**NARM Handbook**
**Version 3.1**

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# Contents

# 1. Purpose and status of this document

1.1    The purpose of this document is to:

1. Set out the methodology for calculating relevant funding adjustments and penalties under the NARM Funding Adjustment and Penalty Mechanism[1] for Electricity Transmission, Gas Transmission, and Gas Distribution licensees.

2. Provide guidance to Electricity Transmission, Gas Transmission, and Gas Distribution licensees on the following:
   a) the provision of justification for Over-Delivery and Under-Delivery;
   b) the treatment of Non-Intervention Risk Changes; and
   c) Clearly Identifiable Over-Delivery and Clearly Identifiable Under-Delivery.

3. Act as a starting point and reference source for anyone wishing to learn about the NARM. The intention is not to be fully comprehensive but to be an accessible starting point with signposts to relevant documents for anyone wishing to learn more.

1.2    This document forms part of Special Condition (SpC) 3.1: Baseline Network Risk Outputs of the RIIO-ET2, RIIO-GT2 and RIIO-GD2 licences. SpC 3.1 sets out, among other things, the process for making changes to it. Text indicated in this document with an orange banner, containing the word 'Methodology', in the left margin is not considered guidance for the purposes of SpC 3.1.16(f).

1.3    Chapters 2 to 6 of this document provide an introduction to the NARM, RIIO-2 NARM Outputs and funding, an overview of the NARM Funding Adjustment and Penalty Mechanism, as well as an overview of the associated regulatory reporting requirements. Appendix 6 provides an overview of the licensees' NARM methodologies.

1.4    Please note, the Gas and Electricity Markets Authority (the Authority) is the energy regulator for Great Britain.  Ofgem is the Office of the Authority.  The

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[1] Appendix 1: NARM Glossary features a full list of definitions.

terms "Ofgem" and "the Authority", "we" and "us" may be used interchangeably in this document.

# 2. An introduction to NARM

## Background and history

2.1     Network companies are required to provide safe, secure, reliable and efficient energy network services. Through their asset management activities such as replacement or refurbishment, network companies are required to ensure that the risk to consumers is maintained within reasonable bounds.

2.2     Over the past few price controls, we[2] have worked with the industry through the development and implementation of a range of output measures in this area such as asset age, health and criticality indices and progressed to the monetised risk-based measures adopted in RIIO-1. In RIIO-1, the cost allowances were tied, where possible, to the delivery of part of the then **Network Output Measures (NOMs)**, which reflected either the level of total network risk or the levels of risk reduction that network companies are required to achieve. The way asset risk is measured and incorporated into network companies' asset management decision-making was developed further through RIIO-1. Our RIIO-2 arrangements build on the progress made in previous price controls.

**Figure 1: Development of Network Asset Risk Metric Regulatory Framework**



## What is NARM?

2.3     During the course of RIIO-1, the network companies, in each of the four sectors, developed new NOMs methodologies. These new methodologies utilised condition data, collected through inspections and other asset management activities, as well as information on the likely consequence of asset failures to express the risk measure in monetised terms. Monetised Risk is generally determined through

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[2] References to the "Authority", "Ofgem", "we" and "our" are used interchangeably in this document. The Authority refers to GEMA, the Gas and Electricity Markets Authority. The Office of Gas and Electricity Markets (Ofgem) supports GEMA in its day to day work. Decisions are made by or on behalf of GEMA.

multiplication of the probability of asset failure by the monetised value of the consequences of the failure (e.g. the value of interruption to supply, or cost of damage to the environment, etc.).

2.4    For RIIO-2, through the **Network Asset Risk Metric (NARM),** we are building on the progress made in RIIO-1 and are using Monetised Risk as the primary measure for defining the outputs and setting allowances associated with asset management activities. We will apply a consistent approach across all four sectors[3], using Monetised Risk, to define outputs for the relevant assets.

## Single-year snapshot risk versus long-term risk measures

2.5    In RIIO-1, although the network companies were expected to take into account longer-term views of risks when making their investment decisions, monetised risk outputs were defined using a single-year 'snapshot' risk measure. In defining RIIO-2 outputs, the aim has been to define outputs using a longer-term risk measure. See Figure 2 below for an illustrative comparison between single-year snapshot and long-term risk measures.

2.6    Figure 2, which is taken from our RIIO-2 Draft Determinations: NARM Annex[4], illustrates the difference between a long-term risk measure (ET and GT example) and a single-year snapshot measure (GD Example).

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[3] Electricity Transmission (ET), Electricity Distribution (ED), Gas Transmission (GT) and Gas Distribution (GD). ED will be further considered in the development of RIIO-ED2, set to commence 1 April 2023.
[4] RIIO-2 Draft Determinations for Transmission, Gas Distribution and Electricity System Operator | Ofgem

**Figure 2: Comparison of long-term risk and single-year snapshot risk measures**
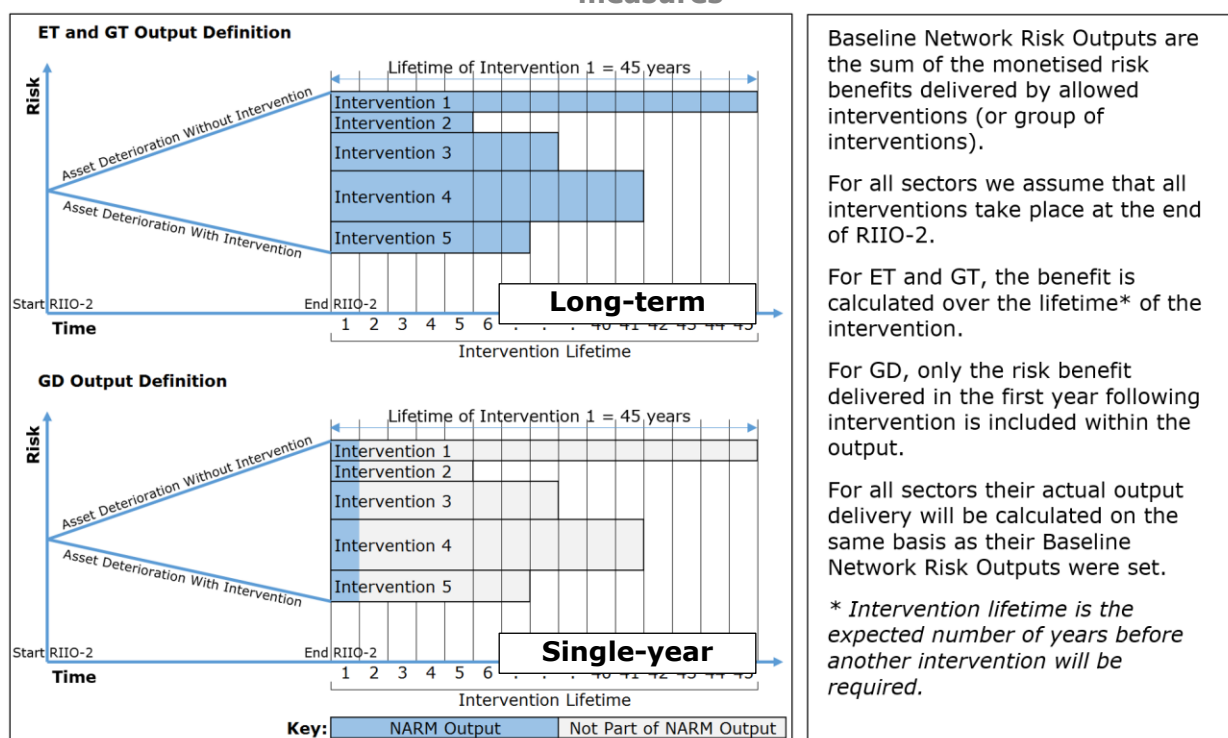
2.7 For RIIO-2, the electricity transmission and gas transmission companies have outputs defined using Long-Term Monetised Risk measures. However, we retained a single-year snapshot measure (similar to the RIIO-1 measure) for defining the Gas Distribution companies' outputs. Please refer to our RIIO-2 Draft Determination and Final Determinations[5] for the reasoning behind these decisions.

## NARM Objectives

2.8 Prior to RIIO-1, NOMs were used primarily as a regulatory reporting tool to monitor the network companies' asset management outputs and performance. During the course of RIIO-1, each of the four sector's NOMs Methodology has been further developed to better facilitate the NOMs objectives listed in the licences.

2.9 NARM was developed to allow us to quantify the benefit, to consumers, of the network companies' asset management activities. In RIIO-2, this will be used as

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[5] https://www.ofgem.gov.uk/publications/riio-2-final-determinations-transmission-and-gas-distribution-network-companies-and-electricity-system-operator

the output to hold the network companies accountable for their investment decisions. NARM is intended not only as a regulatory reporting and monitoring tool, but also as a decision-supporting tool for network companies' asset management investments, and as a way for the network companies to justify past and future investments to Ofgem.

2.10    The NARM Objectives are set out in SpC 9.2 of each network company's RIIO-2 licence. The network companies' NARM Methodologies should facilitate the achievement of the objectives. However, the NARM Methodologies may not be the only tool needed to achieve the NARM Objectives. The network companies should be continually striving to better achieve the NARM Objectives.

2.11    Part B of SpC 9.2 sets out eight NARM Objectives (a to h). These objectives are summarised as follows[6]:

a) To allow Ofgem and other stakeholders to understand the links between the data that a network company collects and utilises and the asset management and investment decisions it makes. The NARM Methodology will therefore help provide assurance that any investment decisions are based on solid evidence and sound reasoning.

b) To enable Ofgem to set outputs for the network company to deliver over a price control period and to ensure that what the network company actually delivers can be compared to the targets on a like-for-like basis.

c) To enable the network company to estimate the Monetised Risk of its network assets both now and in the future.

d) To enable the network company to estimate the Monetised Risk Benefit that would be delivered by different types of interventions on any given asset or group of assets.  The objective is to be able to estimate both single-year snapshot risk benefit and long-term risk benefit.

e) The estimated Monetised Risk Benefits should be suitable for use as inputs in Cost Benefit Analyses (CBA) in order to help network companies choose

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[6] Please note that this summary is intended to provide the reader with an understanding of the NARM Objectives and their intent. They are not comprehensive and readers are referred to SpC 9.2 for the full list of the objectives.

the best value for money investments, and to demonstrate to Ofgem, consumers, and other stakeholders that any investment plans have been optimised. This means that the Monetised Risk Benefits should be realistic with robust probability estimates and correctly valued consequences.

f) To enable the identification and quantification of drivers of changes in Monetised Risk over time.

g) To allow Monetised Risk comparisons to be made between different assets and different networks. In order for this objective to be achieved, the methodologies used for estimating Monetised Risk should be based as little as possible on subjectivity.

h) To enable the network company to report to Ofgem and other stakeholders in a way that can be easily understood and unambiguously interpreted.

# 3. NARM Methodologies

## Introduction

3.1     All network companies are required under SpC 9.2 of their licences to have a NARM Methodology in place. The NARM Methodology must be approved by Ofgem.

3.2     Ofgem and network companies work closely together on the development and subsequent review of the NARM Methodologies to ensure that the methodologies align with how the companies should make investment decisions and that they comply with the relevant regulatory requirements.

3.3     The NOMs methodologies that were in place at the end of RIIO-1 were deemed to be the NARM Methodologies in effect at the start of RIIO-2 until they are superseded. Licensees are required to keep their methodologies under review to ensure they facilitate the achievement of the NARM Objectives. Ofgem conducts a public consultation before approving any revisions to a NARM Methodology.

## General Principles

3.4     Due to the different nature of their network assets and the way the companies operate, each sector has individual NARM Methodologies as well as company-specific elements:

1.  The Gas Distribution sector has a NARM Methodology that is largely common to the gas distribution networks (GDNs)[7].

2.  In the electricity sector, the electricity transmission operators (ETOs) have a common NARM Methodology and company-specific Network Asset Risk Annexes (NARA)[8]. National Grid Electricity Transmission has its own NARA, and SP Transmission and Scottish Hydro Electric Transmission have developed a joint NARA. Both NARAs provide specific detail of the arrangements as they apply to the relevant licensees.

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[7] https://www.ofgem.gov.uk/publications/notice-intention-not-reject-modified-gas-distribution-network-output-measures-noms-methodology
[8] https://www.ofgem.gov.uk/publications/decision-not-reject-modified-electricity-transmission-network-output-measures-noms-methodology-issue-18

3. For Gas Transmission[9], as there is only one network company in the sector (National Grid Gas Transmission (NGGT)), commonality is not an issue.

3.5 Regardless of the detailed approaches adopted, all of the NARM Methodologies apply the principle that risk of asset failure is a combination of the probability of asset failure and monetary valuations of the consequence of the asset failing.

In general terms:

$$\begin{bmatrix} Risk\ of\ Asset \\ Failure \end{bmatrix} = \begin{bmatrix} Probability\ of \\ Failure\ (PoF) \end{bmatrix} \times \begin{bmatrix} Consequence\ of \\ Failure\ (CoF) \end{bmatrix}$$

3.6 In practice, it is usually not as simple as estimating single probability and consequence values related to a given asset, as it is usually necessary to build up the asset risk from a number of sub-components, failure modes, conditional probabilities, and different types of failure consequences.

3.7 The ETOs and NGGT also have a particular focus on Long-term Risk Benefit (LTRB). When an intervention takes place, the asset's monetised risk will be reduced in all years after the intervention up to the expected next replacement or refurbishment intervention. The LTRB is the sum of those risk reductions across a specified horizon. We expect the GDNs to further develop, and progress towards using, LTRB.

