

RIIO-2 Draft Determinations - NARM Annex						
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1. Introduction

Purpose of this document

- 1.1 This document sets out our Draft Determinations relating to the Network Asset Risk Metric (NARM) for the three Electricity Transmission Owners, for National Grid Gas Transmission, and for the eight Gas Distribution Networks.
- 1.2 It sets out the NARM outputs (Baseline Network Risk Outputs) that we propose these network companies will be required to deliver during RIIO-2 and explains how these have been derived. It also sets out our proposals for the design and operation of a NARM Funding Adjustment and Penalty Mechanism to adjust totex allowances for different output delivery scenarios and to penalise under-delivery.

Background to NARM

- 1.3 Network asset risk relates to the consequence of failure of a network asset and the likelihood of a failure occurring. If a network company does not maintain, replace, or refurbish its assets, the likelihood of them failing will generally increase over time, and so would the risk of the consequence of failure materialising. To keep network asset risk within reasonable bounds, gas and electricity network companies are funded to carry out asset management activities such as replacement or refurbishment.
- 1.4 The NARM has been developed to allow us to quantify the benefit to consumers of the companies' asset management activities.¹ In RIIO-2, this will be used as the output to hold the companies accountable for their investment decisions.

NARM decisions in SSMD

1.5 Chapter 6 of the RIIO-2 Sector Specific Methodology Decision (SSMD) set out our decisions to date on the NARM.² These covered the basis on which we would set outputs and the basic principles for dealing with deviation from NARM output targets. The main decisions from our SSMD (Core Document, paragraphs 6.7 - 6.61) are summarised as follows:

¹ NARM does not apply to the ESO as the ESO does not generally own long-life physical assets. We will address how the ESO manages its assets separately via its wider price control framework.

² Specifically, paragraphs 6.7 - 6.61.

- a) Outputs will be set by calculating the relative long-term monetised risk reduction delivered by interventions associated with the baseline funding allowance.
- b) At the end of RIIO-2, any allowances associated with under-delivery of outputs will be clawed back and a penalty will be applied. In exceptional cases, the penalty will not be applied if under-delivery has been justified sufficiently.
- c) There will be no positive adjustment to allowances to reflect additional costs associated with over-delivery, unless, in exceptional cases, over-delivery has been justified sufficiently.
- d) For work programmes spanning price controls, we may provide a fixed pot of money in RIIO-2 to fund outputs to be delivered later. We will carry out a true-up at the end of RIIO-2 and reflect in funding for RIIO-3 the outcome of this true-up.
- e) Monetised risk delivered through investments that have been funded through other mechanisms (such as load related mechanisms, or re-opener), as well as any outturn delivery from those investments, will be excluded from RIIO-2 NARM output targets.
- f) Additionally, certain activities and projects may be ring-fenced with separate Price Control Deliverables (PCDs) and allowances.
- 1.6 Our SSMD also indicated that before we decide the detailed aspects of the NARM mechanism, we would carry out further work to ensure that the mechanism works for all potential delivery scenarios and to ensure that it incentivises appropriate company behaviour and efficient delivery.
- 1.7 We set out in this document our proposed mechanism the NARM Funding Adjustment and Penalty Mechanism – to implement our SSMD decisions a) to c) as set out in paragraph 1.5 above in light of our analysis of the potential delivery scenarios. SSMD decisions d) to f) are reflected in the setting of our proposed totex allowances and NARM output targets.

Summary of our Draft Determinations

Baseline Network Risk Outputs

 As part of their Business Plans, network companies submitted their proposed Baseline Network Risk Outputs that will be delivered through their proposed asset management investments. Our view of the Baseline Network Risk Outputs is based on the companies' proposals and reflects any adjustments to asset intervention volumes to align with baseline funding allowances. Appendix 3 explains our approach to modelling the Baseline Network Risk Outputs.

- 1.9 In some cases, our assessment of the companies' submissions highlighted inconsistencies or errors in their estimates. We worked with the network companies throughout the assessment process to address these issues, and the companies' revised estimates have been used in deriving our view of Baseline Network Risk Outputs. The rationale for and impact of these revisions are explained in Appendix 4.
- 1.10 In the case of the Gas Distribution Networks (GDNs), following reviews of their submissions, we have concluded that GDNs' modelling of risk a number of years into the future contains high levels of uncertainty. Therefore, until further work is done, long-term risk cannot be used as a suitable output measure. Rather than using a longer-term measure of risk for defining the GDNs' Baseline Network Risk Outputs as suggested in our SSMD, we are now proposing to continue to use an end-of-period single-year measure for GDNs, as is used in RIIO-1. The design and operation of the NARM Funding Adjustment and Penalty Mechanism is unaffected by this change. This change would apply only to GDNs. Our SSMD decision in respect of electricity transmission and gas transmission would be unchanged. More detail of the rationale for the proposed differences in approach is set out in Appendix 5.
- 1.11 Table 1 below summarises the results of our assessment and the proposed Baseline Network Risk Outputs for each network company. The Required Network Risk Outputs relate to the Monetised Risk Benefit to be delivered through a network company's asset interventions during RIIO-2.

			Baseline Network Risk Outputs (R£m, 2018/19 Prices)					
Sector	Company	Network	Company Proposed	Net effect of movement to/from other mechanisms	Company Proposed (adjusted for movements)	Removed due to volumes disallowed	Draft Determinatio ns Proposal**	
	NG	NGET	1,387.9	-	1,387.9	-1,079.7	308.2	
ΕT	SSE	SHET	10,808.9	-	10,808.9	-2,943.6	7,865.3	
	SPEN	SPT	29,336.0	-	29,336.0	-5,018.6	24,317.5	
GT	NG	NGGT	216.5	12.3	228.8	-47.5	181.3	
		EoE	24.2	-18.4	5.8	-0.3	5.5	
	Cadapt	Lon	34.2	-24.3	9.9	-0.8	9.1	
	Cauent	NW	28.8	-18.5	10.3	-0.5	9.8	
CD		WM	16.9	-12.1	4.8	-0.1	4.6	
GD	NGN	NGN	10.6	1.1	11.7	-1.4	10.3	
	CON	Sc	14.7	-10.6	4.1	-0.5	3.6	
	SGIN	So	38.5	-10.7	27.8	-7.6	20.2	
	WWU	WWU	15.1	3.7	18.8	-1.6	17.2	

Table 1 - Summary of proposed Baseline Network Risk Outputs for ET, GT, and GD Sectors

* Please note that due to methodological and other differences absolute values cannot be compared across companies

** A breakdown by NARM Asset Category for each company can be found in Appendix 8.

NARM Funding Adjustment and Penalty Mechanism

- 1.12 We have developed the NARM Funding Adjustment and Penalty Mechanism based on the principles set out in our SSMD, and on the further analysis of potential delivery scenarios we undertook.
- 1.13 We considered key factors that could make it easier or harder for the network companies to deliver NARM outputs, and how to treat these factors so as to allocate risks and gains in a fair manner between the network companies and consumers. Our proposed NARM Funding Adjustment and Penalty Mechanism would explicitly exclude the impact of certain factors prior to calculating financial adjustments.
- 1.14 However, such exclusion would not deal adequately with the impact of companies carrying out different work from their initial plan, which our analysis indicated could give rise to disproportionate gains for companies. This affects the whole volume of delivery, not just the part above or below the baseline targets. It would be impractical to separate out windfall gain from genuine efficiency effort.

- 1.15 To address this issue, our proposed approach is to extend the financial adjustments previously focused only on over-delivery and under-delivery to an integrated NARM Funding Adjustment and Penalty Mechanism. This would set a company's final NARM allowance based on the total output (reflecting justified over-delivery or under-delivery) multiplied by a unit cost adjusted from the baseline level. The adjustment to the unit cost would be a proportion of any reduction from the baseline to the outturn level. We set out further detail in Chapter 4. The penalty for under-delivery would still be a proportion of the clawback amount for the unjustified under-delivery.
- 1.16 Our analysis and proposal on the NARM Funding Adjustment and Penalty Mechanism is set out in detail in Chapter 4.

2. Monetised Risk Calculation and Setting Outputs

2.1 This chapter explains how the network companies have calculated their submitted monetised risk values and how we have used the submitted data to derive Baseline Network Risk Outputs.

Submitted Monetised Risk estimates

- 2.2 Each of the Electricity Transmission (ET), Gas Transmission (GT), and Gas Distribution (GD) network companies' submitted Business Plans included estimates of the NARM long-term monetised risk benefit associated with their proposed investments, as well as current and forecast views of the annual network and asset category risks for their entire asset portfolios. The submitted risk values were all derived in accordance with the companies' relevant NARM Methodologies.
- 2.3 Both the long-term risk benefit and single-year risk benefit calculations assume that all RIIO-2 interventions take place in 2025/26. For long-term risk, the period over which the long-term risk is calculated is determined by expectation of when a subsequent intervention will be required. More details can be found in Appendix 4.

Calculating Monetised Risk for the Purpose of Setting Outputs

- 2.4 As mentioned in paragraph 1.10 above, we propose to use two different types of measures for risk as outputs. For ET and GT, we propose that outputs be defined using a long-term measure, whereas for GD, we propose to use a single-year measure. The rationale for the proposed differences in approach are set out in Appendix 5
- 2.5 We have assessed the network companies' submissions and performed data integrity checks to gauge fitness for purpose. We have been able to resolve a number of the issues we identified through engagement with the network companies. Further details of the findings for each sector and how they have been addressed are summarised in Appendix 4.

Our approach to setting Baseline Network Risk Outputs

- 2.6 We have developed an Excel-based 'NARM Output Setting Model' (NARM Model) in order to set the Baseline Network Risk Outputs. The NARM Model derives our view of the monetised risk outputs associated with the relevant intervention volumes that we propose to allow through cost assessment for each network company.
- 2.7 To derive the Baseline Network Risk Outputs, we use the lowest level of data granularity available from the submitted Business Plans.
- 2.8 The NARM Model disaggregates the network company submitted total Network Risk Output into a Risk Output Unit that is defined using unique combinations of the following three attributes:
 - Project Reference: The range of projects the network operator proposed for the price control.
 - Asset Category: The range of asset types the network operators owns.
 - Intervention Category: The range of interventions that can be applied to their network assets.

Figure 1 below illustrates this disaggregation approach.

Figure 1 - Disaggregation of total Network Risk Output to Risk Output Unit

	Project Reference	Asset Category	Intervention Category
	Project 1	Transformer	Refurbishment
			Replacement
Total Network Risk		Circuit Breaker	Replacement
Output	Project 2	Overhead Line	Refurbishment
			Replacement
(total risk benefit)	Project 3	Transformer	Replacement
		Circuit Breaker	Replacement
		Overhead Line	Replacement
Risk Output Unit in			

- 2.9 We used each network company's unique Risk Output Unit combinations to align the monetised risk data submitted in their NARM Business Plan Data Template (BPDT) with the volume data submitted in their Business Plan and our proposed allowed volume data from our cost assessment.
- 2.10 Where we could not achieve full alignment, we considered it necessary to apply reasonable assumptions. The degree of alignment that we could achieve varied

across sectors. For ET and GT, alignment was relatively high. However, for GD, the datasets are much less aligned and therefore we had to apply a much greater degree of assumptions.

