

# Consultation

## Gas Transmission Network Output Measures Rebasing Consultation

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**Contact:** Thomas McLaren

**Team:** Network Output Measures

**Response deadline:** 3 April 2020

**Tel:** 020 7901 7000

**Email:** Thomas.McLaren@ofgem.gov.uk

We are consulting on our intention to approve the rebased Network Replacement Outputs for Gas Transmission. We would like views from people with an interest in Gas Transmission Network Output Measures, in particular from licensees and gas network customers. We also welcome responses from other stakeholders and the public.

This document outlines the scope, purpose and questions of the consultation and how you can get involved. Once the consultation is closed, we will consider all responses. We want to be transparent in our consultations. We will publish the non-confidential responses we receive alongside a decision on next steps on our website at [Ofgem.gov.uk/consultations](https://www.ofgem.gov.uk/consultations). If you want your response – in whole or in part – to be considered confidential, please tell us in your response and explain why. Please clearly mark the parts of your response that you consider to be confidential, and if possible, put the confidential material in separate appendices to your response.

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## 1. Introduction

### Network Output Measures (NOMs)

#### Network Replacement Outputs

1.1. RIIO (Revenue = Incentives + Innovation + Outputs) introduced in October 2010 by Ofgem is an outputs-led price control framework. The RIIO price control for the gas transmission sector (RIIO-GT1) runs from 1 April 2013 until 31 March 2021. It is important that throughout the RIIO-1 period, the network companies understand what they are expected to deliver, and are held to account for delivery. One of the key areas in this respect are the Network Output Measures (NOMs), which help to quantify the impact of the companies' asset management work, and enable Ofgem and stakeholders to see what the network companies have done in respect of the work they have been funded to deliver.

1.2. We<sup>1</sup> have set out the arrangements relating to NOMs<sup>2</sup> in the licences of all gas and electricity networks. As part of these arrangements, licensees have been set targets that set out the network risk outcomes they are required to deliver by the end of RIIO-1 through their asset management activities. For National Grid Gas Transmission (NGGT<sup>3</sup>), these targets are called Network Replacement Outputs (NROs) and are set out in Special Condition 7E (SpC 7E)<sup>4</sup> of its gas transporter licence<sup>5</sup>. NGGT is required to deliver its NROs by the end of RIIO-GT1. These NROs reflect the impact of the asset intervention workload (usually replacement or refurbishment) that NGGT has been funded to deliver in RIIO-GT1, and represent replacement priority targets<sup>6</sup> to be delivered through interventions on five NOMs primary asset categories (PACs)<sup>7</sup>. The NROs are based on NGGT's own methodology for assessing the

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<sup>1</sup> The Gas and Electricity Markets Authority. Ofgem is the office of the Authority. The terms "Ofgem", "the Authority," "we" and "us" are used interchangeably in this document.

<sup>2</sup> NOMs are mechanisms that provide a means to monitor and assess the network asset management outcomes that network companies deliver.

<sup>3</sup> The terms "NGGT" and "Licensee" are used interchangeably. They refer to the onshore gas transmission network operator (National Grid Gas Plc).

<sup>4</sup> Special Licence Condition 7E. Specification of Network Replacement Outputs. Part A: Obligation to deliver Network Replacement Outputs

<sup>5</sup> Table 1: Network Replacement Outputs set the replacement priority (RP) expected to be reached by 31 March 2021. The RP is based on the of asset volumes distributed, based on their health and criticality, onto 5x4 tables. For each asset category, NGGT has stated its price control start position (2013) and its view of the price control end position (2021) for both with and without intervention scenarios.

<sup>6</sup> Replacement priority targets is the expected position NGGT is targeted to meet through their intervention plan for RIIO-GT1.

<sup>7</sup> These are: Entry, Exit, Compressor, Pipeline and Multijunction.

health and criticality of its network assets and the impact of its asset interventions on these parameters.

### **Development of NGGT's NOMs Methodology**

1.3. The NOMs mechanism provides a means to monitor and assess the network asset management outcomes that network companies deliver. They represent the service delivery resulting from companies' asset interventions, and can be considered a forward-looking indicator of network performance.

1.4. The methodology that underpinned NGGT's original NRO targets (we refer to these as "Original Targets"), introduced at the beginning of the RIIO-GT1 price control for the purpose of prioritising network assets for replacement or refurbishment. However, because it was volumetric based, it did not allow for robust like-for-like comparisons across different PACs. On 19 June 2018, the Authority published its decision to not reject NGGT's new NOMs Methodology<sup>8</sup>, which utilised a monetised risk approach<sup>9</sup> to help address the comparability issues. As part of that decision, we noted the following:

*It is important that [NGGT's NOMs Methodology] is robustly validated and NGGT's existing asset volume targets are appropriately translated to monetised targets, in order that the NOMs Methodology as submitted is used to effectively implement the NOMs Incentive Mechanism and to objectively and transparently inform NGGT's investment planning. Once implemented, [NGGT's NOMs Methodology] will allow us to interrogate NGGT's investments and future plans and to assess whether they are justified...*

*We expect NGGT to propose and agree the methodology for rebasing with us ahead of submission of the final rebased targets in January 2019. We also expect agreement on the appropriate inputs to the model (such as included failure modes, and supply and demand scenarios)...*

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<sup>8</sup> [Ofgem's decision not to reject the modified gas transmission Network Output Measures \(NOMs\) methodology](#)

<sup>9</sup> Under this approach, risk values are represented in monetary terms as a 'common currency' to enable like-for-like comparison between assets and asset groups. Please refer to the methodology linked in footnote 8 for details.

1.5. The exercise of translating existing asset volume targets into monetised targets is called “rebasing”. We refer to these equivalent monetised risk targets as the “Rebased Targets”.

### **NOMs Incentive Methodology and Rebasing**

1.6. On 6 December 2018, the Authority published its decision on a common approach to implementing the NOMs Incentive Methodology. This decision set out the requirement for each sector to work out specific aspects of implementing this agreed methodology.<sup>10</sup> As part of RIIO-GT1 close-out, we will need to assess NGGT’s performance against its Original Targets and calculate the value of any revenue adjustments that might be due under the NOMs incentive mechanism. In order to allow us to carry out this assessment, we need to ensure that both its NOMs target data and the reported actual delivery data are derived on the same basis (i.e. according to the same methodology) and expressed in the same terms. NGGT’s actual delivery at the end of RIIO-GT1 will be reported in accordance with its new NOMs Methodology. As discussed above, NGGT is expected to rebase its Original Targets into equivalent monetised risk targets to enable like-for-like comparison.

### **Rebasing Principles and Process**

1.7. Appendix 1 to our decision not to reject modified gas transmission Network Output Measures (NOMs) methodology<sup>11</sup> set out that when completing the rebasing exercise, we expect NGGT to adhere to the following principles (the “Rebasing Principles”):

- 1) Rebased Targets shall be as equally challenging as the original ones for NGGT to meet and outperform,
- 2) the same principles shall be applied as those used in the RIIO-T1 Business Plan, and
- 3) direct translation of original investment plan shall be made wherever appropriate.

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<sup>10</sup> <https://www.ofgem.gov.uk/publications-and-updates/decision-network-output-measures-noms-incentive-methodology>

<sup>11</sup> [Decision to not reject the modified gas transmission Network Output Measures \(NOMS\) Methodology](#). Appendix 1: Further NOMs related work

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1.8. NGGT submitted an initial set of Rebased Targets to Ofgem on 17 December 2018. Since then, we have worked with NGGT to finalise its rebasing methodology, validate its new NOMs Methodology and agree a standard data reporting format<sup>12</sup> that allows us to compare its Rebased Targets against its Original Targets. NGGT submitted its final Rebased Targets for Authority approval on 20 August 2019.

