Northern Gas Networks

A22.h - Governors

Engineering Justification Paper

Contents

1. Summary table

Name of Project	*Governors RIIO-GD3 Programme*		
Scheme Reference	*A22.h.NGN*		
Primary Investment Driver	*Asset Health/ Compliance /Operational*		
Project Initiation Year	*2026/27*		
Project Close Out Year	*2030/31*		
Total Installed Cost Estimate (£)	*£21.59m*		
Cost Estimate Accuracy (%)	*+/-5%*		
Project Spend to date (£)	*£0m*		
Current Project Stage Gate	*Specific delivery identification*		
Reporting Table Ref	*CV 5.04*		
Outputs included in RIIO-GD3 Business Plan	*As per BDPT above, impact of programme in NARM BPDT*		
Spend apportionment	**RIIO-GD2**	**RIIO-GD3**	**RIIO-GD4***
	£23.45m	£21.59m	c.£20-25m

*Expecting all investments listed for RIIO-GD3 to complete in RIIO-GD3. RIIO-GD4 cost estimate based on indicative asset health spend in RIIO-GD3

2. Executive summary

This Engineering Justification Paper (EJP) sets out the interventions that we plan to undertake on our governor assets during RIIO-GD3. Interventions in this area are asset health and compliance driven, as it is imperative that our governor assets remain in good condition to ensure gas continues to flow through our network in a safe and reliable manner. We have used a combination of our Value Framework and our asset data and expertise to determine the appropriate interventions during RIIO-GD3. Our preferred strategy includes the following 943 investments at a cost of £21.59m over RIIO-GD3:

- 48 District Governor Replacements
- 25 District Governor Refurbishments
- 400 District Governor Housing Replacements
- 10 District Governor Decommissions
- 425 Service Governor Replacements
- 20 District Governor ERS Replacements
- 10 Lineguard Replacements

The profile of the workload across the price control period is shown in more detail in Section 10.4 and the spend profile is detailed in Section 10.2. Unit costs used within the cost benefit analysis have been fully detailed within Section 8.6. Overall, our preferred strategy results in a 9% increase in monetised risk from 2026 through to the end of RIIO-GD3. We also expect a 14% increase in supply interruptions, down from 18% if we don't intervene. The payback period for our preferred strategy is 2 years. Overall, we are confident that the achieved risk reduction represents good value for our customers across all plausible energy pathways. A comparison of our RIIO-GD3 preferred option to our expected RIIO-GD2 delivery in terms of cost, volumes and drivers is shown in table 1 below.

	RIIO GD2 EJP Prefered Option			RIIO GD3 EJP Prefered Option		
Intervention	Workload units	Capex £m 23/24 Prices	Driver	Workload Units	Capex £m 23/24 prices	Driver
District Governor - Housing Replacement	681	£15.47	Operational / Compliance	400	£10.00	Operational / Compliance
District Governor - Refurbishment	25	£0.50	Operational / Compliance	25	£0.50	Operational / Compliance
District Governor - Replacement	25	£2.25	Asset Health / Compliance	48	£6.38	Asset Health / Compliance
District Governor - Decommissioned	10	£0.10	Operational / Compliance	10	£0.16	Operational / Compliance
Service Governor - Replacement	368	£1.08	Operational / Compliance	425	£1.36	Operational / Compliance
District Governor - Lineguard Replacemen	0	£0.00	Operational / Compliance	15	£0.93	Operational / Compliance
District Governor (ERS) - Replacement (MI	15	£1.50	Operational / Compliance	20	£2.00	Operational / Compliance

Table 1 GD2 and GD3 Workload and Cost Comparison

In RIIO-GD2 much of our focus was on reducing loss of supply incidents. However, following extensive surveys, and intervention from the HSE, it became clear that we needed to increase civils and governor housing replacement workload to ensure safety on site for colleagues and contractors. The current RIIO-GD2 run rate is around 100+ per annum and by the end of RIIO-GD2 we will have satisfied HSE requirements to bring our district governor sites up to standard. Whilst delivering the upgrade work during RIIO-GD2, further improvements have been recognised to ensure that district governor sites become TD13 compliant, we propose to proactively address 400 sites in GD3. District governor workload is a priority area due to the potentially significant loss of supply events that can result from failures. Therefore, our strategy is a continuation of the successful approach in RIIO-GD3 that maintains compliance and customer risk levels, whilst continuing to focus on assets that had experienced failures and obsolescence.

3. Introduction

This Engineering Justification Paper details our proposals for investment at our governor sites during RIIO-GD3. It includes justification for improvements to our district governors for asset health reasons and is to be used in conjunction with the accompanying Cost Benefit Analysis (CBA).

The paper also includes interventions on our service governors. However, because the proposed investment in RIIO-GD3 is below Ofgem's materiality threshold, there is no accompanying CBA provided.

Our governors are a critical part of our gas transportation service and require ongoing maintenance, repair, refurbishment, and replacement to ensure we manage increasing risks associated with asset health. During RIIO-GD2 we have undertaken a program of works to upgrade those in the poorest condition. As governor assets deteriorate over time, we will require a similar program of works in RIIO-GD3, to ensure our gas transportation service continues to function safely and reliably and to build on our track record of delivery in RIIO-GD2.

This paper aims to outline the justification for our proposed RIIO-GD3 governor investment, detailing our asset management decision-making process, during which we analyse risk and value and trade-off between different intervention options. It explains the drivers for investment, the inputs and assumptions used in our CBA and how our proposed investment will benefit our customers and stakeholders.

Our preferred strategy results a maintenance of risk levels compared to start of RIIO-GD3 levels and a maintenance of supply interruption level (due to the nature of the impact governors interventions have on consequence measures in the NARM model). Risk, service levels and payback are similar across all options considered. The Do More option was rejected on ground of increased cost resulting in our cost efficiency objectives not being met (for further details on customer support for this, see Insights 1, 9 and 10 referenced in section 5). The Do Less option was rejected on grounds of not meeting our compliance objective, but also due to health and safety and resilience requirements (see Sections 8.1 to 8.5 and Section 9).

We have used a combination of our Value Framework and our asset data and expertise to determine the appropriate interventions during RIIO-GD3. Subject matter experts helped to identify where investments could be used to improve our resilience (from both a climate and physical security point of view). Our strategy is set out in the table below detailing the driver for investment.

Intervention	Workload units	Capex £m 23/24 prices	Driver
District Governor - Housing Replacement Only	400	10	Asset health / Compliance
District Governor - Refurbishment	25	0.5	Asset Health
District Governor - Replacement	48	6.64	Asset Health
District Governor - Decommissioned	10	0.16	Asset Health
Service Governor - Replacement	425	1.36	Asset Health
District Governor - Lineguard Replacement	15	0.93	Operational / Compliance
District Governor (ERS) - Replacement	20	2	Obsolescence / Asset Health
Total	943	21.33	

Table 2 RIIO-GD3 Workload, Cost and drivers

4. Equipment summary

Governors are either above or below ground, predominantly housed, assets which regulate gas flows into or through our distribution network. They have below 7 bar inlets and supply medium or low-pressure networks. Governors are key assets used in balancing pressures to ensure a 1:20 demand capacity is maintained, whilst maintaining as low pressures as possible in order to reduce gas leakage. The failure of a governor could lead to a loss of gas supply for customers and/or a release of gas. For governors in a single feed network, failure would mean an immediate loss of supply. For those governors in multi-feed networks, depending on the characteristics and demand, failure of a governor may still lead to a supply interruption or result in poor pressure. There are various types of governors installed on our network:

District governors – 2638 district governors which are a pressure regulating system operating with an inlet below 7 bar supplying the medium or low-pressure networks.

Industrial and commercial governors – A pressure regulating system operating with an inlet below 7 bar, supplying large individual, commercial or industrial customers.

ERS modules - A pressure regulating system operating with an inlet below 7 bar supplying the medium or low-pressure networks situated below ground.

Service governors – A pressure regulating system operating with an inlet below 7 bar, supplying domestic or smaller commercial or industrial customers. These tend to be in rural areas where there is no low-pressure network and directly supply customers from the above pressure tier. 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 more than ten customers.

The following equipment at governors are considered as secondary assets.

Control systems – A small proportion of our more critical district governors have full electrical, instrumentation and telemetry systems installed. However, all have a datalogger to record pressures which are communicated via GPRS. We control pressures at our district governor sites in one of three ways:

- Seasonal settings are where we visit site twice a year to set pressures for winter and summer periods.
- Clock control uses equipment to adjust pressures between two settings during the winter period.
- Remote profile control allows us to alter pressure at any time without the need to visit site.

Civils – District governors tend to be housed in either brick buildings or glass reinforced plastic kiosks. However, housing can be made from various materials. Some governors are also protected by security fencing and civil infrastructure such as walkways for safe access onto and around the site.

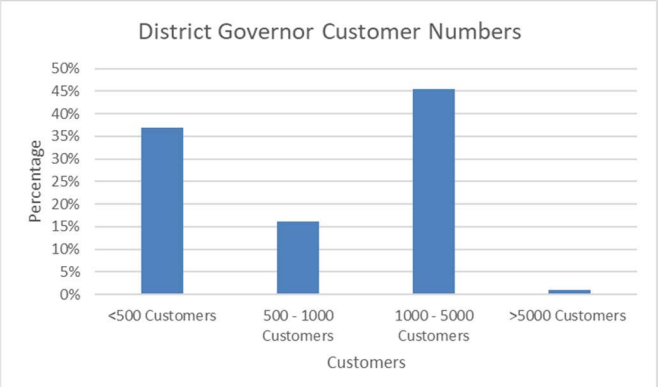

Figure 1 District governor numbers

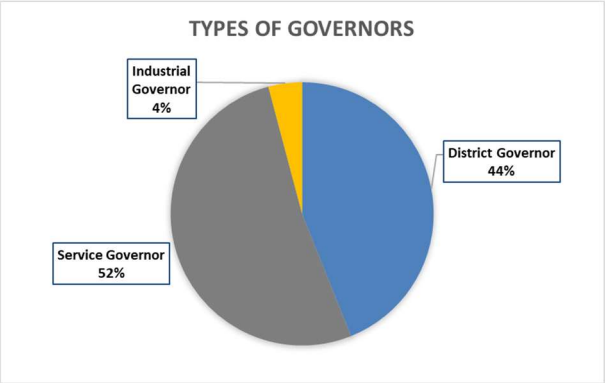

Figure 2 Governor Types

5. Problem / opportunity statement

We have developed a Value Framework which we use to calculate the risk relating to our assets, as well as to understand how the risk changes over time as our assets deteriorate. Governor assets account for 4% of our total network risk.

Within our Value Framework we report on risk in five categories: Compliance, Customer, Environmental, Financial and Health & Safety.