- 2.11 To derive the Baseline Risk Output, the Submitted Risk Output was reduced on a pro-rata basis to reflect any proposed volume disallowances associated with each Risk Output Unit. All Baseline Risk Output values were then added together to give total Baseline Network Risk Output.
- 2.12 A more detailed explanation of how the NARM Model has been designed, as well as the assumptions that we applied, can be found in Appendix 3.

3. Baseline Network Risk Outputs and Baseline Funding

3.1 This Chapter explains the projects and activities that are proposed to be within scope of the NARM Funding Adjustment and Penalty Mechanism, and its interaction with other funding mechanisms.

NARM Funding Categories

- 3.2 Many different types of asset interventions have an impact on monetised risk. This includes asset replacement and refurbishment interventions where the primary driver is to reduce asset risk, but also other types of intervention such as new connections and reinforcement, work on iron mains replacement in gas distribution, and work as part of ring-fenced projects or activities.
- 3.3 To help provide clarity on how NARM Funding Adjustment and Penalty mechanism will work and how it will interact with other funding mechanisms, we have defined four NARM Funding Categories as follows:
 - A1 NARM Funding Adjustment and Penalty Mechanism
 - A2 Funding Under a Separate Mechanism
 - A3 Ring-fenced Project/Activity
 - B Non-NARM Assets
- 3.4 Table 2 below explains our Draft Determinations views on the type of work within each funding category, the risk trading arrangements, and provides a brief summary of the specific scope in each category for the ET, GT, and GD sectors.

Table 2 – Draft Determinations summary of NARM Funding Categories

Funding Category	Explanation of type of work within category	Risk trading arrangements	Scope
A1 - NARM Funding Adjustment and Penalty Mechanism	Work with asset risk mitigation as the primary driver, eg asset replacement or refurbishment required to reduce risk. Some other work, where risk mitigation is not the primary driver, may be included here but only where it delivers risk reduction benefits and is not covered by another funding mechanism or a PCD.	Companies will be permitted to trade- risk across asset categories within category A1 in order to deliver their Baseline Network Risk Outputs. This could mean, for example, doing more work in one asset category and	ET: replacement and refurbishment work on lead assets delivered through non-load schemes excluding specified schemes (see below), which will be subject to within-period determination.

Funding Category	Explanation of type of work within category	Risk trading arrangements	Scope
	When we refer to 'NARM Target' or 'Baseline Network Risk Output' we mean the monetised risk benefit expected to be delivered by interventions within the A1 funding category.	less in another in order to deliver overall on target.	GT: asset health work in 37 secondary asset categories, excluding specified PCDs. GD: capex replacement and
			well as Repex that is not tied to a PCD or volume driver.
A2 - Funding Under a Separate Mechanism	Work where the primary driver is not NARM risk management, but where the work delivers an asset risk impact as a secondary benefit. eg, load- related work that involves some asset replacement, and replacement work driven by compliance with legal obligations, such as iron mains replacement.	In some cases where the primary driver does not materialise during RIIO-2, and where risk mitigation in itself is a sufficiently strong driver to carry out the work, then the associated risk benefit delivered may count towards the company's overall Network Risk Output delivery.	ET: replacement and refurbishment work delivered through load related schemes. GT: N/A GD: Repex Tier 1 and associated services, Tier 2A mains abandonment.
A3 - Ring- fenced Project/Activity	Projects or activities that, due to the nature of their driver or materiality, should be excluded from risk trading and therefore should be excluded from the NARM Funding Adjustment and Penalty Mechanism and should instead be subject to separate PCDs and allowances or within- period determination.	Should the investment driver for these projects/activities not materialise then the A3 workloads will not contribute to Network Risk Output delivery.	ET: SPT 6 specified schemes, NGET 2 specified schemes. GT: Specified Compressor Cab and Electrical interventions. GD: Specified Capex projects.
B - Non-NARM Assets	These are assets currently out of the scope of NARM. Some of these assets may be brought into scope during the course of RIIO-2. However, we do not intend to adjust the NARM target mid-period to account for such cases and the risk benefit.	Not applicable.	All non-NARM asset interventions.

Proposed Sector-Specific Funding Arrangements

- 3.5 The proposed funding arrangements specific to each sector are set out below. We will work with network companies and other stakeholders post-Draft Determinations to work out the full detail of these arrangements, such as how risk trading between A2 and A1 funding categories will work.
- 3.6 The principle we applied in devising these arrangements is that, unless there is a more appropriate funding mechanism, then all interventions on NARM Assets should be within the A1 funding category and subject to the NARM Funding Adjustment and Penalty Mechanism. The rationale for any proposed exclusions is set out in the relevant sector and company annexes.

Electricity Transmission

Non-load related schemes

- 3.7 We propose that all non-load related schemes delivering lead asset replacement or refurbishment be assigned to Category A1 (NARM Funding Adjustment and Penalty Mechanism) and therefore be covered by the NARM Funding Adjustment and Penalty Mechanism.
- 3.8 The only proposed exceptions are:
 - For NGET: Dinorwig-Pentir cable replacement (NGNLT2087) and Tyne-Crossing overhead line (NGNLT20222) schemes, both of which we propose to be subject to within-period determinations.
 - For SPT: Six schemes where we agree with SPT's proposal for a re-opener.³

For these schemes, we propose that their associated expected outputs are included within Category A3 (Ring-fenced Project/Activity).

Load-related schemes

3.9 We propose that all replacement and refurbishment work to be delivered through load-related schemes fall within Category A2 (Funding Under a Separate Mechanism). Any funding associated with these schemes would be covered by the relevant load-related mechanism. Should the anticipated load-related driver for

³ Ref: SPNLT2034, SPNLT2063, SPNLT2099, SPNLT20111, SPNLT20112, SPNLT20113

these schemes not materialise then the existing assets planned for replacement or refurbishment may be considered for risk trading as part of the NARM Funding Adjustment and Penalty Mechanism. Should these assets be replaced or refurbished in the absence of the load-related driver, then the company would be required to provide suitable justification for doing so.

Gas Transmission

- 3.10 We propose that certain interventions, such as on air intakes, cab ventilation, and fire suppression systems, will be ring-fenced with separate PCDs and assigned to Category A3 (Ring-fenced Project/Activity).
- 3.11 We propose that all other asset health work on the 37 NARM asset categories are assigned to Category A1 (NARM Funding Adjustment and Penalty Mechanism). NGGT's Business Plan included a number of interventions on secondary assets, such as air intakes or cladding, as 'indirect interventions'. This is because the associated monetised risk benefit relates to failure of the primary asset. We propose to also include these secondary asset interventions in the A1 Category and the associated risk of allowed interventions would therefore be included in the Baseline Network Risk Outputs.

Gas Distribution

<u>Capex</u>

3.12 A number of Capex projects are proposed to be assigned as separate PCDs.⁴ Where these projects include replacement or refurbishment of a NARM asset, we propose that the associated risk benefit is allocated to NARM Category A3 (Ringfenced Project/Activity).⁵ These projects, should they be delivered, would therefore not contribute towards the delivery of Baseline Network Risk Outputs. Full list of the proposed PCD projects can be found in Chapter 2 (Setting Outputs), 'Capital Projects PCD' subsection of the relevant company annex.

 ⁴ The GD Capex NARM Asset categories are: District Governors, I&C Governors, Service Governors, LTS Pipelines (Piggable), LTS Pipelines (Non-Piggable), Odorisation and Metering, Offtake Filters, Offtake Preheating, Offtake Slamshut/Regulators, PRS Filters, PRS Pre-heating and PRS Slamshut/Regulators.
 ⁵ We have assigned the projects to A3 where it has been possible to do so. However, in some cases it has not been possible with the available data to individually identify the equivalent project within the GDN's NARM BPDT. In these cases the associated Network Risk Output is included in A1 for Draft Determinations. We will work with GDNs to ensure that the risk associated with all PCDs is allocated to the correct category ahead of Final Determinations.

3.13 All other Capex NARM Asset allowed replacement and refurbishment workload is proposed to be allocated to Category A1 and would be covered by the NARM Funding Adjustment and Penalty Mechanism.

<u>Repex</u>

- 3.14 For Repex, Tier 1 and associated services are proposed to be funded and incentivised through the Tier 1 mains and the Tier 1 services PCDs. We propose that abandonment of Tier 2A mains and associated services be funded by a volume driver. These are proposed to be included in Category A2 (Funding Under a Separate Mechanism).
- 3.15 However, we propose that any over-delivery in Tier 1 Repex mains and services workload targets (above the upper limits set out in the relevant PCDs) falls within the scope of delivery against Baseline Network Risk Outputs. GDNs may trade the risk benefit delivered by this excess workload against workload in other asset categories in Category A1. Should the Repex over-delivery contribute to an over-delivery of Baseline Network Risk Outputs, then the GDN may make a case for an associated funding adjustment by providing suitable justification in accordance with the NARM Funding Adjustment and Penalty Mechanism.
- 3.16 In addition, we propose that the following Repex projects will be assigned to A3 (Ring-fenced Project/Activity) and their associated outputs will therefore not contribute towards the delivery of Baseline Network Risk Outputs:
 - Cadent London: London Medium Pressure will be subject to a re-opener
 - SGN Southern: Kings Ferry Proposed PCD
 - SGN Scotland: Intermediate Presssure Services Reconfiguration proposed PCD
- 3.17 All Repex replacement and refurbishment not tied to a PCD or a volume driver is proposed to be allocated to Category A1 and would be covered by the NARM Funding Adjustment and Penalty Mechanism.

Costs Associated with Baseline Network Risk Outputs

3.18 We propose that Baseline Network Risk Outputs are associated with full project costs including costs associated with interventions on secondary assets (ie non-NARM Assets) as well as indirect costs, such as project management. We have not

yet aligned the proposed Baseline Network Risk Outputs with the associated baseline costs. We intend to set this out in our Final Determinations.

Consultation questions

NARMQ1. Do you agree with our proposals on the scope of work within each of the NARM Funding Categories and on the associated funding arrangements?

4. NARM Funding Adjustment and Penalty Mechanism

- 4.1 This chapter sets out our proposed NARM Funding Adjustment and Penalty Mechanism to calculate financial adjustments and penalties for all potential delivery scenarios. This mechanism includes two parts:
 - Adjusting network risk delivery by excluding the impact of non-intervention risk changes; and
 - Adjusting funding by setting the final NARM allowance based on the total adjusted output multiplied by an adjusted unit cost, together with a penalty for unjustified under-delivery.
- 4.2 In our SSMD, we set out principles for dealing with over-delivery and underdelivery scenarios and the incremental cost associated with these scenarios. We also stated in our SSMD that before deciding the detailed aspects of the mechanism, we would carry out further work to ensure that it incentivises appropriate company behaviour and efficient delivery in all potential delivery scenarios.
- 4.3 We considered key factors that could make it easier or harder for the network companies to deliver NARM outputs, and how to treat these factors so as to allocate risks and gains in a fair manner between the network companies and consumers.
- 4.4 Where we can objectively identify factors that cause changes to network company NARM output delivery and these factors are unrelated to their asset intervention actions, our proposal is to exclude the impact of these factors from the network companies' delivery before considering any funding adjustments.
- 4.5 Our delivery scenario analysis has shown that, by re-planning their work to intervene on cheaper assets or choosing alternative interventions, network companies could achieve very large cost reductions for the same total Network Risk Output delivery. Under the Totex Incentive Mechanism (TIM), this could give rise to significant financial gains for companies. It is worth noting that this impact affects the whole volume of delivery, not just the part above or below the baseline targets. While the joint effect of NARM and TIM is to incentivise companies to deliver the Network Risk Outputs more efficiently, companies should not enjoy windfall gains from already available improvement opportunities. However, we

also note that it would be impractical to separate out windfall gain from genuine efficiency effort.