3.8 When considering consequences of failure there are four broad categories that all the methodologies consider. The four consequence categories are:

1. System/network consequences – these are consequences that are a result of service disconnection following an asset failure. They include, for example, a valuation of the cost to consumers of being without electricity or gas supply for the period until supply can be restored, and as such are dependent on the numbers and type of customer that would be disconnected for a given asset. The methodologies also need to account for any mitigation measures, such as

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[9] https://www.nationalgrid.com/uk/gas-transmission/uk/electricity-transmission/document/135626/download

asset redundancy built into the system, or actions that the network company or third parties will take in the event of a loss of supply.

2. Safety consequences – these are the direct consequences on the individuals expected to be in the vicinity of an asset when it fails. When estimating safety consequences, the methodologies must consider the number of individuals that might suffer injury or death in the event of an asset failure, and place values on these consequences. The failure mode is important in this regard as sudden catastrophic failures, such as a gas pipeline explosion, are likely to have much worse safety consequences than other more slowly developing failures.

3. Environmental consequences – these are related to the impact on the natural environment of an asset failure, such as the leakage of oil from a failed transformer into a nearby watercourse, or the leakage of gas into the atmosphere from a failed gas valve.

4. Financial consequences – e.g. these are the direct costs incurred by the licensee as a result of the asset failure. These might include the cost of emergency replacement of a failed asset, or the cost associated with securing the system following an asset failure.

3.9     It is not always easy to value consequences, as many consequences do not have direct monetary impacts, or the monetary impacts do not cover the full scale of the losses experienced by all parties. An example of this is injury or death resulting from an asset failure. In such cases, as much as possible, the methodologies utilise commonly recognised valuations or industry standards, such as Government Green Book valuations, with full referencing to the valuation sources.

3.10   Risk Pounds (R£) is the unit used to denote Monetised Risk values.

3.11   Please see Appendix 6 for short synopses of the individual sector/company methodologies.

# 4. RIIO-2 NARM Outputs and Funding

## Baseline Network Risk Outputs (BNRO)

4.1    The network companies' RIIO-2 business plans contained a range of proposed investments, some of which deliver Monetised Risk Benefits (mainly replacement and refurbishment of existing network assets), and others that do not deliver Monetised Risk Benefit (such as installation of new network assets, or investment in non-network assets, or network assets not covered by the NARM Methodology).

4.2    Ofgem used a range of techniques, including econometric and engineering assessments, in order to determine which investments should be funded during RIIO-2 (through baseline funding), which investments should be subject to uncertainty mechanisms (such as volume drivers), and which investments should be disallowed completely.

4.3    Following on from this assessment, the investments that were allowed were allocated to the relevant NARM Funding Category. There are three NARM Funding Categories: A1, A2, and A3 as follows:

- **A1 – NARM Funding Adjustment and Penalty Mechanism**: this is work within the initial scope of the NARM Funding Adjustment and Penalty Mechanism and which contributes to a company's BNRO. Network companies have discretion to design their delivery programmes to efficiently delivery their BNRO (i.e. they can trade risk).

- **A2 – Funding Under a Separate Mechanism**: this is work delivering Network Risk Outputs that is not currently within the scope of the NARM Funding Adjustment and Penalty Mechanism (e.g. replacement or refurbishment work carried out and funded as part of a load related scheme). The Network Risk Outputs associated with this work do not contribute to the BNRO. However, should the case for funding under the original mechanism fall away then, in the case of the works being delivered, the work should be considered as part of delivery of NARM Funding Category A1 for any Network Risk Outputs. Therefore, Network Risk Outputs from this work may contribute to a company's final Outturn Network Risk Outputs (ONRO).

- **A3 – Ring-fenced Project/Activity**: this is work that will deliver Network Risk Outputs but which is not within the scope of the NARM Funding Adjustment and Penalty Mechanism. The Network Risk Output associated with this work <u>will not</u> contribute to a company's final ONRO.

4.4    Figure  below illustrates the relationship between a network company's submitted RIIO-2 business plan, Ofgem's RIIO-2 Final Determinations, and the NARM Funding Categories.

**Figure 3 - NARM Funding Categories and relationship to RIIO-2 Business Plans and RIIO-2 Final Determinations**
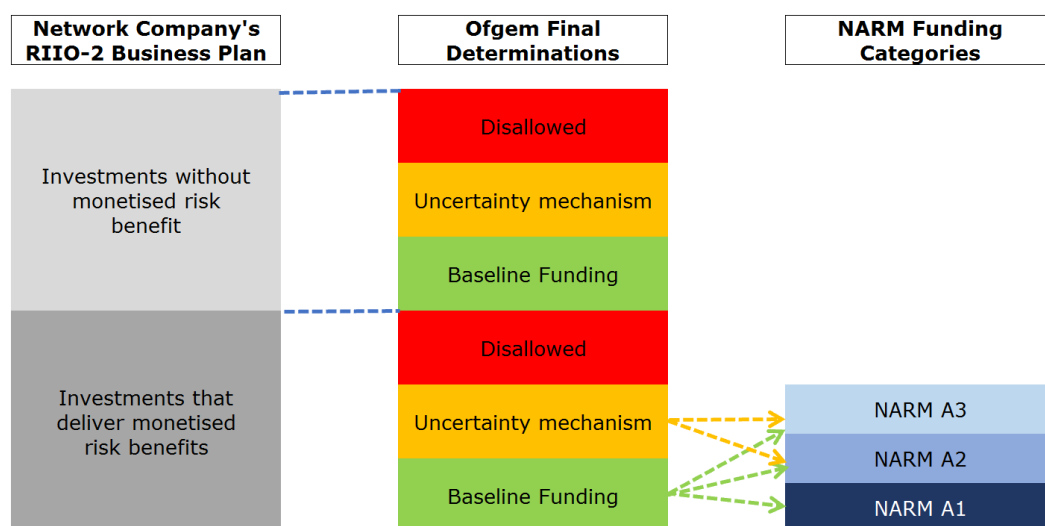


## BNRO segmentation to Risk Sub-Categories

4.5    For the Electricity Transmission and Gas Transmission sectors, the NARM Funding Category A1 was further segmented into 7 and 3 Risk Sub-Categories respectively. The NARM Funding Adjustment and Penalty Mechanism will operate independently for each Risk Sub-Category. Network companies should, however, still optimise their overall network-wide delivery and while there will not be any automatic trading between Risk Sub-Categories, network companies may be able to justify over-delivery in one Risk Sub-Category by reference to under-delivery in another.

4.6    For Gas Distribution, there is no subdivision of BNRO and therefore only one Risk Sub-Category (at the network level). The terms Risk Category and Risk-Sub-Category can therefore be used interchangeably in a Gas Distribution context.

## Rebasing

4.7     Rebasing is the process of modifying the BNRO during RIIO-2  as a consequence of modification of the NARM Methodology. Rebasing is likely to be a necessary outcome of a NARM Methodology modification during a price control period in order to ensure that the company's delivered outputs remain comparable with their BNRO. This differs from adjustments to the BNRO that are made to reflect Non-Intervention Risk changes, but these are also important to ensure comparability between the ONRO and the BNRO for application of the NARM Funding Adjustment and Penalty Mechanism.

4.8     The governing principle for rebasing is that following rebasing the BNRO should be 'as Equally Challenging'[10] to deliver as the original BNRO. The approach that would be used in determining whether an outcome was 'Equally Challenging' would build on the rebasing carried out for RIIO-1.

4.9     The process and requirements for rebasing during RIIO-2 are set out in SpC 3.1 Part C: Rebasing of Baseline Network Risk Outputs.

## Network Asset Risk Workbook (NARM Workbook)

4.10    The purpose of the NARM Workbook is to set out the BNRO that the licensee is required to deliver by the end of RIIO-2. The NARM Workbook also gives a breakdown of the RIIO-2 Baseline Funding and Baseline Unit Cost of Risk Benefit ($UCR_{BL}$) for the associated BNRO at each Risk Sub-Category level. The more granular detail within the workbook is considered commercially sensitive and is therefore redacted and available only to Ofgem and to the relevant network company.

4.11    The result of a rebasing exercise during RIIO-2 will be the revision of the NARM Workbook in accordance with Part C of SpC 3.1.

4.12    Redacted versions of the NARM Workbooks will be published on Ofgem's website, with unredacted versions sent to the relevent network companies.

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[10] As defined in the Appendix 1 – Glossary.

# 5. NARM Funding Adjustment and Penalty Mechanism – Overview

## Introduction

5.1    The mechanism by which network companies will be held to account for their BNRO delivery during RIIO-2 is known as the NARM Funding Adjustment and Penalty Mechanism. Under this mechanism, financial adjustments and penalties are applied depending on the network company's delivery versus their BNRO and the extent to which they justify any over-delivery or under-delivery thereof.

5.2    The NARM Funding Adjustment and Penalty Calculation Methodology is set out in Chapter 7.

## Implementing the NARM Funding Adjustment and Penalty Mechanism

5.3    As illustrated in Figure 4 below, the process for implementing the NARM Funding Adjustment and Penalty Mechanism at RIIO-2 closeout can be separated into three main stages. These stages do not necessarily need to be distinct from each other. It may be possible for there to be some overlap in terms of stage timings and activities.  The three stages are:

1.  Delivery Assessment

2.  Justification Assessment

3.  Incentive Value Calculation

5.4    The precise approaches that Ofgem will use  to carry out its assessment under the NARM Funding Adjustment and Penalty Mechanism, including licensees' submission requirements and timeframes for implementation, will be set out and consulted on ahead of RIIO-2 closeout. This will be informed by any further developments, learning, or issues that arise over the course of RIIO-2.

**Figure 4 - NARM Funding Adjustment and Penalty Mechanism Implementation Overview**
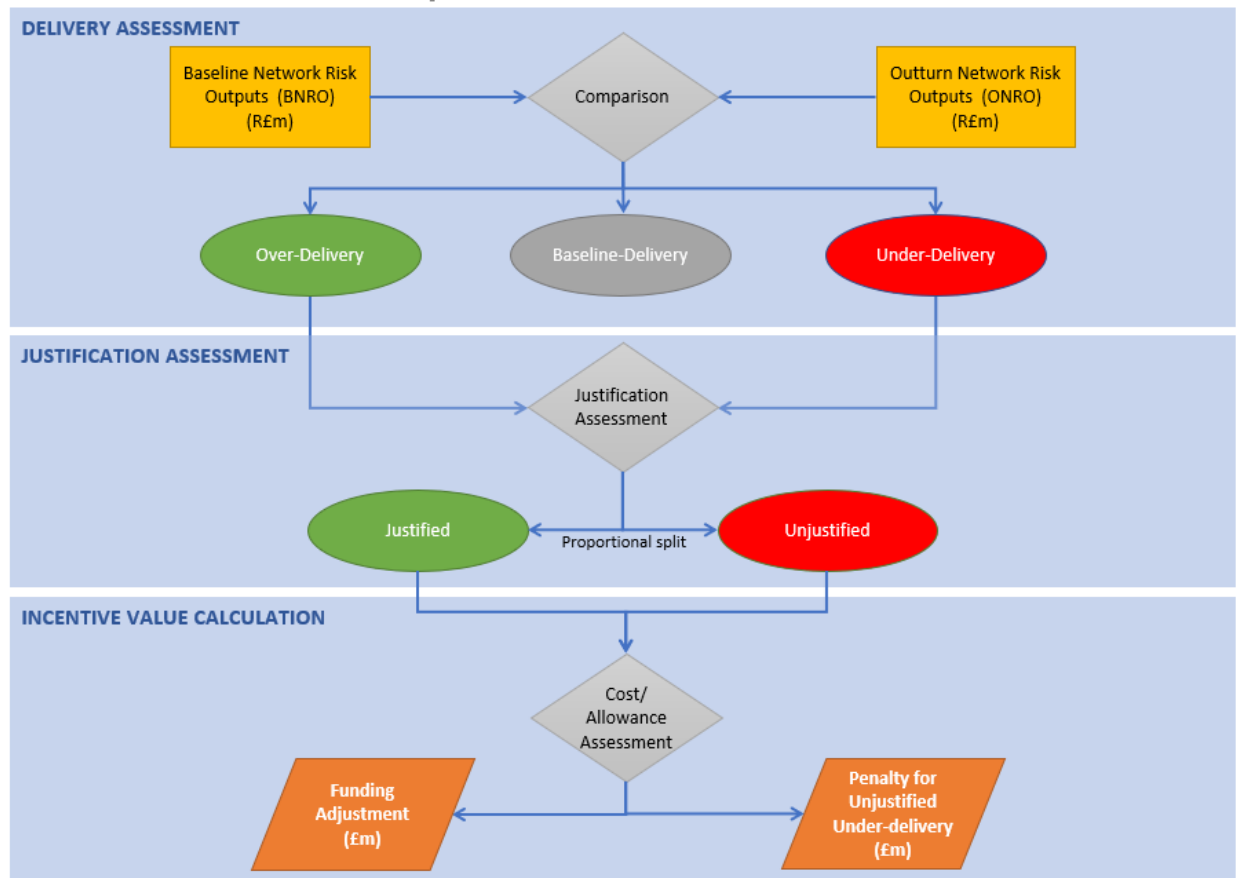


**Delivery Assessment**

5.5 This involves comparison of the licensee's ONRO against its BNRO. In order to be able make a like-for-like comparison between the ONRO and BNRO, it will likely be necessary to 'normalise' the BNRO data to account for Non-Intervention Risk Changes, such as data cleansing, changes to the methodology, and slower or faster deterioration of assets. Risk changes resulting from revision of the NARM Methodology are addressed through a rebasing exercise (see Chapter 4) and therefore will not need to be addressed during the delivery assessment. Guidance on the application of Non-Intervention Risk Changes is provided in Chapter 9.