1.9. NGGT has an absolute target for RIIO-GT1. This means that it is required to deliver a specified level of risk on its network at the end of the price control period (31 March 2021). The total network monetised risk (R£)<sup>13</sup> values indicated by NGGT’s Rebased Targets for the end of RIIO-GT1 is R£5.84m. Figure 1 provides a breakdown of the R£5.84m target position. NGGT is permitted to trade risk across asset categories in order to deliver its total risk target. The equivalent ‘without intervention’ position (i.e. if NGGT did not carry out any work during RIIO-GT1) is R£8.69m.

**Figure 1: Monetised Risk by Asset Category Replacement Priority**

Primary Asset Categories (PACs)		Monetised Risk	Risk Priority (RP)				Total R£
			RP1	RP2	RP3	RP4	
1	Entry	R£	79,107	13,951	1,558	47,767	142,383
2	Exit	R£	320,147	6,790	1,651	7,041	335,629
3	Compressor	R£	378,086	152,390	65,754	121,401	717,632
4	Pipeline	R£	562,672	568,666	383,245	2,756,804	4,271,387
5	Multijunction	R£	317,128	5,795	34,610	13,082	370,615
<b>Total</b>		R£	1,657,140	747,591	486,820	2,946,095	<b><u>5,837,645</u></b>

1.10. We are satisfied the monetised risk values, for with and without investment, are suitable for relative comparison and risk trading,<sup>14</sup> for the purposes of assessing NGGT’s performance under the NOMs incentive mechanism at the end of RIIO-GT1, and for making any consequential adjustments to NGGT’s allowed revenue. Risk trading may occur between

<sup>12</sup> NGGT submitted asset volumes as well as monetised risk as part of its Rebased Targets submission. This data was provided in an Excel template that utilised a 5x4 asset health/criticality matrix in the same format as the Original Targets.

<sup>13</sup> Risk Pound (R£) is the unit used to denote monetised risk.

<sup>14</sup> Risk trading in the context of NROs refers to when a licensee delivers a materially equivalent NRO, in place of another NRO they set out to deliver, as defined in SpC 7E paragraph 7E.6 b)



asset categories or replacement priority bands and will be reviewed in accordance with the NOMs Incentive Mechanism.

### **Our minded-to decision**

1.11. Our minded-to decision is to approve NGGT's Rebased Targets.

### **What we are consulting on**

1.12. This consultation seeks views on the following questions:

1. Do you agree with our rebasing assessment methodology? (Section 3)
2. Do you agree with our view that the Rebased Targets satisfy the Rebasing Principles? (Section 4)
3. Do you agree with our minded-to decision to approve NGGT's Rebased Targets and modify NGGT's licence in order to substitute them for the Original Targets? (Section 5)

1.13. Where you disagree, please clearly set out your reasoning and specify any other considerations/factors we should take into account.

1.14. Alongside this consultation document, we have published a notice of statutory consultation on a proposal to modify SpC 7E of NGGT's gas transporter licence to implement our minded-to decision.

1.15. If we decide to make the proposed licence modification, it will take effect not less than 56 days after the decision is published.

### **How to respond**

1.16. We want to hear from anyone interested in this consultation. Please send your response to the person or team named on this document's front page.

1.17. We've asked for your feedback in each of the questions throughout. Please respond to each one as fully as you can.

1.18. We will publish non-confidential responses on our website at [www.ofgem.gov.uk/consultations](http://www.ofgem.gov.uk/consultations).

## Your response, data and confidentiality

1.19. You can ask us to keep your response, or parts of your response, confidential. We'll respect this, subject to obligations to disclose information, for example, under the Freedom of Information Act 2000, the Environmental Information Regulations 2004, statutory directions, court orders, government regulations or where you give us explicit permission to disclose. If you do want us to keep your response confidential, please clearly mark this on your response and explain why.

1.20. If you wish us to keep part of your response confidential, please clearly mark those parts of your response that you *do* wish to be kept confidential and those that you *do not* wish to be kept confidential. Please put the confidential material in a separate appendix to your response. If necessary, we'll get in touch with you to discuss which parts of the information in your response should be kept confidential, and which can be published. We might ask for reasons why.

1.21. If the information you give in your response contains personal data under the General Data Protection Regulation 2016/379 (GDPR) and domestic legislation on data protection, the Gas and Electricity Markets Authority will be the data controller for the purposes of GDPR. Ofgem uses the information in responses in performing its statutory functions and in accordance with section 105 of the Utilities Act 2000. Please refer to our Privacy Notice on consultations, see Appendix 4.

1.22. If you wish to respond confidentially, we'll keep your response itself confidential, but we will publish the number (but not the names) of confidential responses we receive. We won't link responses to respondents if we publish a summary of responses, and we will evaluate each response on its own merits without undermining your right to confidentiality.

## General feedback

1.23. We believe that consultation is at the heart of good policy development. We welcome any comments about how we've run this consultation. We'd also like to get your answers to these questions:

1. Do you have any comments about the overall process of this consultation?

2. Do you have any comments about its tone and content?
3. Was it easy to read and understand? Or could it have been better written?
4. Were its conclusions balanced?
5. Did it make reasoned recommendations for improvement?
6. Any further comments?

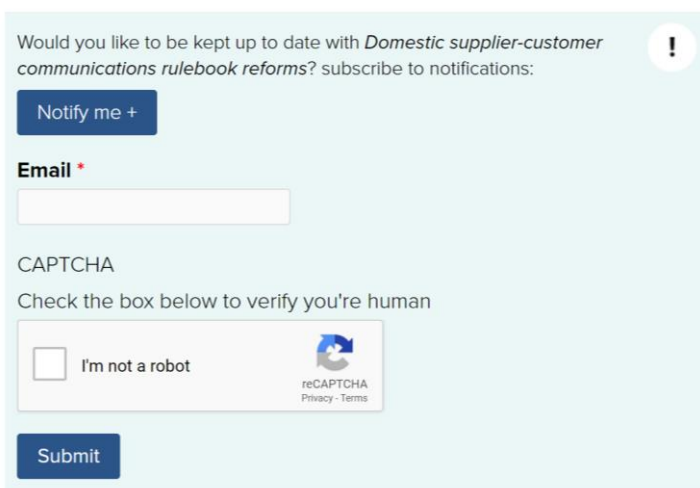
Please send any general feedback comments to [stakeholders@ofgem.gov.uk](mailto:stakeholders@ofgem.gov.uk)

### How to track the progress of the consultation

You can track the progress of a consultation from upcoming to decision status using the 'notify me' function on a consultation page when published on our website.

[Ofgem.gov.uk/consultations](https://www.ofgem.gov.uk/consultations).

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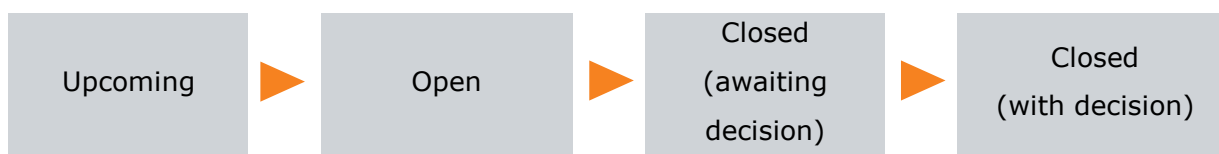
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Once subscribed to the notifications for a particular consultation, you will receive an email to notify you when it has changed status. Our consultation stages are:



## 2. Overview of NGGT's Validation Report and Rebasing Methodology

### Section summary

This section presents an overview of the approach taken by NGGT to validate its NOMs Methodology models, the processes it followed in developing its rebasing methodology, and our views on these.

