

Northern Gas Networks: RIIO-1 NOMS Performance Report

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Executive Summary

Pursuant to Special Licence Condition 4H.7 of the RIIO-GD1 Gas Transporters Licence, licensees must, by 31 July 2021, submit to the authority a report ('the Performance Report') setting out the extent to which it has delivered against its Network Output Measures (NOM's) in accordance with the specifications set out in the NOMs workbook. This document provides Northern Gas Networks (NGN) submission against this licence requirement.

This document meets the requirements of Stage 1 and 2 of Ofgem's assessment process for NOMs RIIO-1 performance as set out in the published guidance¹.

Alongside this document, NGN have submitted its RIIO-1 NOMs Closeout Data Template, as required by Ofgem. All assumptions and methodologies that have been applied to populate this template are outlined within this document.

RIIO-1 Target

The RIIO-1 NOMs Closeout Data Template has been populated using the targets that were approved and published on Ofgem's website² on 12th June 2019.

When RIIO-GD1 NOMs targets were rebased using the revised NOMs methodology, NGN adopted a statistical approach to set its rebased targets. This approach and the revised targets were approved and accepted by Ofgem and contained a number of clearly identified assumptions that had been applied due to missing data from the 2013 workbooks. Due to the application of a statistical approach, it has not been possible to populate all of the data requested in the RIIO-1 NOMs Closeout Data Template. Any attempt to populate some of the fields would be 100% assumption based. This issue has been raised with Ofgem through cross-sector and bi-lateral meetings and it has been agreed that NGN cannot submit this information at this stage of the process.

Ofgem have stated that all Monetised Risks should be reported in 2014/2015 price base. To align with this requirement, no changes have been made to the financial values as NOMs targets were set using 2014/2015 price base.

RIIO-1 Delivery

NGN are proposing that its Risk Delta target for RIIO-1 is adjusted to account for relevant risk changes which total -58.1£Rm, the reasoning for these proposed relevant risk changes are set out in Section 6. NGNs submitted normalised risk delta for the risk output delivered is 62.7£Rm compared to a normalised target of 58.1£Rm which is an over-delivery of 4.6£Rm (7.92%), this can be observed from Table 1.

¹ https://www.ofgem.gov.uk/sites/default/files/2021-06/appendix6_riio1_noms_closeout_submission_guidance_v1.2_clean.pdf

² <https://www.ofgem.gov.uk/publications/gas-distribution-network-output-measures-rebasing-consultation>

NGN	Monetised Risk (R£m, 2014/15 Price Base) 31 March 2021		
	With Interventions (a)	Without Interventions (b)	Risk Delta (b-a)
Rebased Target ³	142.4	207.6	65.1
Normalised Target	99.3	157.4	58.1
Risk Output Delivered	94.7	207.6	112.6
Risk Output Delivered - Normalised	94.7	157.4	62.7

Table 1: NGNs Monetised Risk Targets compared to risk outputs delivered⁴

This over-delivery is primarily driven by mains and services, due to the replacement of more steel than the rebased target. A summary of the workloads associated with Distribution Mains compared to the volumes that were used to derive the rebased target for RIIO-1 are set out in Table 2. NGN have delivered 105km more Distribution Mains replacement compared to the rebased NOMs target. There has been 88km less Tier 1 delivered, however, NGN were over delivering against the Tier 1 target until COVID-19 restrictions and NGN have met the HSE mandated Repex workload volumes for RIIO-1. Additionally, NGN have completely removed all remaining agreed T2A Low Pressure (high risk) and below 8-inch Steel which has contributed to the significant Monetised Risk over-delivery.

Asset Categories	Tier	Rebased Target Workload (km)	Delivered Volume (km)	Difference (km)	Difference (%)
Distribution Mains (Iron)	Tier 1	3,707	3,618	-88	-2%
	Tier 2A	80	228	-15	-6%
	Tier 2B	164			
	Tier 3	40	40	0	-1%
	Zero Scoring	0	70	70	N/A
Distribution Mains (Steel)	8ST	120	126	6	5%
	2ST	270	326	56	21%
Distribution Mains (Other)	N/A	0	7	7	N/A
Distribution Mains (PE)	PE	0	70	70	N/A
Total		4,380	4,485	105	2%

Table 2: RIIO-1 Workload for Distribution Mains Compared to the Volumes for the Rebased Target⁵

The Services Monetised Risk model is directly linked to the Mains risk, as intuitively when a main is replaced the associated services are also replaced. This leads to cost efficiency, improves overall risk removal. As NGN have targeted more high-risk mains (Tier 2A and Steel) over RIIO-1, the high-risk services associated with these mains have also been replaced over the period, this has resulted in an

³ https://www.ofgem.gov.uk/sites/default/files/docs/2019/06/190612_gd_rebasingdecision_final_0.pdf

⁴ Note that the numbers presented have been rounded to 1 decimal place. Due to this, the numbers presented may not add up precisely to the totals provided.

⁵ Note that the numbers presented have been rounded to the nearest whole number. Due to this, the numbers presented may not add up precisely to the totals provided.

over-delivery of the NOMs target by 2.5£Rm. The majority of the Steel mains that have been targeted have been high risk and lead to the Steel services that have been replaced also being of a high risk.

The assets associated with Offtakes / PRS are the only area under-delivery. A summary of the workloads associated with Offtakes and PRS compared to the volumes that were used to derive the rebased target for RIIO-1 are set out in Table 3. NGN have delivered 3 less interventions than were used to derive the rebased NOMs target and were on track to deliver the rebased target volumes until 2020/21. However, COVID-19 restrictions have impacted the delivery of the remaining projects, meaning that these projects had not completed by the end of RIIO-1. If these planned projects had taken place, this would have delivered 17 more intervention volume for Offtakes / PRS.

Primary Asset	Intervention	Target Volume (Nr)	Delivered Volume (Nr)	Combined Delivered Volumes (Nr)	Difference (Nr)	Difference (%)
Offtake / PRS Filters & Pressure Control	Filters Replacement	26	33	40	14	54%
	Filters Refurb		0			
	Filters Civils		5			
	Filter Demolition		2			
	Filters E&I Not Included		0			
	Pressure Control Replacement	32	12	22	-10	-31%
	Pressure Control Refurbishment		1			
	Pressure Control Civils		8			
	Pressure Control E&I Not included		0			
	Pressure Control Demolition		1			
Offtake / PRS Pre-heating	Pre-heating Replacement	59	22	49	-10	-17%
	Pre-heating Refurb		8			
	Pre-heating Civils		19			
	Pre-heating E&I NOT Included		0			
Offtake Odorant & Metering	Meters Replacement	32	9	35	3	9%
	Meters Civils		3			
	Odorant Replace		0			
	Odorant Civils		3			
	Odorant E&I (Odorant Controller)		20			
Total		149	146	146	-3	-2%

Table 3: RIIO-1 Workload for Offtakes and PRS Compared to the Volumes for the Rebased Target

In addition to the impact of COVID-19 reducing the delivered volumes, a significant number of Pre-heating refurbishments have been delivered in RIIO-1 compared to what was planned. These refurbishments have delivered less modelled risk benefit (in terms of NOMS) than is observed in reality.

This is due to the NOMS models assessing the benefit of these interventions in many cases as £0, when these should be at least 50% of the benefit of a Pre-heating replacement.

Relevant Risk Changes

NGN are submitting three relevant risk changes as part of the RIIO-1 NOMs close out data submission. The total of these relevant risk changes results in a proposed delta change of -58.1£Rm.

These relevant risk changes have been categorised as:

- Consequence of failure (COF) changes
- Pre RIIO-1 work
- Slower/faster deterioration.

The reasons for these relevant risk changes and the methodology used to derive the submitted values are detailed in Section 6.