5.6 The licensee will be required to submit data to enable the Delivery Assessment in a format to be specified and issued under Standard Condition B15 (Regulatory Instructions and Guidance) for electricity transmission and under Standard Condition A40 (Regulatory Instructions and Guidance) for gas transmission and gas distribution.

5.7 The Delivery Assessment will result in decision from Ofgem on the extent to which it considers the licensee has Over-Delivered or Under-Delivered, or whether it has delivered its baseline for each Risk Sub-Category.

**Justification Assessment**

5.8 The purpose of the Deadband around the BNRO is to determine whether justification is required for an Over-Delivery or Under-Delivery. For an Over-Delivery or Under-Delivery within the Deadband, no justification is required and it will be treated as 100% justified. For an Over-Delivery or Under-Delivery outside the Deadband, the licensee will be required to provide justification for the full amount of any Over-Delivery or Under-Delivery.

5.9 During this stage, Ofgem will consider the justification provided by the licensee for any Over-Delivery or Under-Delivery, along with the cost and other data that will be needed to calculate the value of any funding adjustments or penalties.

5.10 Ofgem will take a view on the proportion of Over-Delivery or Under-Delivery that has been justified. If the licensee delivers within the Deadband[11] for a particular Risk Sub-Category, then the delivery will be considered justified for these purposes. Guidance on justification requirements can be found in Chapter 8.

5.11 The licensee will also identify the Delivery Elements (e.g. specific projects) that, in its view, can be considered as Clearly Identifiable Over-Delivery and Clearly Identifiable Under-Delivery. Ofgem's decision on any elements to be treated as Clearly Identifiable Over-Delivery and Clearly Identifiable Under-Delivery will determine the valuation approach for the purpose of the Incentive Valuation Calculation. The criteria for Clearly Identifiable Over-Delivery and Clearly Identifiable Under-Delivery are set out in Chapter 10.

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[11] Defined in Appendix 1 – Glossary.

**Incentive Value Calculation**

5.12   In calculating the value of the incentive under the NARM Funding Adjustment and Penalty Mechanism, Ofgem will:

1. <u>Determine the licensee's final allowances</u> to reflect the licensee's level of delivery relative to its BNRO as well as the associated cost of delivery. Ofgem will use two valuation approaches:

    a) Any delivery considered by Ofgem not to qualify as Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery will be assessed using a Unit Cost of Risk Benefit (UCR) approach. This assessment is carried out for each portion of delivery, i.e.,
       - Baseline (all cases)
       - Justified Under-Delivery (if relevant)
       - Unjustified Under-Delivery (if relevant)
       - Justified Over-Delivery (if relevant)
       - Unjustified Over-Delivery (has a value of zero)

       The UCR for each Delivery Element is calculated by applying a Delivery Adjustment Factor (DAF) to the difference between the initial UCR (that was determined at RIIO-2 Final Determinations) and the licensee's outturn UCR.  For RIIO-2 the DAF has been set to zero for all Risk Sub-Categories, so the result is the UCR to be applied to actual delivery will be equal to the initial UCR set at RIIO-2 Final Determinations. Ofgem will gather evidence throughout RIIO-2 as part of the NARM RIGs reporting and Cost RIGs reporting to decide whether a DAF of zero is appropriate for future price controls.

    b) Any delivery considered to qualify as Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery will be subject to a bespoke assessment of the efficient cost based on consideration of the fundamental underlying project components.  For an under-delivery element, the adjustment of BNRO (i.e. claw-back) will be valued equal to the assessed value of that specific element/project we made at RIIO-2 Final Determinations. This may also include addressing partial delivery of a specific element or project.

These assessments will result in a final allowance for each Risk Sub-Category, which is calculated as follows[12]:

$$\begin{bmatrix} Final \\ Allowance^* \end{bmatrix} = \begin{bmatrix} UCR \times NRO \\ (For\ each\ portion\ of\ delivery) \end{bmatrix} + \begin{bmatrix} Adjustment\ for\ Clearly\ Identifiable \\ Over\ Delivery\ and\ Under\ Delivery \end{bmatrix}$$

\* For a given Risk Sub-Category

2. <u>Determine the value of any applicable penalty for Unjustified Under-Delivery</u>. Any Unjustified Under-Delivery will be subject to a penalty. The penalty will be equal to 2.5% of the clawed back allowance associated with the Unjustified Under-Delivery.

Both the funding adjustment and penalty will be applied in the next price control through the Price Control Financial Model (PCFM) or its equivalent for RIIO-3.

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[12] The NRO in the formula refers the Outurn Network Risk Output adjusted for Non-Intervention Risk changes and Clearly Identifiable Over-Delivery or Under-Delivery.

# 6. Regulatory Reporting

## Annual reporting

6.1    As with other areas of the price control, each licensee is required to report annually on the NARM. This includes both data relating to the network company's delivery and supporting qualitative narrative. NARM annual reporting serves a number of purposes, including:

1. the collection of outturn and forecast data which Ofgem can use to take a view on the likely end of period outcome of the NARM Funding Adjustment and Penalty Mechanism. This means that each network company's annual reporting would include its best forecasts of data that will be provided as part of its NARM Closeout Report (see below);
2. helping to identify emerging issues that might need to be addressed ahead of the next price control period or at RIIO-2 closeout;
3. the collection of data and information to inform future development of the NARM Methodologies and NARM mechanisms in future price controls;
4. the collection of data that will be needed to facilitate the robust assessment of the network companies' RIIO-3 business plans.

6.2    Annual reporting requirements for NARM are issued under the Regulatory Instructions and Guidance (RIGs) licence conditions[13] and may include data templates, pro-forma narrative templates, and associated guidance documents.

## End of period reporting (the NARM Closeout Report)

6.3    At the end of the RIIO-2 period, the network companies are required under Part D of SpC 3.1 to submit a report (the NARM Closeout Report) that sets out:

a) their ONROs;
b) the costs incurred in delivering their ONROs, as well as necessary breakdown of those costs in line with the RIGs;

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[13] Standard Condition B15 for both Electricity and Gas Transmission, and Standard Special Condition A40 for Gas Distribution.

c) details of any Non-Intervention Risk Changes, including the associated impact on BNROs or ONROs;

d) justification case for any portions of Over-Delivery or Under-Delivery against BNROs that they consider to be justified; and

e) details of any Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery.

6.4 The data and information submitted in the NARM Closeout Report will be used by Ofgem to determine the value of incentive adjustments under the NARM Funding Adjustment and Penalty Mechanism.

6.5 For further details on the NARM Closeout Report requirements please refer to Chapters 8, 9 and 10.

# 7. NARM Funding Adjustment and Penalty Calculation Methodology

## Section A: Purpose of this methodology

7.1    The Authority will determine the value of adjustments to be made to licensees' allowed revenues in the next price control period (to commence on 1 April 2026) under the NARM Funding Adjustment and Penalty Mechanism in accordance with the assessment methodology set in Sections C-I below.

7.2    Please see Appendix 4 for some illustrative worked examples of this methodology's application.

7.3    See also Appendix 3 : the NARM Funding Adjustment and Penalty Calculation Model, which is an Excel based tool that seeks to provide an indication of the potential outcomes of the NARM Funding Adjustment and Penalty Mechanism for user input scenario data.

7.4    The relevant price base for all terms and calculations is 2018-19 prices.For the avoidance of doubt, all expenditure terms including $NXP_{BL}$, $NXP_{OR}$, $NXP_{OAD}$, $CIX_{OD}$, and $NXP_{FAC}$,  are required to be inclusive of Real Price Effects (RPE)[14].

7.5

## Section B: Application of this methodology

7.6    This methodology applies independently to each Risk Sub-Category for Electricity and Gas Transmission and at the network level for Gas Distribution[15].

7.7    For Electricity Transmission there are seven Risk Sub-Categories equivalent to the seven lead asset categories: Circuit Breaker, Overhead Line Conductor, Overhead Line Fittings, Overhead Line Tower (SPT and SHET only), Reactor, Transformer,

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[14] RPEs are used to adjust company allowances to reflect changes in input prices experienced by companies over the price control period over and above CPI.
[15] For Gas Distribution, 'network level' is considered to be a single Risk Sub-Category for the purposes of applying the NARM Funding Adjustment and Penalty Calculation Methodology. This ensures a consistent application of methodology across the three sectors.

Underground Cable. An Electricity Transmission project is allocated to a Risk Sub-Category according to the asset category delivering the highest risk benefit.

7.8 For Gas Transmission there are three Risk Sub-Categories: Low, Medium, and High. Interventions are allocated to a Risk Sub-Category according to the average Unit Cost of Risk Benefit they deliver.

7.9 For Gas Distribution there is no subdivision of BNRO and therefore only one Risk Sub-Category (network level). The terms Risk Category and Risk Sub-Category can therefore be used interchangeably in a Gas Distribution context.

## Section C: Baseline Unit Cost of Risk Benefit

7.10 The Baseline Unit Cost of Risk Benefit ($UCR_{BL}$) for each licensee is set out in the licensee's NARM Workbook.[16]

7.11 $UCR_{BL}$ is calculated in accordance with Formula 1

**Formula 1**

$$UCR_{BL} = \frac{NXP_{BL}}{NRO_{BL}}$$

where in respect of each Risk Sub-Category:

- $NXP_{BL}$ is the total Baseline Allowed NARM Expenditure for a Risk Sub-Category for the RIIO-2 period as set out in the NARM Workbook for each licensee, and
- $NRO_{BL}$ is the total Baseline Network Risk Output for a Risk Sub-Category as set out in Tab 1.1 (Baseline Network Risk Output) of the NARM Workbook.

## Section D: Licensee's Reported Delivery

7.12 On or before 31 October 2026, the licensee is required by Part D of SpC 3.1 of the RIIO-ET2, RIIO-GT2 and RIIO-GD2 licences to provide to the Authority a report (the NARM Closeout Report), which includes the licensee's views of the value of the following terms for each Risk Sub-Category (units in parentheses):

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[16] Ofgem's consultation page for the NARM workbooks is:
https://www.ofgem.gov.uk/publications/consultation-issuing-network-asset-risk-workbooks-and-network-asset-risk-metric-handbook

a) $NRO_{OR}$ (R£m): the licensee's ONRO where these are relevant to the particular Risk Sub-Category.

b) $NXP_{OR}$: the total NARM related costs incurred by the licensee in delivering its $NRO_{OR}$ (in £m) for each Risk Sub-Category.

c) $NIR_{OR}$ (R£m): the total contribution of identified Non-Intervention Risk Changes on $NRO_{OR}$ for each Risk Sub-Category. This figure could be positive or negative depending on the net impact of the Non-Intervention Risk Changes.

d) $CIO_{OR}$ (R£m): the Network Risk Outputs from ~~projects~~ delivery elements that, in the licensee's view, meet specified criteria for Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery[17] ~~projects~~, where these are relevant to the particular Risk Sub-Category. $CIO_{OR}$ is positive in the case of Over-Delivery and negative in the case of Under-Delivery.

The licensee is also advised to include the breakdown of these values by project, specifically the ONRO attributable to each project, its associated costs, and the contribution of identified Non-Intervention Risk Changes. Individual projects that the licensee considers qualify for Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery should be specifically indicated.

The licensee is also advised to include in the NARM Closeout Report their view of the value of the following term for each Risk Sub-Category (units in parentheses):

e) $CIX_{OR}$ (£m): any additionally incurred NARM related costs or unspent allowances associated with ~~projects~~ delivery elements that meet specified criteria for Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery ~~projects~~ where these are relevant to the particular Risk Sub-Category. $CIX_{OR}$ is positive in the case of Over-Delivery and negative in the case of Under-Delivery.

7.13 In addition, in its NARM Close Out Report the licensee must provide justification cases for any portions of Over-Delivery or Under-Delivery against Baseline Network Risk Outputs that the licensee~~, or the Authority,~~ considers to be justified. This is addressed in further detail in Chapter 8.

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[17] Further detail can be found in Chapter 10:Clearly Identifiable Over-Delivery and Clearly Identifiable Under-Delivery

## Section E: The Authority's Delivery Assessment

7.14    Following review and assessment of the licensee's NARM Closeout Report, the Authority will determine values for the following terms (units in parentheses) for each Risk Sub-Category:

a)  $NIR_{OD}$ (R£m): the determined total contribution of identified Non-Intervention Risk Changes on the $NRO_{OR}$, with respect to the relevant Risk Sub-Category.

b)  $CIO_{OD}$ (R£m): the determined Network Risk Outputs from ~~projects~~ <u>Over-Delivery or Under-Delivery elements</u> that meet specified criteria for<u>, and the Authority deems should be classified as,</u> Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery ~~projects~~, with respect to the relevant Risk Sub-Category. The <u>Over-Delivery or Under-Delivery elements</u> ~~projects~~ within each Risk Sub-Category are grouped to produce an aggregate value for $CIO_{OD}$ on a Risk Sub-Category basis. $CIO_{OD}$ is positive in the case of aggregate Over-Delivery and negative in the case of an aggregate Under-Delivery.

c)  $CIX_{OD}$ (£m): the determined additional incurred costs or unspent allowances associated with each <u>Over-Delivery or Under-Delivery element's</u> ~~project's full risk output~~ <u>Network Risk Output</u> that meet specified criteria for<u>, and the Authority deems should be classified as,</u> Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery ~~projects~~, with respect to the relevant Risk Sub-Category. The <u>Over-Delivery or Under-Delivery elements</u> ~~projects~~ within each Risk Sub-Category are grouped to produce an aggregate value for $CIX_{OD}$ on a Risk Sub-Category basis. $CIX_{OD}$ is positive in the case of Over-Delivery and negative in the case of Under-Delivery.

d)  $NRO_{BLAD}$ (R£m): the Baseline Network Risk Outputs adjusted for $NIR_{OD}$ calculated in accordance with Formula 2:

**Formula 2**

$$NRO_{BLAD} = NRO_{BL} + NIR_{OD}$$

e)  $UCR_{BLAD}$ is calculated in accordance with Formula 3:

**Formula 3**

$$UCR_{BLAD} = \frac{NXP_{BL}}{NRO_{BLAD}}$$

f) $NRO_{OAD}$ (R£m): the Outturn Network Risk Output (ONRO) adjusted $CIO_{OD}$, calculated in accordance with Formula 2 for each relevant Risk Sub-Category:

**Formula 4**

$$NRO_{OAD} = NRO_{OR} - CIO_{OD}$$

g) Application of the justified[18] proportion of any Under-Delivery or Over-Delivery (JUS (%)):

- In an Over-Delivery case (i.e. where $NRO_{OAD}$ + ~~$CID_{OD}$~~ > $NRO_{BLAD}$), JUS is the proportion of Over-Delivery ($NRO_{OAD}$ – $NRO_{BL}$) the Authority determines to be justified.