### NGGT's approach to validating its NOMs Methodology models

2.1. In our NOMs Methodology decision published in June 2018, we said that we expect NGGT to validate its NOMs Methodology, and that we expect agreement on the appropriate inputs to the NOMs model that applies to the Methodology, including those on supply and demand scenarios. NGGT completed this process and submitted to us a Validation Report along with documentation explaining its methodological approaches and the validation results.

2.2. NGGT submitted its initial Validation Report on 17 December 2018. Based on recommendations and discussions with external reviewers<sup>15</sup>, NGGT applied all significant identified improvements to its NOMs Methodology<sup>16</sup>. Some of the remaining recommendations may be incorporated into future NOMs Methodology development work.

2.3. NGGT submitted its final Validation Report to us on 19 August 2019.

2.4. **Figure 2**<sup>17</sup> provides the overview of NGGT's NOMs Methodology validation approach. Numbered paragraph

### Figure 2: NGGT's Validation Approach Overview<sup>18</sup>

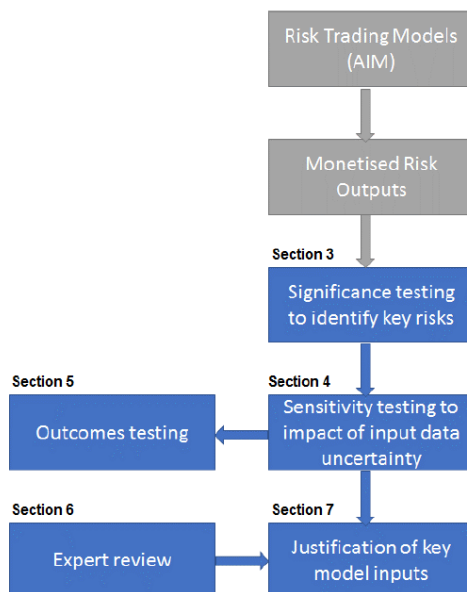
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<sup>15</sup> NGGT commissioned PIE (Pipeline Integrity Engineers Ltd) to undertake an independent review of its rebasing exercise.

<sup>16</sup> NGGT's expert review recommended using a 1-in-20 demand scenario, based on Future Energy Scenarios (FES) 2021 base demands, rather than the average high winter's day scenario originally selected. Some additional accuracy improvements were applied; these can be viewed in full in NGGT's Validation Report, which is published alongside this document.

<sup>17</sup> Figure 2 has been taken from NGGT's Validation Report Section 2.4: Validation Summary.

<sup>18</sup> Section numbers, in figure 2, refer to sections in NGGT's Validation Report.



2.5. [Appendix 1](#) provides a high-level summary of NGGT’s validation approach. Further details are available in NGGT’s Validation Report document, which is published alongside this consultation.

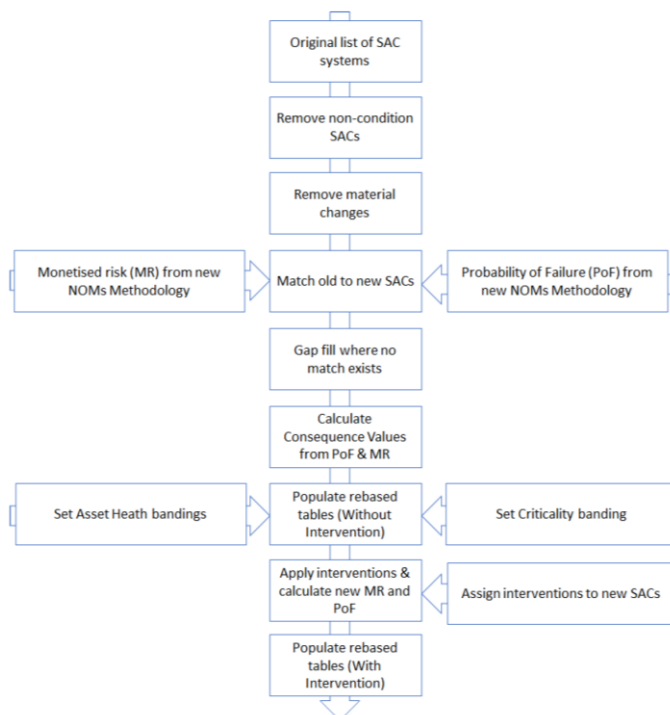
### NGGT’s process for developing its Rebasing Methodology

2.6. NGGT developed its Rebasing Methodology in accordance with the Rebasing Principles listed in paragraph 1.7 above. NGGT developed this alongside its validation approach. **Figure 3<sup>19</sup>** provides an overview of the process it followed in doing this.<sup>20</sup>

<sup>19</sup> Figure 3 has been taken from NGGT’s Rebasing Methodology Section 2: The Rebasing Process.

<sup>20</sup> Figure 3 contains the term Probability of Failure (PoF), which is measure of the likelihood of an asset health failure, and Secondary Asset Category (SAC), which is the categorisation of assets types.

**Figure 3: NGGT’s Rebasing Process Overview**



2.7. NGGT submitted its initial Rebasing Methodology on 17 December 2018, alongside its validation report. NGGT considered and implemented suggestions from the Authority and submitted its Rebased Targets and a final Validation Report to us on 19 August 2019.

2.8. [Appendix 2](#) provides a high-level summary of NGGT’s Rebasing Methodology. Further details are available in NGGT’s Rebasing Methodology document, which is published alongside this consultation.

### **Our view on NGGT’s Validation Report and Rebasing Methodology**

2.9. We have reviewed NGGT’s Validation Report and supporting evidence. We are satisfied that NGGT has made appropriate amendments to its NOMs Methodology to improve the accuracy of model outputs. We note that the amendments were based on the recommendations from expert reviewers. Therefore, we are of the view that NGGT has appropriately validated its NOMs Methodology to ensure that it is fit for purpose.

2.10. We have also reviewed NGGT’s Rebasing Methodology and supporting evidence. We are satisfied that NGGT’s approach to deriving the network risk position at the start of RIIO-GT1 is appropriate and utilised the most complete and robust data available to it. We are also satisfied that the rebasing approach presented by NGGT will properly represent its network risk position at end of RIIO-GT1 for both ‘with intervention’ and ‘without intervention’

scenarios by using its NOMs Methodology. Therefore, we are of the view that NGGT's Rebasing Methodology sets out suitable approaches for deriving its Rebased Targets.

2.11. In the next section, we discuss how the Rebased Targets, derived from NGGT's Rebasing Methodology, are assessed against the Rebasing Principles.

### 3. Our Rebasing Assessment Methodology

#### Section summary

This section discusses our rebasing assessment methodology and seeks views on it.

**Question 1:** Do you agree with our rebasing assessment methodology?

#### Relationship between Original Targets and Rebased Targets

3.1. Our NOMs Methodology decision<sup>21</sup> set out the Rebasing Principles that NGGT was expected to adhere to when doing the rebasing exercise. These are that:

1. Rebased Targets shall be as equally challenging as the original ones for NGGT to meet and outperform,
2. the same principles shall be applied as those used in the RIIO-T1 Business Plan, and
3. direct translation of original investment plan shall be made wherever appropriate.