Methodology for Deriving Associated Costs

In Section 7 we have outlined our proposed approach for deriving the associated costs of any under/over-delivery. For Stage 1 and 2 we are not required to submit these costs, however we have included a worked example to assist Ofgem in understanding our proposed methodology and deciding whether the method is robust and appropriate for Ofgem's assessment.

1 Introduction

Pursuant to Special Licence Condition 4H.7 of the RIIO-GD1 Gas Transporters Licence, licensees must, by 31 July 2021, submit to the authority a report ('the Performance Report') setting out the extent to which it has delivered against its Network Output Measures (NOM's) in accordance with the specifications set out in the NOMs workbook. This document provides Northern Gas Networks (NGN) submission against this licence requirement. This document meets the requirements of Stage 1 and 2 of Ofgem's assessment process for NOMs RIIO-1 performance as set out in the published guidance⁶.

Alongside this document, NGN have submitted a RIIO-1 NOMs Closeout Data Template. All assumptions and methodologies that have been applied to populate this template are outlined within the subsequent sections of this document.

2 Asset and Intervention Definitions

The asset and intervention definitions that Northern Gas Networks (NGN) has applied in the reporting of the Network Output Measures (NOMs) position for RIIO-GD1 are detailed in Appendix A

3 General Assumptions

The following assumptions have been applied to populate the RIIO-1 NOMs Closeout Data Template for NGN:

- Interventions that are outside of NOMs definitions have not been included within the reporting and therefore these interventions will not have an impact on Monetised Risk.
- Higher volumes of Asbestos (AS) mains have been completed in RIIO-1 than was available in the base data. As the RIIO-1 NOMs closeout data template asks for the reporting of actuals, this highlights a discrepancy with the data at 2017. To mitigate this, NGN has assumed that workload cannot exceed maximum asset length to avoid negative risk.
- Due to asset data issues with the 2013 position, only total Monetised Risk by asset type has been provided for 2013, with all other information left blank for that year. This is the same as the assumption applied at each RRP submission (since rebasing). Ofgem were made aware of this at cross-sector and bi-lateral meetings.
- Assets that were cohorted for rebasing (Mains, Services and Risers) have remained cohorted for 2021 delivery. These cohorts use average/sums of asset attributes and as a result they are very susceptible to a data refresh due to replaced lengths/ assets moving to PE cohorts. To account for any movement from a data refresh not including the genuine benefit due to replacement, volumes have been consistently scaled to enable data comparison.
- In Tab 3.2.1 Delivery GD, the 2021 without position has been assumed to be the same as the target to allow for delta calculations.
- NGN have used the same assumptions that were applied at rebasing to determine the LTS volumes and are based on the movement of risk across the risk bandings reported for RRP 2021 compared to those reported in the workbooks submitted as part of the rebasing exercise. This is to ensure that volumes align with those that were used to set the rebased Monetised

⁶ https://www.ofgem.gov.uk/sites/default/files/2021-06/appendix6_riio1_noms_closeout_submission_guidance_v1.2_clean.pdf

Risk target. OLI1 additions that were not due to intervention and CP refurbishments were removed from the volume reported in the RIIO-1 NOMs Closeout Data Template.

- The rebased volume target that was set for Odorant and Metering did not include any associated Civils interventions and therefore only includes the Odorant Controller and Meter Replacement target volumes. Civils interventions have been included in the final delivered volume as they will have an attributed risk reduction. At an Odorant and Metering level, this appears to be an over-delivery on the volume target, but NGN have under-delivered against the Meter Replacement target.
- The rebased volume target for Pre-heating included Civils interventions as the majority of the replacement programme would have been to upgrade Water Bath Heaters to Boiler Systems which includes a Civils intervention count. The run-rate for these interventions across the first four years of RIIO-GD1 was roughly 50:50. This ratio has been applied to the target volumes to apportion the Civils and Mechanical interventions. A similar assumption has been applied to Pressure Control assets (Slam Shuts and Regulators) as a portion of NGNs assets will be housed in a building and the building is likely to be replaced as part of the Pressure Control system replacement. The run-rate applied to the target is 60:40 based on the first four years of delivery.
- Similar to the Odorant and Metering assumptions, NGN have assumed that the target volume for Filters is associated with Mechanical intervention (Replacement) and does not include Civils. This is because Filter assets will rarely be housed in buildings, if at all. Civils interventions have been included in the final delivered volume as they will have an attributed risk reduction.
- For Mains, all Zero Scoring Iron replacement has been attributed to the “Iron” category and not the “Other” category. Additionally, data has been used for four years of RIIO-GD1 to apply an assumption to the ratio of PE to Asbestos from the “Other” category in the RRP workload tables for the remaining four years.
- Delivered workloads for Services only includes Relays and no Transfers. Transfers are not a modelled NOMs intervention.
- Risers delivered workloads do not include “Decommissions”, only “Replacements” and “Refurbishments”.
- Governor interventions delivered as part of Reinforcement or Connections work have been applied as District Governors as the data does not determine whether the Governor is District, Industrial & Commercial or a Service Governor.

4 RIIO-1 Targets

Tab 3.1_Targets_GD of the RIIO-1 NOMs Closeout Data Template has been populated using the targets that were approved and published on Ofgem’s website⁷ on 12th June 2019.

When the rebased NOMs targets were calculated, NGN used a statistical method to back-calculate the NOMs starting position at 2013. As a result of this approach, not all sections of the data template can be populated. At the time of undertaking the rebasing exercise, there was no requirement to rebase total Monetised Risk and further risk breakdowns were not required. Consequently, for the 2013 and 2021 “without intervention” positions and 2021 “with” position (target only), the columns titled: Asset Health, Reliability Risk, Health & Safety Risk, Environmental Risk and Financial Risk have not been

⁷ <https://www.ofgem.gov.uk/publications/gas-distribution-network-output-measures-rebasing-consultation>

populated. There is no data to define the apportionment of risk across these categories and any attempt to populate these fields would be 100% assumption based.

NGN has proactively raised and discussed this issue with Ofgem through both cross-sector and bi-lateral meetings, and it has been agreed with Ofgem that NGN cannot submit this information for the RIIO-1 targets at this stage of the process. This also aligns with the RRP Table 7.3 data submissions for NGN throughout RIIO-GD1.

To determine the RIIO-GD1 start position at 2013, the starting risk position was back-calculated using weighted average risk reductions to add back in risk removed due to investment between April 2013 and March 2017. After obtaining the start position, the Monetised Risk was deteriorated to find the 2021 without intervention position and 2021 with intervention position by reducing risk based on weighted average risk reductions, for the volumes stated in the RIIO_GD1 Final Proposals. Full details of the methodology can be found in the file '4_rebasingmethodology_ngn' as published on Ofgem's website⁸.

Data has been taken directly from the published workbook '11_rebasedtargets_ngn' as published on Ofgem's website⁹ and aggregated across the Health and Criticality categories in order to populate the tab 3.1_Targets_GD at asset class level. Monetised Risk values have been taken from:

- BLOCK 1 of tab '2.2 Rebased_Targets_Monetised' for 2013 risk position.
- BLOCK 2 of tab '2.2 Rebased_Targets_Monetised' for 2021 With Intervention risk position.
- BLOCK 3 of tab '2.2 Rebased_Targets_Monetised' for 2021 Without Intervention risk position.

Asset Length/Volume values have been taken from:

- BLOCK 1 of tab '2.1 Rebased_Targets_Volumes' for 2013.
- BLOCK 2 of tab '2.1 Rebased_Targets_Volumes' for 2021 With Intervention.
- BLOCK 3 of tab '2.1 Rebased_Targets_Volumes' for 2021 Without Intervention.

