm load shedding takes place as required in our Safety Case.

4.1.3.1 Orderly rundown assumptions

1. Severe winter has been experienced, no shipper storage available from 05:00 hours and no shipper firm load reduction.
2. A Network Gas Supply Emergency is declared effective from 05:00 hours and firm load shedding of VLDMCs and LDZ DM loads is required to balance supply and demand.
3. NTS linepack is used to smooth out the mis-match between supply and demand within day, but is limited to +/- 10mcm.
4. With no shipper storage available, the within day supply shortfall is assumed to be met by a combination of Operating Margins booked in Storage and LNG Importation facilities with storage.

4.2 Post-Tender Operating Margins Requirements

Following the tender process, responses have been collated and the total quantities have been re-assessed and compiled based on the profiles of stock and deliverability provided in the submitted tenders (please see section 5).

5 Aggregate Operating Margins Booking 2019/20

Table 1 below shows the aggregated Operating Margins booking for 2019/20.

Table 1: 2019/20 Operating Margins Booking

| | 2018/19 Volume Booking (GWh) | 2019/20 Volume Booking (GWh) | 2019/20 Max Deliverability (GWh/d) |
|------------|---------------------------------------|---|---|
| OM Booking | 676 | 699 | 558 |

This booking explicitly meets our UNC and Safety Case obligations.

Further detail on the 2019/20 Operating Margins tender will be published later this year at:

<https://www.nationalgridgas.com/balancing/operating-margins-om>

The bookings in Table 1 meet the calculated maximum Operating Margins deliverability requirement. To reduce costs and to reflect at high demand that many of these sites are expected to be flowing gas, we will not be booking any site deliverability. Hence, we will use interruptible deliverability or over-run deliverability on the day of use.

6 The Operating Margins Profile

Table 2 below shows the Operating Margins profile, the quantity of gas required for each month of the year. Though not shown the storage profiles can be site specific reflecting their individual Operating Margins needs.

The profiles are generated based on the likelihood of the scenario requiring the use of each group of Operating Margins for that time of year, with proportions of groups being calculated from energy forecasting assumptions of demand and supply.

Table 2: 2019/20 Operating Margin Profile

| | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr |
|----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|-----|-----|
| Monitor (GWh) | 385 | 208 | 192 | 181 | 228 | 516 | 647 | 699 | 699 | 699 | 647 | 568 |
| Monitor (%) | 55% | 30% | 27% | 26% | 33% | 74% | 93% | 100% | 100% | 100% | 93% | 81% |

7 Operating Margins WACOG Calculation Principles

In accordance with Sections K4.2.3(b) and K4.2.6(b) of the UNC, National Grid Gas must publish the principles by which the Operating Margins WACOG and Net Margins WACOG, will be calculated in relation to facilities where National Grid Gas has entered into Operating Margins Gas Delivery Arrangements.

For Gas Delivery Arrangements, Operating Margins WACOG and Net Margins WACOG (Margins WACOG) shall be equal and, in respect of a Operating Margins Facility on a Day, calculated as (i) the total cost of utilising Operating Margins under Gas Delivery Arrangement(s) at such Operating Margins Facility, divided by (ii) the amount of gas delivered to National Grid NTS under the Gas Delivery Arrangement(s) at such Operating Margins Facility.