- 4.6 The same effect can be seen when assets deteriorate faster or slower than assumed at the time of output setting. We are therefore proposing to apply the same solution for both asset switching/work substitution and changes in asset deterioration.
- 4.7 Our proposed solution is to extend the financial adjustments previously focused only on over-delivery and under-delivery to an integrated financial adjustment. This would set the final NARM allowance on the basis of the total delivery – the total Network Risk Output delivery, and an adjusted unit cost - the Unit Cost of Risk Benefit.
- 4.8 We set out below more detail of our proposed approach to dealing with non-intervention risk changes and to adjusting the funding for factors that are not excluded explicitly.

Treatment of non-intervention risk changes

4.9 This section sets out our proposals for the treatment of the non-intervention risk changes specified.

NARM Methodology changes

4.10 We propose to hold the companies neutral for changes in NARM methodology, including lifetime risk of intervention and fixed parameters for consequence of failure. The network companies will report the impact of any proposed NARM methodology change and also track the actual impact this has on their delivered risk. This will be subject to Ofgem review and then appropriate adjustments will be applied to the delivered monetised risk to keep the companies neutral.

Consequence of failure changes

4.11 We propose that where the network company demonstrates that it has taken reasonable actions to mitigate changes in consequence of failure that are not part of a methodology change (for example, organic growth in the number of properties close to assets), then the company will be held neutral for these changes. Otherwise, consequence of failure changes will be addressed through the Unit Cost of Risk Benefit adjustment.

4.12 Any indirect intervention to reduce the consequence of failure will be treated in the same way as work substitution to allow some benefit to be retained by the companies.⁶

Data cleansing

4.13 We propose to hold the companies neutral to reasonable levels of data cleansing changes. The impact of data cleansing will need to be calculated and the network risk benefit delivered will need to be adjusted accordingly. Any data cleansing above the reasonable levels we would expect from a company that is effectively managing its assets could raise wider concerns and may be subject to a case-by-case investigation and appropriate actions.

Funding adjustment

- 4.14 Our scenario analysis (described in Appendix 6) indicates scope for network companies to make large gains by switching investment between asset categories, between schemes, or between types of intervention, with significantly different Unit Cost of Risk Benefit. Changes in asset deterioration from what is assumed for the original plan can also give rise to significant changes in delivered risk. The effect of both of these types of changes will be dealt with through the Unit Cost of Risk Benefit adjustment.
- 4.15 We propose to do this by adjusting the Unit Cost of Risk Benefit and applying this to the total relevant Network Risk Output to derive the adjusted NARM allowance as an input to the TIM. For different delivery levels, the Network Risk Output will be as follows:
 - Over-delivery: the Baseline Network Risk Output plus any justified overdelivery;
 - Baseline delivery: the Baseline Network Risk Output;

⁶ An indirect intervention is an intervention on a network asset, or other infrastructure asset, that modifies the probability of failure, or consequence of failure of another network asset. For example, installation or removal of physical infrastructure designed to prevent damage to adjacent assets in the event of an asset failure (eg installation of a blast wall), or addition or disposal that increases or decreases the resilience of a local or regional network and hence modifies the consequence of failure of other asset(s) in the locality or region.

- Under-delivery: the Outturn Network Risk Output.
- 4.16 If the outturn unit cost is lower than the original baseline unit cost, the final unit cost will be the original baseline unit cost adjusted down by a proportion of the difference between the baseline and outturn unit costs. We propose this proportion to be 95%, which is aimed at reducing windfall gains to the companies while still maintaining an incentive for efficient change of work plans. Where network companies can clearly demonstrate that cost savings are due to genuine efficiencies then we consider that they should retain the full TIM benefit. To ensure this outcome, we propose to apply appropriate efficiency adjustments prior to calculating the Final Unit Cost of Risk Benefit.
- 4.17 If the outturn unit cost is higher than the original baseline unit cost, the final unit cost will remain unchanged from the baseline level. We consider that network companies should manage the risks of inefficient work substitution and be exposed to the full effect of the TIM.
- 4.18 We set out the detailed calculation method for the funding adjustment and penalty in the following section.

Calculating NARM Funding Adjustments and Penalties

4.19 As was the case in RIIO-1, we propose that funding adjustments and/or penalties be applied at the end of the RIIO-2 price control period when a full assessment of delivery can be made.

Proposed assessment and calculation process

- 4.20 As part of our Final Determinations for RIIO-2, we will set the allowed expenditure associated with NARM delivery for each network company and their associated Baseline Network Risk Outputs. Our proposed assessment and calculation process is as follows.
- 4.21 At the end of the RIIO-2 period, the network companies will be required submit to Ofgem a Performance Report which sets out:
 - their outturn expenditure and Network Risk Outputs delivered
 - justification for any over-delivery or under-delivery against their Baseline Network Risk Output

- quantification and justification of material non-intervention risk changes
- evidence of cost efficiencies achieved for schemes or programmes of work underlying their Baseline Network Risk Outputs, and evidence that these efficiencies have not been offset by higher costs elsewhere.
- 4.22 The delivered monetised risk will be adjusted to neutralise the non-intervention factors as explained in paragraph 4.9 to 4.13.
- 4.23 Where a network company provides sufficient evidence that delivered cost savings related to elements of the allowed Final Determinations plan (ie any specific schemes, programmes of work, or sub-elements of these) were achieved through genuine unit cost efficiencies, then we will apply the original allowed expenditure for these elements.
- 4.24 Following application of the adjustments, an Outturn Unit Cost of Risk Benefit is calculated and applied to the relevant Network Risk Output delivery volume to derive an adjusted NARM expenditure allowance.
- 4.25 Finally, the difference between the network company's outturn NARM expenditure and the overall adjusted NARM expenditure allowance will be subject to the TIM.

Calculating Funding Adjustments

Proposed Funding Adjustment Steps

4.26 The following paragraphs set out how we propose to calculate NARM funding adjustments.

STEP 1 - RIIO-2 Final Determinations

4.27 We will set the expenditure allowance associated with the NARM and the risk benefit target: EXP_{BL} and RB_{BL} .⁷ This gives Baseline Unit Cost of Risk Benefit UCR_{BL} = EXP_{BL}/RB_{BL} .

STEP 2 - End of RIIO-2

4.28 The network companies will report outturn cost and risk delivery: EXP_{OR} and RB_{OR}.⁸

⁷ Note that BL refers to the 'Baseline', ie the initial value set at Final Determinations.

⁸ Note that OR refers to the outturn value.

STEP 3a - RIIO-2 Close-out - Assessment of non-intervention risk changes

- 4.29 Based on our assessment of non-intervention risk changes, we will make adjustments to outturn risk delivery to neutralise relevant factors including methodology changes, data cleanse, and certain consequence changes. The outturn risk after the adjustment is RB_{OAD}.
- 4.30 We will then update the Outturn Unit Cost of Risk Benefit.⁹ UCR_{OAD} = EXP_{OR}/ RB_{OAD}

STEP 3b - RIIO-2 Close-out - Efficient Schemes or Programmes of Work

4.31 We will determine which schemes or programmes or work or elements of these in the Final Determinations plan have been delivered more efficiently in terms of unit cost efficiencies. These will be funded based on the original allowed expenditure.

STEP 3c - RIIO-2 Close-out - Funding Adjustments

- 4.32 For the remaining schemes or programmes of work, we will recalculate the Final Unit Cost of Risk Benefit, UCR_{AF}. This will be a value derived from a combination of the original Baseline Unit Cost of Risk Benefit and the adjusted Outturn Unit Cost of Risk Benefit with a function specified below using a Delivery Adjustment Factor (DAF). The Final Unit Cost of Risk Benefit will also be capped at the original value so that companies will be exposed to the risk of inefficient intervention substitutions.
 - If $UCR_{OAD} > UCR_{BL}$, then $UCR_{AF} = UCR_{BL}$.
 - Otherwise UCR_{AF}= UCR_{BL} DAF*(UCR_{BL} UCR_{OAD}).¹⁰
- 4.33 Further explanation and rationale for the DAF is given in paragraphs 4.40 to 4.41.
- 4.34 For baseline delivery, a justified over-delivery, or an under-delivery, the revised allowance will be the outturn risk benefit multiplied by the Final Unit Cost of Risk Benefit. EXP_{AF} = RB_{OAD} x UCR_{AF}
- 4.35 For an unjustified over-delivery, the revised allowance will be the Baseline Unit Risk Output multiplied by the Final Unit Cost of Risk Benefit. EXP_{AF} = RB_{BL} x UCR_{AF}

⁹ Note that OAD refers to the adjusted outturn value,

¹⁰ AF refers to the final adjusted allowed value.

4.36 The overall final allowance is then calculated by adding back in the allowed expenditure for efficient schemes or programmes of work or elements of these, where only part of the work is found to be efficient.

STEP 3d - RIIO-2 Close-out - Penalty calculation

4.37 The penalty for under-delivery will be 2.5% of the funding adjustment for the unjustified portion of the under-delivery. PEN=2.5%*(EXP_{AF}-EXP_{BL})*(1-JUS) where JUS is the proportion of the risk benefit under-delivery which is justified.

STEP 4 - RIIO-2 Close-out - Final Outcome

- 4.38 The difference between the actual NARM expenditure and the overall adjusted NARM expenditure allowance will be subject to the TIM.
- 4.39 For further detail on these steps and on how the mechanism will work in practice in different circumstances, please see the 'Draft Determinations – NARM Supporting Workbook' together with Appendix 7.

Delivery Adjustment Factor

- 4.40 As described in paragraph 4.17, we consider that it is appropriate for network companies to bear the risk of increases in the Unit Cost of Risk Benefit delivery. In our view, as there is significant scope for companies to gain financially through reductions in the unit costs of risk delivery and because it is difficult to differentiate this from genuine cost efficiency, we propose to share these savings in the unit costs of risk delivery between the companies and consumers. This would be in addition the application of the TIM. The Final Unit Cost of Risk Benefit delivery would be Baseline Unit Cost of Risk Benefit delivery minus a proportion of the difference between the Baseline Unit Cost of Risk Benefit and the Outturn Unit Cost of Risk Benefit based on the DAF.
- 4.41 Our analysis suggests that in unconstrained circumstances, some network companies could deliver their Baseline Network Risk Outputs for a small percentage of their baseline allowance.¹¹ We therefore propose a DAF of 95% for all network companies, meaning that, before application of the TIM, the network company would retain 5% of any savings due to asset/work substitution and other factors that have not been subject to separate adjustments. As explained above,

¹¹ By 'unconstrained' in this context we mean the theoretical circumstance where there are no constraints on delivery, ie the network company has no resource or supply limits and it can intervene on any asset regardless of location, access, or outage availability etc.

the company would still retain the full TIM benefit in cases where it has demonstrated that savings are due to genuine efficiencies. We will work together with the companies and other stakeholders ahead of Final Determinations to finalise the strength of DAF.