3.2. Our assessment considers if the submitted Rebased Targets meet each of these principles.

3.3. The relationship between the Original Targets and Rebased Targets is illustrated in Figure 4. The Original Targets were volume-based outputs<sup>22</sup>, while the Rebased Targets use a monetised risk approach. Fundamentally, both sets of targets are based on consistent asset

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<sup>21</sup> Decision to not reject the modified gas transmission Network Output Measures (NOMS) Methodology. Appendix1: Further NOMs related work

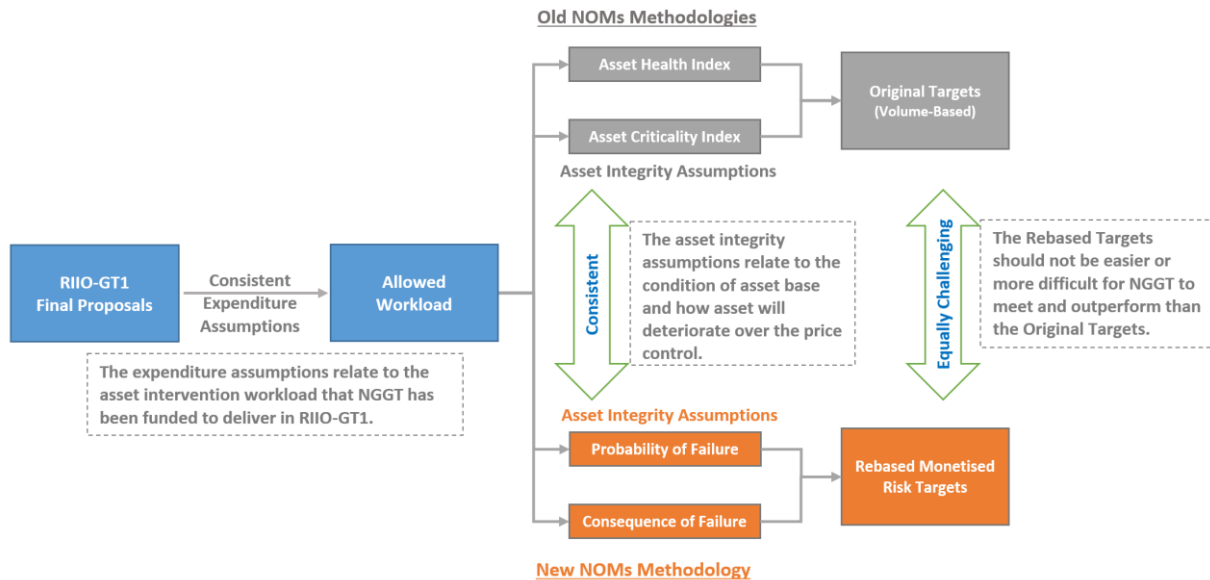
[https://www.ofgem.gov.uk/system/files/docs/2018/06/gt\\_noms\\_methodology\\_confirmation\\_letter.pdf](https://www.ofgem.gov.uk/system/files/docs/2018/06/gt_noms_methodology_confirmation_letter.pdf)

<sup>22</sup> This is because the methodology in accordance with which those targets were derived was volumetric-based.



integrity assumptions and the same allowed workload NGGT was funded to deliver in RIIO-GT1.

**Figure 4: Relationship between Original and Rebased Targets**



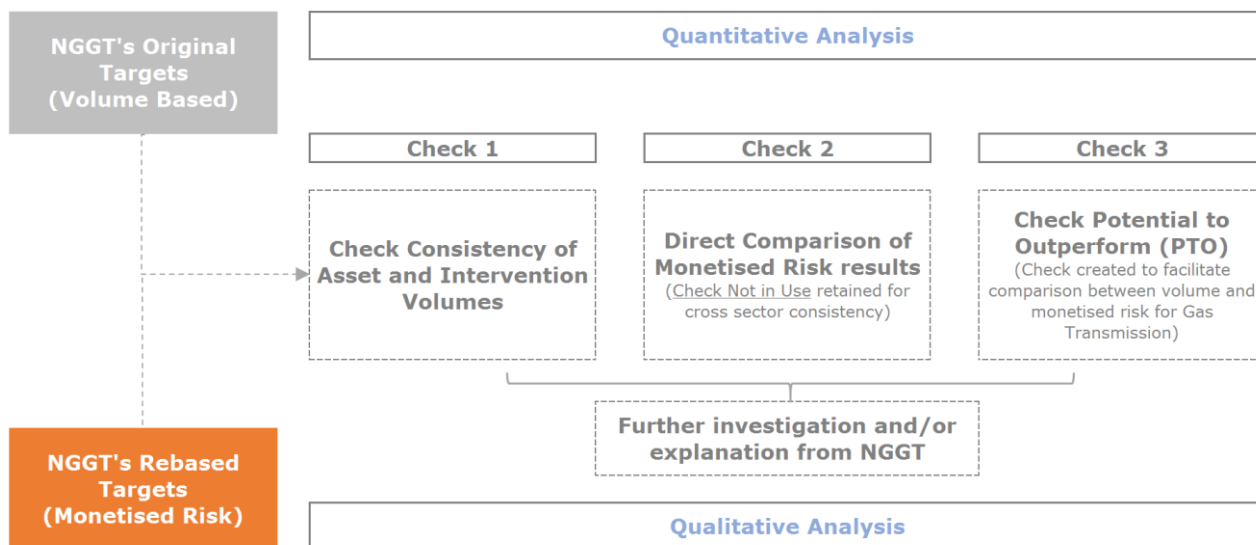
**Our rebasing assessment<sup>23</sup>**

3.4. No single test can by itself confirm that the Rebased Targets satisfy all three Rebasing Principles. We have, therefore, adopted a two-stage assessment to confirm whether the submitted Rebased Targets meet all principles. Stage 1 (Quantitative Analysis) involved running a series of mathematical indicative comparisons between the Original and Rebased Targets. Stage 2 (Qualitative Analysis) involved interpreting and understanding any apparently anomalous results from Stage 1. The assessment approaches we applied to NGGT’s Rebased Targets are consistent with the assessments we applied for electricity distribution and gas distribution companies, but have been modified where appropriate to take account of differences in target specifications and in available data.

3.5. An overview of our rebasing assessment approach is illustrated in **Figure 5**.

<sup>23</sup> The approach we have taken in our rebasing assessment is consistent with that taken in assessing the gas distribution Rebased Targets. <https://www.ofgem.gov.uk/publications-and-updates/decision-approve-and-direct-rebased-network-outputs-gas-distribution-network-operators>

Figure 5: Overview for GT Rebasng Assessment Approach



### Stage 1: Quantitative Analysis

3.6. We developed three indicative quantitative checks to allow us to form an initial view on the Rebased Targets compared with the Original Targets. Failure of a qualitative check does not necessarily mean that the 'equally challenging' requirement has not been met. This is because the two sets of targets are based on two very different methodologies. A failure, therefore, simply indicates to us that further investigation is required in order to determine whether the equally challenging criterion has been met.

3.7. We cannot directly assess the monetised risk in the Rebased Targets against the volume outputs in the Original Targets (Check 2). In order to carry out meaningful like-for-like comparison between both sets of targets, it was necessary to consider the asset volumes that underpin the monetised risk (Rebased) Targets and compare these volumes with the Original Target volumes.

3.8. The three quantitative checks we developed are explained below. These were carried out at both an individual asset category level and at the total network level.

#### Check 1: The volume of assets and intervention

3.9. This check examined whether the volume of assets and interventions in each NOMs asset category within the Rebased Targets is consistent with the Original Targets. Check 1 is

considered to be passed where the volumes of assets and interventions between the Original and Rebased Targets are equal.

