

# SGN NOMs RIIO-1 Close-out report

31/07/2021

SGN

Classification: Public



# SGN

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# 1 Executive Summary

As a responsible network operator, and ISO55001 certified company, SGN is committed to providing a reliable gas supply to our 5.9million customers and ensuring that our gas network operates safely by understanding, quantifying and managing the potential risks posed to gas users, the general public and our employees.

Over the last eight years of RIIO-1 ending on 31<sup>st</sup> March 2021, SGN has worked to deliver efficient asset interventions that consider all risks, opportunities and investment requirements to make sure that we justifiably deliver the best value for our customers whilst continuing to operate a safe and reliable gas supply.

A significant part of this commitment is our performance within the Network Output Measures (NOMs) delivery framework and meeting the targets set by Ofgem as defined by special condition 4G of our Ofgem licence.

As of 2018 the NOMs delivery framework has utilised an approach of monetising risk and the consequence of failure to assess and support the delivery of asset interventions. Prior to 2018 we were using Ofgem approved Health and Criticality Indices to support our investment decisions.

Therefore, the use of the final assessment methodology for monetised risk as set out in this report, was limited to the final three years of the price control period with investment prior to this being informed by the Health and Criticality matrices agreed at the start of the RIIO-1 period.

SGN's NOMs Monetised Risk (MR) target for Scotland is R£362.1m and we delivered £364.2m, and in Southern SGN's NOMs MR target is R£76.3m and we delivered R£77.3m. Our final delivery shows we have achieved and marginally exceeded our targets as shown in Table 1.

*Table 1 - Actual Delivery compared to Post-Normalisation Target*

Network	Target Delta RIIO-1 (R£m)	Actual Delivery Delta RIIO-1 (R£m)	Difference (%)
Scotland	362.1	364.2	0.6
Southern	76.3	77.3	1.3

This report outlines the assets, interventions and assumptions tracked as part of the RIIO-1 NOMs process up to the 31<sup>st</sup> of March 2021. Moving forward into RIIO-2 the NOMs process will be superseded by the NARMs process with a greater focus on the unit cost of risk.

## 2 Introduction

We, SGN, are the gas distribution network for the southeast of England and the whole of Scotland. We manage 74,444km of pipes along with thousands of other assets. The risk these assets pose to the public and wider infrastructure is measured and monitored, for the RIIO-1 price control period, using the Network Output Measures (NOMs) methodology.

This methodology uses a concept of monetising risk to quantify the Health, Criticality and Risk (HCR) of an asset. The development of the Monetised Risk (MR) methodology and its application to the NOMs methodology is detailed in full within the Network Output Measures Health & Risk Reporting Methodology & Framework<sup>1</sup> document.

During RIIO-1 we have worked collaboratively with the other GDNs, through the Safety and Reliability Working Group (SRWG) to develop and maintain the NOMs MR methodology. The SRWG was formally convened in 2013, at the start of RIIO-1, and in 2014 development of the new assessment methodology began.

The resulting methodology, developed through the SRWG, calculates MR values to represent each of our assets by applying the core principle that risk is the product of the Probability of Failure (PoF) of an asset, the Probability of Consequence (PoC) that such failure could lead to and the cost associated with those consequences. Figure 1 provides a diagrammatic overview of the broad MR process.

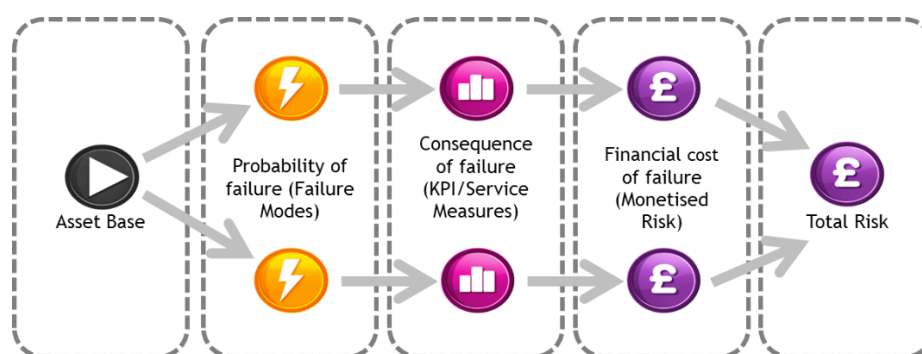


Figure 1 - Broad Monetised risk Process from NOMs methodology

The common framework for deriving the PoF, PoC and costs required for calculating MR values for assets is detailed within the Methodology and Framework document<sup>1</sup>. Within this report we will detail the processes that have been applied through the RIIO-1 period, in accordance with the common framework and licenses, to develop MR values specific to our assets. This will include the broader, and asset specific, assumptions required to accurately assess the range of assets captured within the MR framework.

Interventions upon assets affect the PoF of an asset and therefore alter the MR against that asset. Ofgem have therefore set MR targets, as defined by special Condition 4G, which form a secondary deliverable output under the RIIO framework. This ensures that companies improve their network while allowing networks the flexibility, through the RIIO-1 period, to tailor their intervention strategy to provide the most benefit to the customer.

<sup>1</sup> [https://www.ofgem.gov.uk/sites/default/files/docs/2015/11/gdn\\_asset\\_health\\_risk\\_reporting\\_methodology\\_-\\_v2.0.pdf](https://www.ofgem.gov.uk/sites/default/files/docs/2015/11/gdn_asset_health_risk_reporting_methodology_-_v2.0.pdf)

Prior to implementation of the NOMs MR methodology, until 2018, asset interventions were measured against asset HCR bands. These bands allowed the relative benefit of interventions to be tracked but did not permit comparison of asset health or intervention benefit across asset classes as the MR methodology now does.

During the 2019 financial year, Ofgem confirmed MR targets for each distribution network in the form of a MR delta. This target delta being the total difference in forecast risk at the end of the RIIO-1 period between a zero-delivery scenario, where no interventions are completed, and the position after all interventions detailed within the RIIO-1 Business Plan are completed.

To enable us to accurately plan and track MR for assets and manage their associated interventions, we have employed externally developed software systems. For initial implementation of the MR methodology in 2018, we employed DNVGL's excel based models. However, to enable further development, in 2019, we migrated MR modelling to Copperleaf's C55, a dynamic asset management system.

The transition to C55 has enhanced our ability to apply the MR methodology and will enable us to develop the methodology further going forward. Moving beyond the RIIO-1 close out process, into RIIO-2, the assessment methodology that utilises the MR concept will change from NOMs to Network Asset Risk Metrics (NARMs).

This report will detail SGNs delivery performance against these NOMs MR targets and provide further detail on its application of the MR methodology to specific asset categories. It will also provide supporting information and further explanation of the process taken to complete the accompanying Closeout Data Template. This will include the breakdown of assets and how relevant risk changes were applied in order to normalise targets and provide an equivalent comparison between the target and the final completed delivery.

### 3 Asset and Interventions Definitions

The NOMs methodology categorises network assets into groups for analysis, risk calculation and reporting. At the highest level they are split into a suite of asset groups. These high-level groups are then split into sub-groups where the assets can be assessed with a more granular level of information. These groups and sub-groups are common across all networks and have been agreed with Ofgem to form the basis of regulatory reporting of asset health, critically and risk.

Interventions are defined in the NOMs methodology as either reactive or proactive, where a reactive intervention is an action taken on an asset that is unplanned, and a proactive intervention is planned in advance. Interventions will primarily fall into the following categories:

- Replacement – a proactive intervention that replaces an asset or a proportion of the asset population with new assets.
  - With like for like assets
  - With different assets, such as a different material, new model, etc.
- Refurbishment – a proactive intervention that extends the life of an asset.
  - A reactive only (i.e. repair) intervention regime will be considered the baseline strategy in which other regimes will be compared against. Combinations of the proactive interventions are also considered.

The following subsections will detail the specific interventions that have been used within each asset group alongside any assumptions applied. The full list of asset specific interventions developed for the NOMs methodology are outlined in Appendix B.

#### 3.1 LTS Pipelines

LTS (Local Transmission System) pipelines operate at pressures above 7 bar but not exceeding 100 bar. This includes all pipelines that can be inspected using internal inspection vehicles (OLI1) or other internal inspection technique and includes pig trap installations. Transmission pipelines that cannot be inspected internally (non-piggable) are classed as OLI4. In the NOMs MR methodology, LTS pipelines also capture pipeline crossings, sleeves, block valves, and cathodic protection.

LTS pipelines are captured as individual assets with a length as opposed to in cohorts like other pipe assets (mains, services, risers). Generally, interventions on LTS pipelines will not account for the entire length captured against that asset and a standard intervention cannot be modelled. In this case, the baseline asset is decommissioned and new assets are created with amended lengths to model the outcome; one of the new assets detailing the length of the intervention and the others in baseline state detailing the remainder of the original asset not intervened upon.

Data relating to damage on LTS pipelines and resultant product releases is scarce, primarily because instances are very rare. Gas Distribution Network (GDN) specific data would therefore not constitute a statistically viable sample. GDNs already pool such data with the UK Onshore Pipelines Association (UKOPA) which is shared with European organisations, such as European Gas Pipelines Incident Data Group (EGIG). Pipeline Integrity Engineers (PIE) already administer this data on behalf of UK operators and, as part of the development of the MR model for LTS pipelines, PIE developed common fault data, which has been used within the SGN model. This data provided failure rates dependant on age, diameter and wall thickness. By applying the known age of the pipelines, the base data was derived.

The interventions carried out on LTS pipelines consist of replacements and refurbishment. Replacement of an LTS pipeline is carried out by diversion. Refurbishment is either done to the pipe, using remediation techniques such as recoating and sleeving, or to the cathodic protection, by replacing the transformers or anodes. Refurbishment can also be carried out on crossing structures.

### 3.2 Repex

Repex (Replacement Expenditure) refers to the replacement programme of pipes distributing gas at below 7 bar operating pressure. The assets covered by the Repex programme are distribution mains, services and risers (including laterals).

To facilitate reporting, our Repex assets are grouped into asset cohorts in alignment with the other GDNs. Distribution mains are split by material, pressure and diameter band; services by material and customer type (Domestic/Non-Domestic); and risers by material and type of intervention planned, as only one intervention type can be applied per cohort.

Asset cohorts were developed to group assets by the attributes that most accurately reflect the health of the asset. Within the NOMs MR framework each asset within a cohort is assumed to have the same base PoF, CoF, cost and therefore overall MR associated with it.

#### 3.2.1 Distribution Mains

A distribution main is a below ground pipe, laid as an extension of, or change to, the system that supplies, or has the capability to supply, more than 2 primary meter installations operating below 7 bar gauge.

For the purposes of developing a MR metric for a distribution main it has been assumed that one can exhibit 6 distinct failure modes, each with the same 6 consequence measures associated. The failure modes being: capacity failure, corrosion failure, fracture failure, interference failure, joint failure and general emissions. And the associated consequence measures being: gas escape, gas in building, supply interruption, loss of gas, water ingress and explosion.

As detailed within the published NOMs Methodology & Framework document, these failure modes and consequence measures were identified through extensive consultation with asset experts to form an accurate reflection of the risk associated with a distribution main.

The starting failure rates associated with each failure mode are calculated based on historical repair data collated within our internal asset repository, Maximo. Deterioration factors were developed for the NOMs methodology through cross GDN statistical analysis. These factors represent the effect of an asset's age on the failure rates.

For the purposes of NOMs, we have assumed a one to one relationship between decommissioned mains length and commissioned mains length. Therefore, the total length of decommissioned mains recorded through the RIIO-1 period has been applied to the "Replace with PE" intervention within the relevant asset cohort.

As detailed within the NOMs methodology the "Replace with PE" intervention replaces the historical repair data, representing the old metallic main, with common, cross GDN agreed, failure and deterioration rates associated with a new PE main.

Mains interventions are captured through our Maximo asset repository, an extract from which is translated into the C55 NOMs model to generate the MR benefit associated with those interventions.

### 3.2.2 Risers

A riser is a vertical pipe that carries gas between floors within a building. A lateral is a horizontal pipe connected to a riser that conveys gas along one floor level within a building.

The main failure modes for risers are joint failure, corrosion and interference from 3<sup>rd</sup> parties. The interventions carried out on risers are replacement with PE and replacement with a likewise material (steel).

Data for risers within medium rise buildings, three to five storeys high is known only where SGN has been called to site to complete repairs. In such cases, the riser is surveyed and recorded in our repositories. SGN is currently progressing a detailed survey of all buildings termed, medium rise, and have updated the data set for RIIO-2. For RIIO-1, we have reported against the known risers as captured within Maximo and the Riser Risk Model at the start of rebasing. No estimate was included of risers which were not captured within our repositories. Riser outputs are reported in NOMs on a per asset basis, this may differ compared to other Ofgem reports where riser outputs are reported per Multiple Occupancy Building (MOB) or on a per connection basis.

### 3.2.3 Services

A service is a pipe from a main up to and including the outlet of the 1st Emergency Control Valve (ECV) to an individual meter installation. For the purposes of NOMs, services are assumed to exhibit the same 6 failure modes and consequence measures as mains.

MR associated with services is calculated on a per asset basis as part of the NOMs MR methodology.