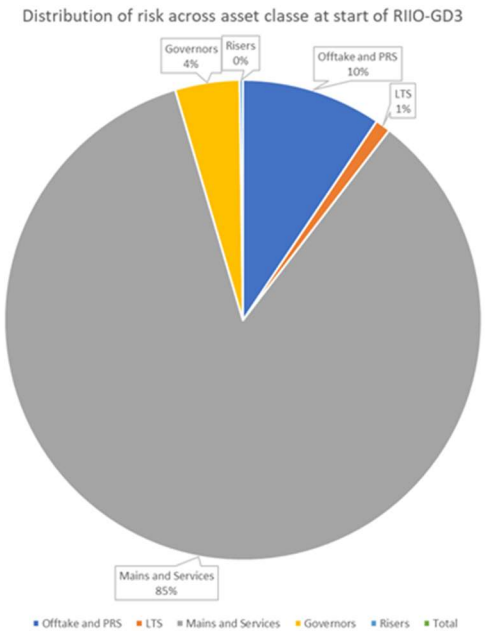

Figure 3 Asset risk distribution

District governors hold the most risk of the governor population in RIIO-GD3 with 95% of total risk. Service governors hold 4% risk and I&C governors hold 1%. When asset populations are assessed to understand the average risk per asset, district governors still on average hold the most risk at nearly ten times that of I&C governors and thirty times that of service governors. This paper therefore only considers district governors due to the materiality threshold set by Ofgem for NARM asset classes and investments in service and I&C governors

not meeting this threshold to warrant a CBA and Engineering Justification Paper.

Risk profile @ FY27	Compliance Risk	Customer Risk	Environmental	Financial Risk	Health & Safety	Total Risk
District Governor	£122,342.92	£12,843,862.21	£1,849,729.07	£2,024,235.41	£765,818.57	**£17,605,988.18**
%	1%	73%	11%	11%	4%	100%

Table 3 Governor risk profile at the start of RIIO GD3

The primary driver for investment is to reduce customer risk, which equates to c.73% of total risk as failure in this group of assets may lead to a loss of supply for customers. A secondary driver for intervention is to reduce other financial risk and environmental risk, which together equate to c.22% of total risk. Increases in other financial risk leads to a greater chance of incurring penalties or fines.

Risk profile @ FY32	Compliance Risk	Customer Risk	Environmental	Financial Risk	Health & Safety	Total Risk
District Governor	£156,823.37	£14,806,293.99	£2,540,127.91	£2,356,469.85	£981,652.60	**£20,841,367.72**
%	1%	71%	12%	11%	5%	100%

Table 4 Governor risk profile at the end of RIIO-GD3

If we do nothing in RIIO-GD3 total risk increases by 18.4%. By not investing in our assets in RIIO-GD3 every asset will move further along its deterioration curve and the probability of failure will increase. This could result in increased risk of loss of supply for our customers or increased risk of carbon emissions during RIIO-GD3 and beyond. Surveys throughout RIIO-GD2 have highlighted several issues relating to the potential deterioration of governor housings over time.

Consideration of governors asset health

We have utilised the NARM Value Framework to assess the health of our assets. We are however using the latest NGN asset data rather than the NARM data, which is held in time as at the start of RIIO-GD2 for regulatory reporting purposes. Our approach in the EJP differs slightly from RRP and NARM BPDT, where A2 and A3 are included.

Governor assets are assigned a health banding 1-10 based entirely on the total failure rate (i.e. the sum of all failure rate components). There are ranges of failure rates which assign an asset to bands 1-10.

The below table highlights the health of our assets using the NARM value measures. This shows that 92% of our governor assets have a score of 6 or more (90% 9-10) at the start of RIIO-GD3. Without intervention, this percentage stays the same, but 20 assets move into band 10 of RIIO-GD3. If our preferred option of investment is followed in RIIO-GD3, the percentage stays similar but overall numbers move down the health band at the end of RIIO-GD3 with investment.

Govenor Health Index	1	2	3	4	5	6	7	8	9	10	Total
Baseline start of RIIO-GD3	28	60	36	65	23	30	27	8	24	2337	2638
	1%	2%	1%	2%	1%	1%	1%	0%	1%	89%	100%
End of RIIO-GD3 w/o intervention	21	48	54	59	23	24	32	16	4	2357	2638
	1%	2%	2%	2%	1%	1%	1%	1%	0%	89%	100%
End of RIIO-GD3 with intervention	13	36	28	74	75	19	29	25	23	2316	2638
	0%	1%	1%	3%	3%	1%	1%	1%	1%	88%	100%

Table 5 Governor Asset Health Scoring

What is the outcome that we want to achieve?

From our stakeholder research (for example, see Insight 1, 9 and 10 from Appendix A3 below) we know that network reliability and cost remain key priorities for our stakeholders. Customers also value the importance of improving resilience against extreme weather, such as storms. From the risk analysis in Section 5 of this document, for this group of assets environmental (carbon) followed by compliance risk are the main risk drivers.

We know that our customers expect value for money and that we need to make the right investment decisions for both our existing and future customers. We have proposed four objectives covering risk, cost, service, and uncertainty. These will be used to determine how successful each option considered is at delivering against our customers' expectations.

What we heard	Appendix A3
Keeping bills as low as possible continues to be domestic and SME (Small Medium Enterprise) customers' top priority, however stakeholders are supportive of investment to respond to significant challenges of climate resilience and decarbonisation. Balancing the trade-off between investing now to future-proof and minimising expenditure to prioritise essentials poses a challenge.	Insight 1
Customers expect our top sustainability commitment to be keeping our infrastructure resilient. This means continuing to reliably supply customers in the short and long term, regardless of climatic conditions and impacts experienced by interconnected sectors (such as telecommunications, road networks etc). As customers are satisfied with the performance and availability of our services, they prefer us to maintain service levels at levels similar to today and asked for us to reduce future risk with targeted investments to enhance removal, reduction, resistance and recovery strategies.	Insight 9
The impact of climate change requires us to proactively reduce the vulnerability of networks to storms, particularly in rural areas, and a collaborative, cross-network approach. 'Preventing supply interruptions from extreme weather by providing back up power' was the most highly valued service improvement among billpayers in our Customer Value Perception study (on average, respondents were willing to pay £0.53pp at 75%).	Insight 10

Table 6 Customer Insights

Risk objective: to maintain total risk to the same level as the starting position of RIIO-GD3 (plus or minus 10%)

We want to manage total risk

We know that our customers value safety and reliability as their number one priority and without intervention total risk will increase by 18.4% for governors within the RIIO-GD3 period. In addition, we want to manage increasing risks to provide a safe working environment for our operatives and avoid loss of supply events. We will aim to maintain risk throughout RIIO-GD3 to plus or minus 10% from the RIIO-GD3 starting position. However, we understand the need to balance this ambition with service and cost constraints.

We are on track to meet our NARM target in RIIO-GD2. RIIO-GD3 is considered to be a roll-over price control so we have seen no need to take a step change approach to risk and have therefore adopted a risk objective that is consistent with that adopted in RIIO-GD2.

Efficiency objective = to minimise RIIO-GD3 spend over and above RIIO-GD2 levels

We know that our customers expect us to invest their money wisely and efficiently to enable a reduction in their bills. To do this we need to make sure we maximise value from our existing assets before we replace them However, we must understand the whole life cost of the decisions we make to ensure we are doing the right thing both now and in the future. As risk is rising sharply in RIIO-GD3, it is expected that we will need to intervene on more assets than we have during RIIO-GD2 to meet our objectives around managing total risk. To avoid escalating costs we therefore need to think of pioneering solutions to ensure we are delivering value for money for our customers. Whilst our RIIO-GD3 spend exceeds our RIIO-GD2 spend at a total level, a significant proportion of this is compliance-led, driving the need for asset replacement and housing/building replacement.

Our aim at the outset is to maintain spend relating to asset health in RIIO-GD3 broadly in line with RIIO-GD2 levels, where this is possible. We discuss this in more detail in **Section 10.2**.

Our objective in RIIO-GD2 was to maintain cost. However, the objectives we are setting out are becoming increasingly conflicted with one another as we move into RIIO-GD3. For example, increasing rises in risk and supply interruption from deterioration in the asset health of our assets, alongside obsolescence and compliance are key drivers for additional investment in RIIO-GD3, over and above the levels we saw in RIIO-GD2. We view maintaining risk and service levels and delivering a reliable, safe, and compliant network for customers as a higher priority than maintaining cost at RIIO-GD2, given the evidenced need for additional investment which is explored in our options appraisal. We are continually committed to providing a balanced programme of work and delivering value for customers. We have therefore updated our efficiency objective in RIIO-GD3 to minimise cost in RIIO-GD3 over and above RIIO-GD2 levels.

Our unit costs are discussed in Section 8.6.

Service objective = to maintain supply interruptions to the same level as the starting position of RIIO-GD3 (plus or minus 10%)

We want to continue to provide exceptional service

The key service measure for our governor assets is the total expected number of supply interruptions. Table 1.06 of the 2023/24 Regulatory Reporting Pack (RRP) submission highlights that our current customer satisfaction scores for unplanned interruptions are exceeding the targets set by Ofgem (9.37 target against our actual performance of between 9.543 and 9.650 between 2022 and 2024). We therefore consider that current service levels are acceptable to our customers and provide a suitable benchmark.

As the regulatory landscape is likely to broadly remain the same in RIIO-GD3, adopting risk and service level objectives that are consistent with that adopted in RIIO-GD2 seems appropriate. Other Reliability metrics outlined in Table 1.06 of 2023/24 RIIO-GD2 RRP demonstrate that we are currently operating a highly reliable network. Our aim therefore to maintain our RIIO-GD2 industry leading service levels in RIIO-GD3.

From the analysis in the section above we understand that supply interruptions are increasing by 23.7% across all governors within the RIIO-GD3. Our RIIO-GD3 investments need to target this service measure and reduce it back down to a more acceptable level.

Certainty objective = to ensure our investments pay back within 16 years

We will protect our customers from future uncertainty

To ensure the investments we make in RIIO-GD3 are right for both our existing and future customers, and to avoid the risk of asset stranding, we must ensure that our investments offer a payback before either the asset life or a point in time where future uncertainty could reduce the forecasted benefits, whichever is the smallest time period. The RIIO-GD3 Business Plan Guidance states that a 16-year payback period is appropriate for the GD sector (page 45)[1], meaning that any new, refurbished or replaced equipment that pays back within this time frame will be deemed suitable for investment.

Compliance objective = to ensure we are compliant with legislation relevant to each asset class

We want to ensure compliance with all relevant health and safety, or technical regulations.

During RIIO-GD3 we are required to undertake several interventions for compliance reasons. Failure to maintain our pressure control assets risks non-compliance with the Pressure Systems Safety Regulations (PSSR) which is mandated by the Health and Safety Executive (HSE).

How will we understand if the spend has been successful?

This asset class is covered within the NARM methodology, and we have set a relative risk target on which we will annually report performance against.

In addition to the NARM target, we would expect to keep the number of supply interruptions from Offtake and PRS asset failure at a manageable level, ideally at the same level seen during RIIO-GD2. During the price control period we would also expect to see a reduction in the numbers of faults and remedials picked up during routine maintenance and PSSR inspections.