### **Check 2: Direct Risk Reduction**

3.10. In order to run Check 2 we need the Original Targets to be monetised. NGGT's Original Targets were purely volume based so Check 2 was not utilised for the assessment of its Rebased Targets. Check 3 was developed to perform similar comparisons to Check 2 but using asset volumes.

### **Check 3: The potential to outperform (PTO)**

3.11. Neither Check 1 nor Check 2 considers the health and criticality of the asset base and the relative risk or health/criticality of the assets being intervened on. For Check 3, we calculated a numerical PTO score for each individual asset category. The PTO score indicates the extent to which NGGT could potentially outperform (deliver more risk benefit) by intervening on either higher criticality or worse health assets. As we need to consider both the health and criticality dimensions, we broke this into: Check 3.1, which considers the Rebased Targets from an asset criticality perspective, and Check 3.2, which considers the Rebased Targets from an asset health perspective. We compared the PTO score for the Rebased Targets against the PTO score for the Original Targets. Check 3 is considered to be passed if the Original Target has an equal<sup>24</sup> or higher PTO score than the Rebased Targets.

### **Stage 2: Qualitative Review**

3.12. Where indicative quantitative checks suggested that the 'equally challenging' had not been met, we then moved on to the qualitative phase of our assessment. This involved questions to, and discussion with, NGGT on the reasons for any failed tests. As NGGT is almost three quarters of the way through implementing its original investment plans, which were based on the old NOMs methodologies, this helped us to understand whether, in practice, moving to the new NOMs Methodology and the submitted Rebased Targets gives it greater opportunity to outperform against its targets.

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<sup>24</sup> We allowed 5% difference tolerance for the comparison results in Check 3.

## **Summary**

3.13. We consider our rebasing assessment methodology robustly analyses whether the submitted Rebased Targets are equally as challenging as the Original Targets. A more detailed explanation of our quantitative analysis can be found at Appendix 3.

3.14. In the next section, we present the results of our rebasing assessment and set out the rationale for our minded-to decision.

## 4. Our Rebasing Assessment Results

### Section summary

This section presents the results of our rebasing assessment, sets out the rationale for our minded-to decision to approve NGGT's Rebased Targets and seeks views on it.

**Question 2:** Do you agree with our view that the Rebased Targets meet the Rebasing Principles? Where you disagree, please clearly set out your reasoning.

### Quantitative Analysis Results

4.1. NGGT's Rebased Targets passed all quantitative checks at the PAC level and at the network level. For more information, please see the Equally Challenging workbooks published alongside this document.

4.2. To ensure a robust checking process, we reviewed the rationale behind NGGT's data normalisation to ensure that these normalisations were appropriate and necessary to ensure like-for-like comparison between its Original Targets and Rebased Targets<sup>25</sup>.

4.3. Appendix 5 provides a summary of our review of NGGT's data normalisations. We are satisfied, based on the explanations provide by NGGT, that data normalisations were required to remove non-asset health or condition-related assets and to adjust asset data volumes based on changes to its original investment plan.

### Qualitative Review Results

4.4. As NGGT's Rebased Targets passed all quantitative checks, a detailed qualitative review was not required.

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<sup>25</sup> NGGT refers to data normalisation as 'material change' in its Rebasing Methodology. Data normalisation was required to ensure monetised risk was not being determined for assets that did not exist or were not included in the original investment forecast.

## 5. Conclusions and proposed next steps

### Section summary

This section sets out our conclusions from our rebasing assessment as well as the next steps.

**Question 3:** Do you agree with our intention to approve NGGT's Rebased Targets and modify NGGT's licence accordingly? Where you disagree, please clearly set out your reasoning.

### Our View

5.1. As discussed in Section 4, we consider that NGGT's Rebased Targets pass all quantitative checks and therefore satisfy the Rebasing Principles.

5.2. We therefore propose to modify SpC 7E of NGGT's licence to replace in Table 1: Network Replacement Outputs the volume-based Original Targets with the monetised risk Rebased Targets.

### Next Steps

5.3. We welcome views on the information presented, in particular in response to the specific questions asked in sections 3, 4 and 5. Unless marked confidential, all responses will be published on our website.

5.4. We have separately published a notice to modify SpC 7E of NGGT's licence in order to implement our minded-to decision.

5.5. Our decision will be made following consideration of any representations received. The proposed licence modification will take effect not less than 56 days after the decision is published.

## Appendices

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## Appendix 1 – Overview of NGGT’s approach to validating its NOMs Methodology models

### Introduction

1.1. NGGT’s NOMs Methodology consists of two independent models: Sites and Pipelines<sup>26</sup>. To ensure that the underlying models produce suitable monetised risk outputs, NGGT undertook a process to validate those models and submitted a report to Ofgem, which is published alongside this consultation. This appendix provides a high-level summary of NGGT’s validation process.

### Significant Routes

1.2. NGGT first identified ‘significant’ routes through its NOMs Methodology models. ‘Significant’ is defined by NGGT as the monetised risk contribution, of a specific Service Risk Framework Measure (SRF<sup>27</sup>), when compared to the total monetised risk is large enough to require focussed validation of contributing data inputs.

1.3. NGGT determine significance through the contribution of SRF measures towards the total network monetised risk. The aim of this process allows the SRF Measures that drive the greatest impact on total monetised risk to be taken into the next process of the sensitivity testing.

### Sensitive Inputs

1.4. NGGT then tested significant routes to identify ‘sensitive’ inputs. Sensitive is defined as the uncertainty a specific data input may have on the overall monetised risk or investment outcome.

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<sup>26</sup> NGGT split its assets into two categories for modelling.

**Pipelines:** assets directly associated with the network of predominantly underground pipes and associated pipe protection.

**Sites:** above-ground assets (AGIs) that form Entry points, Exit points, Multijunctions, Block Valves and Compressor sites.

<sup>27</sup> The SRF provides a consistent method of assessing and articulating the consequence of that asset failure and the service valuations. It provides a common language with which to consistently communicate risk associated with the physical and commercial performance of the asset base i.e. monetised risk.



1.5. NGGT's sensitivity testing assesses specific variables and coefficients (and associated calculations). Within an identified significant route, each input is assessed and compared with other inputs within that route. This provides an identifier of inputs that are sensitive relative to a significant route. The logic applied is that identified sensitive inputs influence a significant route, which subsequently drives total monetised network risk.

1.6. The sensitive inputs are presented in section 4.4, Table 10 of NGGT's Validation Report.

### **Materiality of Input Data Uncertainty on Outcomes**

1.7. NGGT applied an alternative sensitivity test to supplement the testing above. The purpose of these tests was to explore the relative impact of changing input conditions may have on the modelled total monetised risk, giving a view on the materiality and sensitivity of the input conditions.

### **Justification of Key Model Inputs**

**1.8.** Within the justification section of the Validation Report, NGGT present further investigation and discussion on the significant routes and sensitive inputs, exploring the technical and physical aspects. The purpose of this analysis is to confirm that the identified routes through NGGT's risk maps are significant, and to confirm the sensitive inputs. This allows for a better understanding of the inputs that drive monetised risk and potentially investment. The inputs NGGT found to be significant and sensitive are discussed, and potential improvement presented, in section 7 of NGGT's Validation Report.

### **Independent Expert Review**

1.9. The purpose of the independent expert review was to confirm that the model outputs are sensible from an engineering and industry perspective, and to comment on the criticality of inputs and outputs. Pipeline Integrity Engineers (PIE) completed the review of NGGT's models.