As stated in Section 3.2, services are grouped into asset cohorts. A consequence of the asset cohort system is, only one type of intervention can be applied through the model without the introduction of significant modelling complexity. Therefore, for the purposes of NOMs MR, we assume that all service relays are completed with PE. Appendix B provides further details of the types of intervention that can be applied to a cohort through the NOMs methodology.

As with mains, the “Replace with PE” intervention replaces the historical repair data, representing the old service, with common, cross GDN agreed, failure and deterioration rates associated with a new PE service.

Services interventions are captured through our Maximo asset repository, an extract from which is translated into the C55 NOMs MR model to generate the MR benefit associated with those interventions.

## 3.3 Offtake and PRS

Offtakes are installations providing the exit point from the National Transmission System (NTS) into either the LTS or in some cases directly into the distribution system. PRS sites provide further pressure reduction from the LTS into the distribution system. They typically comprise the following components: filters, metering, pre-heating, pressure reduction (including slam-shuts), and odourant injection systems.

PRS (Pressure Reduction Station) and offtakes are captured at an individual asset level and therefore no assumptions were required as all data captured is specific to each asset and no cohorts are used.

The interventions shared across all offtake and PRS sites are civil upgrade, full site rebuild, refurbishment and capacity. Civil upgrade involves the replacement or refurbishment of fencing, in



doing so the probability of failure is reduced on all the assets in the site as per the NOMs MR methodology. The other types of civil upgrades are kiosk and housing works, these reduce the probability of failure of the specific asset on which they are being replaced or refurbished. Full site rebuild involves the complete rebuild of a system or site, replacing fencing, civils, E&I, and the relevant system. Capacity replacements will involve a partial or full rebuild of a site due to constraints in the ability of the station to meet the demand of the network, this can be due to general growth of demand or can occur due to changes in the pipelines or stations of integrated networks, which may rebalance the flow across the network causing capacity constraints.

Appendix B provides tables showing the available interventions as part of the NOMs MR methodology.

### **3.3.1 Filters, Pressure Control**

Filter systems are installed in Offtakes and PRS to remove dust or debris in the gas which if unfiltered can cause damage to regulators and control valves. The interventions carried out on filters include refurbishment or replacement of the filters.

Pressure control systems, including slam-shuts, are critical to ensuring safety and reliability in the running of a network, preventing dangerous high-pressure gas from entering the network and reducing pressure and shutting off supply if other faults occur. The interventions carried out on PRS assets are: PRS replacement and PRS refurbishment.

### **3.3.2 Preheating**

Preheating systems are required to prevent gas from freezing when it reduces in pressure across the regulator. The greater the drop in pressure, and the higher the flow through the site, the larger the preheating system required. A combination of electrical, gas boiler, and water bath heaters are used across our networks to raise the temperature of the gas passing through PRS and Offtakes.

The interventions exclusive to preheating are preheater replacement and reheater refurbishment. Preheater refurbishment can take the form of replacement of a single piece of the heating system, examples being heat exchanger replacement and boiler replacement.

### **3.3.3 Odourant and Metering**

Odourant systems are used to inject odourant into gas prior to its entry into the distribution network. Odour is injected via a pumping system into the LTS system at a National Offtake to give gas its distinctive smell. The odourant interventions are odourant refurbishment and odourant replacement.

The way odourant systems were modelled was found to not contain a cost for odourant. This has been amended as part of the relevant risk changes outlined in Section 6.

A metering system, comprising of one or more requisite meters, is installed on a National Offtake upstream of the Pressure Reduction System. Metering systems are used to ensure accurate reporting of flowrate through the system. The metering interventions are meter refurbishment and meter replacement.

## **3.4 District, I&C and Service Governors**

A Governor is a pressure reduction unit which has an inlet pressure less than 7 Bar. District Governors supply to the gas network, be it intermediate, medium or low pressure. I&C Governors

## Classification: Public

supply to large single non-domestic customers. Service Governors supply to single domestic customers or small non-domestic customers.

District and I&C governors are also captured as individual assets; however, service governors are captured in cohorts based on network pressure (MP or IP).

The most common interventions associated with governor assets are full replacement, replacement of components or refurbishment.

The targets for district and I&C governors are set at a programme level of work targeting similar types of governors. The asset workload is therefore flexible in which specific governors can be chosen and as such the actual risk reduced can vary depending on the selected governors.

## 4 General Assumptions

To complete the NOMs Closeout Data Template some general assumptions must be made at a high level. This is to ensure that the final numbers reported are accurate, while also being both repeatable and possible to validate. The higher-level assumptions required are outlined in the following sections. Some asset specific assumptions are also required, and these have been outlined in Section 3.

### 4.1 Data Quality

SGN commit significant resource to maintaining its databases. Despite this, data is not always in a form that is immediately compatible with the NOMs process and therefore manual adjustment is occasionally required. As with any process involving elements of human intervention there is a risk of inaccuracy. However, we have made every reasonably practicable effort to ensure the data processed is as accurate and reliable as possible. Appendix D details the challenges associated with data source management and the measures SGN has taken to minimise any potential impact.

The data used for transmission is of high quality with a robust process in place to capture asset attributes and actual interventions. The data has been subject to multiple validation exercises, with the most recent large-scale validation carried out after the implementation of the C55 asset management tool.

The distribution asset data is of good quality; however, these are high volume asset groups, and as such it is rare for any material changes to be identified on an asset by asset basis. However, a programme of inspections, composed of individual condition assessments, has been initiated for the district governor population. We have put in place a robust process to capture interventions and apply these to high-level cohorts in line with workloads reported on other regulatory returns.

### 4.2 Transition to Copperleaf C55

Copperleaf's C55 asset management tool was implemented in 2018/2019 to replace the DNVGL model and enhance our ability to further utilise the MR methodology. During the implementation process, validation was performed to ensure the accuracy of the data captured. Moving to a dynamic asset management tool, in C55, has improved our ability to manage our MR model and enhance the process of analysing and reporting MR outputs. A further benefit of moving to this system is centralising our MR modelling to a single system allowing faster and easier comparisons across different asset classes whilst also reducing potential mechanisms for generating errors.

### 4.3 NOMs Modelled Costs

As stated within the introduction of this report and the NOMs MR methodology document, risk is the product of the PoF of an asset, the probability that such failure could lead to a consequence and the cost associated with those consequences. The costs used in this calculation are based on our information where reasonably available, however, for some possible consequences this information is not available within SGN. These remaining costs, such as those associated with societal consequences, are taken from HM Treasury's Green Book and other agreed sources as stated within the NOMs MR methodology document. In accordance with the NOMs methodology, these cost values were fixed in a 2014-15 price base for the RIIO-1 period.

### 4.4 Intervention Volumes

Intervention volumes delivered through the RIIO-1 period have been captured within tab 3.2.1 of the Closeout Data Template. To capture these volumes within the MR model and the Template,

we needed to apply some assumptions, some of which have already been outlined within the relevant subsections of Section 3.

Mains interventions captured within the Closeout Data Template represent the length of mains decommissioned during a project and not the newly commissioned length. This is because the MR model uses the decommissioned length to calculate the risk. Further, the CISBOT intervention is not modelled within NOMs framework, therefore, CISBOT interventions, have not been captured within our intervention volumes.

Intervention volumes captured for LTS pipelines represent only the actual diversion length i.e. laid length. As for the minor refurbishment projects, it is difficult to distinguish intervened length due to how LTS pipelines have been modelled within NOMs. Therefore, we have excluded length associated with minor refurb for both target and delivery scenario.

Replacement and refurbishment interventions for Offtakes and PRS and all replacement types for Risers have been summed together within the Closeout Data Template. However, within the MR models these have been captured separately and therefore the with intervention MR figures for these asset classes are representative of the actual intervention split.

Governor interventions numbers have been captured based on the type of intervention applied. Due to the limitations of the model only one intervention can be applied per asset, as such in the few cases where multiple interventions have been carried out, only the highest risk benefit intervention has been applied.

#### **4.5 Load Related Projects**

We have not included growth related assets as part of this submission and there will be only a minimal impact on the post-normalisation position as normalisation will be applied to both the with and without position. Growth is captured as part of the RIIO-2 data refresh, outlined in Section 6. Growth related assets have not been included as it is understood that the amount of change this causes would be limited due to the low MR values of new assets and the small number of such assets to be added.

We propose to include an updated Template that contains the growth-related asset as part of the 16<sup>th</sup> September submission.

## 5 Performance against Targets and Delivery

As a responsible network operator, and ISO55001 certified company, we are committed to providing a reliable gas supply to our 5.9million customers and ensuring that our gas network operates safely by understanding, quantifying and managing the risks posed to gas users, the general public and our employees. A significant part of this commitment is our performance within the NOMs delivery framework and meeting the targets set by Ofgem. In doing so, we have worked to deliver asset interventions, through the RIIO-1 period, that consider all risks, opportunities and expenditure including operating costs to make sure we deliver the best value for our customers.

In 2018 MR targets were developed to facilitate the changes to the NOMs methodology. These targets are represented as a MR reduction or delta. The delta being the total difference in forecast risk at the end of the RIIO-1 period between a zero-delivery scenario, where no interventions are completed, and the post-delivery position after all interventions detailed within the RIIO-1 Business Plan are completed.

Regardless of the changes to the reporting mechanism, the intervention decisions made throughout RIIO-1 were to maintain a safe and reliable network for our customers, which is the core of our asset management strategy. However, changing assessment methodologies through the course of the RIIO-1 period means that prior to 2018, for the first five years of the RIIO-1 period, investment decisions were being gauged against a methodology that is not being used at close-out. This should be considered when assessing outturn positions as a significant volume of interventions were either already complete or planned with no ability for adjustment. Further, the rebased MR targets were only fully published in the 2019/20 financial year. Therefore, while the NOMs methodology allows reasonable flexibility in intervention planning, there was limited scope to enact significant change to the overall outturn position.

Having delivered R£364.2m in Scotland and R£77.3m in Southern, we have delivered on the targets. The following sections will provide further detail on this delivery performance.

### 5.1 Scotland Targets and Delivery

At the start of RIIO-1 the total MR associated with the Scotland network was R£115.4m. Without intervention, asset condition would have deteriorated such that, at the end of RIIO-1, the MR would have been R£469.2m. The post-normalisation target, with intervention, position is R£107.1m, therefore, the RIIO-1 target risk reduction, or delta, for our Scotland network is R£362.1m. All figures listed, unless otherwise stated, are in the post normalisation position.

The total Scotland network delta includes a large single delta for LTS pipelines of R£306.9m, which relates to a capacity constraint on the Northern Transmission System between Aberdeen and Inverness. Mod90 under the Uniform Network Code was enacted in 2016, which allowed 7 large users to revert from interruptible to firm contracts. In doing so, the updated demand on the system exceeded capacity and therefore significantly increased the MR.

The inner ring of Figure 2 displays the breakdown of the Scotland network's target delta by asset group, excluding LTS due to the significance of the delta (approximately 95% of total delta is from LTS pipelines) associated with that asset group.

Our intervention delivery led to a MR position at the end of RIIO-1 of R£105.0m, thus generating a delta of R£364.2m. We have installed additional pipelines to accommodate the required capacity increase on the Northern Transmission System, completing the work by October 2016 and delivering a delta of R£306.9m. The outer ring of Figure 2

displays the breakdown of the delta from the delivered interventions on the Scotland network, excluding LTS as detailed previously.

As part of our validation exercise we have identified a difference between the target published and the target submitted in the Regulatory Reporting Pack (RRP). It appears that during the rebasing exercise the PRS-Preheating was not captured as part of our target. Currently, the published target shows no risk associated for PRS-Preheating for 2021 with and without intervention. For the Scotland target to be assessed accurately during RIIO-1-close out, the PRS-Preheating delta have been included.

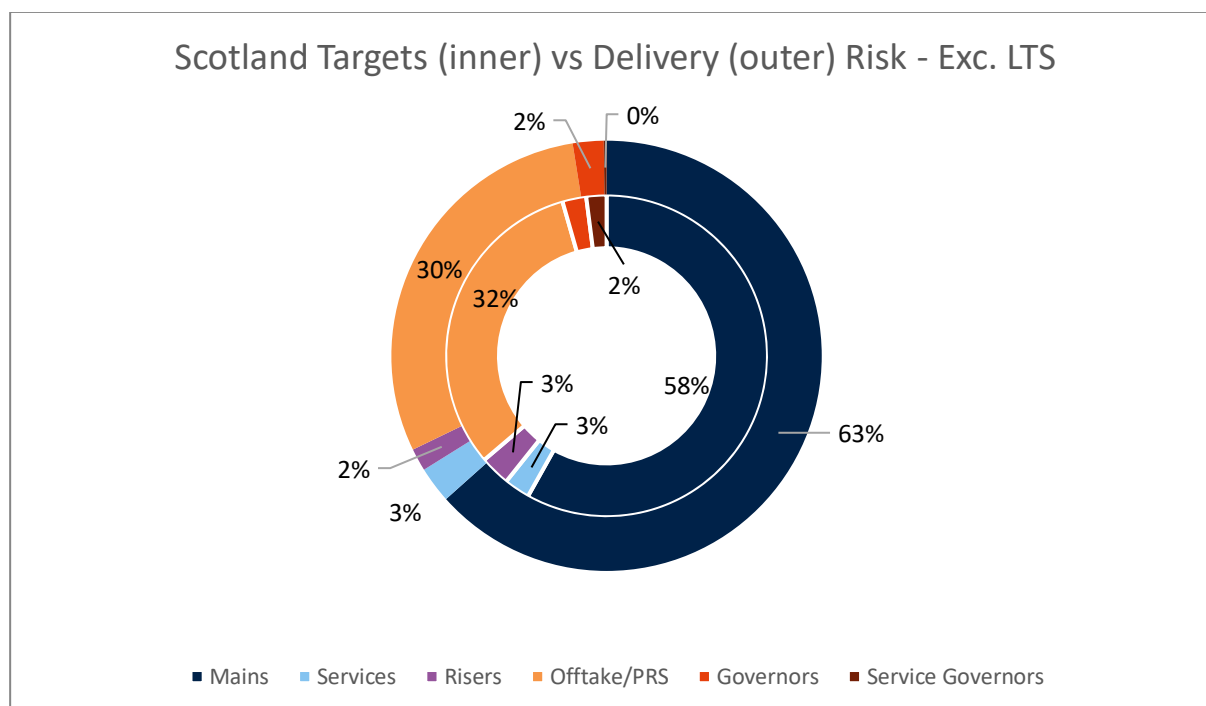


Figure 2 – Concentric pie charts detailing the percentage breakdown of the MR targets (inner ring) and the delivery (outer ring). This graph excludes LTS to provide a more granular comparison.