Our Decision Support Tool allows us to understand various service measures associated with each asset and how these change over time with and without investment.

5.1. Narrative real-life example of problem

CASE STUDY 1 – DISTRICT GOVERNOR REPLACEMENT

The District Governor pictured was located within a pub garden which presented our operational and maintenance teams with access issues well as health and safety concerns for the public. During RIIO-GD2 the decision was undertaken to relocate the District Governor to a more suitable location. During the design engineering phase, we considered all options and found we were able to reconfigure the network by connecting two small low-pressure networks to avoid installing a new Governor in a different location. This resulted in cost savings and less disruption for our customers.

[1] https://www.ofgem.gov.uk/publications/riio-3-business-plan-guidance

CASE STUDY 2 – DISTRICT GOVERNOR REFURBISHMENT

The district governor at [redacted] was identified by our maintenance and network analysis teams as a governor which drooped and struggled to supply at peak demand. This capacity constraint increased the potential risk to customers as failure of one of the streams would lead to poor pressures or supply interruptions. We have a licence obligation to meet 1:20 peak demand and so a project was raised to upsize the asset. During the design engineering phase, it was determined that we could replace the regulators within the equipment rather than having to replace the whole asset. This saved our customers money and ensured continued reliability.

5.2. Project boundaries

The boundaries of spend proposed by this justification paper include capital investment on the assets listed in Section 3. This includes all necessary project costs such as design, procurement of materials, construction, commissioning, and overheads. It does not include any costs associated with mains laid or abandoned, Lineguard cabinets or security such as fencing, as these costs are included within the 'Repex' and 'Other Capex' Business Plan Data Tables in accordance with regulatory reporting.

6. Probability of failure

The Probability of Failure (PoF) is the probability an asset will fail at a given point in time. When justifying our RIIO-GD3 capital Investment, our Cost Benefit Analysis used the NARM methodology to calculate the failure rate of our governor assets. The NARM methodology algorithm used to calculate the failure rate for each Failure Mode (apart from fail open/fail closed) is:

Failure Rate Including Factors = Initial Failure Rate x (exp[(Effective Age – Mean Age) x Deterioration Rate]) x Kiosk Factor x FS Factor x Location Factor x Coastal Factor x Flood Factor

Where:

Initial Failure Rate = Fault Detection Rate x Probability of a Failure event x Total Number of Assets that can Fail

Over and under pressure events from fail open/ fail closed events for governors are now analysed from a system reliability view perspective – further details are provided under changes to the NARM methodology section.

This section discusses how we have used the NARM methodology to understand the types of failure of our governor assets as well as the rate of failure, or deterioration, which is a function of the assets attributed to age and condition.

Types of failure

A failure in an asset is defined as the inability of an asset to fulfil one or more of its intended functions to a standard of performance that is acceptable. In the NARM methodology these failures have been categorised into Failure Modes: Capacity Failure – where the governor is undersized to meet downstream demand.

Fail Closed – Where a fault with the regulator has resulted in it failing in the closed position.

Fail Open – Where a fault with the regulator has resulted in it failing in the open position.

Interference Failure – Where a third party affects the performance of the asset.

Corrosion Failure – Where corrosion of the governor pipework leads to a gas escape or corrosion of the Governor components leads to regulator failing in the fail open / close position.

Governor Failure – Background leakage or shrinkage from the Governor.

Control System Failure – Failure of the telemetry, electrical or instrumentation systems or the pressure profiling equipment.

Rate of failure

The failure rate for an asset is the frequency of failures at a given point in time, typically measured as the number of failures over a year. We have used the NARM models to calculate failure rates in two categories:

1. **Failed open and closed methodology**. The new approach (updated NARM Methodology) models the reliability of the pressure regulating function at the system level. Pressure regulating equipment (component level) are modelled at a system level to ensure that any redundancy in the configuration is accounted for and is simulated in daily timesteps to show durations of outages of individual components. This avoids over or underestimating the impacts of component failure.

   Fault and consequence data has been pooled from the Networks to derive:

- Failure rate and deterioration models.
- Fail open and closed proportions given a component failure.
- Reactive repair times of failed components when detected.

2. **Other failure modes methodology**. This includes capacity, corrosion, emissions, interference, control systems and loss of control. For each failure model the actual number of faults were taken over several years and divided by the total number of assets to give an annualised failure rate.

For further detail on the failure modes see the NARM methodology document.

The failure rate, calculated as above, is then adjusted by age, asset attributes and condition to achieve a more accurate estimate for the initial likelihood of failure for an asset. These scaling factors are:

Condition Risk (Effective Age). This is the modified default age of an asset according to its condition.

Location Risk. A multiplication factor is applicable for assets within 3km of the coast.

Kiosk Risk. A multiplication factor is applicable depending on the condition of the building/kiosk.

Fencing / Security Risk. A multiplication factor is applicable depending on the condition of the fencing and security.

Flood Risk. A multiplication factor is applicable depending on the flood zone the asset is located.

We use the deterioration rate dictated by the NARM methodology for the governor asset class. Weibull curves and expert elicitation derived different failure rates for the failure modes. Fail open and fail closed has a 5% per annum deterioration rate applied, corrosion has a 5% per annum deterioration rate applied, control system and loss of gas have a 10% per annum deterioration rate applied and emission has no deterioration rate applied.

The tables below show the Failure Rates of each primary asset without intervention and the rate of failure over the RIIO-GD3 period:

Failure Mode	Total Expected no. of Failures		RIIO GD3 Failure Rate
	Start of RIIO-GD3	End of RIIO GD3	
Overpressurisation	1.8	2.21	0.41
Total Failures	674.95	813.00	138.05

Table 7 Governor failure rates over RIIO-GD3

Changes to the NARM Methodology

Long Term Risk Benefit Updates

The NARM methodology has been updated since RIIO-GD2 to incorporate changes for long term risk modelling and some changes in failure rates and deterioration rates to better reflect reality. This was carried out as a cross GDN project, underwent a consultation process and is awaiting approval by Ofgem. Please refer to full details of updated methodology changes in the updated version of the NARM Risk Methodology document. A brief summary of the updates includes updates enabling GDNs to report on Long Term Risk (LTR) increases and impact of investments on this metric.

Data has been pooled across networks enabling an update to deterioration curves to include an end of life (EOL) assumption to eliminate artificially high rates of deterioration towards EOL in the previous models for governor and offtake and PRS mechanical asset. These now taper off towards end of life (EOL) and provide much more realistic LTR analysis. Pressure control, governor's regulator and slam shut failure analysis was also updated, and now provides a system view of reliability and failure in the updated version of the model. Mains deterioration was also reviewed as part of the project. The effect of these changes, which have been implemented in the production of the RIIO-GD3 business plan analysis, is to better reflect the reality of operation of the above-mentioned assets.

Updates to the methodology have been discussed with Ofgem during their development and have gone out to consultation. Formal approval is to follow on from the consultation. It was agreed with Ofgem that model updates as part of this project including long term risk would be used for RIIO-GD3 business planning purposes.

6.1. Probability of failure data assurance

The data used in our Probability of Failure (PoF) calculations comes directly from the NARM methodology. The failure models are based on various industry standard guidelines (see GDN Asset Health Risk Reporting Methodology document) and the failure rates have been statistically derived using actual asset information such as age or material and historic failure data taking into consideration other influencing factors such as weather or temperature.

We have an annual process for gathering asset data from the business to support NARM RRP delivery, with majority of data coming ultimately from SAP. There is a documented process where the business leads supplying the data carry out reasonableness checks on the data supplied to the Asset Strategy team, who then undertake validation and consistency checks.

Our 2024 data improvement plan assess key areas of data for robustness and completeness:

Our **core asset data** for offtake and PRS includes location, fault data, health bandings, customers, capacity, obsolescence and maintenance costs. Each year we update the fault data within our systems as a requirement for RRP, therefore this data is up to date as of 2023/24. Our core asset data is assessed to be robust and complete.

Our **asset health and failure data** includes design specification, age, condition, duty, capacity, location and environmental health factors. All other factors within this category are static and are only updated when we install new assets. Our asset health and failure data has been assessed as having some data gaps and assumptions

have been applied. This applies in particular to default condition data being applied to some kiosks and no condition data for fences or control systems. Through smarter work management systems, field work capture capabilities will be developed to improve this. If assumed condition assumptions are lower than reality, this will lead to a conservative calculation of baseline risk and risk reduction on intervention; and vice versa.

Our **financial data** includes all the financial data held in the core system that is used within the risk models. We have recently updated all the interventions costs within the system using historical project cost knowledge and SME input on current cost trends (See section 8.2). Data relating to cost nodes in the modelling have been inflated to 2023/24 prices using the Ofgem agreed inflation factors. Our financial data has been assessed as having some data gaps and assumptions have been applied. If assumed financial costs are lower than reality, this will lead to a conservative calculation of baseline risk and risk reduction on intervention, and vice versa.

It is recognised in the NARM methodology that the GDNs will have data gaps and will not hold the same level of asset data in every area. To facilitate the population of the monetised risk modelling, a flexible but consistent methodology (with options) will be utilised to derive the PoF, deterioration, probability of consequence and associated impacts of Intervention. This is set out in Table 6 of the NARM methodology and ranges from Option A (GDN specific data from company systems) to Option B (Pooled/Shared data – where applicable) to Option C (Global/Assumed). Assumed data could be data that has been analysed to be representative of the population, arrived at by expert elicitation, or arrived at by researching relevant published studies/reports.

7. Consequence of failure

For each failure there may be a Consequence of Failure (CoF) which can be valued in monetary terms. In the NARM methodology the CoF is calculated as the Probability of Consequence (PoC) multiplied by the quantity and Cost of Consequence (CoC) and are linked directly to failure modes which categorise the asset failure.

Types of consequence

The NARM methodology sets out the consequence measures for each failure mode, categorised into four risk groups: customer risk, health & safety risk, carbon risk and other financial risk. Within the CBA we quantify each of these risks over time (note that health and safety risk is split between fatality risk and non-fatality risk).

These are detailed below for Governor assets.

Customer risk:

Over-pressurisation – Where the downstream network becomes over pressurised and can result in either an explosion or supply interruptions. Linked to the following Failure Mode: Fail Open.

Supply interruption – Where customers in the network downstream of the Governor lose their gas supply. Linked to the following Failure Modes: Capacity, Fail Open and Fail Closed.

Health & Safety Risk:

Loss of Control – Where sub optimum pressure leaves the Governor station but is not severe enough to result in a supply interruption but could lead to an explosion. Linked to the following Failure Mode: Fail Open.

Explosion – An explosion at either the Governor itself or in the downstream network resulting in death, injury or property damage. Linked to the following Failure Modes: Interference, Corrosion and Fail Open.

Governor Gas Escape – An increase in gas escapes in the downstream network, resulting in a carbon an explosion or loss of gas. Linked to the following Failure Modes: Interference and Corrosion.