LTS Pipelines are measured in km, but in volume in the workbook '11_rebasedtargets_ngn' for Sleeves and Block Valves. As such, the length of LTS pipelines has been taken from RIGs 2017 submission, this was the raw data used for rebasing.

It should be noted that Pressure Control systems are made up of both Regulators and Slam Shuts and are treated collectively in the secondary asset categorisation in the NOMs methodology. Buildings, Fences, Electrical and Instrumentation systems are not primary asset categories in the NOMs methodology and are therefore included within the relevant Offtake and PRS asset classes.

The rebasing approach did not separate Offtake and PRS assets; it used the categories of Pressure Control, Filters, Pre-heating, Odorant and Metering, as per the NOMs methodology¹⁰. Sub-categorisation has occurred post rebasing through assumptions to fulfil Ofgem's requirements to populate '11_rebasedtargets_ngn'. In some cases, this may cause outputs for Offtakes and PRS to look counterintuitive if they are observed separately, however, this should only be of concern if both Offtake and PRS assets show the same behaviour. Based on this, we recommend that Ofgem combine these assets in their assessment and we have also taken this approach in presenting our RIIO-1 delivery position in Section 5.

⁸ https://www.ofgem.gov.uk/sites/default/files/docs/2019/03/4_rebasingmethodology_ngn.pdf

⁹ https://www.ofgem.gov.uk/sites/default/files/docs/2019/03/11_rebasedtargets_ngn.xlsx

¹⁰ https://www.ofgem.gov.uk/sites/default/files/docs/2017/09/noms_methodology_version_no._v3.2.pdf

Ofgem have stated that all Monetised Risks should be reported in 2014/2015 price base. To align with this requirement, no changes have been made to the financial values as NOMs targets were set using 2014/2015 price base.

5 RIIO-1 Delivery

The following section presents NGNs RIIO-1 Delivery position compared to the rebased targets, as well as justification for each primary asset category where under/over-delivery for NOMs has **exceeded an assumed +/-5% deadband**.

5.1 Risk Target

NGN considers that its Risk Delta target for RIIO-1 is adjusted to account for our submitted relevant risk changes which total -58.1£Rm, the reasoning for these proposed relevant risk changes are set out in Section 6. NGNs submitted normalised risk delta for the risk output delivered is 62.7£Rm compared to a normalised target of 58.1£Rm which is an over-delivery of 4.6£Rm (7.92%), this can be observed from Table 4.

NGN	Monetised Risk (R£m, 2014/15 Price Base) 31 March 2021		
	With Interventions (a)	Without Interventions (b)	Risk Delta (b-a)
Rebased Target ¹¹	142.4	207.6	65.1
Normalised Target	99.3	157.4	58.1
Risk Output Delivered	94.7	207.6	112.6
Risk Output Delivered - Normalised	94.7	157.4	62.7

Table 4: NGNs Monetised Risk Targets Compared to Risk Outputs Delivered¹²

Table 5 shows the normalised risk output delivered compared to the normalised target by asset category. Distribution Mains and Services are the main areas of significant over-delivery (greater than 5%), whilst the assets associated with Offtakes / PRS are the only area of under-delivery. The justification for these risk outputs is explained by primary asset category below.

¹¹ https://www.ofgem.gov.uk/sites/default/files/docs/2019/06/190612_gd_rebasingdecision_final_0.pdf

¹² Note that the numbers presented have been rounded to 1 decimal place. Due to this, the numbers presented may not add up precisely to the totals provided.

Primary Asset	Secondary Asset	Normalised With Intervention (£Rm)	Normalised Without Intervention (£Rm)	Normalised Target Risk Delta (£Rm)	Normalised Risk Output Delivered (£Rm)	Normalised Risk Delta Delivered (£Rm)	Normalised Over/Under Delivery (£Rm)	Normalised Over/Under Delivery (%)
LTS Pipelines	LTS Pipelines - Piggable	9.0	9.3	0.2	7.2	2.0	0.2	N/A
	LTS Pipelines - Non Piggable	3.2	3.0	-0.2	4.7	-1.8		
Distribution Mains	Iron Mains	31.8	49.6	17.8	26.2	23.4	10.7	51%
	PE Mains	8.5	6.0	-2.5	6.3	-0.3		
	Steel Mains	12.5	18.0	5.5	9.6	8.4		
	Other Mains	0.0	0.0	0.0	-	0.0		
Services	Services	19.9	25.9	6.0	17.4	8.5	2.5	42%
Risers	Risers	0.7	0.7	0.0	0.7	0.1	0.1	N/A
Offtake / PRS Filters & Pressure Control	Offtake Filters	0.2	0.4	0.2	0.3	0.0	-1.5	-38%
	PRS Filters	2.3	5.1	2.7	3.3	1.7		
	Offtake Slamshut/Regulators	0.5	0.7	0.2	0.6	0.1		
	PRS Slamshut/Regulators	3.4	4.2	0.8	3.6	0.6		
Offtake / PRS Pre-heating	Offtake Pre-heating	-5.6	6.3	11.8	3.1	3.2	-6.9	-37%
	PRS Pre-heating	5.3	12.2	6.9	3.5	8.6		
Offtake Odorant & Metering	Odourisation & Metering	2.9	11.6	8.7	3.7	7.9	-0.7	-9%
District, I&C and Service Governors	District Governors	4.3	4.3	0.0	4.0	0.3	0.3	N/A
	I&C Governors	0.0	0.0	0.0	0.1	-0.0		
	Service Governors	0.2	0.2	-0.0	0.2	-0.0		
Total		99.3	157.4	58.1	94.7	62.7	4.6	7.92%

Table 5: Risk Output Delivered Compared to the Target by Asset Category¹³

¹³ Note that the numbers presented have been rounded to 1 decimal place. Due to this, the numbers presented may not add up precisely to the totals provided.

A summary of the workloads associated with Distribution Mains compared to the volumes that were used to derive the rebased target for RIIO-1 are set out in Table 6. NGN has delivered 105km more Distribution Mains replacement compared to the rebased NOMs target. There has been 88km less Tier 1 delivered, however NGN were over delivering against the Tier 1 target until COVID-19 restrictions slowed work in the final year of RIIO-1, this profile for Tier 1 can be observed in Figure 1. Although the rebased target workload for Tier 1 is higher than what has been delivered, NGN have met the HSE mandated Repex workload volumes. Additionally, NGN have completely removed all remaining agreed T2A Low Pressure (high risk) and below 8-inch Steel which has contributed to the significant Monetised Risk over-delivery.

Asset Categories	Tier	Rebased Target Workload (km)	Delivered Volume (km)	Difference (km)	Difference (%)
Distribution Mains (Iron)	Tier 1	3,707	3,618	-88	-2%
	Tier 2A	80	228	-15	-6%
	Tier 2B	164			
	Tier 3	40			
	Zero Scoring	0	70	70	N/A
Distribution Mains (Steel)	8ST	120	126	6	5%
	2ST	270	326	56	21%
Distribution Mains (Other)	N/A	0	7	7	N/A
Distribution Mains (PE)	PE	0	70	70	N/A
Total		4,380	4,485	105	2%

Table 6: RIIO-1 Workload for Distribution Mains Compared to the Volumes for the Rebased Target¹⁴

¹⁴ Note that the numbers presented have been rounded to the nearest whole number. Due to this, the numbers presented may not add up precisely to the totals provided.