1.10. NGGT's model was developed using a specialist asset investment optimisation solution called Asset Investment Manager (AIM). PIE concluded that the model provides a detailed and comprehensive representation of all the NGGT pipeline and site assets. In addition, PIE also provided recommendations to NGGT to improve its Sites and Pipeline models. NGGT applied some of these recommended changes and noted others as future model improvements.

1.11. A full list of conclusions and recommendations can be found in section 6 of NGGT's Validation Report. A follow up expert review on the applied changes can be found in section 9.5, of the Validation Report.

### **Supply and Demand Scenario**

1.12. One notable item that was raised during from the expert review was the application of the average high winter's day supply and demand scenario. The experts recommended the supply and demand scenario be changed to the industry-recognised 1-in-20 demand scenario, based on Future Energy Scenarios (FES) 2021 base demands. NGGT applied further validation to the supply and demand part of its models and made the recommended change. For further information, please refer to section 9 of the Validation Report.

### **NGGT's Improvement Plan**

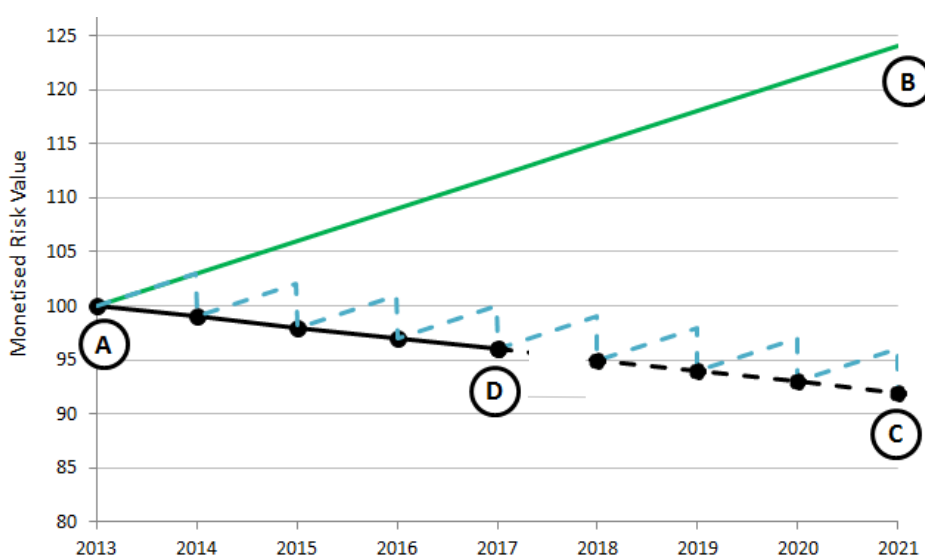
1.13. Based on the findings in the Validation Report, NGGT present a summary of model improvements to increase the reliability and accuracy of its NOMs Methodology Models. Please refer to section 10 of NGGT's Validation Report for the improvement actions and indicative timescales.

## Appendix 2 - Overview of NGGT's Rebasing Methodology

### Overall Rebasing Process

1.1. NGGT's overall rebasing process is illustrated in **Figure 6** below. NGGT has an absolute target based on the level of risk on its network after investment is applied (Point C). This is different to the Electricity Distribution (ED) and Gas Distribution (GD) targets that are based on relative risk removed from the network (the delta between Point B and Point C).

**Figure 6: NGGTs' Overall Rebasing Process**



1.2. Where:

Step 1\_Starting Position of 2019 (Point A): Derive the monetised risk position at start of RIIO-GT1.

Step 2\_End Position of 2021 without Interventions (Point B): Derive the monetised risk position without interventions at end of RIIO-GT1 by applying expected asset deterioration.

Step 3\_End Position of 2021 with Interventions (Point C): Derive the monetised risk position with interventions at end of RIIO-GT1 by applying the impact of asset interventions required under RIIO-GT1 Final Proposals.

## Rebasing Methodology

1.3. The purpose of rebasing is to translate Network Replacement Outputs, which were defined using the old volumes-based NOMs Methodology, into equivalent monetised risk values using the new NOMs Incentive Methodology. This process will allow for a “like for like” comparison between NOMs targets and actual delivery, which will be reported on a monetised risk basis in accordance with the new NOMs Methodology.

1.4. NGGT’s approach to rebasing followed the following four main steps:

1. Apply data normalisations
2. Alignment of Data Sets
3. Apply Interventions
4. Population Rebasing Template

### **Step 1: Applying data normalisations:**

1.5. NGGT data normalised its RIIO-GT1 Original Targets. The adjustments included the removal of assets that are not driven by asset health or condition improvement. Its data normalisations also included adjustments for any non-asset health additions, decommissioning (removals) and removal of load schemes.

### **Step 2: Alignment of Data Sets**

1.6. Before NGGT could band its assets into the required 5X4 matrix, it first had to determine the restated RIIO-GT1 start position, based on its original licence tables (minus data normalisations) and new NOMs Methodology. This provides the Probability of Failure (PoF), Consequence Value<sup>28</sup> and Monetised Risk for each asset.

1.7. NGGT applied the following banding approach to account for outliers (i.e. assets not within 10<sup>th</sup> to 90<sup>th</sup> percentile):

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<sup>28</sup> Consequence Value is representative of the Consequence of Failure (CoF) equals Monetised Risk divided by Probability of Failure. This approach was used for the CoF due to the nature in which the AIM model outputs the Monetised Risk.

**Table 1: Banding applied to assets**

AH1	AH2	AH3	AH4	AH5
Includes bottom 10 <sup>th</sup> percentile, plus the next 1/5 of the PoF values	Equally Banded	Equally Banded	Equally Banded	Includes top 10 <sup>th</sup> percentile, plus the previous 1/5 of the PoF values

1.8. The criticality dimension of the 5x4 matrix was populated using the Consequence Value to represent the Consequence of Failure term. The PoF term represents the asset health of an asset, and is directly banded in the 5x4 matrix.

### Step 3: Applying Interventions

1.9. NGGT applied the following intervention benefits:

Replacement intervention<sup>29</sup>:

- For Site assets, a 90% reduction in the asset PoF<sup>30</sup> is applied. The new asset is also assumed to start with a zero age for future deterioration modelling.

Refurbishment intervention<sup>31</sup>:

- For Site assets, a 50% reduction in the asset PoF is applied.
- For Pipeline assets, the calculated risk reduction is applied to the whole pipeline.

1.10. The interventions are applied to the median assets within AH5 bands. If all AH5 assets are chosen, interventions will apply in the same manner to the next band (i.e. AH4) until all interventions have been applied.

### Step 4: Populating Rebasing Template

1.11. NGGT populated the Rebasing Template, which is published alongside this consultation.<sup>32</sup>

<sup>29</sup> A Replacement intervention is where an existing asset is replaced with a new asset.

<sup>30</sup> Reduction in the PoF is applied as this is relative to the asset's health whereas CoF is reflective of the environment the asset is located. The CoF should be fairly static despite asset replacement/refurbishment unless there is a change to the environment around the asset.

<sup>31</sup> A Refurbishment intervention is where an existing asset is repaired or intervened on to improve or extend the life of the asset.

<sup>32</sup> Tab 2.3 Rebased Targets, Total MR supersedes Tab 2.2 Rebased Targets, Monetised. Tabs 1.0, 1.1, 1.2, 2.1 2.3 were used to populate the equally challenging models.