Carbon Risk:

Loss of gas – Volume of loss of gas from either the Governor itself or in the downstream network. Linked to the following Failure Modes: Interference, Corrosion and Fail Open.

Financial Risk:

The direct financial costs to the business for without-intervention work to the assets such as such as repair.

Monetised Risk:

The principal of total monetised risk, applied across the asset base, is:

Total monetised risk = PoF x PoC x CoC

NGN's Value Framework

We have developed a Value Framework which we use to assess the value of intervention options consistently across asset classes. We use the NARM methodology as the basis of our Value Framework so it is consistent with the consequence measures. However, we have recategorised them into five risk groups instead of four, so that there is clear distinction between NGN and societal costs/benefits, and so that the present values being calculated are correct. This is further explained in our Network Asset Management Strategy. The five risk groups within our Value Framework are: customer risk, health & safety risk, environmental risk, compliance risk and financial risk.

To derive a monetary value for the cost of consequence, each consequence measure is allocated a monetary value which is multiplied by the quantity of the consequence. The monetary values used within our Value Framework are based on the agreed NARM assumptions and use values common across GDN's, such as the base price year, industry approved values such as the cost of carbon or the social cost of an injury. In addition, we use values specific to our business, such as the cost of maintenance or the cost of loss of supply. The quantities used are specific to our network, for example the number of domestic properties at risk of a supply interruption, and have been derived from system data, network analysis or assumptions based on demands, flow and redundancy.

When justifying our RIIO-GD3 capital programme, the monetary value of each consequence measure is calculated to determine the benefit or avoided cost of an intervention. Examples include:

Health & Safety Risk – Societal benefits in avoided costs through reductions in the probability of a fatality or non-fatality injury. These costs are in accordance with the NARM methodology.

Customer Risk – Avoided GDN costs through a reduction in costs of supply incidents (loss of supply). These costs have been calculated from historic incidents and the probability and scale of the incidents are based on NARM models.

Compliance Risk – Avoided GDN costs through a reduction in costs of fines and paying for explosion damage. These costs are in accordance with the NARM methodology. They have been separated from direct Financial Risk as we consider them highly uncertain and likely significantly underestimated by the values in NARM, which does not consider reputation, legal and handling costs.

Financial Risk – Avoided GDN costs through reductions in the costs to fix assets on failure and the direct financial cost of the gas leaked from and consumed by our assets. These costs are in accordance with the NARM methodology.

Environmental Risk – Societal benefits in avoided costs through reductions in the volume of carbon emitted when gas is leaked or consumed. These costs are in accordance with the NARM methodology and industry approved values.

Probability of Consequence

Within our assessment of asset risk, we use the probability of consequence data from the NARM methodology which has been calculated from a mix of observed data, shared GDN data, industry standard data and expertly elicited data.

Different supply/demand scenarios have not been considered during our modelling as the current NARM methodology does not include analysis for this. This is a future update to NARM in gas distribution that has been identified within the methodology document and will be reviewed by the networks through NARM working groups. Overall, we are forecasting a slow recovery from impacts of the cost-of-living crisis and total domestic demand is forecast to return to 2021 levels between 2029 and 2031 for the NE and NO distribution zones of our network. This is based on established econometric modelling and demand forecasting methodologies.

Although the NARM Methodology does not account explicitly for supply demand scenario analysis, the fault and failure data we currently base our modelling calculations on includes data collected over a period dating back to pre-2021. Consequence data from company systems also reflects the latest available view for our asset base at 2023/24 and is also based on data from historic events collected over a period of time. Therefore, we do not anticipate demand to have a material impact on our investment decisions or their benefits during RIIO-GD3.

Our commitment to resilience

Chapter 5 of our business plan demonstrates our longstanding commitment to ensuring that we are able to operate and maintain a resilient network. We have formalised our resilience framework and developed a number of individual resilience strategies which allow us to maintain our high standards. Our resilience framework ensures that we continually review the hazards facing our business and assess whether mitigations that we have in place remain sufficient or need to change. This is relevant to our asset management strategies as we need to take into account exogenous factors when considering both short and long-term investment plans. Our Network Asset Management Strategy which is set out in **Appendix A18** brings this all together.

We have introduced a range of other resilience strategies, such as **Appendix A8 – Climate Resilience Strategy**. A climate risk assessment sets out the risks facing NGN currently, in 2050 and in 2100, as set out in section 1.5.2 of the strategy. The climate scenario risk analysis did not identify high risks for either the 2oC or worst-case 4oC warming scenarios assessed. As such, this recognises our resilience to material climate change risks in the long to very long term (2050+). This is due to our comprehensive asset integrity and management procedures that are in operation to ensure asset condition and performance. In addition, there is inherent resilience afforded by gas infrastructure assets being a sealed, pressurised system principally located underground. Resilience levels to climate change risks will be greater in lesser warming scenarios should they arise, due to lower climatic extremes. The likely current and future climate risk has been factored into our preferred strategies across governors from the outset by utilising our SME knowledge and risk assessments mentioned above.

We are taking a similar approach to RIIO-GD2 in putting together our investment plan, taking a balanced approach to asset management to ensure a safe, reliant and compliant network. This will ensure we can continue to meet our licence obligations whilst at the same time minimising costs for customers.

8. Options considered

Types of Intervention

There are various ways in which we can intervene on our assets within this asset group. Each intervention has its own merits and drawbacks, and the key to good asset management is to understand how the assets behave and use data and information to ensure the right decisions are made to balance risk and value in order to deliver a safe and reliable service for our customers. The interventions available for this asset group are:

Maintenance and repair – Pre-planned inspections and reactive repair works to ensure that performance is optimized, and the asset reaches its expected life. An example of this would be a repair of a leaking Governor roof.

Refurbishment – A proactive planned intervention which includes inspection and replacement or servicing of major components and soft parts with the intention of extending the expected life of the asset. An example of this would be a direct swap of one of the regulators within the Governor asset to replace a faulty component with a new one.

Replacement – Installation of a new asset to replace an existing asset, often because of poor condition The new asset will be of the same capacity but likely be a newer model or design. An example of this would be the replacement of a District Governor including the kiosk and, if relocated to a new location, land purchase, mains and new concrete slab and walkways. Another example could be just the replacement of the kiosk due to condition.

Removal – Where we no longer require an asset, or we can manage our network in a more efficient manner, we decommission and dispose of the asset from our network.

Future Energy Pathways

Assumed proportion of methane is important within the risk calculations and CBA as within the NARM methodology the carbon equivalent of the methane content of the gas lost from our assets is quantified, resulting in a monetised Carbon Risk. Gas can be lost from our mechanical assets through leakage or failure. Civils and E&I asset condition and failure are important because they influence the failure rate of mechanical assets, and the duration of the loss of gas consequence respectively.

We have gone with the default assumption of current assumed proportion of methane CO2 in natural gas projected forwards due to uncertainties in the potential energy pathways and because this is reflective of the current gas quality legislation. However, we acknowledge that significant changes to gas demand or the allowed methane content of gas, for example due to the blending with or conversion to hydrogen, would impact the benefits of our investments.

We have not explicitly modelled changes in the methane content of gas in our CBAs, as overall gas demand and the change in CO2 content of the gas is not expected to be different enough to materially impact the NPV, Payback & Option Ranking of our preferred investment programme. Our chosen programme represents value for money over a 20-year period regardless and is mainly driven by customer benefits such as avoiding loss of supply. The investments also ensure that we are compliant with relevant legislation. Our strategy therefore represents a no regrets investment programme that is consistent with net zero and will deliver value to customers whether a hydrogen or electrification pathway is chosen.

How we make asset decisions

We aspire to make conscious decisions that are balanced across our asset portfolio to ensure we can leverage the most value out of our assets. In making conscious decisions we can evaluate the risk we hold as a business and the impact it has on our strategic objectives. Asset management relies on accurate data. During RIIO-GD2 we have been working to improve our data and the way we capture and store this information, so it can be used to benefit our decision-making process. We use a wide range of asset data, global values such as the cost of carbon and specific values such as the loss of supply, costs from our updated unit cost analysis (see **section 8.6**) and the NARM methodology to calculate risk and value. Technical experts analyse options and set constraints (such as a constraint with the objective of maintaining risk) within our Decision Support Tool which maximises the value of our investments for the given constraints. We use the value measures from our Decision Support Tool in Ofgem's Cost Benefit Analysis template to compare the Net Present Value (NPV) of each option against the baseline option to determine the most suitable capital programme in RIIO-GD3. The diagram above is a simplified representation of this process.

Figure 4 How we make decisions

Options analysis

We consider various options when making asset management decisions to ensure the interventions we undertake are in the best interests of our customers and are optimal in terms of asset performance, capital expenditure and risk management.

Our Decision Support Tool is used to quantify risk and level of service measures and to aid asset management decision making. Optimisation within the software allows us to maximise the value of investments we are making, but we also combine this with bottom-up analysis and constraint application which comes from collaboration with our subject matter experts.

Our process for Governors is to undertake asset class optimisations where we set different constraints for our options and use our Decision Support Tool to optimise within each secondary asset class. By undertaking optimisations at this level, we are allowing the system to maximise the value from investments within each asset class. Once we have run these optimisations, we analyse the results in terms of risk, service and cost and use Ofgem's CBA template to understand the customer benefits derived from each option.

In the early stages of options analysis, optimisations were carried out in our Decision Support Tool to optimise investments over RIIO-GD3, by applying constraints such as maintain risk and maintain investment cost with the objective of maximising value from intervention. The resulting intervention plan recommendations were then reviewed by SMEs, who fed back on specific site and asset intervention applicability providing additional bottom-up insights around factors such as obsolescence and compliance. This information was used to further develop the modelling and intervention selections by applying additional constraints within the modelling process.

A preferred option has been arrived at using a combination of bottom-up analysis and optimisation using our Decision Support Tool (DST) to maximise the value of investments we are making. From this preferred option, further sensitivity analysis is undertaken to see if we can in any way improve the option. This sensitivity analysis is undertaken at the asset class level looking at the different effects of refurbishment and replacement interventions, as well as seeing if there is more merit in delaying the investment. During this sensitivity analysis we will also run each asset class individually through Ofgem's CBA template to ensure that they have a positive

Net Present Value and within a reasonable timeframe. This provides additional confidence that our Decision Support Tool hasn't been inadvertently constrained during the first stage and not been able to deliver the best value for our customers.

The different options we have modelled are set out below in Sections 8.1 to 8.5. These have been appraised against our objectives in Section 5 to determine a preferred option. In summary, we have produced a preferred option focussing on compliance and asset health drivers which we have deemed appropriate to maintaining a safe, reliable and compliant network. Subject matter experts were consulted to create reasonable alternative options, with a particular focus on practical deliverability of the programme of works. It is important to note however that the options discussed have implications on a combination of safety, reliability and compliance which are discussed in the options analysis review. A deferral investment option was also considered.