<u>Deadband</u>

4.42 We do not consider it necessary to apply a deadband as the proposed funding adjustment will work proportionately to the scale of any deviations from target delivery. Given the materiality of asset replacement and refurbishment expenditure, we also consider that it is important for network companies to provide appropriate explanation and justification for performance for all outcomes.

Penalty Rate

4.43 We propose to retain a penalty rate of 2.5% of the funding adjustment in the case of an unjustified under-delivery. This is consistent with the RIIO-1 mechanism and we have not seen evidence to suggest that a different penalty rate would be more appropriate for RIIO-2. We welcome views on an alternative penalty rate.

Justification for over- and under-delivery

- 4.44 In our SSMD, we stated that we would consider cases for over-delivery and underdelivery on an exceptional case-by-case basis and that we would set a high hurdle for companies wishing to make such cases.¹² The principles that we set out in SSMD still stand, ie companies are required to demonstrate that:
 - the outturn delivery provided a significant net benefit to consumers compared to on-target delivery;
 - the over-delivery or under-delivery could not have been avoided through replanning the work, or that to do so would have been significantly less beneficial to consumers;
 - the over-delivery or under-delivery was due to factors that could not reasonably have been included in their RIIO-2 Business Plans at the time of output setting; and
 - they could not, without a significant consumer dis-benefit, have traded risk against other work in order to deliver overall baseline outputs.

 $^{^{\}rm 12}$ Core Document paragraphs 6.41 to 6.44

- 4.45 We are conscious that the Covid-19 pandemic may have impacted network companies' operations, and is possible, for at least some network companies, to lead to an unavoidable shortfall in delivery of some work expected to have contributed towards RIIO-1 NOMs Target delivery. This may also in some cases have a consequential knock-on effect on RIIO-2 workloads, with work previously planned for RIIO-1 delivery being pushed back to RIIO-2.
- 4.46 Our current view is that the RIIO-1 NOMs Incentive Mechanism combined with our proposed RIIO-2 NARM Funding Adjustment and Penalty Mechanism (including the application of the above principles) will be sufficient to ensure that network companies are appropriately funded in the case of any justified workload shifts. Provided a network company can sufficiently evidence and quantify the impact of Covid-19 on its workload delivery, then we propose to consider it a justified contributory factor under both the RIIO-1 and RIIO-2 mechanisms.
- 4.47 While the Covid-19 crisis is still evolving, the overall impact on RIIO-1 delivery cannot yet be fully assessed. We should be in a better position to make such an assessment once RIIO-1 has come to an end. We therefore feel that it is not appropriate to make specific adjustments to our Draft Determinations to account for any forecast impact on RIIO-1 delivery, and instead intend to carry out this assessment at RIIO-1 Close-Out.
- 4.48 We will work with network companies and other stakeholders post-Draft Determinations to ensure that our operation of both RIIO-1 and RIIO-2 mechanisms result in fair outcomes for network companies and for consumers. This may include development of guidance in relation to the nature and quality of engineering and other evidence required for any justification case.

Testing the NARM Funding Adjustment and Penalty Mechanism

- 4.49 We simulated a range of possible delivery scenarios in order to test the robustness of the proposed NARM Funding Adjustment and Penalty Mechanism described above. This testing allowed us to:
 - ascertain whether its application might lead to undesired outcomes;
 - ensure the applicability of the mechanism against future performance outcomes;
 - understand the material impact of various scenarios to inform better decision making; and

- refine the mechanism and work out in more detail the mechanics of its application.
- 4.50 Further details of the testing we carried out and how this work has been used to refine our proposals for the NARM Funding Adjustment and Penalty Mechanism are set out in Appendix 6.

Consultation questions

- NARMQ2. Do you agree the funding adjustment principles and our proposals for applying funding adjustments?
- NARMQ3. Do you agree with our proposed approaches to calculating funding adjustments and to application of penalties?
- NARMQ4. Do you agree with our proposals in regards to requirements for justification cases?

5. Next Steps

- 5.1 We will engage with network companies and other stakeholders ahead of FinalDeterminations to help us further develop the proposals set out in this document.The areas requiring further development include:
 - Improving alignment of NARM and cost and volume datasets to ensure that Baseline Network Risk Outputs are fully aligned with totex allowances;
 - Finalising the scope of interventions within NARM funding categories;
 - Calculating the costs associated with Baseline Network Risk Outputs;
 - Finalising the requirements for justifying over-delivery, under-delivery, and efficient delivery for the purpose of implementing the NARM Funding Adjustment and Penalty Mechanism.
- 5.2 In addition, we will commence work with stakeholders in due course on developing the RIIO-2 reporting requirements for network companies in this area.
- 5.3 We will be arranging cross-sector and sector-specific working group meetings with network companies and other stakeholders to help us progress this work.

Appendices

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Appendix 1 – Consultation questions

NARMQ1. Do you agree with our proposals on the scope of work within each of the NARM Funding Categories and on the associated funding arrangements?NARMQ2. Do you agree the funding adjustment principles and our proposals for applying funding adjustments?

NARMQ3. Do you agree with our proposed approaches to calculating funding adjustments and to application of penalties?

NARMQ4. Do you agree with our proposals in regards to requirements for justification cases?

Appendix 2 – NARM Glossary

Please note that these definitions may be amended through licence drafting and approval process. In the case of any conflicting definitions the relevant licence definition will take precedence.

Table 3	_	NARM	General	Definitions

-			
Term	Definition		
Baseline Network Risk Output	The total Network Risk Output that a network company has been funded to deliver through its RIIO-2 baseline, excluding Network Risk Outputs associated with other mechanisms or PCDs.		
Baseline Unit Cost of Risk Benefit (UCRB)	The Unit Cost of Risk Benefit derived from Baseline Network Risk Output and associated baseline allowance values.		
Delivery Adjustment Factor (DAF)	A proportion of the difference between Baseline Unit Cost of Risk Benefit and Outturn Unit Cost of Risk Benefit.		
Final Unit Cost of Risk Benefit (UCRF)	The Unit Cost of Risk Benefit applied to a network company's adjusted Outturn Network Risk Output to calculate its final allowance.		
Monetised Risk	A risk value associated with a NARM Asset(s) as derived in accordance with the relevant network company's Network Output Measures (NOMs) methodology or NARM Methodology. Unless otherwise stated, reference to 'Risk' in a NARM context means 'Monetised Risk'.		
Monetised Risk Benefit	Analogous to Network Risk Output.		
NARM Asset	An asset specified within the NARM Methodology and where its associated Monetised Risk can be estimated by applying the NARM Methodology.		
NARM Asset Category	A group of assets with similar function and design as specified in the NARM Methodology.		
NARM Delivery	The forecast or outturn delivery of Network Risk Outputs.		
NARM Funding Adjustment and Penalty Mechanism	The mechanism for adjusting a network companies' funding to reflect the Network Risk Outputs delivered during RIIO-2, and for applying penalties in certain delivery scenarios. This mechanism takes account of, among other things, the outturn level of Network Risk Output delivered in RIIO-2 relative to a companies' Baseline Network Risk Outputs.		
NARM Funding Category	 / Broad categorisation used to indicate scope of NARM Fundin Adjustment and Penalty Mechanism and interaction with oth mechanisms. A1 - NARM Funding Adjustment and Penalty Mechanism A2 - Funding Under a Separate Mechanism A3 - Ring-fenced Project/Activity B - Non-NARM Assets 		
NARM Methodology	Means the methodology (sector or company specific) for the Network Asset Risk Metric. The NARM Methodology and NOMs		

Term	Definition		
	Methodology are equivalent until the former is superseded by the latter from the start of RIIO-2.		
NARM Target	Analogous to Baseline Network Risk Output.		
Network Asset Risk Metric (NARM)	The Monetised Risk associated with a NARM asset or the Monetised Risk Benefit associated with a NARM Asset intervention.		
Network Output Measures (NOMs)	RIIO-1 equivalent of Network Asset Risk Metric (NARM).		
Network Risk Output	 The risk benefit delivered or expected to be delivered by an asset intervention, and: a) is the difference between without intervention and with intervention Monetised Risk; b) can be measured over one year or over a longer period of time; and c) includes both direct (ie on the asset itself) and indirect (ie on adjacent assets or on the wider system) risk benefit. 		
NOMs Incentive Mechanism	The RIIO-1 mechanism for adjusting a network company's RIIO-1 funding dependent on its delivery of its NOMs Targets and for applying a reward or penalty in certain delivery scenarios.		
NOMs Methodology	The RIIO-1 Methodology (sector- or company specific) used for deriving Monetised Risk and Monetised Risk Benefit values. The NOMs Methodology will be superseded by the NARM Methodology for RIIO-2.		
NOMs Target	The required outputs related to relevant asset management work for each network company in RIIO-1.		
Outturn Network Risk Output	The ex post assessed Monetised Risk Benefit delivered during RIIO-2 through a network companies asset interventions and suitable for assessment of overall delivery against Baseline Network Risk Outputs.		
Outturn Unit Cost of Risk Benefit (UCRO)	The Unit Cost of Risk Benefit derived from a network company's Outturn Network Risk Output and outturn associated cost values.		
Risk Pound (R£)	The unit used to denote Monetised Risk values. R£ is used to differentiate from financial monetary values. However, provided methodologies for deriving monetised risks have been properly calibrated then Risk Pounds can be considered like-for-like with other monetary costs and benefits.		
Unit Cost of Risk Benefit (UCR)	The average cost of delivering a single unit (one Risk Pound, R£1) of Monetised Risk Benefit for a given asset population or intervention volume.		

Table 4 – NARM Model Definitions – these definitions only apply in the context of the NARM Model

Term	Definition
Baseline Risk Output	The Monetised Risk Benefit related to an individual Risk Output Unit after adjustment for any volume disallowances
Risk Output Unit	A disaggregation of Network Risk Outputs based on unique combination of attributes: Project Reference, Asset Category, Intervention Category.
Submitted Risk Output	The network company submitted value related to an individual Risk Output Unit

Appendix 3 - NARM Output Setting Model

NARM Model Aim

 The primary aim of the NARM model is to utilise the volume and risk data submitted by network companies along with our view (from cost and engineering assessments) of allowed volumes to derive the Baseline Network Risk Outputs for each network company for RIIO-2.

NARM Model Structure

2. The NARM model has been designed as a suite of Excel workbooks. We use VBA to import data from supporting to dependent workbooks and Power Queries to combine and manipulate the data and to perform calculations. The NARM model is structured as shown in Figure 2.

Figure 2 - NARM Model Structure



3. The NARM Model applies the following steps:

- Step 1: Data Import (all network companies):
 - Submitted intervention volumes,
 - Submitted risk outputs,
 - Allowed intervention volumes.
- Step 2: Reconcile CV and NARM intervention volumes.
- Step 3: Derive unit risk for asset interventions, per Risk Output Unit (see Chapter 2 for explanation).
- Step 4: Apply derived unit risks to allowed intervention volumes to give required risk per Risk Output Unit.
- Step 5: Aggregate derived values from Step 4 to give Require Network Risk Outputs for RIIO-2 for each network company.