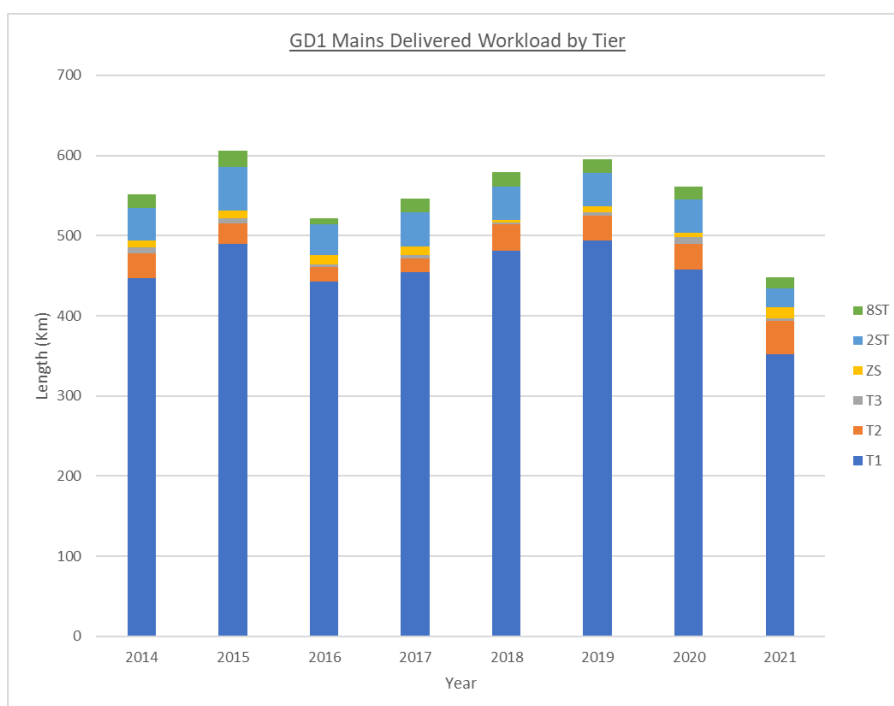


Figure 1: Iron and Steel Replacement Profile for RIIO-1

Steel mains replacement delivers a higher risk delta for each kilometre replaced compared to the other Distribution Mains materials. Table 7 displays the average delta (R£) by each material for RIIO-1; Steel Mains replacement delivered three times the unit risk reduction compared to Iron Mains replacement.

Distribution Mains Material	Normalised Delta (R£m)	Delivered Volume (km)	Normalised Average Delta (R£/km)	RRP 2021 MR per Asset (£/km)
Iron Mains	23.4	3,956	5,908	3,881
PE Mains	-0.3	70	-4,516 ¹⁵	236
Steel Mains	8.4	452	18,642	5,660
Other Mains	0.0	7	432	0

Table 7: Average Monetised Risk Delta by Material Type ¹⁶

The over-delivery of Steel Mains has been due to alignment with NGN's 'Management procedure for Distribution pipe replacement and management' which states that:

"Where ≤ 2 " steel pipes are encountered in the design of any replacement project, they should be included for replacement in their entirety with PE. However, it is recognised that there may be occasions in the design process whereby it is not efficient to include this steel within the project design. Where these situations apply, the ≤ 2 " steel may only be excluded from the project design as follows:

¹⁵ Risk delta delivered against PE has increased due to other materials being replaced with the material PE, which increases the amount of PE in the network and consequently the Monetised Risk value.

¹⁶ Note that the numbers presented have been rounded to the nearest whole number. Due to this, the numbers presented may not add up precisely to the totals provided.

- *Where the remaining steel is connected to a Mandatory Pipe – Ensure records of the remaining steel pipe sections are accurately held on GIS and the Asset Repository. This will ensure that the steel pipework will be captured later in the replacement programme.*
- *Where the remaining steel is connected to a Non-Mandatory Pipe – The steel pipe must be >30m from property. A record of the re-connected steel pipe section must be held on GIS and the Asset Repository. This will ensure that the steel pipework within PE networks can be clearly identified for future inspection and maintenance.”*

Additionally, the procedure states that

“Steel pipes above 2” may be subject to Decommissioning where this is justified by a cost benefit analysis.

- *At the start of the Design Cycle, establish the available budget for this category of workload.*
- *The available budget may take into consideration projects not completed in earlier years but still considered to be beneficial.*
- *Produce a listing from MRPS for Steel pipes above 2” that are not currently planned for abandonment.*
- *Pipes selected for projects must be from this list.*
- *Project development can be via several drivers to ensure the optimal portfolio of projects for a given year.*
- *All projects developed in this Non-Mandatory category should be justified by a cost benefit analysis.”*

This procedure has been approved by the Health and Safety Executive (HSE).

Additionally, NGN have seen a large rise in Dynamic Growth pipes where the risk score of previously low risk pipes has increased dramatically above the risk action threshold. This has led to large projects being swapped out for smaller length but higher risk projects.

5.3 Services Over-Delivery

A summary of the workloads associated with Services compared to the volumes that were used to derive the rebased target for RIIO-1 are set out in Table 8. The rebased targets only disaggregated services into non-domestic and domestic, so a volume comparison can only be performed at this level of granularity. For RIIO-1, NGN have delivered 26,000 less service replacements, but have delivered more non-domestic service replacement than was in the target.

Asset Categories	Rebased Workload (Nr)	Delivered Volume (Nr)	Difference (Nr)	Difference (%)
Domestic	246,546	220,026	-26,520	-11%
Non-Domestic	912	1,561	649	71%
Total	247,458	221,587	-25,871	-10%

Table 8: RIIO-1 Workload for Services Compared to the Volumes for the Rebased Target¹⁷

¹⁷ Note that the numbers presented have been rounded to the nearest whole number. Due to this, the numbers presented may not add up precisely to the totals provided.

The Services Monetised Risk model is directly linked to the Mains risk, as intuitively when a main is replaced the associated services are also replaced. This leads to cost efficiency, improves overall risk removal. As NGN have targeted more high-risk mains (Tier 2A and Steel) over RIIO-1, the high-risk services associated with these mains have also been replaced over the period, this has resulted in an over-delivery of the NOMs target by 2.5£Rm. The majority of the Steel mains that have been targeted have been high risk and lead to the Steel services that have been replaced also being of a high risk.

5.4 Offtakes and PRS Under-Delivery

A summary of the workloads associated with Offtakes and PRS compared to the volumes that were used to derive the rebased target for RIIO-1 are set out in Table 9. NGN have delivered 3 less interventions than were used to derive the rebased NOMs target and were on track to deliver the rebased target volumes until 2020/21. However, COVID-19 restrictions have impacted the delivery of the remaining projects, meaning that these projects had not completed by the end of RIIO-1. This is discussed in more detail by primary asset class below.

Primary Asset	Intervention	Target Volume (Nr)	Delivered Volume (Nr)	Combined Delivered Volumes (Nr)	Difference (Nr)	Difference (%)
Offtake / PRS Filters & Pressure Control	Filters Replacement	26	33	40	14	54%
	Filters Refurb		0			
	Filters Civils		5			
	Filter Demolition		2			
	Filters E&I Not Included		0			
	Pressure Control Replacement	32	12	22	-10	-31%
	Pressure Control Refurbishment		1			
	Pressure Control Civils		8			
	Pressure Control E&I Not included		0			
	Pressure Control Demolition		1			
Offtake / PRS Pre-heating	Pre-heating Replacement	59	22	49	-10	-17%
	Pre-heating Refurb		8			
	Pre-heating Civils		19			
	Pre-heating E&I NOT Included		0			
Offtake Odorant & Metering	Meters Replacement	32	9	35	3	9%
	Meters Civils		3			
	Odorant Replace		0			
	Odorant Civils		3			
	Odorant E&I (Odorant Controller)		20			
Total		149	146	146	-3	-2%

Table 9: RIIO-1 Workload for Offtakes and PRS Compared to the Volumes for the Rebased Target

For Offtake Odorant & Metering, NGN marginally over-delivered on the Controller programme which does not impact the Monetised Risk value, but we under-delivered on our Meter Replacement programme by 4 units (c.30%). We had forecast a further 3 Meter Replacements in Year 8 of RIIO-1, but these were postponed due to COVID-19. If these units had been delivered as planned, using the normalised average delta delivered per Odorant and Metering intervention of approximately £225k (see Table 10), we would expect to have observed a further Monetised Risk reduction of approximately £675k for Odorant and Metering. Delivery of these units would have meant that the Normalised Delta delivered for this primary asset category would be less than 1% under target.