Ofgem CBA Template Assumptions

For all CBAs in our RIIO-GD3 submission, we used an assumed weighted average cost of capital (WACC) of 3.92% based on Ofgem guidance (a real average basis). We have assumed a depreciation Acceleration Factor of 100% across all CBAs and scenarios, i.e. no additional acceleration of depreciation. For Capex CBAs we have assumed a capitalisation rate of 33.7% based on our Totex forecasts in BPDTs and 100% for Repex CBAs. First year of expenditure outflow is set to 2027 in all scenarios for consistent relative NPV calculations. This is in line with Ofgem guidance for RIIO-GD3 and the approach taken in RIIO-GD2. We consider that the plausible ranges of these parameters would not materially affect CBA outcomes and have provided only one version of templates with these consistently applied (as they can be adjusted by Ofgem in any case).

We have not provided direct Opex associated with each CBA scenario as it would require us to artificially and subjectively divide up our maintenance and repair expenditure into each sub-asset class (CBA) and make a judgement on how this would be affected by each scenario. We do not record or report data at this level and we have no robust basis on which to provide it. In reality, maintenance and repair teams attend to multiple asset classes in single visits as part of an efficient function. Instead, we have provided the objectively calculated VF Financial risk, which is based on agreed industry NARM based calculations for estimating impacts on Opex under each CBA scenario. For those asset groupings not covered by NARM we have only included benefits and impacts of key benefits e.g. leakage. We consider this to be a more robust and objective approach to our CBAs. We have completed the NARM monetised risk memo lines from values in the NARM BPDT for baseline and preferred where they are available and relevant.

8.1. Baseline – Do minimum/nothing

This option is used as the baseline for which all other options are measured against. It does not include any capital investment but instead considers the cost of ongoing maintenance activities and repairs on failure. There are no direct benefits accrued under this option, however it does include societal impacts associated with leakage, fatality and injury.

The baseline option shows that there will be an increase of risk of 18.4% and an increase of supply interruption levels of 23.7% above start of RIIO-GD3 levels if we were to adopt this Do Nothing/ Do Minimum option (table 11). All categories of risk contribute significantly to this increase in risk apart from Customer risk and, Carbon risk slightly more so than others as the cost of carbon is increasing (table 12).

Given our objective in Section 5 of maintaining risk levels, this option has been deemed to be unacceptable. It also puts meeting our compliance obligations at significant risk. It is however, the option against which the following options have been measured against.

8.2. First option summary – Maintain total risk (preferred option)

This option aims to maintain risk to an acceptable level, compared with our position at the start of RIIO-GD3.

It ensures compliance with our legal and industrial requirements and account for interventions required due to the age of our existing assets and their increasing obsolescence.

Our preferred strategy includes the following 943 investments at a cost of £21.59m over RIIO-3:

- 48 District Governor Replacements
- 25 District Governor Refurbishments
- 400 District Governor Housing Replacements
- 10 District Governor Decommissions
- 425 Service Governor Replacements
- 20 District Governor ERS Replacements
- 10 Lineguard Replacements

Investment drivers for these interventions are detailed against each asset type intervention in Section 5, but at high level they are obsolescence, compliance, asset health (condition) and capacity. Workload profile across RIIO-GD3 can be seen in Section 10.4.

The preferred option shows that there will be an increase of total risk of 9% and a slight increase of supply interruption levels of 14% compared to start of RIIO-GD3 levels if we were to adopt this option (table 11). We see the risk falls by about 3-7% across all categories of risk (table 12).

In respect of our objectives set out in Section 5:

Risk objective (maintain risk +/- 10%) – we are delivering on this risk objective (+9%) (table 10).

Service level objective (maintain SI levels +/- 10%) – we are missing meeting this risk objective (+14%) this is due to Civil upgrades that are needed for GD3 not having a large NARM impact on SI it does however reduce by 4.6% compared to the baseline.

Compliance Objective – we are delivering on this objective by reducing compliance risk as well as accelerating Governor Housing replacement to ensure we are compliant with industry standards.

Efficiency objective (minimise RIIO-GD3 spend over and above RIIO-GD2 levels) – RIIO-GD3 spend under this option is comparable to forecast RIIO-GD2 spend levels (-£3m). We believe we are meeting this objective by using our SME's high level of site expertise and knowledge in combination with analysis in our Decision Support Tool to develop a balanced programme of work meeting the requirement of workload driven by deteriorating asset health, obsolescence, capacity and compliance, whilst minimising the cost for customers in our investment solutions.

Uncertainty objective: This option pays back in 2 years delivering positive NPV from 2035 onwards. This meets Ofgem's requirement of paying back in less than 16 years and represents significant value for money for customers.

8.3. Second option summary – Do more and increase housing replacement

This option considers the preferred option but rather than focusing on replacing 400 of the District housing Governors identified by surveys its looks at the 60% of the 1,572 District Governors post 2021 that could need a civils intervention, it considers all 100% should have a housing or roof replacement. This option would result in an acceleration of interventions in the RIIO-GD3 period. Under this option, interventions would increase to 1488 overall, at a cost of £33.04m. For the increased spend of £11.45m we would expect a risk position of a 11% increase compared to start of RIIO-GD3 levels and supply interruptions would expect to increase by 14%.

The interventions for this Do More option consist of:

- 48 District Governor Replacements
- 25 District Governor Refurbishments
- 950 District Governor Housing Replacements
- 10 District Governor Decommissions
- 425 Service Governor Replacements
- 20 District Governor ERS Replacements
- 10 Lineguard Replacements

The Do More option shows that there will be an increase of total risk of 9% and a increase of supply interruption levels of 14% compared to start of RIIO-GD3 levels if we were to adopt this option (table 11) We see the risk falls by about 3-9% across all categories of risk (table 12)

In respect of our objectives set out in Section 5:

Risk objective (maintain risk +/- 10%) – we are delivering on this risk objective (+9%).

Service level objective (maintain SI levels +/- 10%) – we are underdelivering this risk objective (+14%).

Efficiency objective (minimise RIIO-GD3 spend over and above RIIO-GD2 levels) – This option costs £11.5m more than the preferred option. For this additional cost we do not see any significant decrease in either risk or service levels and compliance needs have been assessed to have been met by the Preferred option. This Do More option therefore does not align with our customers' expectations of keeping bills as low as possible.

Uncertainty objective: This option pays back in 6 years delivering positive NPV from 2035 onwards. This meets Ofgem's requirement of paying back in less than 16 years.

8.4. Third option summary – Do less and reduce volume of interventions.

We have considered the impact of carrying out fewer interventions and scaling back our intervention plans from the preferred strategy by reducing some of the large governor replacements identified by site surveys and just maintaining them throughout RIIO-GD3 as well as reducing district governor ERS Replacements by 5 to match RIIO-GD2

- 25 District Governor Replacements
- 25 District Governor Refurbishments

- 400 District Governor Housing Replacements
- 10 District Governor Decommissions
- 425 Service Governor Replacements
- 25 District Governor ERS Replacements
- 10 Lineguard Replacements

The Do Less option shows that there will be an increase of total risk of 11% and an increase of supply interruption levels of 16% compared to start of RIIO-GD3 levels if we were to adopt this option (table 12). We see the risk falls by about 2-6% across all categories of risk (table 13).

In respect of our objectives set out in Section 5:

Risk objective (maintain risk +/- 10%) – we are underdelivering on this risk objective (+11%).

Service level objective (maintain SI levels +/- 10%) – we are underdelivering this risk objective (-16%).

Efficiency objective (minimise RIIO-GD3 spend over and above RIIO-GD2 levels) – This option costs £2.3m less than the preferred option. For this decrease in cost we see that our risk is more toward the extremities of the percentage limits we have placed on our maintaining risk objective. The reduced level of spend also places our ability to meet compliance (with PSSR regulations) at risk as we will be replacing less IP governors. ERS modules are also obsolete and replacing less will slow down NGN's progress on replacing all ERS Governors.

Uncertainty objective: This option pays back in 2 years delivering positive NPV from 2035 onwards. This achieves Ofgem's requirement of paying back in less than 16 years.

8.5. Fourth option summary – Deferral of investment

The fourth option we considered was deferral of the investments detailed in option 8.2 (Maintain Risk) to RIIO-GD4. This was not modelled as it was not considered a viable option as it would put our ability to meet compliance to industry and legal standards at risk.

8.6. Options technical summary table

The unit costs used in both our cost benefit analysis and capital expenditure forecasts have been derived using historical project cost knowledge and SME input on current cost trends in order to provide confidence in their accuracy, consistency and credibility. Since the introduction of SAP HANA S4 in Oct 2019 we have captured project costs at a more granular level to support regulatory reporting and to aid future investment decisions. During RIIO1 the Unit Cost Database (UCD) was developed. This used project cost data to derive cost curve models and provide a cost trend, allowing for an accurate cost estimate. The allowances for GD2 were driven by the UCD.

As a reliable starting point, our GD2 unit cost allowances were inflated to 23/24 prices. GD2 project costs and forecasts were then compared against the inflated allowances. Where there were significant variances, time was spent with delivery and commercial SMEs and unit costs were amended accordingly. Technology improvements, resource scarcity and project management costs have caused higher than inflation increases in some Capex activities, and these have been reflected in the base GD3 unit costs.

NGN's expenditure forecasts are built on a tried and tested, robust and efficient process. This is founded in asset management principles that has seen NGN consistently benchmarked as the most efficient gas distribution

company by Ofgem since 2005. It should be noted that "robust and efficient costs" should not be interpreted as lowest cost.

We have and are currently experiencing external and internal cost drivers that are increasing the cost to deliver some workloads and maintain service and compliance objectives. At NGN robust and efficient costs are defined as those which address the network, customer service and environmental risk in an effective and enduring way, to avoid future additional costs or service interruptions. Notably, health and safety and security of supply are priority drivers in determining the appropriate balance of risk and cost which enables investment decision making. As such, our costs are efficient over the life of the intervention and not just at a point in time, which would reduce cost but risk service failures or increased costs in future periods.

NGN's efficient and robust process to determine expenditure is as follows:

- Historic analysis of previous investment programmes to understand how expenditure has been effective in managing network risk (NARM) and the service levels that have been delivered. This provides the actual delivered cost of reducing risk and delivering services levels.
- Forward looking analysis of risk profile, cost drivers and pressures to understand what the forecast programme of work is and the cost associated with maintaining or enhancing performance. This allows a clear articulation of how actual delivered efficiency translates into future cost, accounting for any cost variance.
- A comparison of historic cost base versus forward projection to ensure costs are targeted at addressing compliance requirements (HSE), supply demand and account for additional costs drivers or challenging areas of work. To ensure costs are robust we embed the following process:
    - Compare asset specific costs against Third party industry database to understand where deviations from average costs might be and the reason for these changes. Third party data base provided by Aqua Consultants who maintain database for regulated sectors.
    - Compare costs against Yr3 Industry RRP to assess how NGN costs compare to current delivered costs across GDNs.
    - Compare future investment programme to current actuals using Ofgem GD2 benchmarking to understand where NGN may be benchmarked on a like for like for like basis.
    - Undertake robust Internal challenge with Independently appointed experts to weigh pro's and cons of business case and relevance of costs to meet service levels and manage network risk.
    - The costs are then deemed to be robust and efficient from an NGN perspective and will be subject to a final technical scrutiny by an external consultant to ensure costs, benefits and risk removal are justified.