As can be seen in Figure 2, by comparing the inner and outer circles, we have delivered on target while following our delivery plan closely and engaged in minimal monetised risk trading across primary asset classes, with only slightly increased delivery in mains and a slight reduction within risers and offtakes/PRS. However, we have completed risk trading within asset classes this will be detailed for each specific asset class within Section 5.3.

Table 2 outlines the pre and post normalisation values for the target and actual delivery. The overall impact of normalisation has been limited, and in the instances it has been applied it has not resulted in non-intervention benefits. Further detail around relevant risk change normalisation is captured in Section 6.

Table 2 - Scotland start and end MR positions before and after normalisation

	RIIO-1 Start (R£m)	Without intervention RIIO-1 End (R£m)	Target RIIO-1 End (R£m)	Delivery RIIO-1 End (R£m)
<b>Pre-normalisation</b>	103.7	457.1	94.9	N/A
<b>Post-Normalisation</b>	115.4	469.2	107.1	105.0

## 5.2 Southern Targets and Delivery

At the start of RIIO-1 the total MR associated with the Southern network was R£267.7m. Without intervention, asset condition would have deteriorated such that, at the end of RIIO-1 MR would have been R£310.1m. The post-normalisation target end, with intervention, position is R£233.8m, therefore, the target risk reduction, or delta, for our Southern network for RIIO-1 is R£76.3m. All figures listed, unless otherwise stated, are in the post normalisation position.

The inner ring of Figure 3 displays the breakdown of the Southern network's target delta by asset group.

Our intervention delivery led to a MR position at the end of RIIO-1 of R£232.8m, thus generating a delta of R£77.3m. The outer ring of Figure 3 displays the breakdown of the out-turn delta from the delivered interventions on the Southern network.

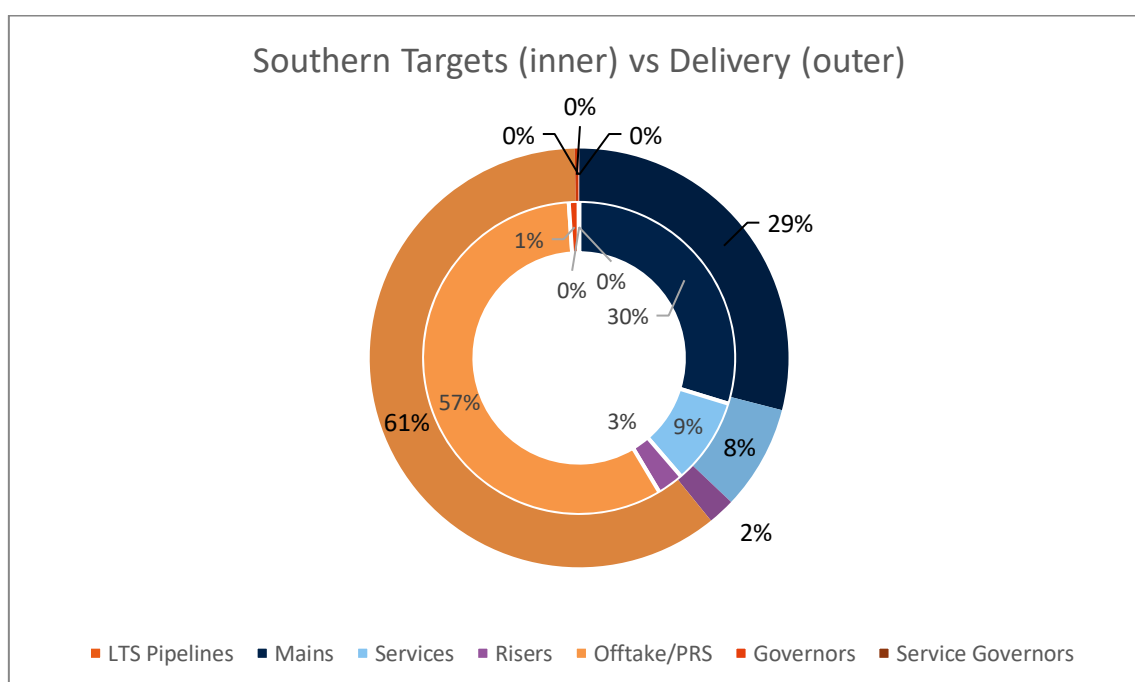


Figure 3 - Concentric pie charts detailing the percentage breakdown of the MR targets (inner ring) and the delivery (outer ring).

As can be seen in Figure 3, by comparing the inner and outer circles, we have delivered on target while following our delivery plan closely and engaged in minimal risk trading across primary asset classes, with only small movement between the Repex and Offtakes/PRS. However, we have completed risk trading within asset classes, this will be detailed for each specific asset class within Section 5.3.

Table 3 outlines the pre and post normalisation values for the target and actual delivery. The overall impact of normalisation has been limited, and in the instances it has been applied it has not resulted in non-intervention benefits. Further detail around relevant risk change normalisation is captured in Section 6.

Table 3 - Southern start and end MR positions before and after normalisation

	RIIO-1 Start (R£m)	Without intervention RIIO-1 End (R£m)	Target RIIO-1 End (R£m)	Delivery RIIO-1 End (R£m)
Pre-normalisation	267.3	309.5	232.6	N/A
Post-Normalisation	267.7	310.1	233.8	232.8

### 5.3 Performance

Since its implementation in 2018, we have utilised the flexible nature of the NOMs MR incentive methodology to ensure that appropriate interventions are taken to minimise risk while ensuring we are efficient in our approach to delivery. This, as part of our wider asset management strategy, has allowed us to act proactively to resolve asset faults and utilise new inspection information. Therefore, allowing us to efficiently run a safe network and deliver best value to our customers.

Prior to the NOMs MR methodology being implemented in 2018, asset interventions were measured against asset HCR bands. These bands were designed to provide simple representations of the difference in the with and without intervention positions in RIIO-1. The HCR methodology did not allow the same level of precise decision making based on calculated risk and limited the ability to risk trade as asset class cross comparison was not available.

At the point of implementing the NOMs methodology many interventions were already completed or planned under the HCR framework. While the NOMs MR methodology allows reasonable flexibility in intervention planning and enables comparison of different asset classes, due to its implementation part way through the price control, there was limited scope to enact significant change to the overall outturn position.

As discussed in Section 5.1 and Section 5.2 we have not engaged in significant risk trading between asset classes. This is primarily due to the expected delivery between asset classes remaining largely unchanged, the changes to planned delivery occurred within the specific asset classes themselves. For example, requirements within PRS and Offtake to deliver different assets due to condition is independent from the delivery required within the Repex program. In addition, as discussed, the HCR methodology did not have the same capability of asset class cross comparison as the MR methodology. Therefore, it was not possible, within the first 5 years of RIIO-1, to assess the relative benefit of risk trading. However, regardless of the reporting mechanism, decision making to intervene on assets to maintain a safe and reliable network for our customers has been, and will always be, the core of our asset management strategy.

The following subsections will break down the delivery within each asset group towards the MR targets. This will include explanations of how our intervention plans have changed in order to efficiently deliver the risk reductions required and detail the interaction of our NOMs delivery with other target mechanisms, such as those set by the Health and Safety Executive (HSE).

#### 5.3.1 PRS Offtakes

The intervention work carried out on PRS and Offtakes has been wide ranging, with projects having been completed on 144 assets across 90 sites in Southern and 135 assets across 85 sites in Scotland. These works included full site rebuilds in addition to the individual replacement or refurbishment of Filters, Preheating, Pressure Controls (PRS), Meters, and Odourant. Work was also carried out to fix civil issues on fences and asset housing.

As explained in Section 6.5, in the submitted target for Scotland no data was included for Preheater interventions. In reality, and as per the business plan, we have delivered interventions on preheating assets in Scotland.

Figure 4 and Figure 5 outline the high-level differences between the MR delivery outlined in the post normalisation target and what was delivered in RIIO-1. This shows how we have been proactive in our approach to managing our assets, delivering greater risk reduction in Southern for filters and more risk for slamshuts and preheating in Scotland.



This additional delivery, and the trade-offs, were partially due to the changing approach to managing risk over RII0-1. Moving from the asset health and criticality to the MR approach, allows us to be proactive and agile in delivering interventions on our assets with higher risk to improve asset health.

In Figure 4 it can be seen that most Southern asset interventions have remained consistent with the target, the main area of additional MR delivery being in PRS filters. This is due to a number of reported faults on southern filters through our PSSR inspection regime. The majority of which were unknown during the business plan submission and required immediate intervention.

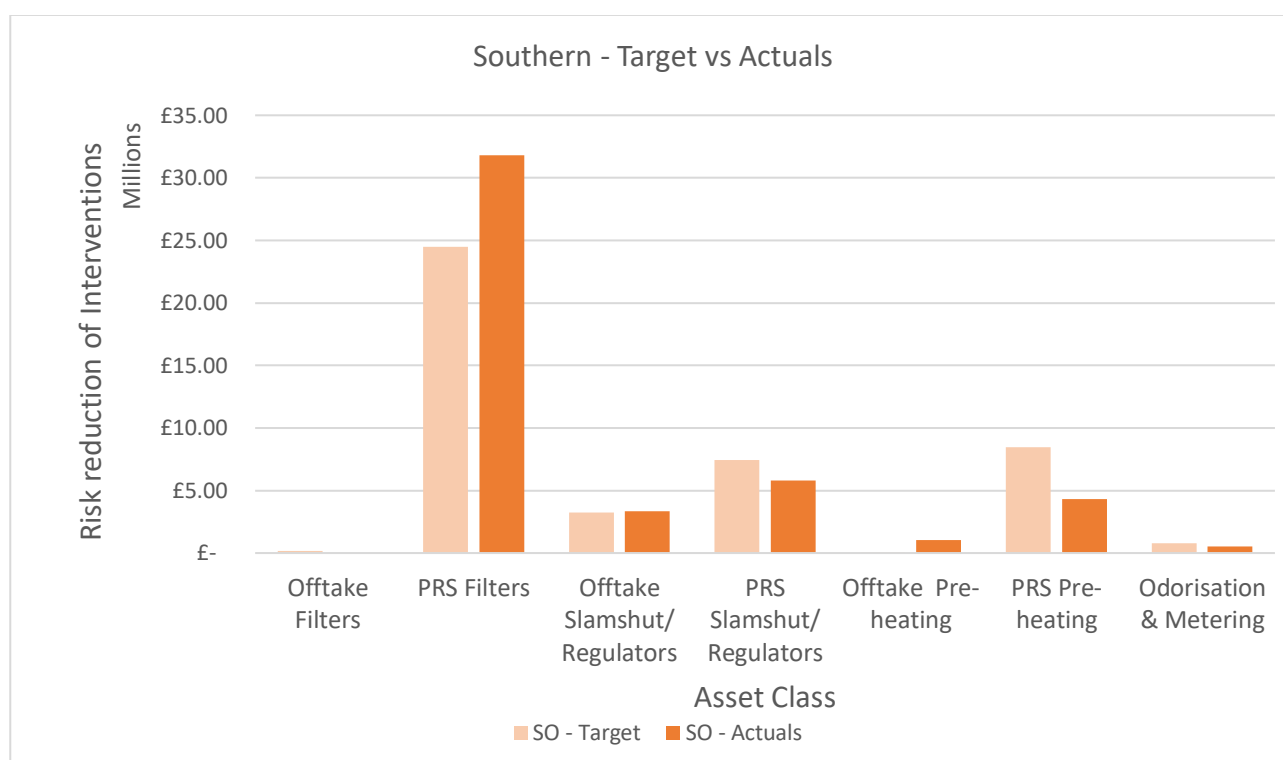


Figure 4 - Southern asset class comparison between the Final Proposal and Actuals

Figure 5 shows the differences in delivery in Scotland with the main changes being the reduction in MR delivery on PRS Filters and Offtake Pre-heating and an increase in MR delivery on PRS Slamshuts and PRS Preheating. This increase in MR delivered on PRS pre-heating and in Scotland is due to an increase in faults that could not be remediated through component replacement. Filters were not affected as significantly by this issue. The increase in delivery on PRS Slamshuts/Regulators was due to an increased focus on replacing slamshut systems which are vulnerable to modes of failure affecting security of supply. It should be noted that the MR change seen does not necessarily correlate with an equivalent change in the number of interventions. For example, the quantity of interventions on PRS filters in Scotland was increased and was driven by the specific sites where faults were discovered during PSSR inspections. This resulted in a reduction of the MR delivered due to the specific sites not having the highest customer totals. This strategy of risk trading has ensured that we have carried out additional necessary interventions on these assets. This has resulted in the ability to target more slam shuts and preheaters.