Primary Asset	Normalised Delta (R£m)	Delivered Volume (Nr)	Normalised Average Delta (R£/Nr)	RRP 2021 MR per Asset (£/Nr)
Offtake / PRS Filters	1.75	40	43,839	19,822
Offtake/ PRS Slamshut Regulators	0.67	22	30,583	20,047
Offtake / PRS Pre-heating	11.84	49	241,688	60,725
Offtake Odorant & Metering	7.93	35	226,563	78,468

Table 10: Average Monetised Risk Delta by Offtake/ PRS Asset

For Offtake / PRS Pre-heating, we underdelivered our replacement target by 8 units but instead delivered 8 more refurbishments, with a further 7 refurbishments and 3 replacements planned for Year 8 of RIIO-1 which were postponed due to COVID-19. If we had been able to deliver this workload, we would have targeted 10 more sites in RIIO-GD1 than the number of sites included in the rebased target.

In addition to the impact of COVID-19 reducing the delivered volumes, a significant number of Pre-heating refurbishments have been delivered in RIIO-1 compared to what was planned. These refurbishments have delivered less modelled risk benefit (in terms of NOMS) than is observed in reality. This is due to the NOMS models assessing the benefit of these interventions in many cases as £0, when these should be at least 50% of the benefit of a Pre-heating replacement.

For Offtake / PRS Filters we have replaced 7 more filters than planned across the RIIO-1 period. These replacements were driven by faults or PSSR¹⁸ inspections, but for RIIO-1 we have increasingly replaced the second filter whilst on site. This outcome has been driven by a number of reasons including: the asset being exposed to the same operational and environmental conditions as the filter that required replacement, filter lead times and small efficiency gains. This has led to an over-delivery on units compared to the target, but some of these units may not have carried a large Monetised Risk so this has led to an under-delivery against the Offtake / PRS filters risk target.

For Offtake/ PRS Slamshut Regulators we have under-delivered against our replacement target by 8 units (40%), but only under-delivered our risk target by 0.3£Rm of 1£Rm (30%). This is due the decommissioning of an Offtake/PRS in Year 6 of RIIO-1. We had planned the replacement of 4 additional Pressure Control units for Year 8 of RIIO-1, but these were postponed due to COVID-19 restrictions.

In summary, the under-delivery in volumes for Offtake/ PRS is primarily attributable to the impact of COVID-19 in Year 8 of RIIO-1 and the NOMS models under-estimating the benefit of Pre-heating Refurbishment. However, if we had been able to deliver the volumes that were planned in the final year of RIIO-1, this under-delivery would have not been observed.

¹⁸ Pressure Systems Safety Regulations

6 Relevant Risk Changes

NGN are submitting three relevant risk changes as part of the RIIO-1 NOMs close out data submission. The total of these relevant risk changes results in a proposed delta change of -58.1£Rm. How this value has been derived and the reasons behind these proposed adjustments are detailed below.

6.1 Methodology for Deriving Values

NGN have determined the risk differences due to changes in data by applying a direct comparison at the point of data refresh. For each data refresh carried out by NGN, the previous year's RRP table has been re-run with the updated data set, to get a like-for-like comparison for the 2021 with and without position. The difference between these positions has been calculated as the normalised risk difference, that is then assigned to the relevant category. Normalisations have been calculated at 2019 and 2021 data refreshes and the combination of these have been reported in tab 3.3.1, along with any other relevant normalisations. As this approach has been applied for previous year RRP, it has not always been possible to retrospectively disaggregate this data to meet the NOMs RIIO-GD1 close-out report requirements, this is due to the fact that the level of disaggregation in terms of data requirements had not been outlined at this point in time. Best endeavours have been made to allocate relevant risk changes to the most appropriate category, however there will still be some uncertainty in adopting this approach, which are outlined as appropriate against each proposed relevant risk change. We ask that lessons are learnt from this and request that Ofgem aims to set out the data requirements and granularity for RIIO-GD2 close-out early enough in the regulatory period to ensure that companies can collect data at the required level.

6.2 Data Cleanse

NGN have populated the data cleanse column with 0. This is due to the data changes that have been made do not comply with the RIIO-1 NOMs Incentive V2.0 definition for data cleanse. Data has not been amended due to any of the following, meaning no normalisation is required:

- Changes in asset volumes due to a measurement, survey or transcription error.
- Changes in previously reported data due to an error or omission in a previously assessed condition score or other NARM input variable.
- Transcription errors.
- Removal of duplicate asset entries.

6.3 Methodology Changes

The methodology for NOMs has not been changed or updated in the period between the submission of Rebased NOMs targets in 2017 to RIIO-GD1 close out in 2021. All financial risk values have been kept to the 2014/15 price base as detailed in the guidance. As a result, NGN have no relevant risk changes to report under this category.

6.4 Consequence of Failure (COF) Changes

We are submitting several relevant risk changes for the consequence of failure, each of these and the reasons behind them, are outlined by asset class below. The majority of this adjustment is associated with the consequence of failure changes for mains.

6.4.1 LTS

There has been significant building development over the course of RIIO-1 meaning that new housing estates are encroaching on our LTS pipelines. As a consequence, this affects the classification of pipelines as either Rural or Suburban, with more properties and people within the immediate area of

an asset. This impacts the health and safety risk drivers in our models, in the case of explosion or rupture. In addition, the way the rural/suburban split is determined has been changed meaning that the pipeline is allocated as wholly rural or suburban.

6.4.2 Mains

There have been changes in the way that customers are allocated to our mains, to account for the networks that are not single feed, i.e. if a main fails, not all customers will suffer from loss of gas incidents as other mains can still carry gas to these customers. As such, the volume of customers per main has decreased causing an overall decrease in Monetised Risk for this asset class.

In addition, changes to cohort averages (model raw data) due to replacement between 2017 and 2021 due to targeting higher risk pipes (T2A and >2"ST).

6.4.3 Services

Given the significant linkages between the mains and services Monetised Risk models and asset base data, the change in the mains consequence of failure has also influenced the services consequence of failure movement.

In addition, there have been changes to cohort averages due to replacement with PE as these pipes will move between cohorts during data refresh. The pipes remaining in the higher risk cohorts have always carried the same risk, but this has been adjusted due to the averaging methodology in using cohorts. NGN considers that these changes should be part of the consequence of failure normalisation as they are not completely driven by replacement.

6.4.4 Risers

As with other cohorted assets (Mains and Services), changes to remaining cohort averages due to investment/ permanent isolation have had an impact on risers and laterals cohort data.

6.4.5 Governors

Xoserve has changed the way it stores customer data which is no-longer consistent with 2017 rebasing. Formulae and capacity tables have been derived which allow for calculations to be performed which have identified additional capacity Governors. We have also seen an increase in network growth, increasing demand in areas of single source governors leading to their identification as capacity Governors.

6.4.6 Offtake/PRS

There has been an improvement to the property density calculations around our Offtake and PRS sites (number of properties within 50m, expected to be destroyed in the event of explosion). This has resulted in a slight change across our Monetised Risk for these assets, however, it is not possible to disaggregate the Offtake and PRS data to identify which differences are due to the property density calculation (consequence of failure change) and slower/faster deterioration. It is expected that the change in deterioration over 8 years will significantly outweigh this data refresh and as such the normalisation has been categorised as slower/faster deterioration.