- In an Under-Delivery case (i.e. where $NRO_{OAD}$ + ~~$CID_{OD}$~~ < $NRO_{BLAD}$), JUS is the proportion of under-delivery ($NRO_{BL}$ - $NRO_{OAD}$) the Authority determines to be justified.

- If the Authority determines that the licensee's delivery is within the Deadband (i.e. [$NRO_{BLAD}$ * (100% - DB)] < $NRO_{OAD}$ + ~~$CID_{OD}$~~ < [$NRO_{BLAD}$ * (100% + DB)]) then JUS = 100%. Where DB is the Deadband value and has the value for each sector given in Table 3 below.

**Table 3 - Deadbands for each sector**

| Sector | Deadband |
|--------|----------|
| ET | 2% |
| GT | 5% |
| GD | 5% |

- For the avoidance of doubt, the Deadband will apply to the relevant Risk Sub-Category.

- A justification percentage will be determined for each project within the Risk Sub-Category that has seen an Under-Delivery or Over-Delivery. The JUS (%) for a given Risk Sub-Category will be calculated by weighting each project's justification percentage by its relative efficient incurred costs.

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[18] Chapter 8~~10~~ sets out further guidance on the information that the licensees must provide for an Under-Delivery or Over-Delivery to be considered justified.

- A separate justification percentage for each Clearly Identifiable Over-Delivery and Under-Delivery element will also be determined, and then aggregated to the Risk Sub-Category level (JUS$_{CI}$).

h) NXP$_{OAD}$ (£m): the licensee's NARM related incurred costs (NXP$_{OR}$) adjusted for CIX$_{OD}$ is calculated in accordance with Formula 5 for each relevant Risk Sub-Category:

**Formula 5**

$$NXP_{OAD} = NXP_{OR} - CIX_{OD}$$

i) UCR$_{OAD}$ (£m/R£m): the adjusted out-turn Unit Cost of Risk Benefit is calculated in accordance with Formula 6 for each relevant Risk Sub-Category:

**Formula 6**

$$UCR_{OAD} = \frac{NXP_{OAD}}{NRO_{OAD}}$$

## Section F: Final Funding Calculation

7.15 Final Allowed Expenditure (NXP$_{FAC}$) will be calculated in aggregate in accordance with Formula 7:

**Formula 7**

$$NXP_{FAC} = \sum_{j=Sub\ Category} \left[ \sum_{i=Delivery\ Element\ (DE)} \left[ NRO_{FAC_{i,j}} \times UCR_{FAC_{i,j}} \right] + CIX_{OD_{i,j}} \right]$$

Where:

a) NXP$_{FAC}$ (R£m): the licensee's Final Allowed Expenditure, for a given Delivery Element (see Table 4 below) for a particular Risk Sub-Category *j.*

b) NRO$_{FAC}$ (R£m): the final Network Risk Output value, for a given Delivery Element (see Table 4 below), for a particular Risk Sub-Category *j.*

c) UCR$_{FAC}$ (£/R£): the final allowed Unit Cost of Risk, for a given Delivery Element (see Table 4 below), for a particular Risk Sub-Category *j.*

d) CIX$_{OD}$ (£m): the final additional incurred costs or unspent allowances associated with each Over-Delivery or Under-Delivery element's Network Risk Output project's full risk output that meet specified criteria for, and the Authority deems should be classified as, Clearly Identifiable Over-Delivery or

Clearly Identifiable Under-Delivery ~~projects~~, for a given Delivery Element (see Table 4 below), for a particular Risk Sub-Category *j*.

e) Where *j*: the Risk Sub-Category where *j* = 1 to 7 for Electricity Transmission, *j*=1 to 3 for Gas Transmission, and *j*=1 for Gas Distribution.

f) where i: the Delivery Element (DE).

**Table 4: NRO$_{FAC}$ and UCR$_{FAC}$ formula for relevant Delivery Element**

| Delivery Element (DE) | Value of Final Allowed Risk Output (NRO$_{FAC}$) for each Delivery Element (DE) | DAF Term | Value of Final Allowed Unit Cost of Risk (UCR$_{FAC}$) for each Delivery Element (DE) |
|---|---|---|---|
| Baseline | =NRO$_{BLAD}$ | DAF$_{BL}$ | = UCR$_{BLAD}$ − (DAF$_{BL}$ x (UCR$_{BLAD}$ − UCR$_{OAD}$)) |
| Justified Under-Delivery | =Minimum [0, JUS x (NRO$_{OAD}$ − NRO$_{BLAD}$)] | DAF$_{UJ}$ | = UCR$_{BLAD}$ − (DAF$_{UJ}$ x (UCR$_{BLAD}$ − UCR$_{OAD}$)) |
| Unjustified Under-Delivery | =Minimum [0, (100% − JUS) x (NRO$_{OAD}$ − NRO$_{BLAD}$)] | DAF$_{UU}$ | = UCR$_{BLAD}$ − (DAF$_{UU}$ x (UCR$_{BLAD}$ - UCR$_{OAD}$)) |
| Justified Over-Delivery | =Maximum [0, JUS x (NRO$_{OAD}$ − NRO$_{BLAD}$)] | DAF$_{OJ}$ | = UCR$_{BLAD}$ − (DAF$_{OJ}$ x (UCR$_{BLAD}$ − UCR$_{OAD}$)) |
| Unjustified Over-Delivery | =0 | DAF$_{OU}$ | = UCR$_{BLAD}$ − (DAF$_{OU}$ x (UCR$_{BLAD}$ − UCR$_{OAD}$)) |

7.16 The DAFs for each Delivery Element reference as part of the calculations within Table 4 are:

- The DAF for the Baseline (DAF$_{BL}$)
- The DAF for Justified Under-Delivery, (DAF$_{UJ}$)
- The DAF for Unjustified Under-Delivery, (DAF$_{UU}$),
- The DAF for Justified Over-Delivery (DAF$_{OJ}$), and
- The DAF for Unjustified Over-Delivery (DAF$_{OU}$)

All have a value of 0% (zero) for RIIO-2 for all sectors. The effect of this is that for RIIO-2, UCR$_{FAC}$=UCR$_{BLAD}$ for all Delivery Elements.

7.17 The values of $NRO_{FAC}$ and $UCR_{FAC}$ will be calculated as per the formula for the relevant Delivery Element given in Table 4. The Final Allowed Expenditure is summed for each relevant Delivery Element and Risk Sub-Category to give the total Final Allowed Expenditure value ($\underline{NXP_{FAC}}$).

7.18 As $NRO_{BL}$ is constant and $DAF_{BL}$ is zero for RIIO-2, the allowance associated with the baseline element of delivery will be constant. The Over-Delivery and Under-Delivery Elements apply positive or negative adjustments to the Baseline Allowed NARM Expenditure.

## Section G: Interaction with Other Funding Mechanisms

7.19 The items allocated to NARM Funding Category A2, as per the NARM Workbook, are funded under other mechanisms. Any Network Risk Outputs from these projects or activities, if funded under another mechanism, will not count towards the licensee's ONRO ($NRO_{OR}$).

7.20 Should an item (e.g. project or activity) listed as NARM Funding Category A2, as per the NARM Workbook, no longer be eligible for funding under the original mechanism then, in the event of them being delivered, the item should be considered as part delivery of NARM Funding Category A1 for any Network Risk Outputs. Therefore, Network Risk Outputs from these items may count towards the licensee's ONRO ($NRO_{OR}$).

## Section H: NARM Excluded Price Control Deliverables

7.21 The items allocated to NARM Funding Category A3 as per the NARM Workbook have been ring-fenced with separate Price Control Deliverables (PCDs) and funding. Any Network Risk Outputs from these projects or activities will not count towards the licensee's ONRO.

## Section I: Application of a penalty for under-delivery

7.22 A penalty (PEN) will be applied in the case of ~~all~~ Unjustified Under-Delivery, ~~projects, including those that are Clearly Identifiable~~including for any Clearly Identifiable Under-Delivery elements that are determined to be unjustified. The penalty value will be 2.5% of the NARM funding adjustment associated with Unjustified Under-Delivery, and will be calculated in accordance with Formula 7. No penalty will be applied to other Delivery Elements.

METHODOLOGY

**Formula 7**

$$PEN = 2.5\% \times (100\% - JUS) \times (NXP_{BL} - NXP_{FAC} + CIX_{OD})$$
$$- 2.5\% \times (100\% - JUS_{CI}) \times CIX_{OD}$$

## Section J: Input to the RIIO-3 Price Control Financial Model (PCFM)

7.23   The licensee's RIIO-3 allowed revenue will be adjusted, through the RIIO-3 PCFM (or equivalent model), to appropriately reflect the Authority's determined values of $NXP_{FAC}$ and PEN.

**METHODOLOGY**

METHODOLOGY

# 8. Guidance on the provision of justification for Over-Delivery and Under-Delivery

8.1    The following guidance provides further clarification on the justification for Over-Delivery and Under-Delivery against the BNRO (which is identical to the $NRO_{BL}$ in in previous sections) for the Gas Distribution, Gas Transmission and Electricity Transmission sectors for the relevant part of the close-out report submission.

## Guidance for justification of Over-Delivery and Under-Delivery

8.2    The overall extent of justification for Over-Delivery and Under-Delivery will depend on the size of the variation from the BNRO (i.e. the difference between the Outturn Network Risk Output (ONRO) delivered and the BNRO) and the complexity of the changes in the intervention plan that underpin the variation, including the Over-Delivery and Under-Delivery elements that make up the net impact. An Over-Delivery or Under-Delivery will be defined as material and therefore requiring justification when it is beyond the Deadband, as outlined in Chapter 7 (Section E) around the BNRO. Any Over-Delivery or Under-Delivery within the Deadband will be classed as non-material and therefore will not require justification.

8.3    For some, or all, of the Over-Delivery and Under-Delivery to be considered justified, the licensee is required to satisfactorily complete all of the following requirements as part of its NARM Closeout Report. Where Over-Delivery and Under-Delivery is the result of work undertaken by licensees which could not be foreseen as the result of changes to legal or regulatory obligations, justification will still be required but will be limited to items a) to c) specified below. The NARM Closeout Report must:

a. on a project-by-project or programme-by-programme basis, or based on key Over-Delivery or Under-Delivery drivers, set out the proportion of the Over-Delivery or Under-Delivery that the licensee considers to be justified together with supporting rationale.

b. provide a detailed explanation of why the factors driving Over-Delivery or Under-Delivery could not reasonably have been forecast as part of the price control setting process and factored into the licensee's final NARM Workbook. For example, new Health and Safety requirements, changes to the Electricity

Safety, Quality and Continuity Regulations (ESQCR), faults or obsolescence of equipment, or constraints on the ability to carry out work which were outside the licensee's control.

c. set out the steps that the licensee has taken to provide the Authority with early notice in writing (via post or email correspondence) of the potential Over-Delivery or Under-Delivery, including reference to relevant communications. Such information should be submitted as part of the licensee's annual RIGs submissions however, where it has not been possible to provide information in the RIGs or where additional context is required, separate notification letters may also be provided.

d. clearly explain and tabulate the changes to the licensee's intervention plans from the assumptions supporting the expenditure allowances set out in Appendix 1 of SpC 3.1 and the NARM Workbook that have led to the Over-Delivery or Under-Delivery, including:

   i. additional interventions that have been brought forward from RIIO-3, deferred into RIIO-3, or have otherwise led to a change in its intervention plans.

   ii. explanation of any direct relationships between Over-Delivery or Under-Delivery in Risk Sub-Categories and Over-delivery or Under-Delivery in other Risk Sub-Categories.

   iii. trading-off of interventions between schemes, programmes of work or types of intervention within Risk Sub-Categories.

   iv. the changes in cost associated with the changes in interventions relative to those detailed in its NARM Workbook, and the net change in cost associated with the Over-Delivery or Under-Delivery.

e. provide rationale for the high-level asset management decision(s) which led to Over-Delivery or Under-Delivery and an explanation of what other options were considered, including:

   i. an overarching engineering justification.

   ii. engineering justification papers for the most material changes in the plan at the scheme/project level, asset class or asset category level, or based on programmes of work, including evidence of an appropriate level of stakeholder engagement and views on the changes in Network Risk Outputs delivery.

   iii. an explanation of mitigating actions taken for the potential Over-Delivery or Under-Delivery including justification for those actions.