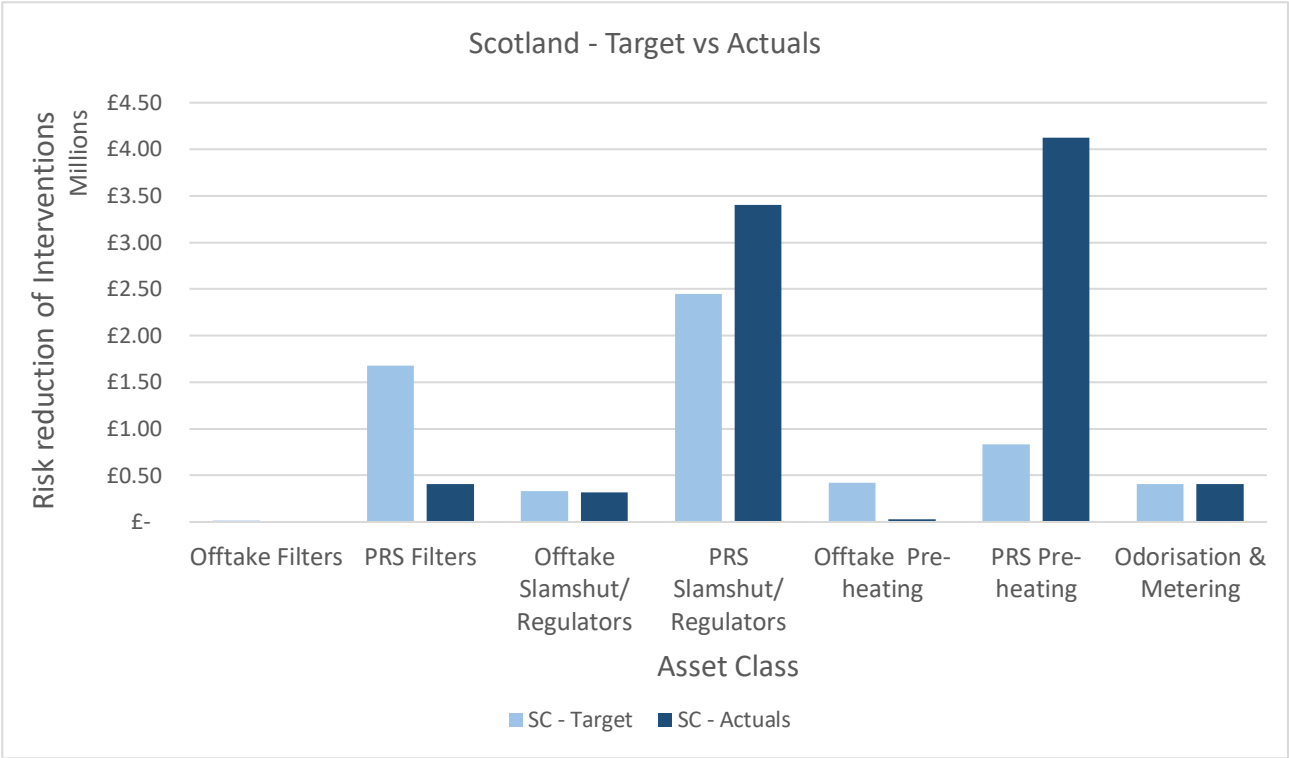


Figure 5 - Scotland asset class comparison between the Final Proposal and Actuals

It should be noted that the difference in delta delivered in assets has not solely been driven by changes to the type of intervention delivered. As seen in Figure 6, there has been an increase in the number of refurbishments as well as an increase in replacements delivered when compared to the target for Scotland. In Southern there has been an increase in refurbishment and a reduction in replacements, this has allowed SGN to complete proactive interventions on more sites.

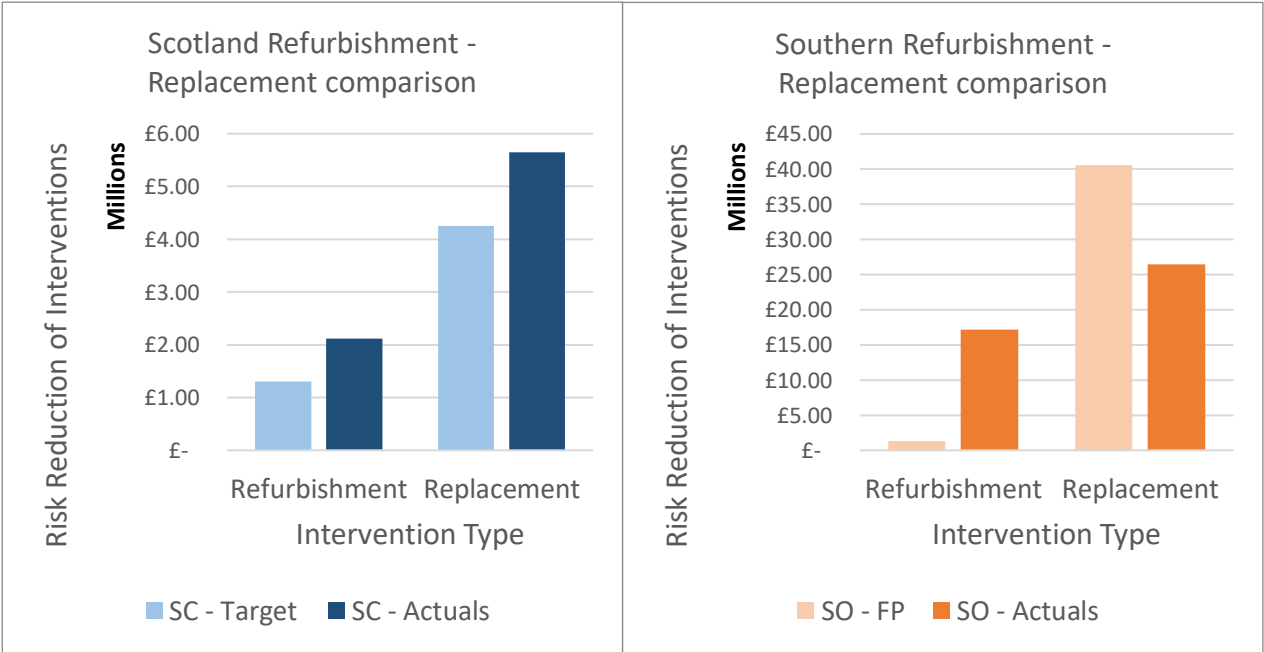


Figure 6 – Refurbishment (including both refurbishment and partial replacement) and Replacement (full rebuild) comparison

In RIIO-1 we initiated the CM4 process. This involves assessing asset condition at a more granular component level, data gathered from this will be used moving forward into RIIO-2. In RIIO-1 fault

data was used to inform our asset management and investment decisions among the asset classes outlined in Figure 4, Figure 5 and Figure 6.

Alongside the initial asset decision benefits, gathering data from the CM4 process will allow future improvements to the MR model. This will improve the data-based insights in our asset management. Thus, improving the identification of potential new risks allowing us to intervene on them earlier using the flexibility provided in the MR process.

### 5.3.2 LTS Pipelines

The Scotland LTS pipelines, outlined in Table 4, had a target delta of R£345.3m. The majority of the total LTS risk delta target was linked to a single pipeline project. This single target delta for LTS pipelines had a value of R£306.9m, which relates to a capacity constraint on the Northern Transmission System between Aberdeen and Inverness. Modification 90 under the Uniform Network Code was enacted in 2016, which allowed 7 large users to revert from interruptible to firm contracts. In doing so, the updated demand on the system exceeded capacity. To resolve the issue, we installed additional pipelines to accommodate the required capacity increase. This work was completed on time by October 2016 and the consequential capacity constraint was avoided. The actual delta delivered was R£306.9.5m. The post-normalisation target and delivery deltas are shown split into piggable and non-piggable pipelines in Table 4.

Table 4 - Scotland published target delta and delivered delta

Asset Class	SC Target (R£m)	SC Delivery (R£m)
LTS Pipelines - Piggable	£330.1	£330.2
LTS Pipelines - Non Piggable	£15.2	£15.3
<b>Total</b>	<b>£345.3</b>	<b>£345.5</b>

Southern LTS pipelines, outlined in Table 5, had a smaller target delta of R£0.02m. With a slight increase in risk on piggable pipeline alongside a reduction in risk on non-piggable pipelines. The actual delta delivered on Southern LTS was R£0.01m. The post-normalisation target and delivery deltas are shown split into piggable and non-piggable pipelines in Table 5. The negative values seen for the piggable pipes are due to assets moving from non-piggable to piggable as a result of intervention. Adding to the population of piggable assets results in a net increased risk position but provides a relatively significant reduction to the non-piggable class. Therefore, at an overall LTS level a net risk reduction is generated showing the benefit of this intervention.

Table 5 - Southern published target delta and delivered delta

Asset Class	SO Target (R£m)	SO Delivery (R£m)
LTS Pipelines - Piggable	-£0.14	-£0.16
LTS Pipelines - Non Piggable	£0.16	£0.16
<b>Total</b>	<b>£0.02</b>	<b>£0.01</b>

The LTS pipeline projects have been delivered on target in both Scotland and Southern. With the majority of the LTS delivery in Scotland tied up in one project, which was delivered on time. The rest of the interventions in Scotland and all the interventions on Southern LTS pipelines accounted for only a small amount of the overall delta. This small delta for the majority of the LTS assets is due to a number of factors, including the long life of LTS assets and the robust surveys and inspections carried out in order to meet regulatory requirements.

### 5.3.3 Governors

Scotland governors had a combined post-normalisation target of R£0.07m with the actual risk delta delivery of R£0.10m. For Southern governors there was a combined post-normalisation target of R£0.14m with the actual risk delta delivered being R£0.26m. In both Scotland and Southern in the Final Proposal (FP), the residual risk from interventions was not captured, this was later captured as part of the normalisation process with more information found in Section 6. The actual delivery against the target following normalisation, split for the three governor asset groups; district, I&C and service, can be seen in Figure 7. The majority of the risk reduction target is located in the district governor asset type with much smaller amounts for both I&C and service governors.

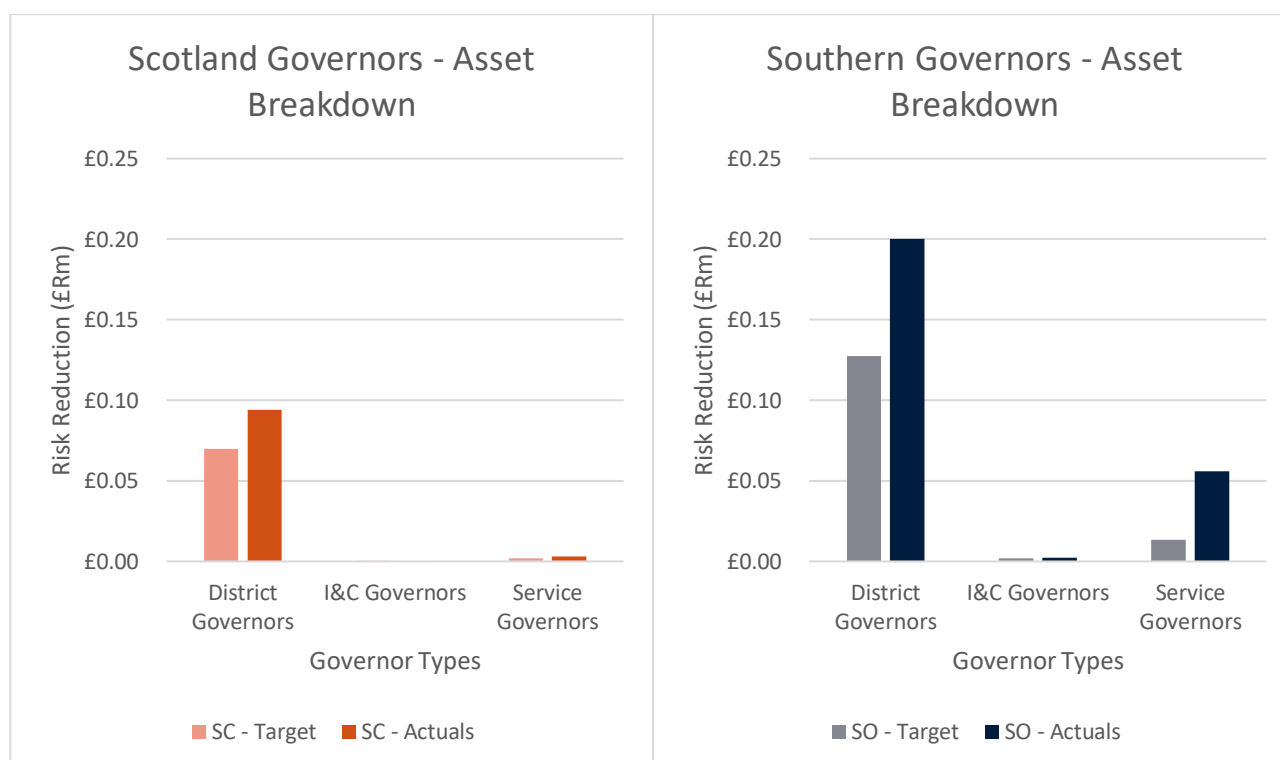


Figure 7 – Governor risk breakdown per asset type, target vs actuals.