6.5 Pre RIIO-1 Work

Pre RIIO-1 work true up has been populated with 0 for most asset classes as the rebasing was performed on a 2017 asset base data. As such any pre-RIIO-1 changes had already been accounted for in our base data.

For Offtake/PRS rebasing work, NGN applied information from the previous Health and Criticality tables (Pre RIIO-1), due to large differences in the data set. In doing so, assets that were expected to

be in worse condition had an uplift applied to their asset health score to ensure consistency with these tables. Surveys have not demonstrated the same level of health condition to some of these assets and as such it is appropriate to remove the uplift that was applied during rebasing. This applies to Pressure Control, Filters, Pre-heating, Odorant and Metering.

6.6 Slower/Faster Deterioration

The way the Offtake and PRS models work, there is not a deterioration based on actual asset age. The deterioration works on an expected age driven by the asset health condition. What has not yet been accounted for in NOMs is the linkage between data refresh and inspection year. This means that an asset in condition score 3 in Year 0 carries eight years of deterioration. If that same asset is still classified as condition score 3 in Year 7, the calculations remove the previous seven years of deterioration and starts the deterioration curve again based on the new data, therefore losing seven years of deteriorated Monetised Risk. As such all Offtakes and PRS assets have a slower deterioration element.

6.7 Impact of Change in Asset Base Over RIIO-1

Asset growth (Impact of change in Asset Base Over RIIO-1) has been defined by identifying assets / differences forecast cohorted lengths (adjusting for replacements) when comparing the 2021 asset base with the 2017 asset base. As such, a number of assets have been identified as “growth” as they were not part of the 2017 asset base data. In total this equates to 65 new assets or 0.289R£m in total Monetised Risk.

There are three assets identified in the LTS pipelines which appear to be new assets. These have not been treated in this way due to the reason that these assets are part of a pipeline that has been sectioned into two. Therefore, these are not ‘true’ new assets and have therefore been included in the standard table with the data cleanse relevant risk change being identified as the best category for this change.

6.8 Covered by Other Mechanisms

NGN do not consider that there have been risk changes due to any other mechanisms. Therefore, this column has been populated with 0 values.

7 Methodology for Deriving Associated Costs

The following represents NGN’s proposed methodology for deriving associated NOMs allowances and costs to derive financial data for a Stage 5 submission if it is required. The draft methodology takes account of what data is available with the necessary level of quality assurance over an eight-year historical time frame.

Where possible, historic data from RRP reporting packs should be used to derive associated NOMs allowances and costs as this data has gone through necessary quality assurance and sign-off processes. Any further breakdown greater than the level provided in RRP would require derived assumptions and be subject to uncertainty.

7.1 Associated NOMs Allowances by Asset Category

At the time of RIIO-GD1 determinations, NOMs Monetised Risk did not exist in the gas distribution sector and therefore the networks were not given associated NOMs allowances. Instead, allowances were provided at the levels shown in Table 11 (taken from RRP 2020, 2.2 Totex costs summary, 2019/20 prices).

Controllable costs by activity	2014	2015	2016	2017	2018	2019	2020	2021	Forecast RIIO Total
LTS, storage and entry	14.1	15.1	24.3	20.2	17.1	17.5	13.8	14.3	136.4
Connections	7.2	7.1	7.9	7.9	7.8	8.0	8.1	8.2	62.3
Mains Reinforcement	5.7	5.6	5.6	5.6	5.4	5.2	5.2	5.0	43.2
Governors (Replacement)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	14.6
Other Capex	30.6	34.4	28.7	28.1	16.1	16.2	19.5	19.7	193.2
of which IT	6.3	6.1	4.4	12.1	5.1	3.8	6.2	5.1	49.1
of which Vehicles	6.0	6.0	8.2	0.5	0.4	3.1	4.3	3.7	32.2
Total Capex	59.4	64.0	68.2	63.5	48.3	48.7	48.4	49.1	449.7
HSE driven mains & services	-2.09	-1.9	-1.7	-2.3	-1.2	-2.8	-0.3	2.1	-10.1
Non-HSE driven mains & services	-	-	-	-	-	-	-	-	-
Multi occupancy buildings (MoBs)	-	-	-	-	-	-	-	-	-
Total Repex	109.8	112.0	111.4	112.0	113.7	112.0	115.6	117.8	904.3

Table 11: RIIO-1 Allowances for NGN

Ofgem has stated in RIIO-1 NOMs Incentive Methodology: Appendix 6:

'All costs should be reported in 2020/21 prices in order to align with the RIIO-1 RRP final year submissions. All Cost data should be entered in £ million to a minimum of three decimal place, with historical financial values reconciling with the audited regulatory accounts.'

'The licensee is required to report its derived annual allowances (i.e. from 2013/14 to 2020/21), by Asset Category, for associated Monetised Risk targets in RIIO-1.'

It would be necessary to estimate what proportion of each of the rows above could be reasonably associated with delivery of Monetised Risk targets on an annual basis. Conversion of allowances to 2020/21 prices could be done using the Year end RPI table and factors in the Universal data tab of Riio-gd1_gas_distribution_reporting_pack_template_version_8.0 - Revised RPI to be consistent with other regulatory reporting.

The RIIO-GD1 NOMs framework was introduced partway through the RIIO-GD1 period (reporting from 2016/17) and has not been a primary driver of asset decision making in the price control, but rather a reported output of established processes. Therefore, cost data has not been captured, stored and retained at the necessary level to separate elements of projects and programmes associated with Monetised Risk targets and those that are not, as this has not been a reporting requirement. For certain asset categories, such as Mains, this is not an issue as all expenditure and therefore associated allowances derived from RRP packs contribute to NOMs risk delivery.

For other categories, such as LTS, Offtakes & PRS, the NOMS proportion of allowances would be based on the approach taken for costs out-turned associated with NOMs for those categories, which would be an estimate itself (see Section 7.2). This would then be averaged over RIIO-GD1 to produce a flat annual allowance that may be exceeded in some years and be less in others for categories with 'lumpy' expenditure such as Offtakes & PRS.

Within RRP tables there are named projects (principally for LTS, storage & entry assets) that could be used to guide allocation of costs/ allowances where it is obvious from the project title the primary asset being intervened on (e.g. 'Knottingley/Carcroft Pre-heating Upgrade'). However, in many cases other NOMs assets categories will have been intervened on whilst at site for efficiency reasons and it will not be possible to identify where this has been the case from RRP data.

However, what is known is the target volumes of each asset category level and the average RIIO-GD1 unit costs for these categories from our Unit Cost Database (see Section 7.2). To Derive a NOMs associated allowance, it would be necessary to multiply target volumes by the relevant unit cost adjusted by the differential between LTS, storage and entry allowance to the RRP reported expenditure on this grouping. This is because unit costs are based on real delivered projects in our Unit Costs Database and this may be above or below the implied efficient unit cost from allowances. For example, if we underspent our allowance on LTS, storage and entry by c. 20% then the derived NOMs allowance should be based on target volumes multiplied by the actual average RIIO-GD1 unit cost uplifted by 20% to be consistent with the overall allowance-cost gap. If expenditure exceeds allowances at the levels in Table 11, then the actual average unit costs would be reduced to the efficient unit costs based on the allowance-cost differential. The worked example in Appendix B provides further detail on this.

For allowances, it would be better to provide data at a level equivalent to the rows in the Table 11 rather than by asset category, unless necessary for justification of a specific asset category delivery at Stage 5; i.e. provide estimates of NOMs associated allowances at asset category level by exception and only where necessary for justification of under or over-delivery. It would be futile and time consuming to provide estimated NOMs allowances for all asset categories at the level of disaggregation outlined in tab '4.1.1_Expenditure_Allowed' in the RIIO-1 NOMs Closeout Data Template if only a fraction is needed for justification. The worked example in Appendix B illustrates NGN's proposed approach.