As demonstrated above, the unit costs used in both our Cost Benefit Analysis and capital expenditure forecasts have been derived using historical project cost knowledge, SME input on current cost trends and current cost quotations, to provide confidence in their accuracy, consistency and credibility. Since the introduction of SAP HANA S4 in Oct 2019 we have captured project costs at a more granular level to support regulatory reporting and to aid future investment decisions. During RIIO-GD1 the Unit Cost Database (UCD) was developed. This used extensive volumes of project cost data to derive cost curve models and provide a cost trend allowing for an accurate cost estimate, the allowances for GD2 were driven by the UCD.

Untimely delivery by contractors and 3rd party delays could all impact on costs, but uncertainty risk relating to unit cost was built in during the development of the UCD in RIIO-GD1 and has carried through as these costs have been developed into the unit costs for developing the RIIO-GD3 business plan, as described below. The RIIO-GD3 unit rates incorporate analysis of efficient historical projects. No explicit efficiency over and above this is included within this EJP appendix as our efficiency target is covered within the main business plan - a 0.5% Ongoing Efficiency (OE) target. This means that in reality, NGN will be subject to a further 0.5% cost reduction target

throughout RIIO-GD3 in order to meet the OE objectives that will be set by Ofgem (refer to Chapter 6 of NGN's business plan).

As a reliable starting point, our RIIO-GD2 unit cost allowances were converted to 23/24 prices, RIIO-GD2 project costs and forecasts were then compared against the 23/24 allowances. Where there were significant variances time was spent with delivery and commercial SMEs. Technology improvements (new functionality), resource scarcity and project management are examples of where we have seen deviations in the GD2 allowance, these have been reflected in the base RIIO-GD3RIIO-GD3 unit costs.

We have Framework partners in place for capex delivery projects which improve certainty and ensure efficiency of costs.

The table below provides a summary of the assumed unit costs applied in modelling and CBA analysis for pressure control. For the avoidance of doubt, costs are shown in 2023/24 prices.

Intervention	RIIO-GD3 Unit Cost
	23/24 prices
District Governor - Housing Replacement Only	£25,000.00
District Governor - Refurbishment	£20,000.00
District Governor - Replacement (IP inlet)	£112,500.00
District Governor - Replacement (MP inlet)	£90,000.00
District Governor (ERS) - Replacement (MP inlet)	£100,000.00
District Governor - Replacement (MP inlet) AGI sites	£175,000.00
District Governor - Replacement (Land Purchase)	£25,000.00
District Governor - Decommissioned	£16,000.00
Service Governor - Replacement (domestic)	£2,950.00
Service Governor - Replacement (I&C)	£25,000.00
District Governor - Lineguard Replacement	£62,000.00

Table 8 RIIO-GD3 unit costs

Option	First Year of Spend	Final Year of Spend	Volume of Interventions	Equipment or Investment Design Life	Total Installed Cost (RIIO-GD3 Capex) 23/24 prices (£M)
Baseline (Do Nothing)	N/A	N/A	N/A	N/A	N/A
First Option Summary – Maintain Total Risk (Preferred Option)	2026/27	2030/31	943	7 - 40 yrs	£21.59
Second Option Summary – Do more and increase interventions	2026/27	2030/31	1488	7 - 40 yrs	£35.30
Third Option Summary – Do less and reduce interventions by 20%	2026/27	2030/31	920	7 - 40 yrs	£16.80
Fourth Option Summary - Deferral of investment	2031/32	2036/37	943	7 - 40 yrs	£21.59

Table 9 Options Cost Technical Summary Table

9. Business case outline and discussion

Option	Description	Objectives						Comments
		Maintain Risk (+/- 10%)	Maintain Supply Interuptions (+/-) 10%	Maintain Customer Risk (+/- 10%)	Efficiency	Uncertainty	Compliance	
	Baseline	Not Met 15.2%	Not Met 18.6%	Not Met 13.6%	N/A	N/A	Not met	Does not meet the risk or compliance objective
1	Preferred	Met 9.6%	Not Met 14.0%	Met 7.6%	Met using SME expertise (comparable to RIIO-GD2 spend	Met 2 years	Met	Total risk is maintained under 10% increase as is customer risk, whilst Interuptionss is over 10% it's a significant decrease over baseline
2	Do More	Met 9.6%	Not Met 14.0%	Met 7.6%	Not Met additional £13.7m	met 6 years	Met	Increase in spend does not decrease risk position siignificantly and misaligned with customers expectations of keeping bills as low as possible
3	Do Less	Not Met 11.2%	Not Met 15.8%	Met 9.3%	Cost Reduction of £4.75m	met 2 years	Not met	Slight Cost reduction comes at a slightly higher overall risk and customer risk.
4	Deferral	Not modelled	Not modelled	Not modelled	Not modelled	Not modelled	Not modelled	Risk increases over GD3 and places compliance at risk

Table 10 Options appraisal summary

Table 10 details a summary of the options appraisal against objectives carried out in Sections 8.1 to 8.5.

In summary:

The baseline option has been rejected as this increases risk levels over start of RIIO-GD3 levels significantly. This is unacceptable and misaligned with our objectives of maintaining risk levels. Our ability to meet compliance regulations is also at risk under this option.

Option 2 the Do More has been rejected as this costs an additional £13.7m (over the preferred option) does not result in any significant improvement in risk or service level position. This option is therefore misaligned with our customers' expectations of keeping bills as low as possible.

Option 3 Do Less comes at £4.75m less than the preferred option, delivering slightly worse risk and service levels. This option would however put our compliance with PSSR regulations at risk on IP governors and fails in allowing NGN to replace obsolete ERS modules throughout RIIO-GD3 and RIIO-GD4.

Option 4 Deferral has been discounted due to the risk to compliance.

Option 1 has been assessed to be the preferred option as it delivers the best-balanced programme of work combating deteriorating asset health, compliance, capacity and obsolescence whilst minimising spend for customers. It maintains risk over RIIO-GD3 for all risk categories apart from it also meets service level, efficiency, uncertainty and compliance objectives (see Section 8.2).

Our Preferred option is detailed in full in Section 10.1.

9.1. Key business case drivers description

This section discusses the development of the preferred strategy and sensitivity analysis then undertaken.

We have assessed the present value of each investment option utilising Ofgem's CBA template. To calculate all present value figures, we have compared the capital and operational costs associated with each option and overlaid them against the leakage reductions (associated with reduced numbers of failures) and reductions in risk relating to customer, compliance, financial and health and safety we expect each to attain.

All alternative options should be compared to the baseline counterfactual of the baseline position. The baseline position outlines what we expect our annual shrinkage position to be assuming zero interventions on governors. The present value of each alternative relates to our expected reduction in shrinkage given the funding received under each option. To value each of these efficiency gains we have used the non-traded price of carbon dioxide, as quoted by Ofgem. As noted above, each alternative option also analyses the impact of the change in customer, compliance, financial and health and safety risk. The preferred Strategy development is discussed in Section 8.2 with the options (sensitivity analysis) detailed in Sections 8.1 to 8.5.

The key drivers for investment in governor assets are obsolescence, compliance, asset health and capacity.

Obsolescence and compliance: Given the obsolescence and reliability concerns, a phased replacement of the Audco Lineguard system with modern, supported alternatives has been recommended. This would ensure continued compliance with PSSR and reduce the risk of incidents. A phased replacement of ERS modules over the remaining price control period with above ground units and supported alternatives. Governor housing has been brought up to industry standard throughout RIIO-GD2 in order to maintain this standard and compliance 400 governor housings have been identified to be upgraded throughout RIIO- GD3 to ensure standards are maintained.

Asset health: It is imperative that district governors remain in good condition in order to ensure gas continues to flow through our network in a safe and reliable manner. Governor refurbishment interventions are being driven by asset health, deteriorating assets and site surveys. This intervention as in RIIO-GD2 is being applied where we can act to improve the asset and improve its longevity. Where this has not been possible, replacements have been considered.

Capacity: Capacity constraint investments have been considered where we have sites already exceeding capacity limits, or narrowly approaching them these governors are part of the Reinforcements EJP that can be found in section 7 of the EJP A22.I Reinforcement paper.

Further details can be found in Section 5.

Other Minor Investments:

We have modelled the impact of service governors failing through our Value Framework. However, as these assets tend to only supply one customer, the risk associated with them is less than the cost of replacing the asset. This means investment to replace failed assets does not payback in the lifetime of the asset. Regardless of this, to ensure we maintain our license obligation for continuity of supply, we must proactively replace these assets before failure to ensure a continuity of supply. We have used historic failure rate trends to determine our strategy for RIIO-GD3 as well as fault data. During RIIO-GD2 we experienced a small number of Service Governor failures each year and our proposal for RIIO-GD3 is that this failure rate will continue based on fault data. This approach equates to a projected spend of less than £250k per year.

9.2. Business case summary

The analysis results for each of the options detailed in Sections 8.1-8.5 are summarised in the tables below. Options appraisal is detailed in Sections 8.1 to 8.5 for each option and option selection is detailed at the start of Section 9.