METHODOLOGY

8.4     The engineering justification papers must include clear cross-references to the licensee's final NARM Workbook, and include cost-benefit analysis in accordance with the RIIO-2 Business Plan and Investment Decision Pack guidance. The engineering justification papers should:

    a. include options for delivery both in line with the relevant components of both the BNRO and the ONRO delivered that relate to any Over-Delivery or Under-Delivery.

    b. include costs and benefits based on the lifetime of interventions and relevant benefits beyond those captured by the Network Risk Outputs.

    c. explain why the ONRO delivered provides a better outcome for consumers than lower/higher levels of delivery, including delivery in line with the relevant components of the BNRO.

    d. explain why the work that led to the Over-Delivery or Under-Delivery could not reasonably have been deferred/carried out.

    e. include sensitivity analysis, where suitable, and test and demonstrate the sensitivity of results to the value of key assumptions. The CBAs should include clear referencing to the licensee's NARM Workbook (NARW).

    f. explain and provide relevant references to any interlinkages with the licensee's RIIO-3 Business Plan.

    g. provide an explanation of any key changes other than asset risk which may have driven the Over-Delivery or Under-Delivery such as faults or obsolescence of equipment, together with quantification of the impact of these factors on the Network Risk Output delivery.

    h. clearly articulate the impact of Over-Delivery or Under-Delivery on other areas of work, such as broader PCDs, Output Delivery Incentives, and licence obligations, where relevant.

# 9. Guidance on the treatment of Non-intervention Risk Changes

9.1 Non-Intervention Risk Changes are changes to the assessed risk of an asset or group of assets as a result of factors other than the categories of interventions and/or projects intended to be directly funded through Baseline Allowed NARM Expenditure. These include faster or slower deterioration, a change in the NARM methodology, consequence of failure changes, and data cleansing. It is necessary to normalise for the effect of Non-Intervention Risk Changes to compare the ONRO and the BNRO for the purpose of implementing the NARM Funding Adjustment and Penalty Mechanism.

9.2 The impact of Non-intervention risk changes will depend on whether an asset is included in the BNRO. Where an asset is included in the BNRO and its condition score has changed, it will be necessary to normalise the BNRO such that the post-normalised BNRO reflects the revised monetised risk benefit of the intervention. However, where an asset is excluded from the BNRO and a condition score and/or criticality has changed, it will not be necessary to normalise the BNRO but the ONRO must be based on the updated condition score and/or criticality of the asset to reflect the latest information. This helps to ensure licensees are prioritising appropriately between different assets.

9.3 The following guidance is intended to provide a framework for the treatment of Non-Intervention Risk Changes in respect of the Gas Distribution, Gas Transmission and Electricity Transmission sectors.

9.4 For the avoidance of doubt, the guidance provided in this chapter relates to normalisations to the BNRO as a result of Non-Intervention Risk Changes and highlights that the ONRO must always be reported using the latest information on condition and criticality.

## Faster or slower deterioration than forecast

9.5 Licensees will be held neutral for faster or slower deterioration than that forecast in the BNRO where the change has not been driven by the licensee's action.

METHODOLOGY

## NARM Methodology changes

9.6     Where NARM Methodology changes (other than consequence of failure changes) have an impact on the licensee's performance relative to the BNRO, these will be addressed through rebasing as highlighted in paragraph 4.7. The treatment of consequence of failure changes should be grouped with other consequence of failure changes and will be addressed as Non-Intervention Risk Changes through normalisation of the BNRO.

## Consequence of failure changes

9.7     Consequence of failure changes will be grouped into three categories:

Category 1: Network configuration parameters that are fixed for the purposes of setting out the Network Risk Outputs in the RIIO-2 period for the purpose of the NARM Funding Adjustment and Penalty Mechanism as set out in Appendix 5.

For these cases, no adjustments need to be applied. However, licensees are required to still account for changes in these parameters in their decision-making, for example by factoring them into the CBA used to inform the decisions. This should be done based on the position at the time the licensee makes decisions. As long as they have been appropriately taken into account in decision-making, they will be taken as part of a valid justification for Over-Delivery or Under-Delivery, and provided other justification criteria (as outlined in Chapter 8) are also met.

Category 2: Consequence of failure financial parameters that are variable and where normalisations will be made to ensure neutrality.

For example, there may be changes in financial parameters such as asset replacement costs or the cost of carbon. The impact of these changes should be estimated and normalisations to the Network Risk Output delivered will be made to keep the licensee neutral. Licensees are required to account for changes in its decision-making in order to provide justification at RIIO-2 closeout.

<u>Category 3: Indirect interventions</u> to reduce the consequence of failure.

These will be treated in the same way as a work substitution to allow some benefit to be retained by the licensee. This means that they will feed through to the NARM Funding Adjustment and Penalty Mechanism.

## Data cleansing

9.8 Licensees will be held neutral for all properly-evidenced data cleansing that has been carried out. However, if data cleansing exceeds a 'guide level' (as outlined in paragraph 9.12) that the Authority would expect from a licensee that is managing its assets effectively, this may be subject to a case-by-case investigation and, if any element of data cleansing is found not to be appropriate then a licensee will not be held neutral for that proportion.

9.9 For the avoidance of doubt, any data cleansing will be determined as a change relative to the asset data used at the time of business plan preparation as per the licensee's asset management systems.

*Definition of data cleansing*

9.10 Data cleansing is defined as: "The activity of detecting and correcting either missing or inaccurate records where correction results in a change to the Asset Register volumes, condition, or criticality data." This includes:

a. changes in asset volumes due to a measurement, survey or transcription error, e.g. if previous surveys had given overhead line route length at 1.0 km but some volumes had been missed which results in a corrected route length of 1.1 km.

b. changes in previously reported data due to an error or omission in a previously assessed condition score or other NARM input variable. For example, if an Electricity Transmission licensee had previously given a transformer a Dissolved Gas Analysis (DGA) score of 150, and, on review, the licensee found that the scoring did not consider a relevant piece of information that was available at the time and should have resulted in a DGA score of 200. Or, if scoring is corrected to enter a previously omitted key component of criticality, such as the number of customers affected by an outage for a particular asset.

c. transcription errors, e.g. if a physical inspection document had a DGA score of 15 but this was entered into the asset management system used for reporting as a score of 51.

d. removal of duplicate asset entries.

9.11 The definition of data cleansing does not include:

a. updated asset data stemming from a new inspection or survey (as opposed to missing or inaccurate data).

b. faster or slower deterioration of assets than previously assumed.

c. installation of new assets or disposals of assets.

d. any other change based on new information that was not available at the time the previous assessment was made.

*'Guide level'*

9.12 For the specific purposes of data cleansing, 'defined level' referred to in paragraph 9.8 above will be taken to mean: "The position where the volume of data cleansing is less than an indicative 0.5% of the network company's aggregate NARM Asset base in total volume terms at the start of the RIIO-2 period". Where multiple fields are updated for a single asset as part of data cleansing, this will only count as one item for the percentage of assets have been cleansed.The figure is indicative and is intended as a guide due to the uncertain nature associated with any future data cleansing activities that may be required. Further engagement during the RIIO-2 period, specifically linked to licensees' regulatory reporting, is expected on a sector-by-sector basis to determine the final position of the 'defined level' figure.

## Regulatory reporting

9.13 For relevant Non-Intervention Risk Changes, where the Authority will apply adjustments as described in paragraph 9.2, licensees will be expected to report changes as part of their annual RIIO-2 RIGs reporting.

9.14 In providing its reporting, each licensee is required to provide details of:

- the Non-Intervention Risk Change;
- the reasons for the change;
- the estimated impact of the change on the Network Risk Output delivery; and
- any associated implications for other delivery.

METHODOLOGY

9.15   For smaller (de minimis) changes (as defined in the RIGs), rather than the individual impact being reported, the details of the estimated aggregate impact is required to be provided.

# 10. Guidance on qualifying criteria for Clearly Identifiable Over-Delivery and Clearly Identifiable Under-Delivery

10.1   The NARM Funding Adjustment and Penalty Mechanism approach avoids the need for ex-post project-by-project assessment except in ~~rare~~ cases where ~~a small number of~~ projects are clearly identifiable as driving an Over-Delivery or Under-Delivery.

10.2   Where ~~a small number of~~ projects/schemes/programmes of work are clearly identifiable as driving an Over-Delivery or Under-Delivery, these will be normalised out of the delivered output and outturn costs and will be subject to an ex-post assessment as shown in paragraph 7.12. A separate adjustment for clearly identifiable projects, more reflective of the relevant outputs and costs, will be made in setting the Final Allowed Expenditure, as shown in paragraph 7.13.

10.3   The Final Allowed Expenditure (NXP$_{FAC}$) will be calculated using the adjusted output delivery (revised to add in Justified Over-Delivery and remove Under-Delivery) and the Unit Cost of Risk Benefit. Where justified, any clearly identifiable <u>delivery elements of </u>projects that have caused an Over-Delivery or Under-Delivery will then be added back in.

10.4   The qualifying criteria specified further below will be considered when determining the values for the terms in Table 5 below for the purpose of implementing the NARM Funding Adjustment and Penalty Mechanism.

**Table 5: Clearly Identifiable Over-Delivery and Under-Delivery terms**

| Term | Description | Determined By |
|---|---|---|
| $CIO_{OR}$ | the relevant Network Risk Outputs from ~~projects~~ delivery elements that, in the licensee's view, meet the specified criteria for Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery ~~projects~~. <br><br> $CIO_{OR}$ is positive in the case of Over-Delivery and negative in the case of Under-Delivery. | Licensee |
| $CIX_{OR}$ | the licensee's view of the additionally incurred costs or unspent allowances associated with ~~projects~~ delivery elements that meet the specified criteria for Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery ~~projects~~. <br><br> $CIX_{OR}$ is positive in the case of Over-Delivery and negative in the case of Under-Delivery. | Licensee |
| $CIO_{OD}$ | the determined Network Risk Outputs from ~~projects~~ Over-Delivery or Under-Delivery elements that meet the specified criteria for, and the Authority deems should be classified as, Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery ~~projects~~. <br><br> $CIO_{OD}$ is positive in the case of Over-Delivery and negative in the case of Under-Delivery. | Authority |
| $CIX_{OD}$ | the determined efficient additionally incurred costs or unspent allowances associated with Over-Delivery or Under-Delivery element's Network Risk Output~~project's full risk output~~ that meet the specified criteria for, and the Authority deems should be classified as, Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery ~~projects~~. <br><br> $CIX_{OD}$ is positive in the case of Over-Delivery and negative in the case of Under-Delivery. | Authority |

**Qualifying criteria for consideration as Clearly Identifiable Over-Delivery or Under-Delivery**

*Clearly Identifiable Over-Delivery*

10.5    To qualify as Clearly Identifiable Over-Delivery, an Over-Delivery element ~~, and not the full project,~~ must meet the following criteria:

1.      Outputs and costs must both be quantifiable and separable from the overall delivery (e.g. a specific project);

2.      The Over-Delivery element must not have been specified within the licensee's RIIO-2 Business Plan, or if specified, must have been specifically excluded from BNRO at Final Determinations as reflected in the NARM Workbook (NARW).~~- This includes~~The exception to this is a case where an Over-Delivery is achieved as a result of ~~fewer assets being added to the network, or~~a reduction in ~~project~~ the scope of a baseline project, in which case this criterion will be considered met~~, regardless of whether the Over-Delivery element was specified as part of basline. .~~.

3.      The Over-Delivery element must not be specified in NARM Funding Category A3; and

4.      The Over-Delivery element must have an outturn UCR greater than 105% ~~greater~~ of the baseline UCR~~than a specified upper-threshold~~, or less than 95% ~~less than~~of ~~a specified lower-threshold~~ the baseline UCR value, for ~~a~~ the given risk sub-catergory where applicїable. ~~(see paragraph 10.9 for further detail on these values).~~

10.6    Where a ~~project~~ delivery element meets the Clearly Identifiable Over-Delivery criteria, the Authority will undertake an ex-post efficiency assessment of the associated costs.

*Clearly Identifiable Under-Delivery*

10.7    In order to qualify as Clearly Identifiable Under-Delivery, an Under-Delivery element must meet the following criteria:

1.      Outputs and costs must both be quantifiable and separable from the overall Under-Delivery (e.g. a specific project);

2.      The Under-Delivery element must be included in the licensee's BNRO and individually specified in its NARM Workbook (NARW~~It must be that Under-Delivery reflects physical intervention undertaken by the network company and it must be that the ~~;

3.      The Under-Delivery element must not be specified in NARM Funding Category A2 or A3; and

4.      The Under-Delivery element must have a UCR greater <u>than 105% of the baseline UCR</u><s>than a specified upper-threshold</s>, or less than <u>95% of the baseline UCR value, for the given risk sub-catergory where appliciable.</u> <s>a specified lower-threshold value (see paragraph 10.9 for further detail on these values).</s>

10.8   For the avoidance of doubt, this may include partial delivery of project.

10.9   Where a <s>project</s> <u>delivery element</u> meets the Clearly Identifiable Under-Delivery criteria, the licencees funding will be adjusted in line with the allowances in <s>line with</s> RIIO-2 Final Determinations.

10.10 <s>We intend to carry out further analysis before consulting in Q3 2022-23 on the appropriate level of the upper and lower threshold values</s>.

# Appendix 1    NARM Glossary

Please note that some of the terms defined in this Appendix may also be defined in the licence.  In the event of any conflicting definitions, the relevant licence definition will take precedence.