## Appendix 3 – Our Quantitative Analysis

### Standardised Rebasing Data Submission

1.1. In order to allow us to carry out the quantitative analysis in a consistent and transparent manner, we agreed with NGGT a standard rebasing data template. The template is populated with the Rebased Targets (and supplementary data) in both the volume and monetary format as the 5x4 matrix of asset health/criticality indices (HI<sup>33</sup>/CI) used in the Original Targets.

1.2. The standard 5x4 matrix of HI/CI is illustrated in **Figure 7** below, where the asset risk increases along both the asset health index (from HI1 to HI5) and criticality index (from C4 to C1).

**Figure 7: The 5x4 Matrix for Original Targets and Rebased Targets**

5 x 4 Matrix		HI Banding				
		1	2	3	4	5
CI Banding	4					
	3					
	2					
	1					

*Note: The table includes dashed arrows indicating 'Risk Increases' moving from right to left (HI 5 to 1) and from bottom to top (CI 1 to 4).*

### Quantitative Analysis

1.3. No single test can by itself confirm that the Rebased Targets satisfy the licence requirements. We therefore adopted a two-stage assessment. First, we carried out quantitative analysis to form an initial view on the Rebased Targets; second, in cases where the Rebased Targets appear to not fully meet all the requirements, we would conduct a qualitative review to allow us to understand whether, in practice, the Rebased Targets can fail certain parts of the quantitative analysis but still be considered as satisfying the rebasing requirements.

1.4. Initially, we considered using the statistical test (Check 2) applied in the ED NOMs rebasing assessment<sup>34</sup> to check whether the risk points delivered by the Rebased Targets are

<sup>33</sup> HI and AH are used interchangeably to represent Probability of Failure (PoF) within the 5x4 matrix.

<sup>34</sup> ED NOMs Rebasing Requirements and Assessment Methodology:

equally as challenging as the Original Targets. However, due to the inherent difference of the Original Targets between GD/GT (volume-based) sectors and ED (monetisation-based) sector, we found that this statistical test cannot give consistent and reliable results for GD/GT to allow us to derive meaningful findings. We therefore decided to omit this statistical test and developed the potential to outperform (PTO) check as an appropriate alternative. The PTO was originally developed for testing GD rebased targets. We have then used the same approach to test the rebased targets for GT.

1.5. The following paragraphs provide more detailed explanations of each of the checks in our quantitative analysis.

### **Check 1: Asset and Intervention volumes**

This check examined whether the volume of interventions in each NOMs Asset Category in the Rebased Targets is the same as the Original Targets. Check 1 is considered to be passed where the volumes of interventions are equal.

### **Check 2: Direct Risk Reduction**

1.6. This check was designed as a direct comparison of monetised risk. A direct comparison was not possible due to the very different methodologies of the Original and Rebased Targets for GT. This check was initially designed based on the direct monetised risk comparison achievable for ED. Check 2 is considered to be superseded by Check 3 for testing NGGT's rebased targets.

### **Check 3: The potential to outperform (PTO)**

1.7. Neither Check 1 nor Check 2 considers the health and criticality of NGGT's asset base and the relative risk or health/criticality of the assets being intervened on. For Check 3 we calculated a numerical PTO score for individual asset categories. The PTO score indicates the extent to which NGGT could potentially outperform (deliver more risk benefit) by intervening on either higher criticality or worse health assets. We then compared the PTO score for the

Rebased Targets against the PTO score for the Original Targets. Check 3 is considered to be passed if the Original Target has an equal or higher PTO score than the Rebased Targets.

1.8. As we need to consider both the HI and CI dimensions in the matrix, this was divided into: Check 3.1, which compares three PTO metrics from an asset criticality perspective (i.e. the given criticality band or range: C1, C1&C2, C1&C2&C3); and, Check 3.2, which compares three PTO metrics from an asset health perspective (i.e. the given asset health band or range: HI5, HI5&HI4, HI5&HI4&HI3).

1.9. The mathematical formula used for PTO in asset criticality dimension in Check 3.1 is shown in **Figure 8**. The formula is the same to calculate the PTO in asset health dimension in Check 3.2 where criticality variables are replaced with corresponding asset health variables.

This PTO check examines two areas in the Original Targets and Rebased Targets respectively:

- First, it checks whether there are higher criticality or worse health assets that could have been intervened on but were not in the targets.
- Second, it checks whether all interventions that were carried out were on the higher criticality or worse health assets in the targets.

**Figure 8: Potential to Outperform formula**

$$PTO = \sqrt{\frac{Vol_{C\#} + Imp_{C\#}}{Vol_{C\#}}} \times \frac{Imp_{Tot} - Imp_{C\#}}{Imp_{Tot}} \times Vol_{C\#}$$

The formula is annotated with three parts: Part 1 (red dashed box) is the fraction  $\frac{Vol_{C\#} + Imp_{C\#}}{Vol_{C\#}}$  under a square root; Part 2 (blue dashed box) is the fraction  $\frac{Imp_{Tot} - Imp_{C\#}}{Imp_{Tot}}$ ; and Part 3 (green dashed box) is the term  $Vol_{C\#}$ .

Where:

$Vol_{C\#}$  (positive value) denotes the asset number without intervention in the relevant criticality band(s) analysed.

$Imp_{C\#}$  (negative value) denotes the change of asset number with intervention in the relevant criticality band(s) analysed.

$Imp_{Tot}$  (negative value) denotes the change of asset number with intervention in the relevant criticality band(s) analysed.



**Part 1** indicates whether there are higher criticality assets that could have been intervened on but were not in the targets.

**Part 2** indicates whether all interventions that were carried out were on the higher criticality assets in the targets.

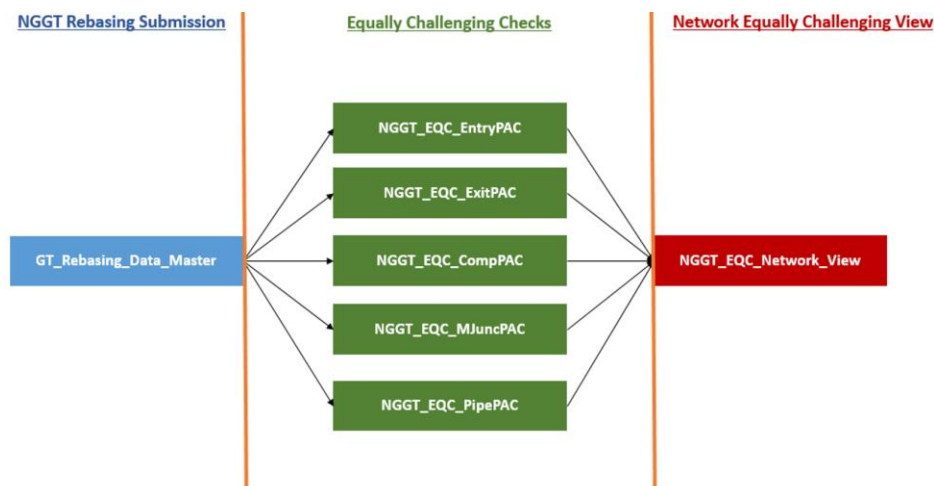
**Part 3** scaled to give results that can compare Original Targets against Rebased Targets.

1.10. We note that Check 3 is designed to provide indicative PTO metrics, and the PTO check itself will not be able to explain any failures caused by NOMs methodological changes and asset characteristics. Where a check has highlighted, by quantitative checks, to not be equally challenging, we would require qualitative information to be supplied.