Option	Description	RIIO-3 Primary		Total NVP compared to Baseline at 2070 (£m)	Objectives				
		Replace	Refurb		Total Risk Change from 2026 %	RIIO-3 Total Capex Cost (£m)	Supply Interuption Change from 2026 %	Customer Risk Change from 2026 %	Payback (years)
	Baseline	0		-£1,434.6	15.23	-	18.64%	13.64	-
1	Preferred	468	25	£85.5	9.68	21.59	14.05%	7.68	2
2	Do More	1018	25	£81.5	9.62	35.3	14.05%	7.68	6
3	Do Less	440	25	£61.2	11.20	16.8	15.78%	9.29	2

Table 11 Options summary risk and CBA

Option	Description	No.of Primary Interventions in RIIO-3	Forcast		Total NPV Compared to Baseline (£m)									
			Capex RIIO-3 (£m)	Totex RIIO 3 (£m)	2035	2040	2045	2060	2070	Payback (years)	Total Risk Change from 2026 %	Supply Interuption Change from 2026 %	Customer Risk Change from 2026 %	Preferred Option
	Baseline	0			-£204.0	-£318.3	-£434.9	-£978.4	-£1,434.6		15.23	18.64%	13.64	N
1	Preferred	468	21.59	£21.6	£3.5	£8.3	£14.4	£51.9	£85.5	2	9.68	14.05%	7.68	Y
2	Do More	1018	35.3	£35.3	£1.0	£4.7	£10.3	£47.8	£81.5	6	9.62	14.05%	7.68	N
3	Do Less	440	16.8	£16.8	£2.4	£5.6	£9.9	£36.9	£61.2	2	11.20	15.78%	9.29	N

Table 12 Options summary including NPV

Option	Description	Risk Change from 2026					Total Risk
		Total VF Carbon Risk	Total VF Complaince Risk	Total Customer Risk	Total VF Financial Risk	Total VF Health & Safety Risk	
	Baseline	24.49	23.55	13.64	13.17	23.55	**15.23**
1	Prefered	21.09	15.74	7.68	9.21	15.74	**9.68**
2	Do More	21.08	15.58	7.68	8.77	15.58	**9.62**
3	Do Less	22.07	17.98	9.29	10.38	17.98	**11.20**

Table 13 Options summary detailed risk

10. Preferred option scope and project plan

10.1. Preferred option

Our preferred strategy includes the following 943 investments at a cost of £21.59m over RIIO-3:

- 48 District Governor Replacements
- 25 District Governor Refurbishments
- 400 District Governor Housing Replacements
- 10 District Governor Decommissions
- 425 Service Governor Replacements
- 20 District Governor ERS Replacements
- 10 Lineguard Replacements

We have arrived at this position through a combination of the use of our Decision Support Tool to optimise the portfolio of assets to deliver the maximum value, whilst ensuring compliance with our legal and industry standards. A key consideration in this strategy has been the age of the existing assets given the increasing difficulties we are facing in sourcing replacement parts and the specialist knowledge to undertake the works. By upgrading our Governor housing, we avoid the assets degrading and requiring more costly interventions as well as ensuring we meet industry standards. Increasing our ERS module replacements enables us to remove obsolescent equipment off the network at an efficient and achievable pace.

As discussed in Section 9, this is the option that best balances the increase in investment cost to tackle asset health, obsolescence, capacity and compliance drivers for this asset class overall Risk levels are maintained within specified bounds (+/-10%), and we are also reducing all risk categories below baseline levels. This option also continues to deliver our objective of delivering against our efficiency, uncertainty and compliance objectives (see Section 8.2 and Section 9).

Costs for Governors for the RIIO-GD3 EJP (£21.5m) are comparable to projected RIIO-GD2 spend (£22.2m) on a comparable 23/24 price basis. A Lineguard Cabinet programme has also been proposed in RIIO-GD3 due to reasons of obsolescence and to maintain compliance (£0.9m).

Long term risk impact on preferred option

12 provides details of the Preferred option Capex spend alongside Single Year Risk benefit and Long Term Risk benefit output as shown in our NARM BPDT. Long Term Risk calculations allow for accrual of benefit over the life of the intervention. These intervention lives are detailed in full in our NARM BPDT submission. Section 5.2 Project boundaries detail the investments within our Preferred option where we have been able to model risk and risk reduction under NARM.

We have provided undiscounted Long Term Risk benefit both here and in the NARM BPDT. Further clarification with SRWG is needed around the requirement for discounting LTR.

		NARM BPDT	
	Capex Spend (£m)	Single Year Risk Benefit (R£m)	RIIO-3 Long Term Benefit Output (R£m)
Governors	9.7	3.87	955.23

Table 14 Long term risk presentation for Governors

10.2. Asset health spend profile

The total forecast capital expenditure for governors has been included within the accompanying CBA. The table below shows our spend per individual asset category across the 5 years. As demonstrated below, we have endeavoured to maintain consistency in spend as far as possible.

£m 23/24 prices	2026/27	2027/28	2028/29	2029/30	2030/31	Total (£m)
District Governor - Housing Replacement Only	£2.00	£2.00	£2.00	£2.00	£2.00	**£10.00**
District Governor - Refurbishment	£0.10	£0.10	£0.10	£0.10	£0.10	**£0.50**
District Governor - Replacement (IP inlet)	£0.11	£0.11	£0.11	£0.11	£0.11	**£0.56**
District Governor - Replacement (MP inlet)	£0.36	£0.36	£0.36	£0.36	£0.36	**£1.80**
District Governor (ERS) - Replacement (MP inlet)	£0.40	£0.40	£0.40	£0.40	£0.40	**£2.00**
District Governor - Replacement (MP inlet) AGI sites	£0.88	£0.70	£0.88	£0.70	£0.88	**£4.03**
District Governor - Replacement (Land Purchase)	£0.05	£0.05	£0.05	£0.05	£0.05	**£0.25**
District Governor - Decommissioned	£0.03	£0.03	£0.03	£0.03	£0.03	**£0.16**
Service Governor - Replacement (domestic)	£0.25	£0.25	£0.25	£0.25	£0.25	**£1.24**
Service Governor - Replacement (I&C)	£0.03	£0.03	£0.03	£0.03	£0.03	**£0.13**
District Governor - Lineguard Replacement	£0.19	£0.19	£0.19	£0.19	£0.19	**£0.93**
Total	**£4.39**	**£4.21**	**£4.39**	**£4.21**	**£4.39**	**£21.59**

Table 15 Asset health spend profile

10.3. Investment risk discussion

We have controls and processes in place throughout the development of our RIIO-GD3 capital expenditure programme to ensure we mitigate both our customer's and our own exposure to risk. Workload and unit cost risks are inherent when forecasting failure rates and intervention solutions for large populations of assets. The bullet points below outline the steps we have undertaken to ensure we limit these risks to provide an accurate capital programme.

Workload risk mitigations

- We have used the NARM methodology to calculate Probability of Failure, including the use of asset attributes to determine specific failure rates.
- We have undertaken recent surveys during 2024 on over half of our governor sites. This latest information has been used within our modelling.
- As most of our governors installed on our network are from one manufacturer, Donkin, we have not witnessed different failure rates across the populations.
- There is an increase in workload for RIIO-GD3 over RIIO-GD2, therefore there are increasing risks around delivery of project workload to timescales, however we have experienced Project Managers who have a proven track record of delivering this type of work. Some Particular risks to delivery have been discussed in Key Business Risks (Section 10.5).
- We have consistently engaged on our preferred strategy with our SMEs and operational colleagues to ensure that our strategy is both viable and deliverable.
- As part of the above, we have ensured adequate internal and external resource for design and delivery.
- We have procurement strategies in place which take into account the likely volumes and lead times we could experience. Our Workforce and Supply Chain Resilience Strategy (Appendix A7) has been developed with this in mind.

- Our project managers have been engaged throughout so that we have developed appropriate workload planning procedures.
- Land requirements and costs have been factored into our project plans to ensure that they are dealt with well in advance of project construction to avoid undue delays.

Unit cost risk mitigations

We have used our updated unit cost analysis (see section 8.6) to determine our unit costs.

We are not planning to undertake new work activities. We have undertaken all interventions previously and have historic costs allocated within our unit cost analysis.

We have experienced project managers who have a proven track record of delivering this type of work in the past and we have a commercial team of quantity surveyors who are focussed on delivering value for money.

We have well developed processes and assurance activities in place, with scrutiny and challenge provided throughout. This ensure that we can deliver value for money by driving cost efficiency. Details on unit cost processes are provided within Section 8.6.

Section 4.1 of **Appendix A7 – Workforce and Supply Chain Resilience Strategy** sets out some of the supply chain challenges that we have faced throughout RIIO-GD2. It acknowledges how NGN is a comparatively smaller GDN, which reduces our buyer power (section 4.1.2) and also discusses the significant inflationary pressures that have been placed on GDNs (section 4.1.4). For example, it discusses how the prices charged for coiled pipes have increased by 82% in the period from January 2020 to August 2023. In spite of these challenges, we are confident that our input unit costs remain efficient.

This Appendix also touches on a number of external shocks which have impacted on things such as lead times. Examples include the Covid-19 pandemic, the Suez Canal blockage, Russia's invasion of Ukraine and rising geopolitical tensions. We outline in the strategy how we expect volatility to continue across our supply chain, and that we will utilise storage facilities in order to mitigate against supply input shortages. We plan to resource our supply chain and procurement team appropriately to help us overcome these challenges.

Appendix A21 – Cost assessment and benchmarking approach demonstrates how, despite challenges facing us, NGN leads the industry in terms of cost efficiency, having been ranked the most efficient operator by Ofgem in both RIIO-GD1 and RIIO-GD2. This Appendix further outlines the value of NGN in Ofgem's cost assessment modelling at RIIO-GDS2 by showing how NGN's frontier setting performance enabled Ofgem to set cost allowances that were £211 million lower than they would otherwise have been. In other words, our efforts to lead the sector on cost efficiency have resulted in significantly lower bills for consumers across the whole country.

We have achieved this position by being innovative in our thinking and directly and aggressively challenging industry norms and practices by bringing forward market-led, commercially focussed business solutions across almost every area of our business. For example:

- NGN introduced modern labour terms and conditions (T&Cs) for the majority of its operational workforce, leading to a significant reduction in legacy staff costs by approximately £9 million p.a. in RIIO-GD1 (a 25% reduction) and £[XX] million p.a. in RIIO-GD2.
- NGN introduced a Direct Service Provider (DSP) model, leveraging small local engineering firms to deliver its replacement program instead of relying on the traditional 'tier 1' companies that have typically dominated the industry.
- Given that NGN has made strong productivity improvements over time, we have re-invested our outperformance payments in areas that (among other things) improve our productivity further. For example, we have used outperformance to invest heavily in IT systems through the SAP4 Hana

investment and 'Future Ways of Working' programme. These projects are expected to significantly improve the customer experience and enable NGN to become a data-focused business.

We also outline in this Appendix our suggestion to target a 0.5% Ongoing Efficiency (OE) target, alongside the reasons why this is an appropriate level (see section 6 of the Appendix). This means that in reality, NGN will be subject to a further 0.5% cost reduction target throughout RIIO-3 in order to meet the OE objectives that will be set by Ofgem.

We outlined above how we have faced price increases significantly above inflation during RIIO-GD2. The Real Price Effects (RPE) methodology attempts to adjust for the difference between input price inflation and consumer price inflation. We outline in the Appendix our broad support for RPEs, however we note that during RIIO-GD2, all networks have seen relatively large swings in real term allowances year to year due to RPE and inflation volatility from the geopolitical energy shocks in 2022 and 2023. RIIO-GD3 therefore presents an opportunity to refine the basket of reference indices to better capture GDNs actual input price movements and better mitigate this risk. The impact of RPEs have not been factored into our unit cost pricing.

10.4. Project plan

This section sets out how we plan to deliver interventions across our governor assets throughout RIIO-GD3. The vast majority of our interventions relate to the governor housing.