**Table 6 – NARM General Definitions**

| Term | Definition |
|---|---|
| The Authority | Has the meaning given in Standard Condition A1 (Definitions and interpretation). |
| Baseline Allowed NARM Expenditure | The allowed expenditure associated with the Baseline Network Risk Outputs as set out in Appendix 1 to Special Condition 3.1 (Baseline Network Risk Outputs). |
| Baseline Network Risk Output (BNRO) | The cumulative total, for a given Risk Sub-Category,  of Network Risk Outputs for all items allocated to 'NARM Funding Category A1' in the licensee's Network Asset Risk Workbook. |
| Baseline Unit Cost of Risk Benefit ($UCR_{BL}$) | The Unit Cost of Risk Benefit derived from Baseline Network Risk Output and associated Baseline Allowed NARM Expenditure values. |
| Business Plan (BP) | The plan that the licensee was invited to submit by paragraph 2.25 of the document titled 'RIIO-2 Sector Specific Methodology – Core document', published by the Authority on 24 May 2019. |
| Clearly Identifiable Over-Delivery | Projects/schemes/programmes of work that is individually driving Over-Delivery disproportionately more than other combined projects/schemes/programmes of work in the work plan, as determined by the criteria outlined in Section 10 of the NARM Handbook. |
| Clearly Identifiable Under-Delivery | Projects/schemes/programmes of work that is individually driving Under-Delivery disproportionately more than other combined projects/schemes/programmes of work in the work plan, as determined by the criteria outlined in Section 10 of the NARM Handbook. |

METHODOLOGY

| Term | Definition |
|---|---|
| Cost-Benefit Analysis | The process of assessing the costs, benefits and risks of alternative ways to meet objectives. The expected costs and benefits of an intervention are estimated and the trade-off between costs and benefits is considered |
| Deadband | Is the range around the Baseline Network Risk Output which the Authority will use to take a view on the proportion of Over-Delivery or Under-Delivery that has been justified. Delivery within the Deadband range is deemed to be justified whereas delivery outside of the Deadband range is not automatically deemed to be justified. The size of the Deadband for each sector is set out in Section E, Table 3. |
| Delivery Adjustment Factor (DAF) | A proportion of the difference between Baseline Unit Cost of Risk Benefit and Outturn Unit Cost of Risk Benefit that is applied in determining the Final Unit Cost of Risk Benefit.<br><br>DAF can have a value of between 0% and 100%. For RIIO-2, DAF has a value of 0%, which means that the Unit Cost of Risk Benefit is fixed at the Final Determinations level. |
| Electricity Transmission (ET) | Electricity Transmission Owners (ETOs);<br>• National Grid Electricity Transmission Plc (NGET)<br>• Scottish Hydro Electric Transmission Plc (SHET)<br>• SP Transmission Ltd (SPT) |
| Electricity Distribution (ED) | Distribution Network Operators (DNOs);<br>• Electricity North West Limited<br>• Northern Powergrid: x2 DNOs<br>• SP Energy Networks: x2 DNOs<br>• SSE Power Distribution: x2 DNOs |

METHODOLOGY

| Term | Definition |
|---|---|
| | • UK Power Networks: x3 DNOs<br>• Western Power Distribution: x4 DNOs |
| Equally Challenging | Means presenting equal or higher challenge to the licensee compared to the Baseline Network Risk Outputs, where challenge relates to the scope for a licensee to over-deliver by carrying out the same volume of interventions but selecting different assets for intervention from those assumed in the setting of the Baseline Network Risk Outputs, and the proportionate levels of over-delivery and under-delivery of Baseline Network Risk Outputs resulting from higher or lower level of intervention volumes. |
| Final Allowed Expenditure (NXP$_{FAC}$) | Means the calculation term as defined in Table 7 of this document. |
| Final Unit Cost of Risk Benefit (UCR$_{FAC}$) | Means the calculation term as defined in Table 7 of this document. |
| Gas Distribution (GD) | Gas Distribution Networks (GDNs);<br>• Cadent Gas Ltd: x4 GDNs<br>• Northern Gas Networks Ltd (NGN)<br>• Scottish & Southern Gas Networks Plc (SGN): x2 GDNs<br>• Wales and West Utilities Ltd (WWU) |
| Gas Transmission (GT) | Gas Transmission Owner;<br>• National Grid Gas plc (NGGT) |
| Justified Over-Delivery | Where a licensee provides evidence to support the delivery of a higher level of Network Risk Output than a Baseline Network Risk Output or other benchmark measure. |
| Justified Under-Delivery | Where a licensee provides evidence to support the delivery of a lower level of Network Risk Output than a Baseline Network Risk Output or other benchmark measure. |

METHODOLOGY

| Term | Definition |
|---|---|
| Long-term Monetised Risk | The Monetised Risk measured over a defined period of time greater than one year from a given start date and equal to the cumulative Single-Year Monetised Risk values over the defined period. |
| Monetised Risk (MR) | An estimation of asset risk as derived in accordance with the NARM Methodology as well as the similarly derived estimated risks associated with aggregated asset groupings, and disaggregated sub-components, as relevant. |
| Monetised Risk Benefit | The risk benefit delivered or expected to be delivered by an asset intervention, which:<br>a) is the difference between without intervention and with intervention Monetised Risk;<br>b) can be measured over one year or over a longer period of time; and<br>c) includes both direct (i.e. on the asset itself) and indirect (i.e. on adjacent assets or on the wider system) risk benefit. |
| 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 Closeout Report | The report each licensee is required to submit at the end of the RIIO-2 period under Part D of Special Condition 3.1 (Baseline Network Risk Outputs). |
| NARM Funding Adjustment and Penalty Mechanism | The mechanism for adjusting a network company's 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 company's Baseline Network Risk Outputs. |
| NARM Funding Category | Broad categorisation used to indicate scope of NARM Funding Adjustment and Penalty Mechanism and interaction with other mechanisms.<br>A1 – NARM Funding Adjustment and Penalty Mechanism |

METHODOLOGY

| Term | Definition |
|------|------------|
| | A2 - Funding Under a Separate Mechanism<br>A3 - Ring-fenced Project/Activity<br>B - Non-NARM Assets |
| NARM Methodology/ NARM Methodologies | The methodology established in accordance with Special Condition 9.2 (Network Asset Risk Metric methodology).<br><br>The NOMs Methodology in effect on 31 March 2021 is deemed to be the NARM Methodology in effect from 1 April 2021 until superseded. |
| NARM Objectives | The objectives set out in Part B of Special Condition 9.2 (Network Asset Risk Metric methodology). |
| Network Asset Risk Metric (NARM) | The Monetised Risk associated with a NARM Asset or the Monetised Risk Benefit associated with a NARM Asset intervention. |
| NARM Workbook NARW | The workbook containing the licensee's Baseline Network Risk Outputs issued by the Authority in accordance with Part F of Special Condition 3.1 (Baseline Network Risk Outputs). |
| 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 is calculated as the difference between Monetised Risk values associated with the "without intervention scenario" and the "with intervention scenario". This is measured over a period equal to the assumed intervention lifetime from the end of the Price Control Period, which can vary for asset category or specific assets and intervention types for Electricity Transmission and Gas Transmission. For Gas Distribution only the first year of risk benefit is measured following the intervention. |

| Term | Definition |
|---|---|
| NOMs Incentive Methodology | The document entitled "Network Output Measures (NOMs) Incentive Methodology" published by the Authority on 6 December 2018, as amended in accordance with Part B of Special Condition 7.10 (Closeout of the RIIO-1 Network Outputs). |
| NOMs Methodology | For ET, the methodology approved under Special Condition 2L (Methodology for Network Output Measures) of the ETOs' Electricity Transmission licences as in force on 31 March 2021. |
| | For GT, the methodology approved under Special Condition 7D (Methodology for Network Output Measures) of NGGT's licence as in force on 31 March 2021. |
| | For GD, the methodology approved under Special Condition 4G (Methodology for Network Output Measures) of the GDNs' Gas Transporter licences as in force on 31 March 2021. |
| NOMs Target | The required outputs related to relevant asset management work for each network company in RIIO-1. |
| Non-Intervention Risk Changes | Changes to the assessed risk of an asset or group of assets as a result of factors other than the categories of interventions and/or projects intended to be directly funded through Baseline Allowed NARM Expenditure as set out in section 9 of the NARM Handbook. |
| Outturn Network Risk Output (ONRO) | The Monetised Risk Benefit delivered during the Price Control Period through the licensee's Asset Interventions.Where an asset is excluded from the BNRO and a condition score and/or criticality has changed, the ONRO must be based on the updated condition score and/or criticality of the asset to reflect the latest information. |
| Outturn Unit Cost of Risk Benefit | A Unit Cost of Risk Benefit derived from a licensee's Outturn Network Risk Output (ONRO) and outturn associated cost values. |

METHODOLOGY

| Term | Definition |
|---|---|
| Over-Delivery (OD) | Delivery of a higher level of Network Risk Output than a Baseline Network Risk Output or other benchmark measure. |
| Price Control Financial Model (PCFM) | The financial model which derives the incremental changes to base revenue during the RIIO price control period. It does this by recalculating base revenues based on a limited number of updated variables. |
| Rebased Baseline Network Risk Output | A Baseline Network Risk Output that has been revised to give effect to a modified NARM Methodology as approved under paragraph 9.2.9 of Special Condition 9.2 (Network Asset Risk Metric methodology) pending the Authority's approval. If approved by the Authority, the Rebased Baseline Network Risk Output will supersede the Baseline Network Risk Output for the purposes of Special Condition 3.1 (Baseline Network Risk Output). |
| Rebasing | The process of modifying the Baseline Network Risk Output as set out in Part C of Special Condition 3.1 (Baseline Network Risk Outputs). |
| RIIO-2 Business Plan Data Template (BPDT) | The document of that name submitted by the licensee to the Authority on 9th December 2019. |
| RIIO-2 Final Determinations | The documents published by the Authority on 8 December 2020 setting out the Authority's decisions in relation to the Price Control Period. |
| RIIO-3 | The price control period that will commence on 1 April 2026 for Electricity Transmission, Gas Transmission and Gas Distribution licensees and on 1 April 2028 for Electricity Distribution licensees. |
| Risk Sub-Category | A subdivision of Baseline Network Risk Output.<br>• Electricity Transmission – 7 Risk Sub-Categories equivalent to the seven lead asset categories (Circuit Breaker, Overhead Line Conductor, Overhead Line Fittings, Overhead Line Tower, |

| Term | Definition |
|---|---|
| | Reactor, Transformer, Underground Cable). An ETO project allocated to a Risk Sub-Category according to the asset category delivering the highest risk benefit.<br>• Gas Transmission – 3 Risk Sub-Categories (Low, Medium, and High).  Interventions are allocated to Risk Sub-Category according to the average Unit Cost of Risk Benefit they deliver.<br>• Gas Distribution – no subdivision of BNRO.<br>The NARM Funding Adjustment and Penalty Mechanism operates independently for each Risk Sub-Category. |
| Risk Pound (R£) | The unit used to denote Monetised Risk values. R£ is used to differentiate from financial monetary values. |
| Single-Year Monetised Risk | The Monetised Risk measured over a given one-year time period. |
| Under-Delivery | Delivery of a lower level of Network Risk Output than a Baseline Network Risk Output or other benchmark measure. |
| 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 intervention in an asset or group of assets. |
| Unjustified Over-Delivery | Where a licensee is unable to provide reasonable evidence to support the delivery of a higher level of Network Risk Output than a Baseline Network Risk Output or other benchmark measure. |
| Unjustified Under-Delivery | Where a licensee is unable to provide reasonable evidence to support the delivery of a lower level of Network Risk Output than a Baseline Network Risk Output or other benchmark measure. |

METHODOLOGY

**Table 7 – Chapter 7 Defined Calculation Terms**

| Defined Calculation Term | Definition |
|---|---|
| DB | Deadband percentages. |
| $CIO_{OR}$ | The Network Risk Outputs from projects that in the licensee's view meet specified criteria for Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery projects, where these are relevant to the particular Risk Sub-Category. $CIO_{OR}$ is positive in the case of Over-Delivery and negative in the case of Under-Delivery. (R£m) |
| $CIO_{OD}$ | The determined Network Risk Outputs from projects that meet specified criteria for, and the Authority deems should be classified as, Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery projects, with respect to the relevant Risk Sub-Category. The projects within each Risk Sub-Category are grouped to produce an aggregate value for $CIO_{OD}$ on a Risk Sub-Category basis. $CIO_{OD}$ is positive in the case of aggregate Over-Delivery and negative in the case of an aggregate Under-Delivery.  (R£m) |
| $CIX_{OR}$ | The licensee's view of the additionally incurred NARM related costs or unspent allowances associated with projects that meet specified criteria for Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery projects where these are relevant to the particular Risk Sub-Category. $CIX_{OR}$ is positive in the case of Over-Delivery and negative in the case of Under-Delivery (£m) |
| $CIX_{OD}$ | The determined efficient additionally incurred costs or unspent allowances associated with each project's full risk output that meet specified criteria for, and the Authority deems should be classified as, Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery projects, with respect to the relevant Risk Sub-Category.  The projects within each Risk Sub-Category are grouped to produce |