In both Scotland and Southern, after normalisation has been carried out, the targets were both achieved. In Scotland the actual amount of risk reduced was only marginally higher than the targets set. In Southern the amount of risk reduction delivered was higher than initially planned with much of this attributed to an increase in replacement as can be seen in Figure 8. This increase can be accounted for by a slight increase in the district governor workload which also targeted higher risk governors due to the flexibility of the governor programme as highlighted in Section 3. There was also more opportunity in Southern for Service Governor replacement than had been planned and as such more benefit could be captured here.

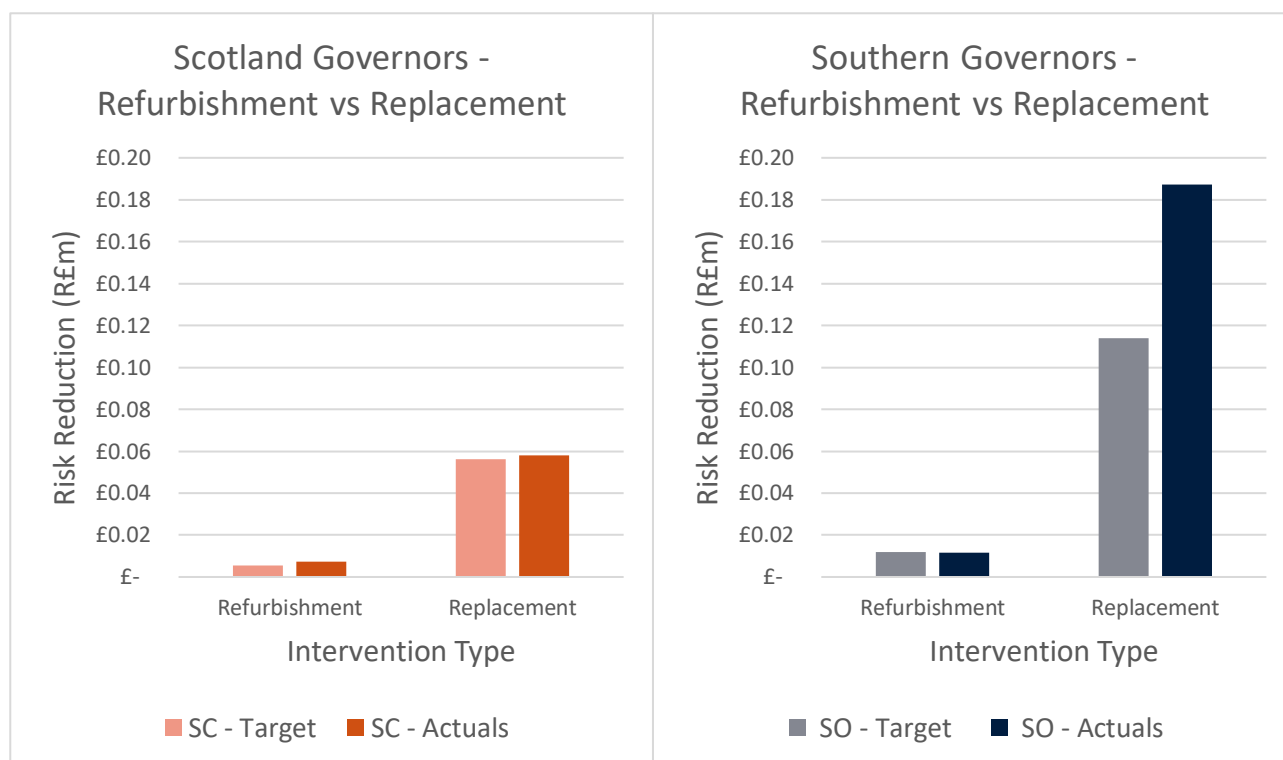


Figure 8 – Governors refurbishment and replacement target vs actuals comparison.

### 5.3.4 Repex – Mains, Services, Risers

Our Scottish Repex programme was set a combined target MR delta of R£10.6m. The majority of this target is made up of interventions within the Iron Mains Replacement Programme. The target set for the replacement of iron mains was R£7.5m. Despite restrictions to delivery in the final year of RIIO-1 due to the COVID-19 pandemic, the actual risk delta delivered was R£9.9m. R£7.9m of the total being delivered from iron mains, the majority of which is delivered through the Iron Mains Replacement Programme.

Our Southern Repex programme was set a combined target delta of R£31.7m. Similarly, the majority of this target is associated with the Iron Mains replacement programme, R£21.4m. The actual risk delivered during the RIIO-1 period was R£30.2m. R£20.9m of the total being delivered from iron mains, the majority of which is through the Iron Mains Replacement Programme.

We have not applied relevant risk changes or any other normalisations to either the Scotland or Southern Repex targets, for detailed justification supporting this please refer to Section 6.

The Repex programme is principally driven by HSE, legal and safety goals, in particular the Iron Mains Replacement Programme. As a result, there is limited scope to risk trade as it is of primary importance that the targets set by the HSE are met.

Figure 9 and Figure 10 display our annual mains outturn delivery compared with the rebased FP. Through year's 1-7 our delivery, in terms of intervention length, was in line with, or above, the FP target. However, due to the COVID-19 pandemic, delivery in year 8 (FY20) was significantly reduced. Despite this, due to effective intervention strategy, our MR delivery remains on-target.

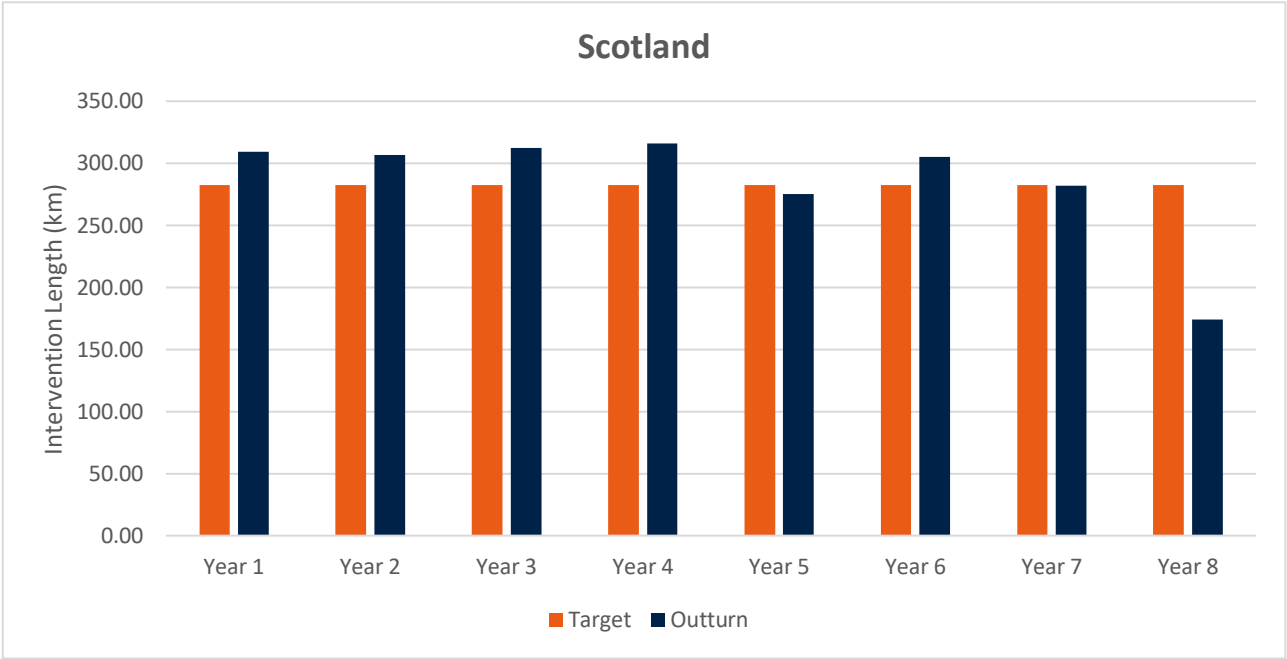


Figure 9 - Scotland Mains Replacement FP vs Outturn

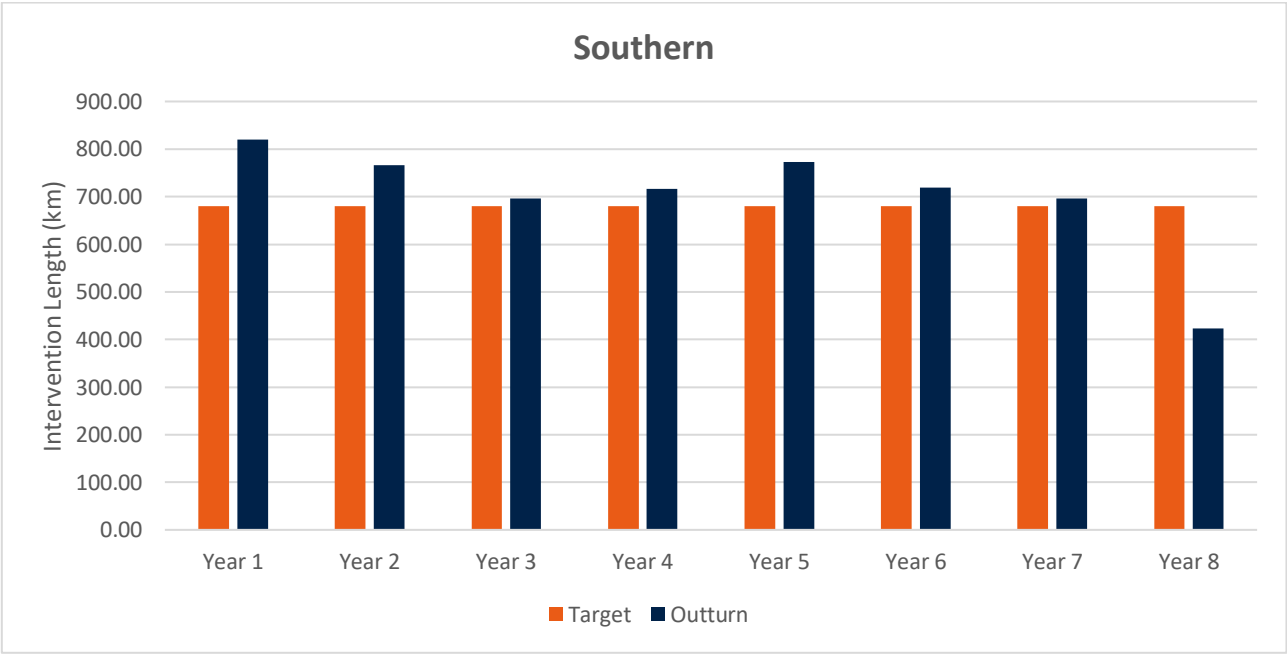


Figure 10 - Southern Mains Replacement FP vs Outturn

As detailed in Sections 5.2 we have engaged in limited risk trading across asset classes, similarly, within the Mains asset class, very limited risk trading has been completed as displayed by Figure 11. This is principally because interventions within the Repex asset classes are driven by HSE requirements.