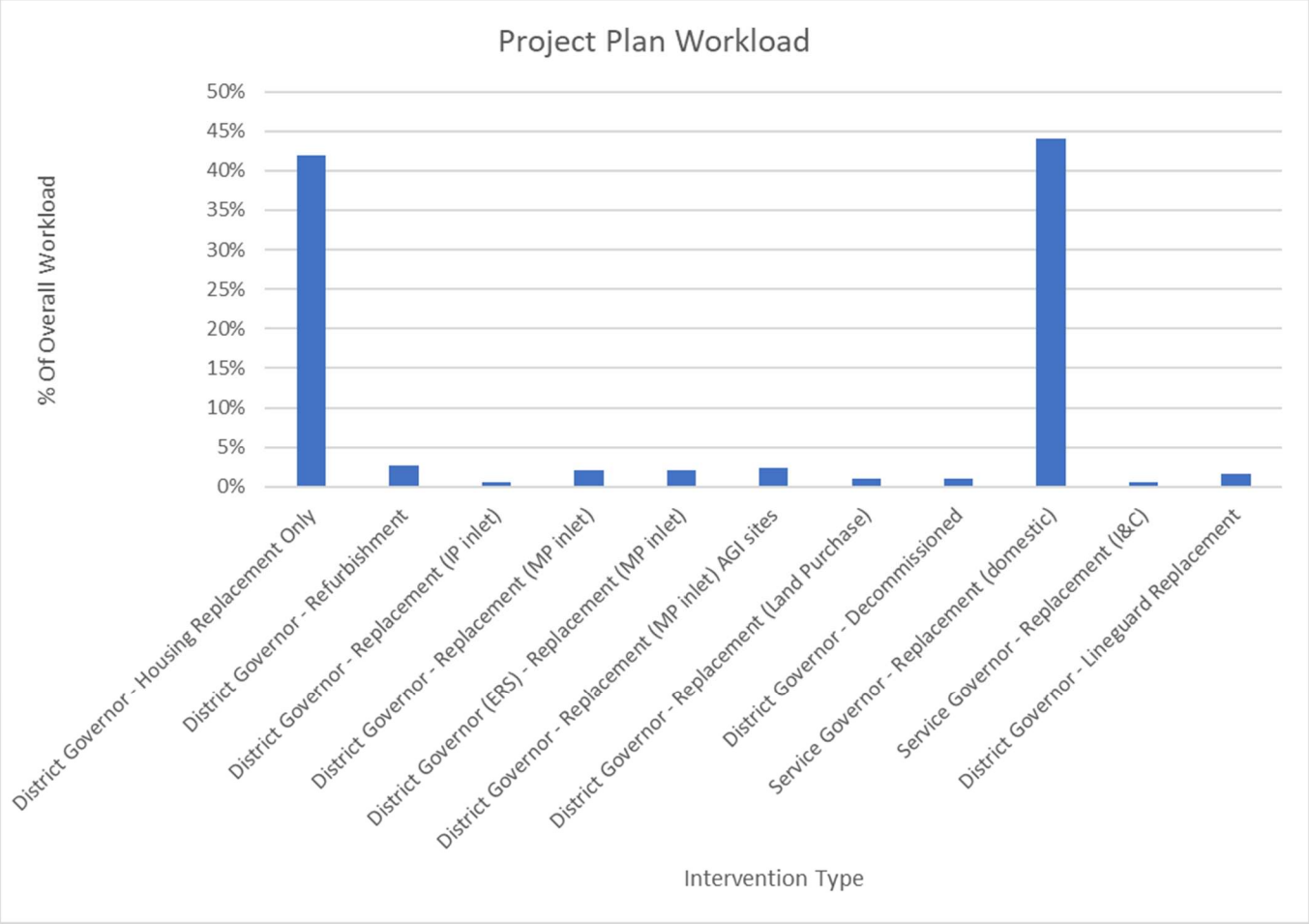

Figure 5 Project plan

As shown below, we have planned work throughout the period to ensure that we have a steady flow of interventions throughout the year. For example, we have staggered our system replacements to ensure that we are only undertaking one each year

Workload Interventions	2026/27	2027/28	2028/29	2029/30	2030/31	Total
District Governor - Housing Replacement Only	80	80	80	80	80	**400**
District Governor - Refurbishment	5	5	5	5	5	**25**
District Governor - Replacement (IP inlet)	1	1	1	1	1	**5**
District Governor - Replacement (MP inlet)	4	4	4	4	4	**20**
District Governor (ERS) - Replacement (MP inlet)	4	4	4	4	4	**20**
District Governor - Replacement (MP inlet) AGI sites	5	4	5	4	5	**23**
District Governor - Replacement (Land Purchase)	2	2	2	2	2	**10**
District Governor - Decommissioned	2	2	2	2	2	**10**
Service Governor - Replacement (domestic)	84	84	84	84	84	**420**
Service Governor - Replacement (I&C)	1	1	1	1	1	**5**
District Governor - Lineguard Replacement	3	3	3	3	3	**15**
Total	**191**	**190**	**191**	**190**	**191**	**953**

Table 16 Planned pressure control intervention workload profile

A Risk Register for Pressure control investment over RIIO-GD3 is included within the CBA and the key risks and mitigations are covered in Sections 10.3 and 10.5.

10.5. Key business risks and opportunities

To include specific deliverability risks and mitigations.

Risks

Internal delivery capability – The workload planned for RIIO-GD3 is high. Carrying out a total of 953 interventions across our governor assets is labour intensive, time consuming and specialist. We will need to resource at the right level and there will need to be a robust training programme in place to ensure this knowledge can be rolled out across the maintenance teams. We are currently assessing the current structure of the team to determine any changes required to ensure delivery is achievable.

Cost variability - External Project management, untimely delivery by contractors and 3rd party delays could all impact on costs. However, framework partners who deliver the Capex workload are rigorously challenged to deliver value for money and alternative partners are continually being used were cost or delivery is a challenge. Uncertainty risk associated with unit costs has also be built into the analysis for unit costs used in the RIIO-GD3 planning process (see Section 8.6 for further details).Supply chain risk – NGN have had issues with the supply chain recently (in particular for volumetric skids) and also issues with Liability levels associated with the failure of equipment and the level of liability held by the manufacturer in the event of this. This has been recently resolved with one supplier. However, this is occurring more regularly and will need to continue to be closely managed in RIIO-GD3.

Deterioration, obsolescence and compliance – All of these are relevant to the governor interventions set out in our preferred strategy. There are also wider considerations which indirectly impact on our investment decisions. Our Workforce and Supply Chain Resilience Strategy (Appendix A7) sets out our plans to tackle potential future skills shortages. Whilst we are not envisaging specific skills shortages in the RIIO-GD3 period thanks to our long standing commitment to ensuring we have a 24/7, highly skilled workforce, we do need to ensure that our longer term investment proposals are deliverable given the future challenges we may face as an industry. This strategy also discusses how we ensure that we have a resilient supply chain that can withstand shocks and unforeseen

circumstances. This is also an important consideration given the limited supplier and resource pool facing increased demand as we move towards net zero.

NARM impact – Potential for NARM risk reduction to be impacted by the change in strategy. This will be closely monitored.

Opportunities

Obsolescence issues identified and plan initiated - While the original equipment manufacturer (OEM) has discontinued support for Audco Lineguard since the 1990s, individual components can still be maintained, albeit with limited availability of overhaul spares. Given the obsolescence and reliability concerns, a phased replacement of the Audco Lineguard system with modern, supported alternatives has been recommended. NGN has identified this problem and worked to put a plan in place for future replacement and general maintenance issues. This would ensure continued compliance with PSSR and reduce the risk of incidents.

ERS Modules mainly produced by the now obsolete British Synergy are no longer supported and there is a poor ability of obtaining soft spares, Oxford Flow have design an new ERS module that would be industry leading and would have a refreshed and resilient supply chain could be available during RIIO-GD3 and into RIIO-GD4 and would enable a large number of obsolete equipment to be replaced.

Efficiencies – The level of efficiency depends on the site we are working on, the type of asset being replaced, and whether the site gas supply can be isolated. Ideally if we were carrying out two separate replacements (refurbishment and housing upgrade) on a single site we would look to do all the work at the same time to minimise mobilisation and demobilisation cost for instance.

We discuss in Chapter 5 of our Business Plan how we are mitigating against the immediate risks facing our business in the RIIO-GD3 period. In terms of network asset management, we have identified asset condition deterioration, obsolescence, and compliance – all of which are relevant to the odorant and metering interventions set out in our preferred strategy. There are also wider considerations which indirectly impact on our investment decisions. Our Workforce and Supply Chain Resilience Strategy (Appendix A7) sets out our plans to tackle potential future skills shortages. Whilst we are not envisaging specific skills shortages in the RIIO-GD3 period thanks to our long standing commitment to ensuring we have a 24/7, highly skilled workforce, we do need to ensure that our longer term investment proposals are deliverable given the future challenges we may face as an industry. This strategy also discusses how we ensure that we have a resilient supply chain that can withstand shocks and unforeseen circumstances. This is also an important consideration given the limited supplier and resource pool facing increased demand as we move towards Net Zero.

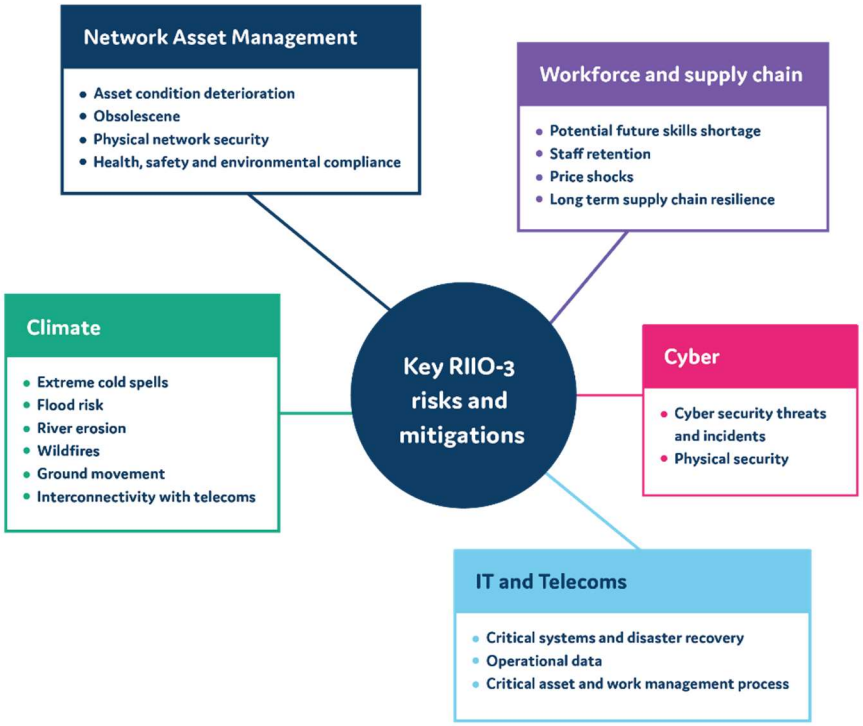

Figure 6 RIIO-GD3 Key Risks and Mitigations

10.6. Outputs included in RIIO-GD2 plans

We do not expect to carry over any RIIO-GD2 interventions into RIIO-GD3.