METHODOLOGY

| Defined Calculation Term | Definition |
|---|---|
| | an aggregate value for $CIX_{OD}$ on a Risk Sub-Category basis. $CIX_{OD}$ is positive in the case of Over-Delivery and negative in the case of Under-Delivery (£m) |
| $DAF_{BL}$ | The DAF for the Baseline |
| $DAF_{UJ}$ | The DAF for Justified Under-Delivery |
| $DAF_{UU}$ | The DAF for Unjustified Under-Delivery |
| $DAF_{OJ}$ | The DAF for Justified Over-Delivery |
| $DAF_{OU}$ | The DAF for Unjustified Over-Delivery |
| DE | Delivery Element |
| Risk Sub- Category j | The Risk Sub-Category where j = 1 to 7 for Electricity Transmission, j=1 to 3 for Gas Transmission, and j=1 for Gas Distribution. |
| $NIR_{OR}$ | The total contribution of identified Non-Intervention Risk Changes on $NRO_{OR}$ for each Risk Sub-Category. (R£m) |
| $NIR_{OD}$ | The determined total contribution of identified Non-Intervention Risk Changes on the $NRO_{OR}$, with respect to the relevant Risk Sub-Category. (R£m) |
| $NRO_{BL}$ | The total Baseline Network Risk Output for a Risk Sub-Category as set out in Tab 1.1 (Baseline Network Risk Output) of the NARM Workbook. (R£m) |
| $NRO_{OR}$ | The licensee's Outturn Network Risk Output (ONRO) where these are relevant to the particular Risk Sub-Category. (R£m) |
| $NRO_{OAD}$ | The Outturn Network Risk Output (ONRO) adjusted for $NIR_{OD}$ and $CIO_{OD}$, calculated in accordance with Formula 2 for each relevant Risk Sub-Category. (R£m) |
| $NRO_{BLAD}$ | The Adjusted Baseline Network Risk Output taking into account adjustments for Non-Intervention Risk Changes |

METHODOLOGY

| Defined Calculation Term | Definition |
|---|---|
| $NRO_{FAC}$ | The final Network Risk Output value, for a given Delivery Element (see Table 4) for a particular Risk Sub-Category x. (R£m) |
| $NXP_{BL}$ | The total Baseline Allowed NARM Expenditure for a Risk Sub-Category for the RIIO-2 period as set out in Appendix 1 to Special Condition 3.1 of the RIIO-ET2, RIIO-GT2 and RIIO-GD2 licences. |
| $NXP_{FAC}$ | The Final Allowed Expenditure. The result of multiplying the final Network Risk Output value, for a given Delivery Element by the Final Unit Cost of Risk Benefit. (£m) This is then summed by Delivery Element and Risk Sub-Category to get the aggregated value. |
| $NXP_{OR}$ | The total NARM related costs incurred by the licensee in delivering its $NRO_{OR}$ (in £m) for each Risk Sub-Category. |
| $NXP_{OAD}$ | The licensee's NARM related incurred costs ($NXP_{OR}$) adjusted for $CIX_{OD}$ is calculated in accordance with Formula 3 for each relevant Risk Sub-Category. (£m) |
| ONRO | The Monetised Risk Benefit delivered during the Price Control Period through the licensee's Asset Interventions |
| $UCR_{BL}$ | The Baseline Unit Cost of Risk Benefit for each licensee as set out in the licensee's NARM Workbook. (£m/R£m) |
| $UCR_{BLAD}$ | The adjusted Baseline Unit Cost of Risk Benefit for each licensee based on the Adjusted Baseline Risk Output. |
| $UCR_{OAD}$ | The adjusted out-turn Unit Cost of Risk Benefit is calculated in accordance with Formula 4 for each relevant Risk Sub-Category. (£m/R£m) |

| Defined Calculation Term | Definition |
|---|---|
| $UCR_{FAC}$ | The final allowed Unit Cost of Risk , for a given Delivery Element (see Table 4 below), for a particular Risk Sub-Category x.  (£m/R£m) |
| | |

METHODOLOGY

## Appendix 2    NARM Reference library

Unless otherwise stated, the documents listed below below do not form part of the licence.

| Document | Version | Publication Date | Description | Publication URL |
|---|---|---|---|---|
| ET NOMs Methodology | Issue 18 | 7 August 2018 | The latest approved version of the ET NOMs Methodology.  Deemed to be approved NARM Methodology in effect from 1st April 2021. | https://www.ofgem.gov.uk/publications-and-updates/decision-not-reject-modified-electricity-transmission-network-output-measures-noms-methodology-issue-18 |
| GT NOMs Methodology | v2.0 | 19 June 2018 | The latest approved version of the GT NOMs Methodology.  Deemed to be approved NARM Methodology in effect from 1st April 2021. | https://www.ofgem.gov.uk/publications-and-updates/notice-intention-not-reject-national-grid-gas-transmission-s-network-output-measures-noms-methodology |
| GD NOMs Methodology | v3.2 | 14 September 2017 | The latest approved version of the GD NOMs Methodology.  Deemed to be approved NARM Methodology in effect from 1st April 2021. | https://www.ofgem.gov.uk/publications-and-updates/notice-intention-not-reject-modified-gas-distribution-network-output-measures-noms-methodology |
| RIIO-2 BPDT | - | 20 September 2019 | The data template used by ET, GT, and GD licensees to submit RIIO-2 Business Plan data related to NARM. | https://www.ofgem.gov.uk/publications-and-updates/riio-2-final-data-templates-and-associated-instructions-and-guidance |

| RIIO-2 Final Determination NARM Annex | Revised | 3 February 2021 | Ofgem's RIIO-2 Final Determinations in respect of NARM for ET, GT, and GD sectors. | https://www.ofgem.gov.uk/publications-and-updates/riio-2-final-determinations-transmission-and-gas-distribution-network-companies-and-electricity-system-operator |
|---|---|---|---|---|
| RIIO-2 Draft Determination NARM Annex | - | 9 July 2020 | Document setting out Ofgem's Draft Determinations relating to the NARM for the three Electricity Transmission Owners, for National Grid Gas Transmission, and for the eight Gas Distribution Networks. | https://www.ofgem.gov.uk/publications-and-updates/riio-2-draft-determinations-transmission-gas-distribution-and-electricity-system-operator |
| RIIO-2 Licences | - | 3 February 2021 | The revised version of the licences reflecting the licence conditions required to implement the RIIO-2 price control settlement for the transmission companies, gas distribution networks and the electricity system operator. | https://www.ofgem.gov.uk/publications-and-updates/decision-proposed-modifications-riio-2-transmission-gas-distribution-and-electricity-system-operator-licences |
| RIIO-2 framework | - | 30 July 2018 | Document detailing the approach to running the RIIO price controls. | https://www.ofgem.gov.uk/publications-and-updates/riio-2-framework-decision |
| RIIO-2 SSMD | - | 24 May 2019 | Document setting out the decision on the methodology to be applied for setting the RIIO-2 price controls for the gas distribution and gas and electricity | https://www.ofgem.gov.uk/publications-and-updates/riio-2-sector-specific-methodology-decision |

| | | | transmission networks and the electricity system operator. A separate SSMD was published for ED. | |
|---|---|---|---|---|
| RIIO-1 licence consultation | - | 30 October 2012 | Document setting out our draft thinking as to how the licences of the transmission companies and GDs may be amended to implement the RIIO-T1 and GD1 price controls. | https://www.ofgem.gov.uk/publications-and-updates/riio-t1-and-gd1-draft-licence-conditions-%E2%80%93-second-informal-licence-drafting-consultation |
| RIIO-T1 FP for NGET and NGGT | - | 17 December 2012 | Document detailing the Final Proposals (final determinations) for the RIIO-T1 transmission price controls for National Grid Electricity Transmission (NGET) and National Grid Gas (NGGT) for RIIO-1 from 1 April 2013 to 31 March 2021. | https://www.ofgem.gov.uk/publications-and-updates/riio-t1-final-proposals-national-grid-electricity-transmission-and-national-grid-gas-%E2%80%93-overview |
| RIIO-T1 FP for SHET and SPT | - | 23 April 2012 | Document detailing the Final Proposals (final determinations) for the RIIO-T1 transmission price controls for Scottish Hydro Electric Transmission (SHET) and SP Transmission (SPT) for RIIO-1 from 1 April 2013 to 31 March 2021. | https://www.ofgem.gov.uk/publications-and-updates/riio-t1-final-proposals-sp-transmission-ltd-and-scottish-hydro-electric-transmission-ltd |
| RIIO-GD1 FP | - | 17 December 2012 | Document detailing the Final Proposals (final determinations) for the RIIO-GD1 price controls for the GD companies for | https://www.ofgem.gov.uk/publications-and-updates/riio-gd1-final-proposals-%E2%80%93-overview |

| | | | RIIO-1 from 1 April 2013 to 31 March 2021. | |
|---|---|---|---|---|
| RIIO-T1 IP for NGET and NGGT | - | 27 July 2012 | Document detailing the Draft Proposals (draft determinations) for the RIIO-T1 transmission price controls for National Grid Electricity Transmission (NGET) and National Grid Gas (NGGT) for RIIO-1 from 1 April 2013 to 31 March 2021. | https://www.ofgem.gov.uk/publications-and-updates/riio-t1-initial-proposals-national-grid-electricity-transmission-and-national-grid-gas-overview |
| RIIO-T1 IP for SHET and SPT | - | 7 February 2012 | Document detailing the Draft Proposals (draft determinations) for the RIIO-T1 transmission price controls for Scottish Hydro Electric Transmission (SHET) and SP Transmission (SPT) for RIIO-1 from 1 April 2013 to 31 March 2021. | https://www.ofgem.gov.uk/publications-and-updates/riio-t1-initial-proposals-sp-transmission-ltd-and-scottish-hydro-electric-transmission-ltd |
| RIIO-GD1 IP | - | 27 July 2012 | Document detailing the Draft Proposals (draft determinations) for the RIIO-GD1 price controls for the GD companies for RIIO-1 from 1 April 2013 to 31 March 2021. | https://www.ofgem.gov.uk/publications-and-updates/riio-gd1-initial-proposals-%E2%80%93-overview |
| RIIO-ED1 final determinations | - | 28 November 2014 | Document detailing the Final Proposals (final determinations) for the RIIO-ED1 price controls for the ED companies for | https://www.ofgem.gov.uk/publications-and-updates/riio-ed1-final-determinations-slow-track-electricity-distribution-companies |

| | | | RIIO-1 from 1 April 2015 to 31 March 2025. | |
|---|---|---|---|---|
| RIIO-ED1 draft determinations | - | 30 July 2014 | Document detailing the Draft Proposals (draft determinations) for the RIIO-ED1 price controls for the ED companies for RIIO-1 from 1 April 2015 to 31 March 2025. | https://www.ofgem.gov.uk/publications-and-updates/riio-ed1-draft-determinations-consultation-slow-track-electricity-distribution-companieshttps:/www.ofgem.gov.uk/publications-and-updates/riio-ed1-draft-determinations-consultation-slow-track-electricity-distribution-companies |
| NOMs Incentive Methodology | - | 6 December 2018 | Document setting out the common methodology for implementing the RIIO-1 incentive arrangements relating to NOMs for all the four network sectors. | https://www.ofgem.gov.uk/publications-and-updates/decision-network-output-measures-noms-incentive-methodology |
| ET NOMs Rebasing decision | - | 3 December 2020 | Decision for the ET sector which ensured both target data and the reported actual delivery data are derived on the same basis (i.e. according to the same methodology). | https://www.ofgem.gov.uk/publications-and-updates/decision-approve-rebased-network-replacement-outputs-and-modify-special-condition-2m-electricity-transmission-licences-held-onshore-electricity-transmission-network-operators |
| GT NOMs Rebasing decision | - | 15 July 2020 | Decision for the GT sector which ensured both target data and the reported actual delivery data are derived on the same | https://www.ofgem.gov.uk/publications-and-updates/decision-approve-rebased-network-replacement-outputs-and-modify- |

| | | | basis (i.e. according to the same methodology). | special-condition-7e-gas-transporter-licence-held-national-grid-gas-plc |
|---|---|---|---|---|
| GD NOMs Rebasing decision | - | 12 June 2019 | Decision for the GD sector which ensured both target data and the reported actual delivery data are derived on the same basis (i.e. according to the same methodology). | https://www.ofgem.gov.uk/publications-and-updates/decision-approve-and-direct-rebased-network-outputs-gas-distribution-network-operators |
| ED NOMs Rebasing decision | - | 5 May 2017 | Decision for the ED sector which ensured both target data and the reported actual delivery data are derived on the same basis (i.e. according to the same methodology). | https://www.ofgem.gov.uk/publications-and-updates/network-asset-secondary-deliverables-rebasing-decision |
| ET1 RIGs | V6.2 | 18 April 2019 | The annual reporting requirements for the ET sector including data templates, pro-forma narrative templates, and associated guidance documents. | https://www.ofgem.gov.uk/publications-and-updates/direction-modify-regulatory-instructions-and-guidance-rigs-riio-et1-version-62 |
| GT1 RIGs | v6.2 | 7 May 2019 | The annual reporting requirements for the GT sector including data templates, pro-forma narrative templates, and associated guidance documents. | https://www.ofgem.gov.uk/publications-and-updates/direction-modify-gas-transmission-regulatory-instructions-and-guidance-rigs-riio-t1 |
| GD1 RIGs | v7.0 | 3 June 2020 | The annual reporting requirements for the GD sector including data templates, | https://www.ofgem.gov.uk/publications-and-updates/direction-make-modifications- |

| | | | pro-forma narrative templates, and associated guidance documents. | regulatory-instructions-and-guidance-rigs-riio-gd1-version-70 |
|---|---|---|---|---|
| ED1 RIGs | v5.0 | 18 April 2019 | The annual reporting requirements for the ED sector including data templates, pro-forma narrative templates, and associated guidance documents. | https://www.ofgem.gov.uk/publications-and-updates/direction-make-modifications-regulatory-instructions-and-guidance-rigs-riio-ed1-version-50 |
| RIIO-1 annual performance report | - | - | Annual report published separately for each sector which detail performance including output delivery and expenditure. | https://www.ofgem.gov.uk/regulating-energy-networks/current-network-price-controls-riio-1/riio-1-annual-performance-reports |
| RIIO Handbook | | 4 October 2010 | Developed to give stakeholders a better understanding of how the RIIO model works in practice. The handbook is a living document, adapted over time to reflect learning and development as the regulatory framework is applied to price controls. | https://www.ofgem.gov.uk/publications-and-updates/handbook-implementing-riio-model |

# Appendix 3    NARM Funding Adjustment and Penalty Calculation Model

The NARM Funding Adjustment and Penalty Calculation Model is an Excel based tool which seeks to give an indication of the potential outcomes of the NARM Funding Adjustment and Penalty Mechanism for user input scenario data.