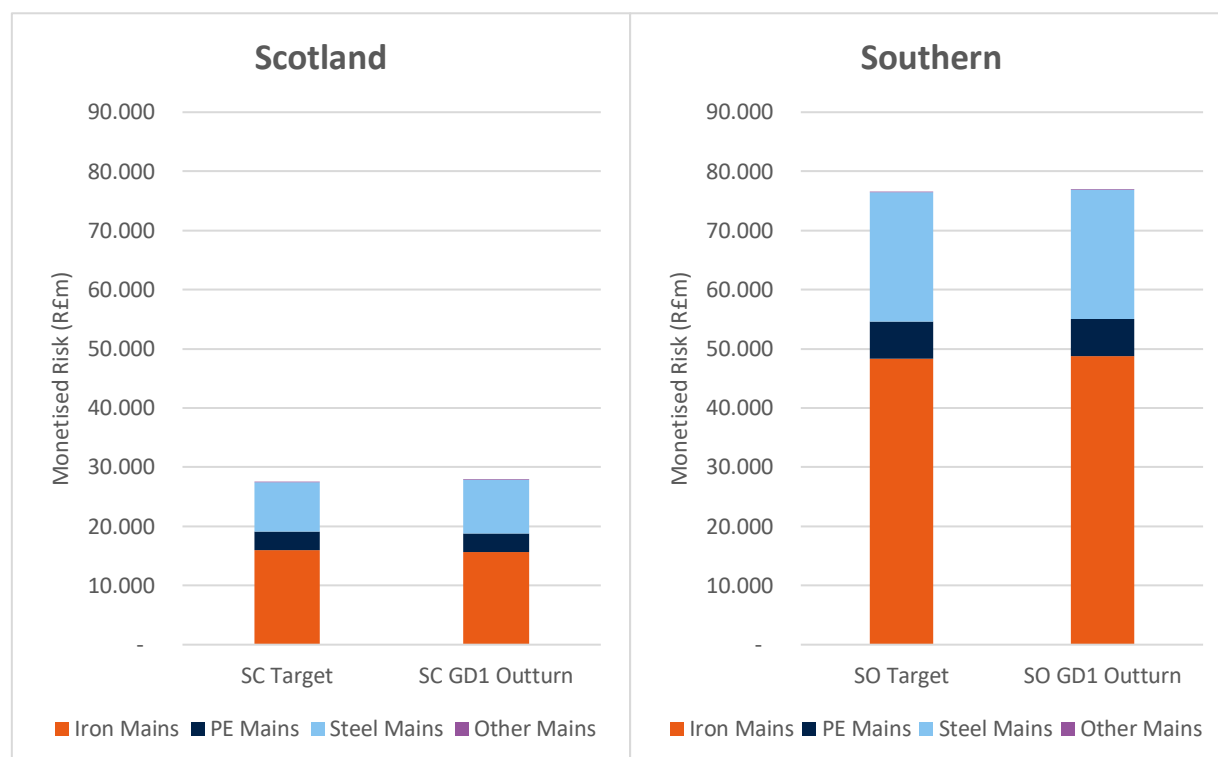


Figure 11 - Mains Replacement FP vs Outturn, Material Breakdown

Services delivery is largely dependent on mains delivery as services are re-laid when the associated main is replaced, this makes up a significant proportion of total services delivery. Therefore, as we have delivered on target with mains, the services delivery is also within a small variance of its target. The target risk reduction on the Southern network was agreed at R£6.9m and the actual final delivery was R£6.3m, on the Scotland network the target risk reduction was agreed at R£0.4m and the actual final delivery was R£0.3m.

Scotland risers had a target of R£0.5m with an actual risk delta delivery of R£0.3m. For Southern risers there was a target of R£2.1m with the actual risk delta delivered being R£1.7m. In both Scotland and Southern the actual risk reduction achieved was slightly below the target as can be seen in Figure 12. This difference can be accounted for by a lower number of risers being replaced with PE than initially planned. This was a conscious decision following the Grenfell Tower incident where replacement with PE was phased out entirely and risers continued to be replaced with non-PE materials instead. Non-PE materials provide a much lower risk benefit than intervening with PE, as such the overall risk reduction is less than was initially planned, however, there was no decrease in safety with the same overall workload being carried out.

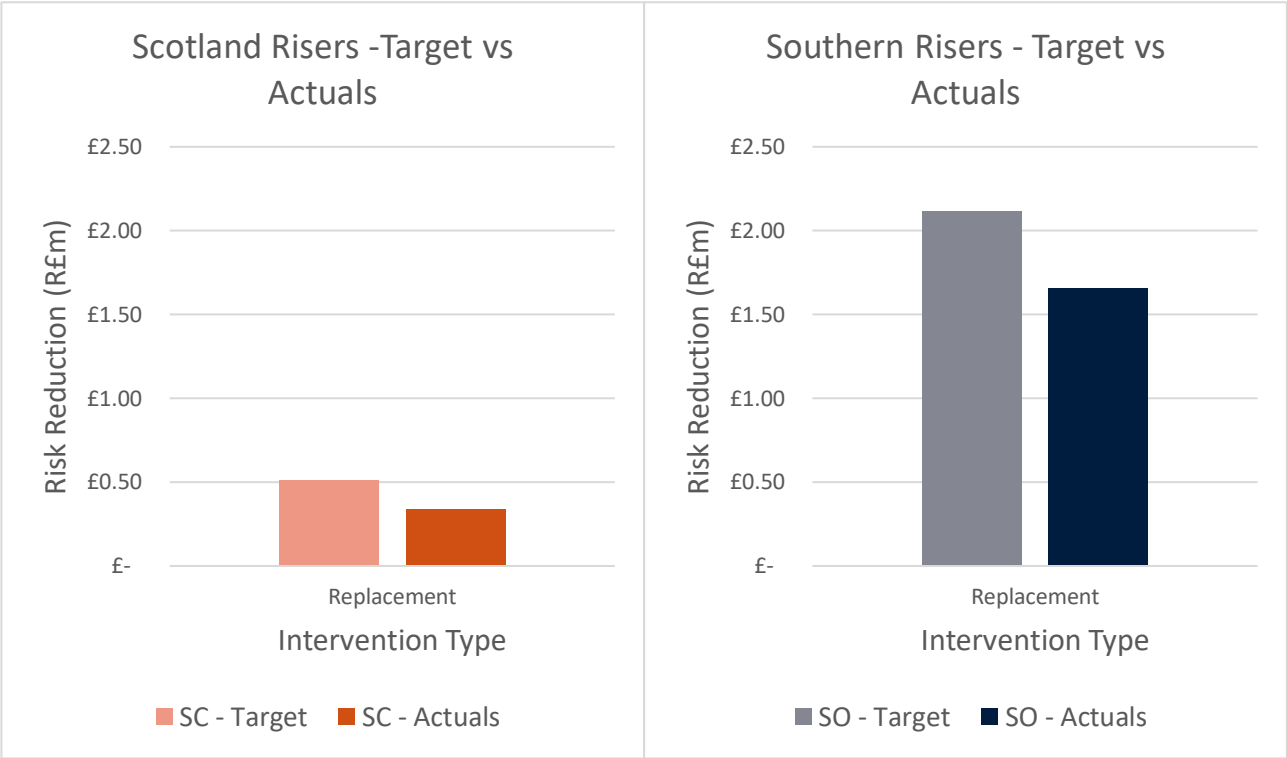


Figure 12 – Risers replacement actuals vs target comparison.



## 6 Relevant Risk Changes

### 6.1 Overview of Relevant Risk Change

We will be using the provided template for normalisations within the Closeout Data Template to justify differences seen in the target between the RIIO-1 FP and the updated, post normalisation, target against which we have reported our actual delivery.

In 2019 SGN and Ofgem completed a rebasing exercise to set out NOMs MR, since then there have been minimal changes to in our asset base. As a result, we have not used most of the available normalisation types when applying relevant risk changes to our NOMs MR targets. The rationale behind our application of each of the relevant risk changes is outlined in the following sections.

#### 6.1.1 Data Cleanse

We have not widely applied data cleansing during RIIO-1 to the NOMs MR model. However, changes to the asset base were tracked separate to the NOM MR model, thereby allowing us to update and refresh our data in preparation for RIIO-2.

Including further data cleanse to line up and the RIIO-1 close out RIIO-2 start positions would require translation of additional data across MR models and significant, additional, normalisation to be applied in the Closeout Data Template. Both procedures increase the potential for data entry errors and, therefore, possibly unintended windfall gains, for example through updating the cost of carbon and price base etc. Specific examples of the cases where we have used the data cleanse field to normalise our targets are detailed in Sections 6.2 to 6.6.

All changes to asset condition and other, general, data cleansing were implemented at the changeover between price control periods. Doing so has simplified the process of preparing the RIIO-2 business plan and provides a clearer comparison of our RIIO-1 performance against targets as shown in Section 5. Figure 13 outlines the effect on the base MR risk position following these changes between price controls.

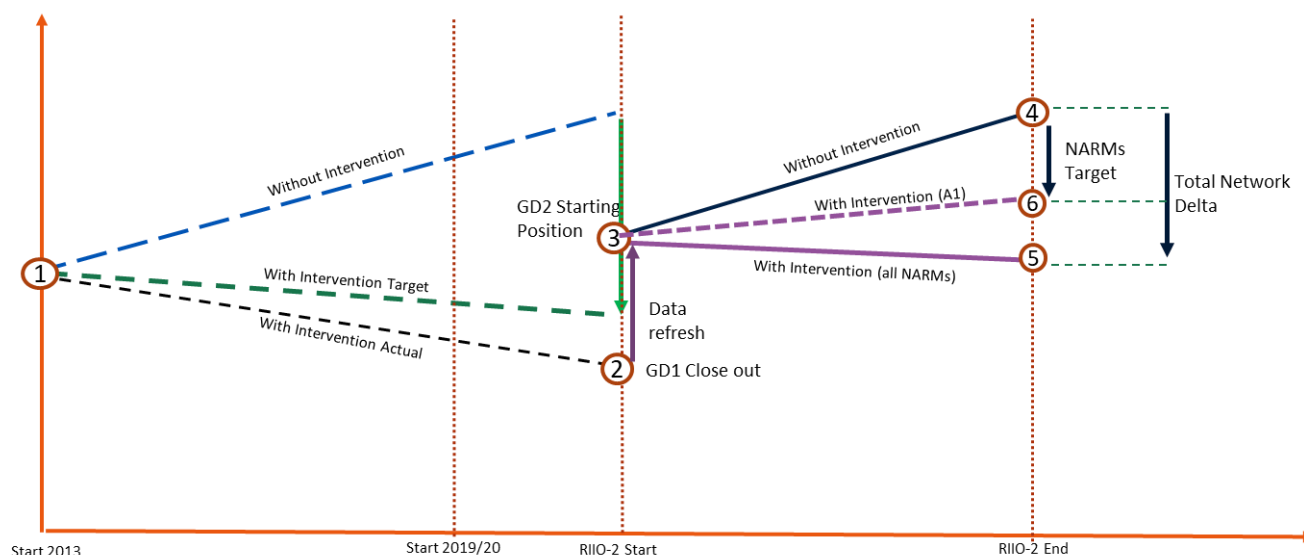


Figure 13 - Relevant Risk changes carried out between RIIO periods

#### 6.1.2 Methodology Change, CoF change

There are no normalisations linked to methodology or CoF changes applied. The primary reason being that the NOMs MR process was only implemented in 2018 and there have been no higher-

level changes to asset degradation rates, baseline values, or coefficients since then. This is primarily linked to the age of the NOMs MR process and any changes to rates are expected to be part of a longer-term approach to the way assets are managed. Coefficients and baseline values have been examined and some minor adjustments carried out on inflation factors moving into RIIO-2, however, these changes will not affect the RIIO-1 NOMs MR outcomes.

### **6.1.3 Pre-RIIO-1 Work True-up**

There are no normalisations applied to the pre-RIIO-1 work true-up field. The rebasing exercise in removed any requirement for a us to apply adjustments for pre RIIO-1 work.

### **6.1.4 Faster and Slower Deterioration**

It is very difficult to accurately evaluate as it is likely that the deterioration rate of assets not intervened upon will be different to those that were intervened upon. As such a change would not be reflective of the asset base at the beginning of the price control when companies were making their investment decisions. Therefore, no changes have been applied to asset degradation rates in the Close-Out Data Template.

### **6.1.5 Free Text Normalisation, covered by Other Mechanisms**

There are no additional processes or deliverables that have been completed that would lead to a requirement to include any free text normalisations.

## **6.2 Scotland Normalisations**

During the setting of the NOMs MR target, no risk target was added for Pre-Heating hence, the pre normalisation column shows as a negative figure although, we do have volumes and risk to declare against Pre-Heating. We have delivered 22 preheating interventions in Scotland. This therefore led to a requirement to normalise the target.

As outlined in Section 6.4, normalisation has been applied to the with and without intervention positions for odourant and metering as the odourant costs were updated upon moving to the NOMs MR methodology. This has no impact on the delta as we are required to pay for odourant regardless of the intervention therefore the difference in MR is the same for both the with and without position.

Data cleanse adjustments have also been applied to the with intervention position for LTS pipelines and governors. Normalisations applied to the LTS pipelines with intervention position are due to the methodology for intervention capture, where new assets are generated when the length of pipe being diverted is not equal to the length of the original asset as stated in the model. There will be a slight discrepancy in the MR value of the sections that weren't replaced within the original asset and therefore this data cleanse was required to balance the MR between the with and without positions.

The district and I&C governor normalisations are required due to the residual risk of the intervened governors not being captured. Hence, this is only applied to the with intervention position. The normalisation applied to service governors is detailed within Section 6.6.

Any changes applied as part of this submission are consistent with our historic 7.3 RRP submission.

## **6.3 Southern Normalisations**

As outlined in Section 6.4, normalisation has been applied for odourant and metering to the with and without intervention position due to the odourant costs being changed upon moving to the

NOMs MR methodology. This has no impact on the delta as the difference in MR is the same in both the with and without position.

Data cleanse has also been applied to the with intervention position for governors. This is to include the residual risk found on district and I&C governors post intervention. The normalisation applied to service governors is detailed within Section 6.6.

Any changes applied as part of this submission are consistent with our historic 7.3 RRP submission.

## **6.4 Odourant Cost Data Refresh**

The target set for odourant was refreshed to better account for the cost of the odourant within the consequence measures. This was captured as a data cleanse and has been populated as such in the Closeout Data Template. This resulting, additional, MR has been applied equally to both the with and without intervention positions and therefore has not had caused a material difference to the overall delta delivery position.

## **6.5 Pre-heating – Target**

In the NOMs MR target for Scotland no data was included for pre-heating, the delta therefore shows as a value of zero despite their being volumes and risk to declare against pre-heating. In reality we have delivered preheating assets in Scotland and we have normalised the targets based on the original RIIO-1 business which proposed delivery of pre-heating assets alongside other PRS assets. The with and without position for preheating is consistent with our annual 7.3 RRP submission.