Step 1: Data Import

- 4. For the NARM Model, we utilised the following input data:
 - a) Submitted intervention volumes: volume data from both the Cost and Volume (CV) BPDTs and NARM BPDTs.¹³
 - b) Submitted risk output data and intervention volumes from the NARM BPDT.
 - (i) For ET and GT sectors we used submitted long-term risk benefit for proposed intervention volumes.
 - (ii) For GD we used submitted single year risk benefit delta for proposed intervention volumes.¹⁴
 - c) Allowed intervention volumes: this data was input directly from the relevant cost and engineering assessment workbooks for the individual sectors.

Step 2: Reconcile CV and NARM intervention volumes

Volume scaler

- 5. Our expectation was for intervention volumes to be aligned across the Costs and Volumes (CV) and NARM BPDTs. While integrating the data, we observed significant misalignment between CV and NARM volumes for all sector. The bulk of this misalignment was resolved through Supplementary Questions (SQs) and resubmission of data. We utilised a volume scaler to address any residual misalignment.
- 6. The volume scaler adjusts the submitted NARM volumes to align with submitted CV intervention volumes. The scaled NARM volume is then used to calculate unit risk.¹⁵
- We will work with network companies post-Draft Determinations to better align the input data sets in order to avoid the need to apply a volume scaler for Final Determinations.

Model assumptions and data cleanse

Common to all three sectors

a) Only replacement and refurbishment interventions are within scope. Where other types of intervention, such as addition of new assets, are included

¹³ When we refer to Cost and Volume (CV) we mean the data submitted through the companies' main Business Plan Data Tables (BPDT) and/or the allowed costs or volumes resulting from our cost and engineering assessment of these BPDTs and supporting documents (eg Engineering Justification Papers)

¹⁴ See Appendix 5 for explanation of difference in approach between sectors.

¹⁵ Please not that this is not the same as Unit Cost of Risk Benefit. Unit risk = (monetised risk)/(intervention volume).

within data sets, then these have been removed as part of the data cleanse process.

- b) For NARM intervention volumes we have used the 'asset count after intervention'. In some cases, it appears that companies have submitted data related to entire asset population. In these cases, we rely on the volume scaler (see above) to reconcile to intervention volumes.
- c) For replacements where both additions and removal/disposal volumes have been submitted, we have used volumes off (removals) as the CV intervention volume.
- d) Intervention mapping: in order to align CV and NARM volumes, we have mapped the interventions in the CV data to assumed equivalent NARM interventions categories. For example, CV BPDT intervention categories 'Refurbishment - Major' and 'Refurbishment - Minor' have both been mapped to NARM intervention category 'Refurbishment'

Gas transmission

- a) NGGT set the intervention type in its NARM BPDT submission to 'Indirect Intervention' for secondary assets. We have used the CV BPDT intervention type to assign these as either replacement or refurbishment.
- b) Multiple intervention volumes: NGGT has instances of multiple interventions on the same asset, each delivering risk benefit. In such cases, we have considered these as a single intervention. The risk benefit value is the cumulative benefit delivered by all interventions.

Gas Distribution

- a) Project Mapping: For all GDNs, the projects listed in the NARM BPDT do not fully align with the projects or activities listed in the CV BPDT. Where it has been possible to do so we have mapped NARM projects to corresponding CV projects. Where this has not been possible then we have assigned relevant volumes to generic proxy projects based on the asset and intervention category.
- b) No CV volume data: For some interventions, we do not have either submitted CV volumes or allowed volumes. In such cases, we have used cost as a proxy and rely on a volume scaler to align with NARM volumes.

Step 3: Derive unit risk for asset interventions

8. To derive a unit risk benefit we divide the monetised risk benefit delivered through given interventions by the associated volume of interventions. Unit Risk Benefit for these purposes is therefore calculated in accordance with Formula 1:

Formula 1

 $Unit Risk Benefit = \left[\frac{Submitted Risk Benefit}{Submitted Volume}\right]_{Risk Output Unit}$

Step 4: Apply derived unit risk to allowed intervention volumes

9. The Baseline Risk Output for each Risk Output Unit (that make up the overall Baseline Network Risk Output) is then calculated by multiplying the Allowed Volume by the Unit Risk Benefit:

Formula 2

Baseline Risk Output Unit = $[Allowed Volume \times Unit Risk Benefit]_{Risk Output Unit}$

Step 5: Aggregate derived values from Step 4 to give Baseline Network Risk Outputs for each network company

- 10. Unit Risk Benefits are then assigned to the relevant funding category, A1, A2, or A3 (Chapter 3).
- 11. All Required Risk Output Unit values in the A1 category were then summed to give total Baseline Network Risk Output, Formula 3:

Formula 3

Baseline Network Risk Output = $\sum (Baseline Risk Output Unit)_{A1}$

Appendix 4 - Review of the Network Company NARM Submissions

 Our assessment of the network companies' Business Plans included a review and audit of their monetised risk submissions. The purpose of this review was to determine the robustness of their monetised risk calculations and their suitability as output measures. The different sectors took different approaches to deriving risk and populating their NARM BPDTs. We describe some of the outcomes from this exercise and the actions taken below.

Electricity Transmission

- Electricity Transmission Owners (ETOs) submitted their Business Plan based on projects/schemes, each of which is associated with a number of asset interventions and volume of assets. Monetised risks and long-term risk benefit are submitted based on scheme references, asset category and intervention type.
- 3. ETOs' long-term risk benefit submissions are supported by a list of long-term risk calculation files using the template provided by Ofgem. The long-term risk benefit is calculated as the difference between the non-intervention option (baseline), and the intervention option.
- 4. We have identified a number of mislabelled schemes and asset categories between NARM Business Plan submissions and long-term risk benefit files. Most of those have been resolved through the SQ process and resulted in re-submission of the BPDTs and long-term risk benefit files. Other resolved issues also include data errors, and misinterpretation when populating the long-term risk benefit files.

Gas Transmission

- 5. NGGT submitted its Business Plan based on asset categories and interventions. These are not specific schemes, rather volumes of work were submitted for each asset category and intervention type. The volumes of work can be different from the volumes of assets intervened on as multiple interventions can be applied to the same assets during the RIIO-2 period. The mapping between volume of assets and volume of work are provided as a supplementary document by NGGT.
- NGGT did not submit the workings for how the long-term risk benefit was calculated. Instead, the long-term risk benefit was included in the cost benefit analysis (CBA) files. According to NGGT's narratives, the long-term risk is presented as an aggregate

long-term risk benefit for all intervention types and all assets (in the particular category). This makes it difficult for us to audit and review the investment decisions using the CBA files submitted.

7. For NGGT, the long-term risk benefit is not calculated by estimating the long-term risk associated with specific assets for with and without intervention scenarios. Instead, it derives a typical risk benefit associated with each intervention type. These typical risk benefit values are then applied to relevant assets within plan.

Gas Distribution

- 8. GDNs submitted their Business Plans based on asset cohorts and intervention types.¹⁶ Some of the GDNs (Scotland and Southern) used asset location as additional information to separate assets otherwise in the same cohort. Monetised risks for the current year, the beginning and the end of RIIO-2, with and without intervention were submitted. Long-term risk benefit was also submitted for the assets associated with the Business Plan.
- 9. The long-term risk benefit is calculated for 10 years after end of RIIO-2, without differentiating by intervention type. The long-term risk benefit calculation is recorded in the CBA files which provided an audit trail for the submitted long-term risk benefit. However, this was not done consistently across the GDNs: Cadent only included monetised risk up to 2026 while WWU did not include monetised risk at all. Even for those companies that included the monetised risk in the CBA calculation, it is difficult to tie the figures in the CBA with those in the BPDT. Appendix 5 highlights the uncertainty around GDNs' long-term risk calculations which has led to our proposed approach of using an end-of-period single year measure for gas distribution.

Monetised risk calculation

- 10. The ETOs submitted long-term risk files alongside their NARM BPDTs. The probability of end-of-life failures is used to adjust the annual risk to take into account asset survival. GT and GD have assumed that their assets do not have end-of-life failure modes.
- 11. The adjustment method assumes that after an asset fails, the risk becomes zero in the "without intervention" scenario. However, in reality, the failed assets will be replaced by new assets which have risk associated with them and should not be

¹⁶ A grouping of individual assets which can be assessed together meaningfully for intervention/investment planning purposes or regulatory reporting purposes. Within the NOMs methodology cohorts are defined specifically for planning and assessing investment interventions to quantify health and monetised risk benefits.

ignored. Figure 3 and Figure 4 below show how long-term risk was treated in the BPDT template, and how risk could be measured more accurately.

Figure 3 - Treatment of asset failure in the NARM BPDT submissions





Figure 4 - How asset failure should be treated to enable a like for like comparison between with and without intervention scenarios

- 12. By ignoring the new asset under the "replacement-on-failure" scenario, the companies always under-estimate the long-term risk benefit. In extreme cases, this may lead to a negative risk benefit, when the ETOs include both non end-of-life and end-of-life failures modes in their risk models. We have observed that NGET has submitted negative long-term risk benefit for some of their schemes, and this can be resolved by including the risk of the new assets in the replacement-on-failure scenario. For SHET and SPT, the impact of the non-end-of-life risk is relatively small. Therefore, ignoring the risk will have a relatively small effect.
- 13. The timing of failure of the existing asset is a probabilistic value and cannot be "planned". Therefore, a Monte Carlo method or a convolution method is required to provide an overview of the expected risk over the lifetime of the new asset. The longterm risk calculation template has been revised for the ETOs to use to update the long-term risk benefit.
- 14. For the purposes of baseline output setting, we believe that the original methods for SHET and SPT were adequate. For NGET, where the differences are much larger and the original method was not adequate, we requested that NGET recalculate the risk benefit of all the interventions in its submitted Business Plan using the updated template.

Appendix 5 – Network Risk Output Definition

1. In our SSMD, we said that would use the relative reduction in long-term monetised network asset risk delivered by asset management work to justify the funding for and to set NARM outputs. For the ET, GT, and GD sectors we are still proposing to use a relative risk reduction measure and for ET and GT our proposal to use longterm risk is unchanged. However, for GD we are proposing that, rather than utilising a long-term metric, we will measure the risk reduction using an end-of-period singleyear metric over a one-year period from the end of RIIO-2. This is the same output measure used in RIIO-GD1 and does not affect the design or operation of the NARM Funding Adjustment and Penalty Mechanism. Figure 5 below illustrates the difference in output definition between GD and the other two sectors.



Figure 5 - Comparison of NARM Network Risk Output definition across sectors

2. Utilising a long-term risk measure remains our preferred approach to defining outputs, as it allows better differentiation between interventions of differing lifetime than a single-year measure does. However, due to higher levels of uncertainty in the modelling of long-term risk in the GD sector compared to ET and GT, we consider that further work on long-term risk is required before it is ready to be adopted as an output measure in that sector.