7.2 Associated NOMs Costs by Asset Category

As with allowances, costs are reported as a minimum at the levels shown in Table 12 (taken from RRP 2020, 2.2 Totex costs summary, 2019/20 prices).

	Actuals						Current year actuals	Forecast	Forecast RIIO Total
Controllable costs by activity	2014	2015	2016	2017	2018	2019	2020	2021	
LTS, storage and entry	10.2	17.0	22.3	16.4	12.0	16.1	7.3	14.4	115.8
Connections	7.5	7.7	11.1	9.7	10.6	10.6	9.6	8.5	75.3
Mains Reinforcement	3.3	2.0	3.6	2.4	2.3	2.4	4.0	9.0	29.0
Governors (Replacement)	2.4	1.6	2.0	1.8	1.5	2.7	1.9	2.9	16.8
Other Capex	23.0	26.7	29.4	34.4	28.9	29.4	28.0	22.3	222.2
of which IT	6.1	5.5	6.8	17.6	14.9	24.0	16.8	12.7	104.4
of which Vehicles	4.5	5.1	3.1	2.8	3.4	0.4	1.3	2.9	23.4
Total Capex	46.4	55.0	68.3	64.7	55.4	61.2	50.9	57.1	459.1
HSE driven mains & services	74.4	81.1	72.5	73.9	70.1	72.0	69.5	68.0	581.5
Non-HSE driven mains & services	27.4	25.8	23.9	19.7	26.1	26.7	28.7	26.5	204.8
Risers	0.1	0.0	0.0	-	0.1	0.0	0.0	0.1	0.4
Total Repex	101.9	106.9	96.4	93.6	96.3	98.7	98.2	94.5	786.6

Table 12: RIIO-1 Costs for NGN as Reported for RRP 2020

As with allowances, cost data has not been captured, stored and retained at the necessary level to separate elements of projects and programmes associated with Monetised Risk targets and those that

are not, as this is not a reporting requirement. However, a somewhat further breakdown of costs are available via historic RRP reporting than for allowances. As stated previously, within RRP tables there are named projects (principally for LTS, storage & entry assets) that could be used to guide allocation of costs where it is obvious from the project title the primary asset being intervened on (e.g. 'Knottingley/Carcroft Pre-heating Upgrade').

In many cases other NOMs assets categories will have been intervened on whilst at site for efficiency reasons and it will not be possible to identify where this has been the case from RRP tables alone. What is known, is the delivered volumes of each asset category level and the average RIIO-GD1 unit costs for these categories from our Unit Cost Database. This is a comprehensive dataset that is based on real world projects and includes wholistic project costs. If the Unit Cost Database does not sufficiently cover an asset category at the level required, a sample of relevant delivered projects may be used to derive the representative and most appropriate unit rate instead.

It is possible to use these sources to remove elements of costs not associated with NOMs, such as Electric & Instrumentation costs, to leave the elements that contribute to Monetised Risk delivery for asset categories such as Offtakes and PRS. In addition, it is necessary to allocate proportionally the relevant project design, management and delivery elements at the NOMs asset category level. These NOMs associated unit costs are multiplied by the volume delivered to derive the total expenditure in the relevant categories e.g. LTS, storage and entry. In practice this will likely lead to an over allocation of expenditure to NOMs on average; but it is the most robust way of deriving NOMs associated expenditure that is available and will give a reasonable NOMs cost outturn overall. The worked example in Appendix B provides further detail on this.

7.3 Methodology for Identifying Delivery Elements that have Contributed to Over-Delivery or Under-delivery

At the asset category level, it is obvious from comparing the Deltas in 2.2.2_Delivery_Post_Norm to 2.1.2_Targets_Post_Norm which asset category has materially contributed to over or under-delivery of the network level risk target. For a network such as NGN, a materiality threshold of at least £0.5m for the difference in target and delivered Deltas at asset category level combined appropriately (e.g. Governors, LTS pipelines) is appropriate, as this is less than 1% of our target Delta post-normalisation. What remains, is asset categories where a further breakdown to identify elements of material over or under-delivery may be necessary.

Asset categories and models that are subject to the largest variations in risk across a population are those most likely to contribute to under or over-delivery of Monetised Risk targets. This is because changes to underlying asset data, such as updated condition surveys or the selection of different assets to intervene on from originally planned, can result in materially different Monetised Risk outcomes. Relatively homogenous assets and interventions, such as those associated with mains, services and governors, are less likely to contribute to under or over-delivery of risk targets, unless the volume of interventions delivered are significantly different from originally planned.

The first step in identifying which asset categories contributed materially to under or over-delivery of Monetised Risk targets is to compare planned or the typical volume of interventions delivered, to those actually delivered. There may be particular years in the RIIO-GD1 period that stand out as significantly more or less volume delivered of a particular asset category intervention that could be attributed to identified factors such as the impact of the COVID-19 pandemic.

Once significantly different volumes of relatively homogenous assets and interventions have been identified or eliminated as contributors to under or over-delivery of Monetised Risk targets, it is necessary to identify assets where different choices of sites and/or interventions could result in materially different risk outcomes, such as major projects associated with assets on Offtake and PRS

sites. The models for these assets are sensitive to deterioration, obsolescence and condition assumptions and data. In addition, interventions on ancillary assets such as fencing and housing may have a significant impact on Monetised Risk and the volume of interventions on these could be materially different from what was originally planned.

A combination of the above will allow GDNs to identify which projects / programmes / asset categories contribute significantly to over or under-delivery of Monetised Risk targets. The worked example in Appendix B illustrates NGN's proposed approach.

7.4 Methodology for calculating the costs (or unspent allowances) and how the effect of any deadband will be accounted for

Sections 7.1 to 7.3 and the example in Appendix B illustrate NGN's proposed approach. The same deadband for risk targets should also be applied to associated costs and unspent allowances and justification should only apply to the differential up to that deadband to be consistent with the overall approach and criteria for entering Stage 5.

7.5 Worked Examples to Illustrate the Application of the Proposed Approach

Appendix B contains worked examples which illustrates NGN's proposed approach.

Appendix A Asset and Intervention Definitions

Asset Definitions

Table 13 lists the asset definitions that NGN have applied for NOMs in RIIO-GD1.

Primary Assets	Secondary Assets	Asset Definition
LTS Pipelines	Piggable Pipelines	Steel pipelines of varied diameter and wall thickness operating above 7 bar but not exceeding 100 bar. These pipelines can be internally inspected using Pipeline Inspection Gauges (PIGs).
	Non Piggable Pipelines	Identical construction and pressure to Piggable Pipelines, however they cannot be inspected internally due to limiting factors such as tight bends or smaller pipe diameters.
Distribution Mains	Iron Mains	Distribution mains constructed of either Cast Iron, Spun Iron or Ductile Iron.
	PE Mains	Distribution mains constructed of Polyethylene.
	Steel Mains	Distribution mains constructed of Steel.
	Other Mains	Distribution mains constructed of non-standard materials, principally asbestos.
Services	Services	Service pipes carrying gas from the local distribution main to the customers property, terminating at the emergency control valve.
Risers	Risers	Service pipes supplying multi-occupancy buildings constructed of a variety of materials including Polyethylene, Steel and Copper.
Offtake / PRS Filters & Pressure Control	Offtake Filters	Remove debris from the gas stream thereby protecting downstream assets from damage
	PRS Filters	
	Offtake Slamshut/Regulators	This system consists of Regulators, whose function is to reduce the pressure of gas in the network and Slamshuts, whose function it is to protect the downstream network and customers from over-pressurisation that could occur.
	PRS Slamshut/Regulators	
Offtake / PRS Pre-heating	Offtake Pre-heating	Heats the gas prior to pressure reduction to overcome the temperature loss created as natural gas is reduced in pressure. This will prevent critical downstream assets such as regulators and associated control systems from freezing.
	PRS Pre-heating	
Offtake Odorant & Metering	Odourisation	This system injects a distinctive smell into the gas, so leaks can be readily detected as natural gas has no smell.