## **6.6 Governor - Target**

As part of the rebasing exercise carried out in 2018 the total number of service governors for Scotland was input into the 2021 target risk table. The result of this was a MR target which is much lower than it should be. This has been amended using the normalisations process.

In both Scotland and Southern, the residual risk for district and I&C governor replacements were not included as part of the overall target. This resulted in a higher target MR delta. This has been amended using the normalisations process.

## 7 Methodology

As part of this submission licensees are required to draft a methodology for deriving, or allocating, the allowances by asset category in the case of over/under delivery. This would go into section 4 of the Closeout Data Template.

It should be noted that SGN do not foresee this submission being required as we have delivered close to the target which we consider to be within the material threshold. However, in the event that a submission is required we will use the approach outlined in the following sections to capture the allowance and expenditure.

In order to provide a consistent methodology across all GDNs, our preference is that the expenditure and allowance methodology is based on information previously submitted to Ofgem such as RRP submissions and Final Proposal. Furthermore, any identification of over or under delivery should broadly follow the principles discussed and consulted upon as part of the RIIO-2 NARMs process and use the unit cost of risk, UCR, methodology.

### 7.1 Allowance and Expenditure Allocation

Our preference to derive the NOMS allowance and expenditure is to apply a similar approach to that used to derive the RIIO-2 NARMs allowance. The RIIO-2 methodology differentiated the NARMs, and Non-NARMs, elements of the investment which were then used to calculate the final NARMs allowance. Similarly, the Final Proposal can be used to break down the NOMs allowance into NOMs and non-NOMs elements to calculate the NOMs allowance and expenditure. Table 6 below, taken from the RRP reporting pack, shows the breakdown of funding categories and their association with the NOMs output.

Table 6 - RRP funding category and NOMs contribution breakdown

Funding Category		NOMs Contribution
Controllable Cost	Capex	LTS, storage and entry
		Partial
		Connections
		0%
		Mains Reinforcement
	Repex	0%
		Governors (Replacement)
		100%
		Other Capex
	Direct Opex	0%
		HSE driven mains & services
		100%
		Non-HSE driven mains & services
		100%
		Multi occupancy buildings (MoBs)
	Opex	100%
		Work Management
		0%
		Emergency
	Sub-Deducts	0%
		Repair
		0%
	Sub-Deducts	Maintenance
		0%
		Statutory independent undertakings (SIUs)
		0%
	Sub-Deducts	Other Direct Activities
		0%
		Business support
		0%
	Sub-Deducts	Training & Apprentices
		0%
		Total Indirect Opex
	Sub-Deducts	0%
		Sub-deducts
	Sub-Deducts	0%

<b>Table 6 Cont.</b>			
<b>Uncontrollable Cost</b>	Other	Licence/network/other	0%
		NTS exit costs	0%
		Shrinkage	0%
		NTS pensions contributions	0%

We propose that the expenditure information submitted as part of the annual RRP through RIIO-1 is used for this process. Using information captured through an existing process will reduce the potential for inaccuracies as information submitted through the RRP process has already undergone extensive QA. However, the granularity of data captured through the RRP does differ in comparison to the NOMs 7.3 table. As breaking the RRP costs down to the level shown in the NOMs 7.3 table would demand the application of significant assumptions and potentially introduce inconsistencies, we propose that costs are broken down into the following asset categories to allow for better alignment with the current cost models.

- LTS Pipeline
- PRS
- Offtake
- Mains and Services
- Risers
- District, I&C and Service Governors

This is the lowest level of granularity we can provide, while ensuring accuracy in the breakdown of the allowance and expenditure.

## 7.2 Identification of Specific Delivery Elements

In order to identify which specific delivery element led to the over or under delivery we suggest the following criteria are considered:

- NOMs Outputs and costs are both quantifiable and separable from the overall delivery (e.g. a specific project);
- In the case of an over-delivery scenario, the over-delivery element is not specified within the licensee's RIIO-1 business plan;
- In the case of an under-delivery scenario, the under-delivery element must have been specified within the licensee's RIIO-1 business plan;
- The under-delivery/over-delivery element is not driven by other mechanisms (e.g. mains replacement programme).

Regarding the need for the outputs and costs to be quantifiable and separable, in some asset classes it is expected to be difficult to separate them out. For instance, it would be challenging to pick out a specific project or expenditure that contribute to over or under delivery within Repex as interventions are not captured at an individual asset or project level within the MR models due to the volume of assets that fall within this category. Therefore, any over or under delivery within Repex will have to be assessed at the total asset group level.

## 7.3 Deriving costs of Specific Delivery Elements

In deriving costs of specific elements, it is our preference to use a UCR approach. This uses the average cost of delivering a single unit (one Risk Pound, R£1) of Monetised Risk benefit for a given asset population or intervention volume.

## Classification: Public

There are significant challenges associated with the derivation of costs for specific elements and it should be noted that while we have mapped out a framework for the process, due to the complexities and amount of time required, we have not practically carried out the methodology yet. This would only be initiated if an over/under delivery process is required.

## 7.4 Worked Example

The example below demonstrates how associated cost for over/under delivery could be calculated incentive/penalty associated under NOMs mechanism. These are based on theoretical example where a company has target of R£100m of monetised risk point and assuming the material threshold deadband is set at plus/minus 5% around the target.

Table 7 - Worked example inputs

	Monetised Risk (R£m)	Cost (£m)
Target	100	100
Actual (Over -Delivery)	110	110
Actual (Under Delivery)	90	90

### Under-delivery Scenario

In this scenario the licensee has under-delivered Network Risk Outputs by R£10 risk point and the under-delivery element is deemed unjustifiable. For simplicity of illustration, only the final parameter values determined by the Authority are given.

Table 8 - Under-delivery example

Term	Description	Value
Target	Target set during 2019 financial year as part of rebasing exercise	R£100.0m
Delivery	Risk delivered by GDN through the RIIO-1 period	R£90.0m
Unit Cost of Risk based on Final Proposal	$\text{Unit Cost of Risk (Target)} = \frac{\text{Allowance}}{\text{Risk Target}}$	1 £/R£
Deadband for under-delivery	Deadband around target risk  <u>Deadband Range</u> [Target Risk * (1 - DB)] < Delivered Risk < [Target Risk * (1 + DB)]	±5%  £95m to £105m
Penalty Rate	Penalty rate for unjustified under-delivery	2.5%
Justification	Assuming the under-delivery is un-justifiable	0%
Cost associated to UD	Allowance associated with under-delivery element $\text{Unit Cost of Risk (Target)} * \text{UnderDelivery}$	-R£5m
Penalty	Penalty associated with under-delivery, penalty set at 2.5%	-£0.125m

<b>Table 8 Cont.</b>		
<b>Adjustment</b>	Under delivery element measured from the edge of the deadband.	-£5.125m
<b>Final allowed expenditure</b>	<u>Outturn Allowance</u> Final allowed expenditure = Allowance – UD adjustment – penalty	£94.875m

In a scenario where the under-delivery element is deemed justifiable companies do not incur a penalty.

### Over-delivery Scenario

In this scenario the licensee has over-delivered Network Risk Outputs by R£10 risk point and the Over-delivery element is deemed justifiable. For simplicity of illustration, only the final parameter values determined by the Authority are given.

Table 9 - Over-delivery example

Term	Description	Value
<b>Target</b>	Target set during 2019 financial year as part of rebasing exercise	R£100.0m
<b>Delivery</b>	Risk delivered by GDN through the RIIO-1 period	R£110.0m
<b>Unit Cost of Risk based on Final Proposal</b>	$\text{Unit Cost of Risk (Target)} = \frac{\text{Allowance}}{\text{Risk Target}}$	1 £/R£
<b>Deadband for Over-delivery</b>	Deadband around target risk  <u>Deadband Range</u> [Target Risk * (1 - DB)] < Delivered Risk < [Target Risk * (1 + DB)]	±5%  £95m to £105m
<b>Reward rate</b>	Reward for justified over-delivery	2.5%
<b>Justification</b>	Assuming the over-delivery is justifiable	100%
<b>Cost associated to OD</b>	Allowance associated with under-delivery element $\text{Unit Cost of Risk (Target)} * \text{OverDelivery}$	R£5m
<b>Reward</b>	Reward associated with over-delivery; reward set at 2.5%	£0.125m
<b>Adjustment</b>	Under delivery element measured from the edge of the deadband	£5.125m

Table 9 Cont.		
<b>Final allowed expenditure</b>	<u>Outturn Allowance</u> Final allowed expenditure = Allowance – OD adjustment – penalty	£105.125m

In a scenario where the over-delivery element is deemed unjustifiable companies do not rewarded.



## Appendix A - Glossary

Asset Base - Core asset data records providing specification/configuration and location data.

C55 – Copperleaf C55 is the asset management software used to calculate monetised risk values and track asset health. It was brought in to replace the original DNVGL model in 2018.

DNVGL – Excel based monetised risk model. See C55.

E&I – Electrical and Instrumentation

ECV – Emergency Control Valve

EGIG - European Gas Pipelines Incident Data Group

FP – Final Proposal

GDN – Gas Distribution Networks (Distribution network operators).

HCR – Health, Criticality and Risk

HSE – Health and Safety Executive

Intervention - Any activity which is carried out, beyond the scope of Maintenance that changes either the probability or consequence of asset failure, or extends the life of the asset.

I&C – Industrial and Commercial

ISO55001 - This International Standard specifies requirements for an asset management system within the context of the organization and can be applied to all types of assets and by all types and sizes of organizations.

LP, MP, IP – Low Pressure (<75mbar), Medium Pressure (<2bar), Intermediate Pressure (<7bar)

LTS – Local Transmission System (pipeline network)

Maximo – SGN Asset Database

MOB – Multiple Occupancy Building

MOD90 - Modification 90 under the Uniform Network Code was enacted in 2016, which allowed 7 large users to revert from interruptible to firm contracts.

MR – Monetised Risk

NARMS – Network Asset Risk Metrics: Measure by which change in risk is measured in RIIO-2

NOMs – Network Output Measures: Measure by which change in risk is measured in RIIO-1

NTS – National Transmission System

OLI1 – Piggable transmission pipelines

OLI4 – Non-Piggable transmission pipelines

PE – Polyethylene, used for replacement gas mains as it is more corrosion resistant than the iron and steel it replaces.

PIE – Pipeline Integrity Engineers

PoC – Probability of Consequence

PoF – Probability of Failure

PON – Pipe Object Number

PRS – Pressure Reduction Station

PSSR – The Pressure Systems Safety Regulations 2000

Repex – Replacement Expenditure

RIIO – Revenue = Incentives + Innovation + Outputs. The measures by which the revenue of an energy network are set by the regulator.

RIIO-1 – Gas Distribution Price Control Period 1. A price control sets out the outputs that the eight Gas Distribution Networks (GDNs) need to deliver for their consumers and the associated revenues they are allowed to collect for the eight-year period from 1st April 2013 until 31st March 2021. See RIIO.

RIIO-2 – Gas Distribution Price Control Period 2. From 1st April 2021 until 31st March 2026. See RIIO.

RRP – Regulatory Reporting Pack

Slam-shut – A slam-shut is a valve used to cut the gas flow rapidly in the event of an high or low pressure incident.

SRWG – Safety and Reliability Working Group

UCR – Unit Cost of Risk

UKOPA - UK Onshore Pipelines Association

Classification: Public

## Appendix B - Asset Interventions

### District Governors, I&C Governors, Service Governors

Description	Definition
<b>Governor Replacement</b>	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.
<b>Fencing</b>	Includes installation or replacement of a fence and reduces the interference
<b>Kiosk replacement</b>	Replacing the entire kiosk/housing of the governor
<b>Governor Refurbishment</b>	Improving the governor condition by painting, reducing corrosion and overall deterioration
<b>Regulator Replacement</b>	Refer to Intervention 1 (minus kiosk replacement)
<b>ERS Replacement</b>	Replacement of underground module with an above ground governor
<b>Service Governor Replacement</b>	Replacement of complete unit within kiosk
<b>Governor Decommissioning</b>	Abandonment of governor site.

### LTS Pipelines

Description	Definition
<b>Diversions</b>	Abandon old pipe and new pipe in new route.
<b>Pipe Refurbishment</b>	Pipe remedial, eg recoating, sleeving
<b>CP Major Refurb</b>	New transformer install and/or new anode ground bed.
<b>Above Ground Crossings Remedial (Structural, Painting, Anti-vandal Guards)</b>	Remediate exposed crossings (above ground sections only) - support and coatings.

 Classification: Public

## Mains

Description	Definition
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

Description	Definition
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.
Decommission	Decommission/abandonment of services

## Risers

Description	Definition
Replace	Replacement of riser and associated laterals with pipes of the same material as existing or with PE.
Refurbishment	Refurbishment of riser and associated laterals

Classification: Public

## Preheating

Description	Definition
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

## Pressure Control and Filters

Description	Definition
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
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.