- 3. This higher level of uncertainty is due to the combined effect of two main factors. Firstly, the general uncertainty around the future use of gas networks, and secondly, the uncertainty inherent in the GDNs' modelling of future risks, where the failure rate deterioration curves can increase risk in perpetuity.
- 4. Because GD assets can experience multiple repairable failures in a year, their NARM models are appropriately based on annual failure rates rather than annual probabilities of failure. While probability of failure (PoF) curves are naturally capped at 100% probability, failure rate curves can continue to increase in perpetuity (see Figure 6 below). GDNs have assumed that asset deterioration follows a standard bathtub-shaped curve whereby the failure rate is relatively flat for the majority of an asset's life, with deterioration (ie the failure rate) assumed to increase exponentially after a certain point in time.
- 5. The GDNs' models were designed and calibrated to work well for the flat portion of the deterioration curve and give good estimates of current and short-term future asset risks. However, although it is reasonable to assume that at some point in time asset deterioration will follow the standard bathtub shape curve and rise exponentially, it is quite uncertain exactly what the rate of increase will be or when exponential increase is likely will occur. GDNs have previously identified this as an area for future NARM development.
- 6. We acknowledged, in discussions with the GDNs ahead of Business Plan submission, the higher level of uncertainty in GD long-term risk, and consequently agreed with them that long-term risk should be measured assuming a fixed 10-year intervention lifetime.
- 7. Only after the GDNs submitted their long-term risk estimates in their Business Plans was it possible to assess the impact of exponential deterioration on risk values. We have found that even with the application of the 10-year fixed asset life, exponential deterioration is a much more significant effect in forecast modelled risk than we assumed it would be ahead of submission.



Figure 6 - Comparison of probability of failure vs failure rate deterioration curves

Appendix 6 - Testing the NARM Funding Adjustment and Penalty Mechanism

Asset/work substitution

- 8. Using our unit cost model and the monetised risk submitted by the ETOs, we discovered that the cost per unit risk benefit of in-plan assets varies significantly between asset categories and intervention types, even for the same company. There are asset categories where the cost of unit risk benefit varies by orders of magnitude both in-plan and out-of-plan. This will could lead to future scenarios where companies make disproportionate gains by substituting assets or intervention types with higher Unit Cost of Risk Benefit delivery with much lower ones.
- 9. Our analysis shows the magnitude of this is significant. An example is shown in Figure 7. It uses one of the ETO's Unit Cost of Risk Benefit based on its submitted asset replacement plan. The box plot shows the median (the line in the box), upper and lower quartile (the box), 95% confidence level (the bar) and outliers (the dots). Relative values are shown by setting the Circuit Breaker median value to 1. It can be observed that the Unit Cost of Risk Benefit has a wide range for one asset type across different voltages. The variance of Unit Cost of Risk Benefit is also significant across asset types. As shown in the figure, the median value can be up to 10 times higher for circuit breakers than for overhead line fittings.



Figure 7 - Illustration of variation in the Unit Cost of Risk Benefit delivery for electricity transmission

10. The NARM Funding Adjustment and Penalty Mechanism outlined in Chapter 6 has been designed to protect consumers from potential significant over-payment for outputs as a result of these variations in unit costs, while also providing certainty to network companies in regards to funding in the event of asset switching.

Methodology change and data cleanse

11. The variability in Unit Cost of Risk Benefit, may in some cases be partially attributable to methodological issues. This is something we would expect with relatively immature models such as NARM. We expect network companies to continue to review their methodologies and to identify areas for improvement throughout RIIO-2. However, as noted in Chapter 4, the network companies should not benefit from or be disadvantaged by risk changes as a result of methodology changes. We have provided an example of how adjustment for methodology changes may be calculated within the 'Draft Determinations – NARM Supporting Workbook'. We expect to work with companies to develop a methodology of capturing nonintervention risk changes and reporting them as part of the NARM Funding Adjustment and Penalty Mechanism.

- 12. There are some potential interdependencies between methodology changes and asset/work substitution. To avoid over-complication, we propose to only apply methodology adjustments for work in the originally submitted Business Plan.
- 13. Risk change due to data cleansing would be treated the same as methodology changes.

Other non-intervention risk changes

14. Another potential outturn scenario is that the assets deteriorate faster or slower than expected at the time the original Business Plan was devised. This could lead to the same workload delivering different risk benefits and a misalignment between outturn baseline delivery. This can be due to either different asset management practices (from assumed) or an inaccurate forecast model to start with. It is at this stage difficult to differentiate the two. Our materiality test using historical data shows the impact is relatively modest compared to the asset/work substitution, and the changes can go in both directions. The companies are expected to continue optimising their intervention plans by considering the most up-to-date condition data. In our view, the effect of risk benefit changes due to slower or faster deterioration is similar to that of asset switching and it can be sufficiently covered by the NARM Funding Adjustment and Penalty Mechanism detailed in Chapter 6.

Over-delivery and Under-delivery

15. In Appendix 7 we have provided a number of example scenarios to illustrate the impact of the NARM Funding Adjustment and Penalty Mechanism under various scenarios: justified and unjustified, under- and over-delivery, and under- and overspend. These scenarios show the mechanism delivers the desired outcomes. By allowing evidenced unit cost efficiency savings to be treated separately, and differentiating these from the savings through asset/work substitution, the mechanism strikes a balance between protecting customers, rewarding genuine efficiency savings, and encouraging continuous asset management plan optimisation.

Appendix 7 NARM Funding Adjustment and Penalty Mechanism - Illustrative Examples

- 16. We provide below a number of example scenarios to help stakeholders understand the effect of the proposed NARM Funding Adjustment and Penalty Mechanism. The accompanying 'Draft Determinations – NARM Supporting Workbook' has been provided to help stakeholders understand in more detail how the mechanism will work.
- 17. These scenarios are based on four factors. These are, whether:
 - a company's outturn expenditure exceeds or is below their initial allowance (over-spend/under-spend);
 - b) a company's outturn risk benefit exceeds or is below their initial baseline output (over-delivery/under-delivery);
 - c) deviations in the outturn risk benefit from baseline are justified or unjustified; and
 - d) the Outturn Unit Cost of Risk Benefit (UCR) has increased or decreased relative to the initial UCR.
- 18. most combinations of these factors are valid, with a few exceptions: Scenarios that combine over-spend with under-delivery must have a higher-than-initial outturn UCR, and scenarios that combine under-spend with over-delivery must have a lowerthan-initial UCR.
- 19. Note that these examples are not exhaustive. For instance, they do not account for baseline expenditure or delivery, changes due to non-intervention effects, changes due to evidenced unit cost efficiencies, or partially justified deviations in outturn delivery relative to the initial target.
- 20. For each scenario, an allowed UCR is calculated. If the outturn UCR is lower than the initial UCR, then a value that lies between the two is chosen based on the delivery adjustment factor (DAF). If the outturn UCR is higher than the initial UCR, then the allowed UCR will remain capped at the initial value.
- 21. To compute the adjusted funding, the allowed Unit Cost of Risk Benefit is multiplied by a risk-benefit value. For unjustified over-delivery, this value is the initial risk benefit target. For all other cases this value is the outturn risk benefit delivered.
- 22. Finally, for unjustified under-delivery a penalty is computed. This is the amount of funding that was clawed back multiplied by a penalty rate (PR).

23. Figure 8 shows how these calculations play out for each of the scenarios. The adjusted funding is shown relative to the outturn expenditure and where possible, to the initial allowance. This will help stakeholders see whether the funding adjustment results in a financial benefit or disbenefit to the network company, and whether it will lead to any funding clawback or additional funding allocation.

Figure 8 - Example scenarios with summarised funding adjustment and penalty outcomes

Over-spend			Under-spend		
Over-deliver			Under-deliver		
Justified	Unjustified		Justified	Unjustified	
Decreased UCR EXP.AI < EXP.OR < EXP.AA PEN = 0	Decreased UCR EXP.AA < EXP.AI < EXP.OR PEN = 0		Decreased UCR EXP.OR < EXP.AA < EXP.AI PEN = 0	Decreased UCR EXP.OR < EXP.AA < EXP.AI PEN > 0	
Increased UCR EXP.AI < EXP.AA < EXP.OR PEN = 0	Increased UCR EXP.AA = EXP.AI < EXP.OR PEN = 0		Increased UCR EXP.AA < EXP.OR < EXP.AI PEN = 0	Increased UCR EXP.AA < EXP.OR < EXP.AI PEN > 0	
Under-deliver		l	Over-deliver		
Justified	Unjustified		Justified	Unjustified	
Increased UCR EXP.AA < EXP.AI < EXP.OR PEN = 0	Increased UCR EXP.AA < EXP.AI < EXP.OR PEN > 0		Decreased UCR EXP.OR < EXP.AA PEN = 0	Decreased UCR EXP.AA < EXP.OR < EXP.AI PEN = 0	

24. The table below provides comments on the principles that underlie the treatment of each scenario. The scenarios are labelled using the code over-spend (OS), under-spend (US), over-delivery (OD), under-delivery (UD), justified (JU), unjustified (UN), increased UCR at outturn (IN), decreased UCR at outturn (DE).

Table 5 - Comments on the principles that underlie the treatment of example scenarios

Scenario	Comments
OS.OD.JU.DE	Funding is increased beyond the company's outturn expenditure. This is because justified over-delivery is funded, and companies will retain a portion of any savings they make by decreasing their UCR.
OS.OD.JU.IN	Funding is increased but remains below the company's outturn expenditure. This is because justified over-delivery is funded, but companies will incur excess expenditure caused by an increase in their UCR at outturn.
OS.OD.UN.DE	Funding is reduced. This is because unjustified over-delivery is not funded, and a portion of savings made by decreases in UCR at outturn are clawed back.
OS.OD.UN.IN	Funding is unchanged. This is because unjustified over-delivery is not funded, and companies will incur all excess expenditure caused by an increase in their UCR at outturn.
OS.UD.JU.IN	Funding is reduced. This is because only delivered risk benefits are eligible for funding. No penalty is applied because the under-delivery is justified.
OS.UD.UN.IN	Funding is reduced. This is because only delivered risk benefits are eligible for funding. A penalty is applied based on the penalty rate and the amount of funding that was clawed-back.
US.UD.JU.DE	Funding is reduced but remains above the company's outturn expenditure. This is because only delivered risk benefits are eligible for funding, and the company will retain a portion of any savings they make by decreasing their UCR. No penalty is applied because the under-delivery is justified.
US.UD.JU.IN	Funding is reduced below the company's outturn expenditure. This is because only delivered risk benefits are eligible for funding, and companies will incur all excess expenditure caused by an increase in their UCR at outturn. No penalty is applied because the under- delivery is justified.
US.UD.UN.DE	Funding is reduced but remains above the company's outturn expenditure. This is because only delivered risk benefits are eligible for funding, and companies will retain a portion of any savings they make by decreasing their UCR. A penalty is applied based on the penalty rate and the amount of funding that was clawed-back.
US.UD.UN.IN	Funding is reduced below the company's outturn expenditure. This is because only delivered risk benefits are eligible for funding, and companies will incur all excess expenditure caused by an increase in their UCR at outturn. A penalty is applied based on the penalty rate and the amount of funding that was clawed-back.
US.OD.JU.DE	Funding may reduce or increase but will remain above the company's outturn expenditure regardless. This is because the justified over- delivery is funded, but this funding is based on the allowed UCR. In this case the outturn UCR has increased from its initial value, and so the company will retain a portion of the savings it made.
US.OD.UN.DE	Funding is reduced below the company's outturn expenditure. This is because unjustified over-delivery is not funded, and a portion of savings made by decreases in UCR at outturn are clawed back.

Appendix 8 - Asset Category Breakdown of Baseline Network Risk Outputs

Baseline Network Risk Outputs (BNRO) relate only to the A1 Funding Category.