### Equally Challenging Model Structure

1.11. To complete the equally challenging checks on the Rebased Targets, we applied the checks at the SAC level for each PAC then aggregated the results up to the Network level. Some SACs appear within multiple PACs. However, because the health and criticality banding approaches in the Original Targets differed across PACs, we were unable to combine SAC volumes from different PACs into single health-criticality matrices in order to allow us to assess at an individual SAC level. Our equally challenging model is therefore structured as shown in Figure 9. This approach was necessary to ensure like-for-like comparison between Original Targets and Rebased Targets.

**Figure 9: Equally Challenging Model Structure**



## Appendix 4 – Our Rebasing Assessment Results

### General Considerations

1.1. For NGGT, we are satisfied from our rebasing assessment that at the network level the Rebased Targets are as equally challenging as the Original Targets.

1.2. Based on the quantitative assessment, we did not require qualitative assessment other than to clarify minor points or to correct some minor data errors. Therefore, we applied a qualitative approach to capture the justification of NGGT's data normalisations. As described above, we consider that NGGT provided sufficiently reasonable justification, that we intend to assess as part of the NOMs Incentive Mechanism.

### Assessment Results

1.3. NGGT passed all quantitative equally challenging checks. Checks 1.1 and 1.2 do not contain any tolerance as we expect a direct translation of volumes from the Original Targets. Checks 3.1 and 3.2 feature a 5% acceptable tolerance due to the nature of comparing the original and rebased methodologies.

1.4. NGGT's quantitative checks demonstrate positive results. None of the PACs failed any of the checks. We are therefore of the view that the Rebased Targets developed by NGGT have satisfied our assessment criteria, and are minded to approve them.

## Appendix 5 – Summary of Data Normalisations

1.5. From identification of where data normalisation was applied, we linked this to specific locations and requested a narrative to be provided by NGGT. The responses received are summarised below. In some instances, we were able to confirm where data normalisations had been applied through our annual reviews of Regulatory Reporting Packs (RRP).

1.6. The scope of our investigation work for data normalisations was to identify where it had been applied and to capture NGGT’s narrative on the driver for the data normalisation. Assessment of the suitability of the data normalisations and the underlying driver will be completed in our cost assessment of RIIO-GT1.

<b>Asset Location</b>	<b>NGGT explanation of data normalisation driver</b>	<b>Ofgem comment</b>
Alrewas	These are new assets that we believed were required to meet future customer demand for gas and ensure sufficient network capacity and flexibility, or are required to meet legislative requirements such as Emissions. These would have not been funded via an Asset Heath driver. New assets add risk to the network and inclusion would prevent the Rebased Targets showing the change in risk delivered through Asset Heath interventions on existing assets, so have therefore been removed.	Normalisation required to enable like-for-like comparison of Original and Rebased Targets. Response is satisfactory for rebasing to proceed, as it aligns to our current understanding of NGGT’s commitments.
Asselby		
Asselby		
Aylesbury		
Carrington		
Churchover		
Crieff		
Diss		
Felindre		
Hatton		
Huntingdon		
Kings Lynn		
Kirriemuir		
Lockerley		
Lt Barford		
Moffat		
Peterborough		
St Fergus		
Three Cocks		
Warrington		
Wormington		
Wyre		
Bacton		

Caldecott (Corby PS)	They are treated as a Data Normalisations as they are asset removals based on the customer no longer needing the asset or the replacement being undertaken for reasons other than managing asset condition/risk (such as Emissions legislation). If the asset was actually decommissioned it would not be funded as an Asset Health driver	
Deeside		
Killingholme		
Kings Lynn		
Pannal		
Peterborough		
Sandy Lane		
Sellafield		
St Fergus		
Network - Slamshuts	As discussed while agreeing our rebasing approach, it is not straightforward to identify the system assets that were used to produce our Original NOMs Methodology within our Asset Register (Ellipse). Ellipse did not exist when our Original Methodology was developed and the Original Methodology system asset list was developed on a spreadsheet from site drawings and other offline data sources. For most Secondary Asset Classes, we have been able to approximate a system asset in Ellipse from equipment assets (supplemented by "nearest neighbour gap-filling). This has not been possible for Slamshuts, due to the way the Ellipse Asset Register has been constructed. Slamshuts are effectively small ball valves; the slamshut is effectively an asset purpose, not an asset type. The PoF and MR for Slamshuts is therefore accounted for within other SACs where it performs its purpose of isolating the network in the event of over- or under-pressurisation (such as SAC18 - Filters & Regulators)	Normalisation required to enable like-for-like comparison of Original and Rebased Targets. Response is satisfactory for rebasing to proceed, as it aligns to our current understanding of NGGT's commitments.
Aberdeen	N/A	Carbon Capture and Storage (CCS) project did not progress, data normalisation undertaken
Barrow		Customer driven changes to project, data normalisation undertaken

Barrow		Operator managed change, data normalisation undertaken
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## Appendix 6 – Privacy notice on consultations

### Personal data

The following explains your rights and gives you the information you are entitled to under the General Data Protection Regulation (GDPR).

Note that this section only refers to your personal data (your name address and anything that could be used to identify you personally) not the content of your response to the consultation.

#### 1. The identity of the controller and contact details of our Data Protection Officer

The Gas and Electricity Markets Authority is the controller, (for ease of reference, "Ofgem"). The Data Protection Officer can be contacted at [dpo@ofgem.gov.uk](mailto:dpo@ofgem.gov.uk)

#### 2. Why we are collecting your personal data

Your personal data is being collected as an essential part of the consultation process, so that we can contact you regarding your response and for statistical purposes. We may also use it to contact you about related matters.

#### 3. Our legal basis for processing your personal data

As a public authority, the GDPR makes provision for Ofgem to process personal data as necessary for the effective performance of a task carried out in the public interest. i.e. a consultation.

#### 3. With whom we will be sharing your personal data

***(Include here all organisations outside Ofgem who will be given all or some of the data. There is no need to include organisations that will only receive anonymised data. If different organisations see different set of data then make this clear. Be as specific as possible.)***

#### 4. For how long we will keep your personal data, or criteria used to determine the retention period.

Your personal data will be held for ***(be as clear as possible but allow room for changes to programmes or policy. It is acceptable to give a relative time e.g. 'six months after the project is closed')***

#### 5. Your rights

The data we are collecting is your personal data, and you have considerable say over what happens to it. You have the right to:

- know how we use your personal data
- access your personal data
- have personal data corrected if it is inaccurate or incomplete
- ask us to delete personal data when we no longer need it
- ask us to restrict how we process your data
- get your data from us and re-use it across other services
- object to certain ways we use your data
- be safeguarded against risks where decisions based on your data are taken entirely automatically
- tell us if we can share your information with 3<sup>rd</sup> parties
- tell us your preferred frequency, content and format of our communications with you
- to lodge a complaint with the independent Information Commissioner (ICO) if you think we are not handling your data fairly or in accordance with the law. You can contact the ICO at <https://ico.org.uk/>, or telephone 0303 123 1113.

**6. Your personal data will not be sent overseas** (Note that this cannot be claimed if using Survey Monkey for the consultation as their servers are in the US. In that case use “the Data you provide directly will be stored by Survey Monkey on their servers in the United States. We have taken all necessary precautions to ensure that your rights in term of data protection will not be compromised by this”.

**7. Your personal data will not be used for any automated decision making.**

**8. Your personal data will be stored in a secure government IT system.** (If using a third party system such as Survey Monkey to gather the data, you will need to state clearly at which point the data will be moved from there to our internal systems.)

**9. More information** For more information on how Ofgem processes your data, click on the link to our “[Ofgem privacy promise](#)”.