Primary Assets	Secondary Assets	Asset Definition
	Metering	Record the volume of gas that flows into the network, allowing for accurate billing and management of the network capacity.
District, I&C and Service Governors	District Governors	A pressure regulating system operating with an inlet below 7 bar, supplying the intermediate, medium, or low-pressure networks with more than ten customers.
	I&C Governors	A pressure regulating system operating with an inlet below 7 bar, supplying large individual, commercial or industrial customers.
	Service Governors	A pressure regulating system operating with an inlet below 7 bar, supplying domestic or smaller commercial or industrial customers. They tend to be in rural areas where there is no low-pressure network and directly supply customers from the intermediate and medium pressure networks. The assets can be split into three categories, those that supply a single customer, those that supply more than one but less than ten customers and those that supply greater than ten customers.

Table 13: NOMs Asset Definitions for RIIO-GD1

Intervention Definitions

Table 14 lists the intervention definitions that NGN have applied for NOMs in RIIO-GD1.

Primary Assets	Secondary Assets	Intervention	Intervention Definition
LTS Pipelines	Piggable Pipelines	Diversions	Abandon old pipe and lay new pipe in new route.
		Pipe Refurbishment	Pipe remedial, e.g. recoating, sleeving
		CP Major Refurb	New transformer install and/or new anode ground bed.
		Decommission	Decommissioning/abandonment of existing main
	Non Piggable Pipelines	Diversions	Abandon old pipe and new pipe in new route.
		Pipe Refurbishment	Pipe remedial, e.g. recoating, sleeving
		CP Major Refurb	New transformer install and/or new anode ground bed.
		Decommission	Decommissioning/abandonment of existing main
		Convert to OLI1	Converts a non piggable pipe to a piggable pipe
Distribution Mains	Iron Mains/PE Mains/Steel Mains/Other Mains	Replacement	Replacement of non PE main with PE main (includes service PE transfers)
		Decommissioning	Decommissioning/abandonment of existing main
		CIPP Lining	Cured in place lining refurbishment of main
		Planned internal repairs (e.g. CISBOT)	Internal repair/refurbishment of mains e.g. joint repairs.
Services	Services	Service relays	Replace non PE service with PE service
		Bulk service replacements	Bulk replacement of services with PE
		Alteration	Customer driven service/meter move Associated with extensions and property development.

Primary Assets	Secondary Assets	Intervention	Intervention Definition
		Decommission	Decommission/abandonment of services
Risers	Risers	Replace	Replacement of riser and associated laterals with pipes of the same material as existing or with PE.
		Corrosion Protection	Corrosion protection of the of riser through sleeve repair
		Decommission	Decommission / abandonment of the riser and associated laterals
Offtake / PRS Filters & Pressure Control	Offtake Filters/PRS Filters	Filter Refurb	Filter refurb
		Filter Replace	Total replacement of the filter system
		Civils Upgrade (Fence and Building replacement)	Replacement of fence and building on site. Intervention should only be applied to systems that the building applies too.
		Civils Upgrade (Fence replacement)	Replacement of fence on site.
		Civils Upgrade (Building replacement)	Replacement of building on site. Intervention should only be applied to systems that the building applies too.
		Full System E&I Upgrade	Full Upgrade of E&I equipment on site. If a loop is only upgraded on site then the intervention should only be applied to the relevant system.
		Full System Rebuild	Full upgrade of relevant system, fence, civils and E&I.
	Offtake/PRS Slamshut/Regulators	PRS Refurb	Refurbishment of main components on pressure reduction stream (monitor, active, slam)
		PRS Replace	Total replacement of all pressure reduction streams on the specific system from inlet to outlet
		Civils Upgrade (Fence and Building replacement)	Replacement of fence and building on site. Intervention should only be applied to systems that the building applies too.

Primary Assets	Secondary Assets	Intervention	Intervention Definition
		Civils Upgrade (Fence replacement)	Replacement of fence on site.
		Civils Upgrade (Building replacement)	Replacement of building on site. Intervention should only be applied to systems that the building applies too.
		Full System E&I Upgrade	Full Upgrade of E&I equipment on site. If a loop is only upgraded on site, then the intervention should only be applied to the relevant system.
		Full System Rebuild	Full upgrade of relevant system, fence, civils and E&I.
Offtake / PRS Pre-heating	Offtake Pre-heating/ PRS Pre-heating	Preheater Replace	Replacement of heating system
		Preheater Refurb	Refurb of heating system
		Full System E&I upgrade	Full Upgrade of E&I equipment on site. If a loop is only upgraded on site, then the intervention should only be applied to the relevant system
		Civils Upgrade (Fence and Building replacement)	Replacement of fence and building on site. Intervention should only be applied to systems that the building applies too.
		Civils Upgrade (Fence replacement)	Replacement of fence on site
		Civils Upgrade (Building replacement)	Replacement of building on site. Intervention should only be applied to systems that the building applies too.
		Full System Rebuild	Full upgrade of relevant system, fence, civils and E&I
Offtake Odorant & Metering	Odorisation	Odorant Refurb	Refurb of odorant system (inc. pumps)
		Odorant Replace	Replacement of odorant system (inc. pumps)
		Full System E&I Upgrade	Full Upgrade of E&I equipment on site. If a loop is only upgraded on site, then the intervention should only be applied to the relevant system

Primary Assets	Secondary Assets	Intervention	Intervention Definition
		Civils Upgrade (Fence and Building replacement)	Replacement of fence and building on site. Intervention should only be applied to systems that the building applies too.
		Civils Upgrade (Fence replacement)	Replacement of fence on site
		Civils Upgrade (Building replacement)	Replacement of building on site. Intervention should only be applied to systems that the building applies too.
		Full System Rebuild	Full upgrade of relevant system, fence, civils and E&I
	Metering	Meter Refurb	Refurb of meter system
		Meter Replace	Replacement of metering system
		Full System E&I Upgrade	Full Upgrade of E&I equipment on site. If a loop is only upgraded on site then the intervention should only be applied to the relevant system
		Civils Upgrade (Fence and Building replacement)	Replacement of fence and building on site. Intervention should only be applied to systems that the building applies too.
		Civils Upgrade (Fence replacement)	Replacement of fence on site
		Civils Upgrade (Building replacement)	Replacement of building on site. Intervention should only be applied to systems that the building applies too.
		Full System Rebuild	Full upgrade of relevant system, fence, civils and E&I
District, I&C and Service Governors	District Governors/ I&C Governors	Governor Replacement	Replacement of complete unit within kiosk including control system. Resets asset age to 0, failure rate then represents an initial failure rate on deterioration curve.
		Fencing	Includes installation or replacement of a fence and reduces the interference
		Kiosk replacement	Replacing the entire kiosk/housing of the governor

Primary Assets	Secondary Assets	Intervention	Intervention Definition
		Governor Refurbishment	Improving the governor condition by painting, reducing corrosion and overall deterioration
		Regulator Replacement	Refer to Intervention 1 (minus kiosk replacement)
		ERS Replacement	Replacement of underground module with an above ground governor
		Governor Decommission	Decommissioning of Governor
		KIOSK - Negative Intervention	Used for Re-Base lining only
	Service Governors	Service Governor Replacement	Replacement of complete unit within kiosk

Table 14: NOMs Intervention Definitions for RIIO-GD1

Appendix B Methodology for Deriving Associated Costs Worked Example



Methodology%20for
%20Deriving%20Assc