Full trading: means that, unless funded through another mechanism, any over-delivery or under-delivery of Network Risk Outputs in the given asset category will contribute towards the network company's Outturn Network Risk Output.

Partial trading: means that baseline allowances include funding in category 'A3 – Ringfenced Projects/Activities'. These A3 projects or activities are excluded from risk trading and even if the original funding driver does not materialise during RIIO-2 then the associated risk benefit delivered will not count towards the network company's overall Network Risk Output delivery.

Restricted trading: means that some projects or activities within the asset category can be traded and will count towards the network company's Outturn Network Risk Output if certain criteria are met.

See Chapter 3 for explanation of the NARM Funding Categories.

Table 6 - Electricity Transmission - National Grid Electricity Transmission(NGET)

Asset Category	BNRO (R£m)	Summary of exclusions and risk trading arrangements
132kV Circuit Breaker	4.88	Full trading – Load related schemes excluded
132kV Transformer	-	Full trading
132kV Reactor	3.67	Full trading
132kV Underground Cable	-	Full trading
132kV OHL Conductor	-	Full trading
132kV OHL Fittings	35.20	Full trading
132kV OHL Tower	-	Full trading
275kV Circuit Breaker	0.43	Full trading – Load related schemes excluded
275kV Transformer	37.97	Full trading – Load related schemes excluded
275kV Reactor	2.99	Full trading – Load related schemes excluded
275kV Underground Cable	-	Full trading
275kV OHL Conductor	7.80	Partial trading – Load related schemes excluded, Schemes subject to in-period determination excluded
275kV OHL Fittings	31.35	Partial trading – Load related schemes excluded, Schemes subject to in-period determination excluded
275kV OHL Tower	-	Full trading
400kV Circuit Breaker	1.13	Full trading – Load related schemes excluded
400kV Transformer	55.70	Full trading – Load related schemes excluded
400kV Reactor	5.42	Full trading
400kV Underground Cable	_	Partial trading – Load related schemes excluded, Schemes subject to in-period determination excluded
400kV OHL Conductor	32.35	Full trading – Load related schemes excluded
400kV OHL Fittings	89.28	Full trading – Load related schemes excluded
400kV OHL Tower	-	Full trading
TOTAL	308.17	Full trading – Load related schemes excluded

Load related schemes excluded: submitted load related schemes with element of replacement or refurbishment work were allocated to NARM funding Category A2 prior to assessment. Some of these schemes may have been disallowed through our engineering

and cost assessments. Any Network Risk Output from intervention on assets originally within load related schemes will only count towards Outturn Network Risk Outputs should the relevant load related driver not materialise.

Schemes subject to in-period determination excluded: specified projects will be subject to an in-period determination. Any Network Risk Outputs from these projects will not count towards the network company's Outturn Network Risk Output.

Table 7 - Electricity	y Transmission -	SHE Transmission	(SHET)
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Asset Category	BNRO (R£m)	Summary of exclusions from BNRO and risk trading arrangements
132kV Circuit Breaker	147.97	Full trading – Load related schemes excluded
132kV Transformer	1,505.75	Full trading – Load related schemes excluded
132kV Reactor	4,951.08	Full trading
132kV Underground Cable	252.92	Full trading
132kV OHL Conductor	-	Full trading
132kV OHL Fittings	240.20	Full trading
132kV OHL Tower	446.55	Full trading
275kV Circuit Breaker	18.07	Full trading – Load related schemes excluded
275kV Transformer	-	Full trading
275kV Reactor	-	Full trading
275kV Underground Cable	-	Full trading
275kV OHL Conductor	13.47	Full trading – Load related schemes excluded
275kV OHL Fittings	286.66	Full trading
275kV OHL Tower	2.62	Full trading
400kV Circuit Breaker	-	Full trading – Load related schemes excluded
400kV Transformer	-	Full trading – Load related schemes excluded
400kV Reactor	-	Full trading
400kV Underground Cable	-	Full trading
400kV OHL Conductor	-	Full trading – Load related schemes excluded
400kV OHL Fittings	-	Full trading – Load related schemes excluded
400kV OHL Tower	-	Full trading – Load related schemes excluded
TOTAL	7,865.29	

Load related schemes excluded: submitted load related schemes with element of replacement or refurbishment work were allocated to NARM funding Category A2 prior to assessment. Some of these schemes may have been disallowed through our engineering and cost assessments. Any Network Risk Output from intervention on assets originally within load related schemes will only count towards Outturn Network Risk Outputs should the relevant load related driver not materialise.

Table 8 – Electri	city Transmission	- SP Transmission	(SPT)
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Asset Category	BNRO (R£m)	Summary of exclusions and risk trading arrangements
132kV Circuit Breaker	298.05	Full trading
132kV Transformer	280.62	Full trading – Load related schemes excluded
132kV Reactor	-	Full trading
132kV Underground Cable	544.15	Partial trading – PCDs excluded
132kV OHL Conductor	1,432.34	Full trading – Load related schemes excluded
132kV OHL Fittings	2,658.96	Full trading – Load related schemes excluded
132kV OHL Tower	1,057.45	Full trading – Load related schemes excluded
275kV Circuit Breaker	622.25	Partial trading – PCDs excluded
275kV Transformer	338.59	Full trading – Load related schemes excluded
275kV Reactor	-	Partial trading – PCDs excluded
275kV Underground Cable	549.25	Partial trading – Load related schemes excluded, PCDs excluded
275kV OHL Conductor	311.47	Partial trading – PCDs excluded
275kV OHL Fittings	3,552.26	Full trading – Load related schemes excluded
275kV OHL Tower	1,667.17	Partial trading – PCDs excluded
400kV Circuit Breaker	99.64	Full trading
400kV Transformer	134.94	Full trading
400kV Reactor	-	Full trading
400kV Underground Cable	-	Full trading
400kV OHL Conductor	1,085.08	Partial trading – PCDs excluded
400kV OHL Fittings	9,493.10	Full trading
400kV OHL Tower	192.15	Partial trading – PCDs excluded
TOTAL	24,317.47	

Load related schemes excluded: submitted load related schemes with element of replacement or refurbishment work were allocated to NARM funding Category A2 prior to assessment. Some of these schemes may have been disallowed through our engineering and cost assessments. Any Network Risk Output from intervention on assets originally within load related schemes will only count towards Outturn Network Risk Outputs should the relevant load related driver not materialise.

PCDs excluded: specified projects or activities have been ringfenced with separate PCDs and funding. Any Network Risk Outputs from these projects or activities will not count towards the network company's Outturn Network Risk Output.

Table 9 - Gas Transmission - National Grid Gas Transmission (NGGT)

Asset Category	BNRO (R£m)	Summary of exclusions and risk trading arrangements
Cladding	0.04	Full trading
After coolers	_	Full trading
Air Intake	-	Partial trading – PCDs excluded
Exhausts	-	Partial trading – PCDs excluded
Boundary Controllers	-	Full trading
Cab ventilation	-	Partial trading – PCDs excluded
Fuel tanks & bunds	0.01	Full trading
Compressor	2.27	Full trading
Cathodic Protection	0.18	Full trading
Electrical - including standby generators	3.09	Partial trading – PCDs excluded
Electrical - safe shutdown	-	Full trading
Filters and Scrubbers (incl. Condensate Tanks)	0.59	Full trading
Fire and gas detection	-	Full trading
Fire Suppression	-	Partial trading – PCDs excluded
Flow or pressure regulator	25.36	Full trading
Gas analyser	-	Full trading
Gas Generator	28.07	Full trading
Metering	-	Full trading
Fuel gas metering	-	Full trading
Network control and instrumentation	-	Full trading
Odorisation Plant	-	Full trading
Pig Trap	-	Full trading
Above Ground Pipe and Coating	_	Full trading
Below Ground Pipe and Coating	52.81	Full trading
Power turbine	45.35	Full trading
Preheaters	3.29	Full trading
Station process control system	-	Full trading
Unit Control System	-	Full trading
AntiSurge System	-	Full trading
Starter motor	_	Full trading
Vent System	4.78	Full trading
Electrical variable speed drive	12.97	Full trading
Locally actuated valves	0.23	Full trading
Non Return Valve	0.14	Full trading
Remote Isolation Valves	0.97	Full trading

Asset Category	BNRO (R£m)	Summary of exclusions and risk trading arrangements
Process valves	1.11	Full trading
Slam shut	-	Full trading
TOTAL	181.26	

PCDs excluded: specified projects or activities have been ringfenced with separate PCDs and funding. Any Network Risk Outputs from these projects or activities will not count towards the network company's Outturn Network Risk Output.

Asset Category	BNRO (R£m)	Summary of exclusions and risk trading arrangements
LTS Pipelines (Piggable)	0.00	Full trading
LTS Pipelines (Non Piggable)	0.00	Full trading
Iron Mains	0.34	Restricted trading – Repex PCDs excluded
PE Mains	-	Restricted trading – Repex PCDs excluded
Steel Mains	0.82	Restricted trading – Repex PCDs excluded
Other Mains	0.00	Restricted trading – Repex PCDs excluded
Services	2.29	Restricted trading – Repex PCDs excluded
Risers	0.60	Full trading
Offtake Filters	0.05	Full trading
PRS Filters	0.41	Full trading
Offtake Slamshut/Regulators	0.07	Full trading
PRS Slamshut/Regulators	0.34	Full trading
Offtake Pre-heating	0.54	Full trading
PRS Pre-heating	0.01	Full trading
Odorisation & Metering	0.00	Full trading
District Governors	0.05	Full trading
I&C Governors	-	Full trading
Service Governors	-	Full trading
TOTAL	5.53	

Table 10 - Gas Distribution - Cadent - East of England (EoE)

A number of GDN Capex projects are proposed to be assigned as separate PCDs. We have assigned the projects to Funding Category A3 where it has been possible to do so. However, in some cases it has not been possible with the available data to individually identify the equivalent project within the GDN's NARM BPDT. In these cases, the associated Network Risk Output is included in Funding Category A1 for Draft Determinations. We will work with the GDNs to ensure that the risk associated with all PCDs is allocated to the correct category ahead of Final Determinations.

PCDs excluded: specified projects or activities have been ringfenced with separate PCDs and funding. Any Network Risk Outputs from these projects or activities will not count towards the network companies Outturn Network Risk Output.

Asset Category	BNRO (R£m)	Summary of exclusions and risk trading arrangements
LTS Pipelines (Piggable)	-	Full trading
LTS Pipelines (Non Piggable)	0.00	Full trading
Iron Mains	0.05	Restricted trading – Repex PCDs excluded
PE Mains	-	Restricted trading – Repex PCDs excluded
Steel Mains	1.44	Restricted trading – Repex PCDs excluded
Other Mains	-	Restricted trading – Repex PCDs excluded
Services	3.70	Restricted trading – Repex PCDs excluded
Risers	3.04	Full trading
Offtake Filters	0.02	Full trading
PRS Filters	0.35	Full trading
Offtake Slamshut/Regulators	0.01	Full trading
PRS Slamshut/Regulators	0.10	Full trading
Offtake Pre-heating	-	Full trading
PRS Pre-heating	0.06	Full trading
Odorisation & Metering	-	Full trading
District Governors	0.37	Full trading
I&C Governors	-	Full trading
Service Governors	-	Full trading
TOTAL	9.14	

Table 11 - Gas Distribution - Cadent - London (Lon)

A number of GDN Capex projects are proposed to be assigned as separate PCDs. We have assigned the projects to Funding Category A3 where it has been possible to do so. However, in some cases it has not been possible with the available data to individually identify the equivalent project within the GDN's NARM BPDT. In these cases, the associated Network Risk Output is included in Funding Category A1 for Draft Determinations. We will work with the GDNs to ensure that the risk associated with all PCDs is allocated to the correct category ahead of Final Determinations.