Classification: Public

## Odourant and Metering

Description	Definition
<b>Odourant Refurb</b>	Refurb of odourant system (inc pumps)
<b>Meter Refurb</b>	Refurb of meter system
<b>Odourant Replace</b>	Replacement of odourant system (inc pumps)
<b>Meter Replace</b>	Replacement of metering system
<b>Full System E&amp;I Upgrade</b>	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
<b>Civils Upgrade (Fence and Building replacement)</b>	Replacement of fence and building on site. Intervention should only be applied to systems that the building applies too.
<b>Civils Upgrade (Fence replacement)</b>	Replacement of fence on site
<b>Civils Upgrade (Building replacement)</b>	Replacement of building on site. Intervention should only be applied to systems that the building applies too.
<b>Full System Rebuild</b>	Full upgrade of relevant system, fence, civils and E&I

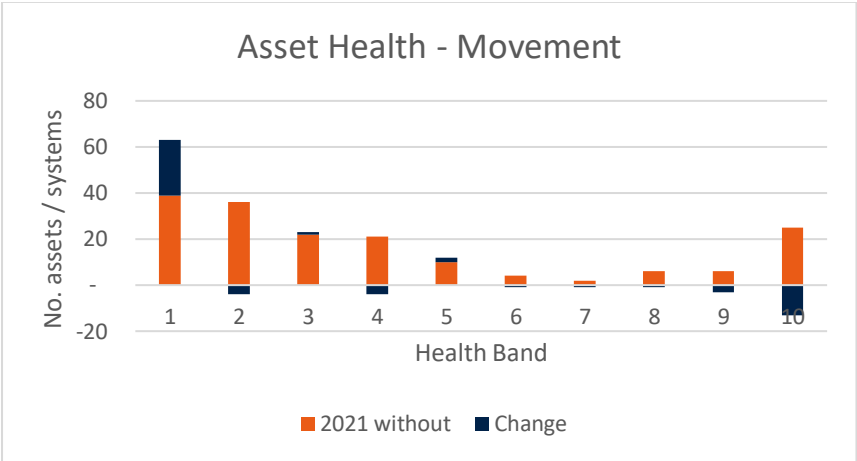
## Appendix C - Asset Banding

The MR process generates an output for each asset, system or cohort in pounds sterling and pence. The value for each asset, system or cohort is therefore likely to be unique with as many different values as there are assets or systems.

The MR methodology does not contain any link to Health or Risk Indices and the methodology does not attempt to bracket the monetised output into formally defined health or Risk bands.

Within tab 7.3 of the Regulatory Reporting Pack (RRP), in addition to the tables for MR output, there are also tables for Health and Risk with the expectation that the assets or systems will be distributed across ten bands (undefined within the methodology).

These tables were included at the request of Ofgem and were understood to allow a simple representation of change in Health and Risk between ‘Without’ and ‘With’ intervention or the start and end of the formula period as a result of interventions delivered. For example, the following is a simple graphical representation of the movement in Health of pressure control systems on Pressure Reduction Stations in Southern Network between the ‘Without’ and ‘With’ scenarios in 2021:

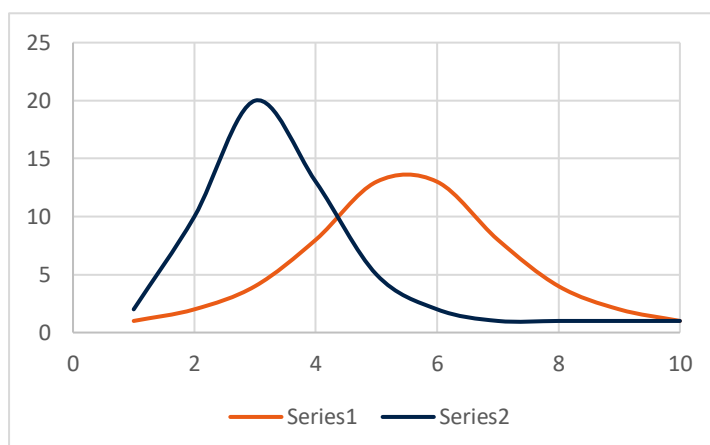


The ten Health and Risk bands do not relate in any way to the five Health (HI1 to 5) and Risk (RI1 to 5) used in the previous rejected Health and Risk Indices methodologies. Instead, these bands are linear in nature (equal in size) and are specified for each asset sub-group to provide a meaningful distribution of assets across the ten bands.

The bandings may be specific to individual asset groups for a single Distribution network, although, we have maintained consistency across Southern and Scotland Networks and across similar asset groups such as Offtakes and PRS. However, no attempt has been made to achieve consistency beyond our control (namely, WWU, NGN and Cadent).

In order to achieve the most meaningful asset distribution, we have considered the range Health and Risk values for a particular asset sub-group. For example, the ranges for series one in the graph below will be equally distributed across the whole range of values, while the ranges for series two will be compressed to cover the majority of values towards the lower end.

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Primary Assets	Secondary Asset	Health band	Risk Band
LTS Pipelines	LTS Pipelines - Piggable	0.2 <sup>(1)</sup>	100,000 <sup>(1)</sup>
	LTS Pipelines - Non Piggable	0.2 <sup>(1)</sup>	100,000 <sup>(1)</sup>
Distribution Mains	Iron Mains	0.2	1000
	PE Mains	0.2	1000
	Steel Mains	0.2	1000
	Other Mains	0.2	1000
Services	Services	0.2	1000
Risers	Risers	0.001	100
Offtake/ PRS Filters & Pressure Control	Offtake Filters	0.1	10,000
	PRS Filters	0.1	10,000
	Offtake Slamshut/ Regulators	0.1	10,000
	PRS Slamshut/ Regulators	0.1	10,000
Offtake/PRS Pre Heating	Offtake Pre-heating	0.1	10,000
	PRS Pre-heating	0.1	10,000
Offtake Odourant & Metering	Odourisation & Metering	0.1	10,000
District, I&C and Service Governors	District Governors	0.01	1000
	I&C Governors	0.01	1000
	Service Governors	0.20	1000



Classification: Public

## Appendix D - Data Quality Assessment

### Data quality assessment – Transmission

	Red	Amber	Green	Comments
<b>Complexity of data sources</b>	Two numerical systems or two financial systems or more than two Data systems used to populate submission.	One numerical and one financial Data system used to populate submission.	Single Data system used to populate submission.	The data required for NOMs methodology is not readily available. Therefore, multiple data sources were used to complete the data set.
<b>Completeness of data set</b>	Data not routinely captured by Licensee to populate this report. Reporting for a significant number of elements of the submission is based on extrapolation of sample Data rather than full Data set	Data routinely captured by DNO to populate this report but for less than 2 years or some elements of reporting based on extrapolation of sample Data rather than full Data set.	Complete Data set routinely captured to populate this report for 2 years or more	Intervention for RRP submission are updated annually but the base data is fixed until end of RIIO-1 in order to be consistent with our target.
<b>Extent of manual intervention</b>	More than 60% of the Data is manually collated and reported.	More than 0% but less than 60% of the Data is manually collated and reported.	Data collation and reporting are fully automated.	Multiple sources of data were used to capture information for NOMs process this resulted in manual intervention. However, base data was validated thoroughly.
<b>Complexity and maturity of reporting rules</b>	The rule set is incomplete or the rules require significant interpretation, judgement or	The rule set is complete and has not changed for at least 12 months, but the rules require some interpretation, judgement or assumptions.	The rule set is complete; the rules require no interpretation, judgement or assumptions; the rules have been in place for more than 12 months.	Due to complexity around data required by NOMs process meant assumption were made to complete the data set. These assumptions were based on historic activities and were used consistently within the defined rule set.

## Classification: Public

	assumptions or the first issue of rules have been completed within the last 12 months.			
<b>Control activities</b>	There are inadequate validation / preventative controls <b>or</b> controls have been in place for less than 12 months <b>or</b> systems and processes not documented and control points not assessed (ie any such material lacks substantial coverage) <b>or</b> Regulatory submissions not subject to effective review or supervision processes.	There are adequate validation / preventative controls <b>and</b> controls have been in place for more than 12 months but less than 2 years <b>and</b> systems and processes substantially documented and control points assessed <b>and</b> regulatory submissions subject to effective review or supervision processes.	There are extensive validation / preventative controls. <b>and</b> controls have been in place for more than two years and systems and processes fully documented <b>and</b> control points fully evaluated and assessed <b>and</b> regulatory submissions subject to comprehensive and effective review and supervision processes.	Extensive validation was done prior to the initial submission. There is a robust process in place to capture the actual interventions and material changes for annual reporting.
<b>Experience of personnel</b>	This submission being collated by employees with no prior experience of doing so <b>and</b> no method statement available to explain prior year approach to completing this report.	This submission being collated by employees with no prior experience of completing this submission but using method statements for prior submissions to support them <b>or</b> this submission being collated by employees with prior experience of completing this submission – with no method statements for prior years available.	This submission being collated by employees with prior experience of completing this submission – with method statements for prior years in place	The initial submission was done by experienced employees who had been involved in the process from the start and had very good knowledge of our system and data.
<b>Evidence of historical Errors with this Data</b>	Material Errors identified for this report, or table level as appropriate, within the last two years; and the issues identified have not been eliminated <b>or</b>	Material Errors for this submission have been identified within the last two years for which all issues have been remediated but not yet validated <b>or</b> no audits undertaken on this Data	Audit has been undertaken on this submission within the last two years and no Material Errors were identified <b>and either</b> there were no previously identified Errors in submissions.	There were few errors identified in the previous submission which has been now corrected and validated.

Classification: Public

	no audit undertaken on this submission in the last five years.	within the last two years, but audit has been undertaken within the last five years.	or Audit confirmed that any previously identified issues have been properly addressed.	
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## Data quality assessment - Distribution

	Red	Amber	Green	Comments
<b>Complexity of data sources</b>	Two numerical systems or two financial systems or more than two Data systems used to populate submission.	One numerical and one financial Data system used to populate submission.	Single Data system used to populate submission.	Multiple data sources are used to collate asset specifications and base data for various asset types as well as financial information from other sources to populate the reporting model.
<b>Completeness of data set</b>	Data not routinely captured by Licensee to populate this report. Reporting for a significant number of elements of the submission is based on extrapolation of sample Data rather than full Data set	Data routinely captured by DNO to populate this report but for less than 2 years  or some elements of reporting based on extrapolation of sample Data rather than full Data set.	Complete Data set routinely captured to populate this report for 2 years or more	Asset base data has remained unchanged for more than 2 years.
<b>Extent of manual intervention</b>	More than 60% of the Data is manually collated and reported.	More than 0% but less than 60% of the Data is manually collated and reported.	Data collation and reporting are fully automated.	Data is extracted from multiple sources and manually collated and validated.
<b>Complexity and maturity of reporting rules</b>	The rule set is incomplete or the rules require significant interpretation, judgement	The rule set is complete and has not changed for at least 12 months, but the rules require some interpretation, judgement or assumptions.	The rule set is complete; the rules require no interpretation, judgement or assumptions; the rules have been in place for more than 12 months.	Due to the complexity of the reporting rules and some of the base data required to report this, some judgement and assumptions have been made such as condition scores.

Classification: Public

	<p><b>or</b></p> <p>assumptions or the first issue of rules have been completed within the last 12 months.</p>			
<b>Control activities</b>	<p>There are inadequate validation / preventative controls</p> <p><b>or</b></p> <p>controls have been in place for less than 12 months</p> <p><b>or</b></p> <p>systems and processes not documented and control points not assessed (ie any such material lacks substantial coverage)</p> <p><b>or</b></p> <p>Regulatory submissions not subject to effective review or supervision processes.</p>	<p>There are adequate validation / preventative controls</p> <p><b>and</b></p> <p>controls have been in place for more than 12 months but less than 2 years</p> <p><b>and</b></p> <p>systems and processes substantially documented and control points assessed</p> <p><b>and</b></p> <p>regulatory submissions subject to effective review or supervision processes.</p>	<p>There are extensive validation / preventative controls.</p> <p><b>and</b></p> <p>controls have been in place for more than two years and systems and processes fully documented</p> <p><b>and</b></p> <p>control points fully evaluated and assessed</p> <p><b>and</b></p> <p>regulatory submissions subject to comprehensive and effective review and supervision processes.</p>	<p>There are extensive validation controls in place and regulatory submissions are subject to comprehensive review.</p>
<b>Experience of personnel</b>	<p>This submission being collated by employees with no prior experience of doing so</p> <p><b>and</b></p> <p>no method statement available to explain prior year approach to completing this report.</p>	<p>This submission being collated by employees with no prior experience of completing this submission but using method statements for prior submissions to support them</p> <p><b>or</b></p> <p>this submission being collated by employees with prior experience of completing this submission – with no method statements for prior years available.</p>	<p>This submission being collated by employees with prior experience of completing this submission – with method statements for prior years in place</p>	<p>Submission completed by employees with prior experience and method statements in place.</p>
<b>Evidence of historical Errors with this Data</b>	<p>Material Errors identified for this report, or table level as appropriate, within the last two years; and the issues identified have not been eliminated</p>	<p>Material Errors for this submission have been identified within the last two years for which all issues have been remediated but not yet validated</p> <p><b>or</b></p>	<p>Audit has been undertaken on this submission within the last two years and no Material Errors were identified</p> <p><b>and either</b></p> <p>there were no previously identified</p>	<p>Some errors were previously identified and corrected.</p>

 Classification: Public

	<b>or</b> no audit undertaken on this submission in the last five years.	no audits undertaken on this Data within the last two years, but audit has been undertaken within the last five years.	Errors in submissions. <b>or</b> Audit confirmed that any previously identified issues have been properly addressed.	
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