PCDs excluded: specified projects or activities have been ringfenced with separate PCDs and funding. Any Network Risk Outputs from these projects or activities will not count towards the Network company's Outturn Network Risk Output.

Asset Category	BNRO (R£m)	Summary of exclusions and risk trading arrangements
LTS Pipelines (Piggable)	-	Full trading
LTS Pipelines (Non Piggable)	0.00	Full trading
Iron Mains	-	Restricted trading – Repex PCDs excluded
PE Mains	-	Restricted trading – Repex PCDs excluded
Steel Mains	0.61	Restricted trading – Repex PCDs excluded
Other Mains	0.01	Restricted trading – Repex PCDs excluded
Services	3.63	Restricted trading – Repex PCDs excluded
Risers	2.52	Full trading
Offtake Filters	0.03	Full trading
PRS Filters	0.18	Full trading
Offtake Slamshut/Regulators	0.06	Full trading
PRS Slamshut/Regulators	0.21	Full trading
Offtake Pre-heating	0.00	Full trading
PRS Pre-heating	1.14	Full trading
Odorisation & Metering	0.41	Full trading
District Governors	0.97	Full trading
I&C Governors	-	Full trading
Service Governors	-	Full trading
TOTAL	9.78	

Table 12 - Gas Distribution - Cadent - North West (NW)

A number of GDN Capex projects are proposed to be assigned as separate PCDs. We have assigned the projects to Funding Category A3 where it has been possible to do so. However, in some cases it has not been possible with the available data to individually identify the equivalent project within the GDN's NARM BPDT. In these cases, the associated Network Risk Output is included in Funding Category A1 for Draft Determinations. We will work with the GDNs to ensure that the risk associated with all PCDs is allocated to the correct category ahead of Final Determinations.

PCDs excluded: specified projects or activities have been ringfenced with separate PCDs and funding. Any Network Risk Outputs from these projects or activities will not count towards the Network company's Outturn Network Risk Output.

Asset Category	BNRO (R£m)	Summary of exclusions and risk trading arrangements
LTS Pipelines (Piggable)	-	Full trading
LTS Pipelines (Non Piggable)	-	Full trading
Iron Mains	0.09	Restricted trading – Repex PCDs excluded
PE Mains	-	Restricted trading – Repex PCDs excluded
Steel Mains	0.91	Restricted trading – Repex PCDs excluded
Other Mains	-	Restricted trading – Repex PCDs excluded
Services	1.45	Restricted trading – Repex PCDs excluded
Risers	1.72	Full trading
Offtake Filters	0.02	Full trading
PRS Filters	0.22	Full trading
Offtake Slamshut/Regulators	0.01	Full trading
PRS Slamshut/Regulators	0.10	Full trading
Offtake Pre-heating	0.07	Full trading
PRS Pre-heating	0.01	Full trading
Odorisation & Metering	0.00	Full trading
District Governors	0.03	Full trading
I&C Governors	-	Full trading
Service Governors	-	Full trading
TOTAL	4.61	

Table 13 - Gas Distribution - Cadent - West Midlands (WM)

A number of GDN Capex projects are proposed to be assigned as separate PCDs. We have assigned the projects to Funding Category A3 where it has been possible to do so. However, in some cases it has not been possible with the available data to individually identify the equivalent project within the GDN's NARM BPDT. In these cases, the associated Network Risk Output is included in Funding Category A1 for Draft Determinations. We will work with the GDNs to ensure that the risk associated with all PCDs is allocated to the correct category ahead of Final Determinations.

PCDs excluded: specified projects or activities have been ringfenced with separate PCDs and funding. Any Network Risk Outputs from these projects or activities will not count towards the Network company's Outturn Network Risk Output.

Asset Category	BNRO (R£m)	Summary of exclusions and risk trading arrangements
LTS Pipelines (Piggable)	-	Full trading
LTS Pipelines (Non Piggable)	-	Full trading
Iron Mains	1.10	Restricted trading – Repex PCDs excluded
PE Mains	-	Restricted trading – Repex PCDs excluded
Steel Mains	4.53	Restricted trading – Repex PCDs excluded
Other Mains	-	Restricted trading – Repex PCDs excluded
Services	1.23	Restricted trading – Repex PCDs excluded
Risers	0.03	Full trading
Offtake Filters	0.52	Full trading
PRS Filters	0.37	Full trading
Offtake Slamshut/Regulators	0.01	Full trading
PRS Slamshut/Regulators	0.68	Full trading
Offtake Pre-heating	0.13	Full trading
PRS Pre-heating	0.09	Full trading
Odorisation & Metering	1.09	Full trading
District Governors	0.50	Full trading
I&C Governors	0.03	Full trading
Service Governors	0.02	Full trading
TOTAL	10.33	

Table 14 - Gas Distribution - Northern Gas Networks (NGN)

A number of GDN Capex projects are proposed to be assigned as separate PCDs. We have assigned the projects to Funding Category A3 where it has been possible to do so. However, in some cases it has not been possible with the available data to individually identify the equivalent project within the GDN's NARM BPDT. In these cases, the associated Network Risk Output is included in Funding Category A1 for Draft Determinations. We will work with the GDNs to ensure that the risk associated with all PCDs is allocated to the correct category ahead of Final Determinations.

PCDs excluded: specified projects or activities have been ringfenced with separate PCDs and funding. Any Network Risk Outputs from these projects or activities will not count towards the Network company's Outturn Network Risk Output.

Asset Category	BNRO (R£m)	Summary of exclusions and risk trading arrangements
LTS Pipelines (Piggable)	-	
LTS Pipelines (Non Piggable)	-	Partial trading – PCDs excluded
Iron Mains	-	Restricted trading – Repex PCDs excluded
PE Mains	-	Restricted trading – Repex PCDs excluded
Steel Mains	2.58	Restricted trading – Repex PCDs excluded
Other Mains	-	Restricted trading – Repex PCDs excluded
Services	0.32	Restricted trading – Repex PCDs excluded
Risers	0.17	Full trading
Offtake Filters	-	Partial trading – PCDs excluded
PRS Filters	0.04	Partial trading – PCDs excluded
Offtake Slamshut/Regulators	-	Partial trading – PCDs excluded
PRS Slamshut/Regulators	0.17	Partial trading – PCDs excluded
Offtake Pre-heating	-	Full trading
PRS Pre-heating	0.09	Partial trading – PCDs excluded
Odorisation & Metering	0.00	Full trading
District Governors	0.24	Full trading
I&C Governors	0.00	Full trading
Service Governors	0.03	Full trading
TOTAL	3.63	

Table 15 - Gas Distribution - Scotia Gas Networks (SGN) - Scotland (Sc)

A number of GDN Capex projects are proposed to be assigned as separate PCDs. We have assigned the projects to Funding Category A3 where it has been possible to do so. However, in some cases it has not been possible with the available data to individually identify the equivalent project within the GDN's NARM BPDT. In these cases, the associated Network Risk Output is included in Funding Category A1 for Draft Determinations. We will work with the GDNs to ensure that the risk associated with all PCDs is allocated to the correct category ahead of Final Determinations.

PCDs excluded: specified projects or activities have been ringfenced with separate PCDs and funding. Any Network Risk Outputs from these projects or activities will not count towards the Network company's Outturn Network Risk Output.

Asset Category	BNRO (R£m)	Summary of exclusions and risk trading arrangements
LTS Pipelines (Piggable)	-	Full trading
LTS Pipelines (Non Piggable)	-	Full trading
Iron Mains	1.76	Restricted trading – Repex PCDs excluded
PE Mains	-	Restricted trading – Repex PCDs excluded
Steel Mains	1.98	Restricted trading – Repex PCDs excluded
Other Mains	-	Restricted trading – Repex PCDs excluded
Services	5.94	Restricted trading – Repex PCDs excluded
Risers	1.01	Full trading
Offtake Filters	-	Full trading
PRS Filters	-	Partial trading – PCDs excluded
Offtake Slamshut/Regulators	-	Partial trading – PCDs excluded
PRS Slamshut/Regulators	0.41	Partial trading – PCDs excluded
Offtake Pre-heating	-	Partial trading – PCDs excluded
PRS Pre-heating	8.39	Partial trading – PCDs excluded
Odorisation & Metering	-	Full trading
District Governors	0.44	Full trading
I&C Governors	0.00	Full trading
Service Governors	0.25	Full trading
TOTAL	20.18	

Table 16 - Gas Distribution - Scotia Gas Networks (SGN) - Southern (So)

A number of GDN Capex projects are proposed to be assigned as separate PCDs. We have assigned the projects to Funding Category A3 where it has been possible to do so. However, in some cases it has not been possible with the available data to individually identify the equivalent project within the GDN's NARM BPDT. In these cases, the associated Network Risk Output is included in Funding Category A1 for Draft Determinations. We will work with the GDNs to ensure that the risk associated with all PCDs is allocated to the correct category ahead of Final Determinations.

PCDs excluded: specified projects or activities have been ringfenced with separate PCDs and funding. Any Network Risk Outputs from these projects or activities will not count towards the Network company's Outturn Network Risk Output.

Asset Category	BNRO (R£m)	Summary of exclusions and risk trading arrangements
LTS Pipelines (Piggable)	-	Full trading
LTS Pipelines (Non Piggable)	0.06	Full trading
Iron Mains	0.11	Restricted trading – Repex PCDs excluded
PE Mains	-	Restricted trading – Repex PCDs excluded
Steel Mains	3.48	Restricted trading – Repex PCDs excluded
Other Mains	-	Restricted trading – Repex PCDs excluded
Services	1.26	Restricted trading – Repex PCDs excluded
Risers	0.99	Full trading
Offtake Filters	0.03	Full trading
PRS Filters	0.52	Full trading
Offtake Slamshut/Regulators	-	Full trading
PRS Slamshut/Regulators	4.72	Full trading
Offtake Pre-heating	-	Full trading
PRS Pre-heating	4.53	Full trading
Odorisation & Metering	0.46	Full trading
District Governors	0.58	Full trading
I&C Governors	0.04	Full trading
Service Governors	-	Full trading
TOTAL	17.25	

Table 17 - Gas Distribution - Wales and West Utilities (WWU)

A number of GDN Capex projects are proposed to be assigned as separate PCDs. We have assigned the projects to Funding Category A3 where it has been possible to do so. However, in some cases it has not been possible with the available data to individually identify the equivalent project within the GDN's NARM BPDT. In these cases, the associated Network Risk Output is included in Funding Category A1 for Draft Determinations. We will work with the GDNs to ensure that the risk associated with all PCDs is allocated to the correct category ahead of Final Determinations.

PCDs excluded: specified projects or activities have been ringfenced with separate PCDs and funding. Any Network Risk Outputs from these projects or activities will not count towards the Network company's Outturn Network Risk Output.