This model is for information only.

The model has been published on Ofgem's website alongside this document.

# Appendix 4   Worked Examples: NARM Funding Adjustment and Penalty Calculations

1.1.   The following are simplified worked examples to help illustrate some of the main aspects relevant to the implementation of the NARM Funding Adjustment and Penalty Mechanism methodology.  The examples may not capture the full complexity and range of potential delivery scenarios. These worked examples do not form part of the NARM Funding Adjustment and Penalty Calculation Methodology.

## Example 1: Over-delivery scenario

1.2.   In this scenario, the licensee has an Over-Delivery on Network Risk Outputs and over-spent compared to its Baseline Allowed NARM Expenditure. For simplicity of illustration, only the final parameter values determined by the Authority are given.  The licensee's submitted values are not shown.

1.3.   The following values were set at RIIO-2 Final Determinations.

| Term | Description | Value |
|------|-------------|-------|
| $NXP_{BL}$ | the total Baseline Allowed NARM Expenditure for the RIIO-2 period | £10.0m |
| $NRO_{BL}$ | the total Baseline Network Risk Output | R£20.0m |
| $UCR_{BL}$ | Baseline Unit Cost of Risk $$UCR_{BL} = \frac{NXP_{BL}}{NRO_{BL}}$$ | 0.5 £/R£ |
| DB | Deadband around Baseline Network Risk Output | ±5% |
| | Deadband Output Range: [$NRO_{BL}$ * (1 - DB)] < $NRO_{OAD}$ < [$NRO_{BL}$ * (1 + DB)] | £19m to £21m |
| DAF | Delivery Adjustment Factor Set at 0% for every Delivery Element | 0% |
| Penalty Rate | Penalty rate for Unjustified Under-Delivery | 2.5% |

*The Authority's assessment of delivery and determination of final values*

1.4.    Following review of the licensee's submission and other relevant information, the Authority has determined the following values.

| Term | Description | Value |
|---|---|---|
| $NIR_{OD}$ | Contribution of Non-Intervention Risk Changes | 0 |
| $CIO_{OD}$ | The Network Risk Outputs from projects that meet specified criteria for Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery projects | 0 |
| $CIX_{OD}$ | the determined efficient additionally incurred costs or unspent allowances associated with Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery projects | 0 |
| $NRO_{OAD}$ | the Outturn Network Risk Output (ONRO) adjusted for $NIR_{OD}$ and $CIO_{OD}$ <br><br> Delivery of R£22.0m equates to an <u>over-delivery</u> of R£2m ($NRO_{OAD} - NRO_{BL}$). | R£22.0m |
| JUS | The proportion of Justified Over-Delivery. <br><br> The licensee has delivered R£22.0m, which is outside of the Deadband range (R£19.0m to R£21.0m) and therefore not automatically deemed to be justified. <br><br> The Authority has determined that 75% of the total £2m over-delivery has been justified. | 75% |
| $NXP_{OAD}$ | the licensee's incurred costs ($NXP_{OR}$) adjusted for $CIX_{OD}$ $$NXP_{OAD} = NXP_{OR} - CIX_{OD}$$ where $NXP_{OR}$ is the licensee's Outturn Network Risk Output (ONRO). | £12m |
| $UCR_{OAD}$ | the adjusted out-turn Unit Cost of Risk Benefit $$UCR_{OAD} = \frac{NXP_{OAD}}{NRO_{OAD}} = \frac{£12.0m}{R£22.0m}$$ | 0.55 £/R£ |

*Final Allowed Expenditure calculation*

1.5. The Final Allowed Expenditure is calculated for each relevant Delivery Element in accordance with the formulae in Table 4 as follows:

| Delivery Element (DE) | Value of Final Allowed Network Risk Output (NRO$_{FAC}$) for each Delivery Element (DE) (R£m) | Value of Final Allowed Unit Cost of Risk (UCR$_{FAC}$) for each Delivery Element (DE) (£/R£) | Final Allowed Expenditure (R£m) (NRO$_{FAC}$ x UCR$_{FAC}$) |
|---|---|---|---|
| Baseline | =NRO$_{BL}$<br><br>= R£20.0m | = UCR$_{BL}$ - DAF$_{BL}$ x (UCR$_{BL}$ - UCR$_{OAD}$)<br><br>= 0.5 £/R£ | = R£20.0m x 0.5 £/R£<br><br><br>= £10m |
| Justified Under-Delivery | Not relevant | Not relevant | Not relevant |
| Unjustified Under-Delivery | Not relevant | Not relevant | Not relevant |
| Justified Over-Delivery | =Maximum [0, JUS x (NRO$_{OAD}$ – NRO$_{BL}$)]<br><br>= 75% x R£2m<br><br>= R£1.5m | = UCR$_{BL}$ – DAF$_{OJ}$ x (URC$_{BL}$ - UCR$_{OAD}$)<br><br>= 0.5 – 0% x (0.5 – 0.55)<br>= 0.5 £/R£ | = R£1.5m x 0.5 £/R£<br><br><br><br>= £0.75m |
| Unjustified Over-Delivery | =0 | = UCR$_{BL}$ – DAF$_{OU}$ x (URC$_{BL}$ - UCR$_{OAD}$)<br><br>= 0.5 – 0% x (0.5 – 0.55)<br>= 0.5 £/R£ | = R£0.0m x 0.5 £/R£<br><br><br><br>= £0.0m |
| **Total**<br><br>**(NXP$_{FAC}$)** | $$NXP_{FAC} = \sum_{DE}(NRO_{FAC} \times UCR_{FAC}) + CIX_{OD}$$<br>CIX$_{OD}$ = 0 in this example. | | = £10.0m + £0.75m<br><br>= **£10.75m** |

1.6.   The licensee's Final Allowed Expenditure (NXPFAC) in this example is £10.75m. As the licensee spent £12.0m in delivering its Network Risk Outputs, it has over-spent by £1.25m.  This £1.25m will be subject to the TOTEX Incentive Mechanism (TIM).

*Penalty calculation*

1.7.   A penalty only applies in the case of Unjustified Under-Delivery and is therefore not applicable in this scenario.

## Example 2: Under-delivery scenario

1.8.   In this scenario, the licensee has an Under-Delivery on Network Risk Outputs and under-spent compared to its Baseline Allowed NARM Expenditure.  For simplicity of illustration, only the final parameter values determined by the Authority are given.  The licensee's submitted values are not shown.

1.9.   The following values were set at RIIO-2 Final Determination.

| Term | Description | Value |
|------|-------------|-------|
| NXP$_{BL}$ | the total Baseline Allowed NARM Expenditure for the RIIO-2 period | £10.0m |
| NRO$_{BL}$ | the total Baseline Network Risk Output | R£20.0m |
| UCR$_{BL}$ | Baseline Unit Cost of Risk $$UCR_{BL} = \frac{NXP_{BL}}{NRO_{BL}}$$ | 0.5 £/R£ |
| DB | Deadband around Baseline Network Risk Output <br><br> Deadband Output Range: <br> [NRO$_{BL}$ * (1 - DB)] < NRO$_{OAD}$ < [NRO$_{BL}$ * (1 + DB)] | ±5% <br><br><br> £19m to £21m |
| DAF | Delivery Adjustment Factor <br><br> Set at 0% for every Delivery Element | 0% |
| Penalty Rate | Penalty rate for Unjustified Under-Delivery | 2.5% |

*The Authority's assessment of delivery and determination of final values*

1.10. Following review of the licensee's submission and other relevant information, the Authority has determined the following values.

| Term | Description | Value |
|---|---|---|
| $NIR_{OD}$ | Contribution of Non-Intervention Risk Changes | 0 |
| $CIO_{OD}$ | The Network Risk Outputs from projects that meet specified criteria for Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery projects | 0 |
| $CIX_{OD}$ | the determined efficient additionally incurred costs or unspent allowances associated with Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery projects | 0 |
| $NRO_{OAD}$ | the Outturn Network Risk Output (ONRO) adjusted for $NIR_{OD}$ and $CIO_{OD}$<br><br>Delivery of R£18.0m equates to an <u>under-delivery</u> of R£2m ($NRO_{OAD} - NRO_{BL}$). | R£18.0m |
| JUS | The proportion of Justified Under-Delivery.<br><br>The licensee has delivered R£18.0m, which is outside of the Deadband range (R£19.0m to R£21.0m) and therefore not automatically deemed to be justified.<br><br>The Authority has determined that 75% of the total £2m under-delivery has been justified. | 75% |
| $NXP_{OAD}$ | the licensee's incurred costs ($NXP_{OR}$) adjusted for $CIX_{OD}$ $$NXP_{OAD} = NXP_{OR} - CIX_{OD}$$ where $NXP_{OR}$ is the licensee's Outturn Network Risk Output (ONRO). | £8m |
| $UCR_{OAD}$ | the adjusted out-turn Unit Cost of Risk Benefit $$UCR_{OAD} = \frac{NXP_{OAD}}{NRO_{OAD}} = \frac{£8.0m}{R£18.0m}$$ | 0.44 £/R£ |

*Final Allowed Expenditure calculation*

1.11. The Final Allowed Expenditure is calculated for each relevant Delivery Element in accordance with the formulae in Table 4 of Chapter 1 as follows:

| Delivery Element (DE) | Value of Final Allowed Network Risk Output (NRO$_{FAC}$) for each Delivery Element (DE) (R£m) | Value of Final Allowed Unit Cost of Risk (UCR$_{FAC}$) for each Delivery (DE) (£/R£) | Final Allowed Expenditure (£Rm) (NRO$_{FAC}$ x UCR$_{FAC}$) |
|---|---|---|---|
| Baseline | =NRO$_{BL}$<br><br>= £20.0m | = UCR$_{BL}$ - DAF$_{BL}$ x (UCR$_{BL}$ - UCR$_{OAD}$)<br><br>= 0.5 £/R£ | = R£20.0m x 0.5 £/R£<br><br><br>= £10m |
| Justified Under-Delivery | =Minimum [0, JUS x (NRO$_{OAD}$ − NRO$_{BL}$)]<br><br>= 75% x -R£2m<br><br>= -R£1.5m | = UCR$_{BL}$ − DAF$_{UJ}$ x (UCR$_{BL}$ − UCR$_{OAD}$)<br><br>= 0.5 − 0% x (0.5 − 0.44)<br><br>= 0.5 £/R£ | = -R£1.5 x 0.5 £/R£<br><br><br><br>= -£0.75 |
| Unjustified Under-Delivery | =Minimum [0, (1 − JUS) x (NRO$_{OAD}$ − NRO$_{BL}$)]<br><br>= 25% x -R£2m<br><br>= -R£0.5m | = UCR$_{BL}$ − DAF$_{UU}$ x (UCR$_{BL}$ - UCR$_{OAD}$)<br><br>= 0.5 − 0% x (0.5 − 0.44)<br><br>= 0.5 £/R£ | = -R£0.5 x 0.5 £/R£<br><br><br><br>= -£0.25 |
| Justified Over-Delivery | Not relevant | Not relevant | Not relevant |
| Unjustified Over-Delivery | Not relevant | Not relevant | Not relevant |
| Total | $NXP_{FAC} = \sum_{DE}(NRO_{FAC} \times UCR_{FAC}) + CIX_{OD}$ | | = £10.0m − £0.75m − £0.25m |

| Delivery Element (DE) | Value of Final Allowed Network Risk Output (NRO$_{FAC}$) for each Delivery Element (DE) (R£m) | Value of Final Allowed Unit Cost of Risk (UCR$_{FAC}$) for each Delivery (DE) (£/R£) | Final Allowed Expenditure (£Rm) (NRO$_{FAC}$ x UCR$_{FAC}$) |
|---|---|---|---|
| (NXP$_{FAC}$) | CIX$_{OD}$ = 0 in this example. | | = **£9.0m** |

1.12.  The licensee's Final Allowed Expenditure (NXP$_{FAC}$) in this example is £9.0m.  As the licensee spent £8.0m in delivering its Network Risk Outputs, it has under-spent by £1.0m.  This £1.0m will be subject to the TOTEX Incentive Mechanism (TIM).

*Penalty calculation*

1.13.  The penalty is applied to the unjustified portion of under-delivery:

$$PEN = 2.5\% \times (1 - JUS) \times (NXP_{BL} - NXP_{FAC})$$

$$PEN = 2.5\% \times (1 - 75\%) \times (£10.0m - £9.0m)$$

$$PEN = £6.25k$$

1.14.  The licensee incurs a penalty of £6,250 in this scenario.

## Example 3: Clearly Identificable Over-Delivery and Under-Delivery

1.15.  The criteria for evaluating which projects or schemes are set out in Chapter 10.

1.16.  The table below is a simplified comparison between the baseline and outturn position submitted by one licensee. The total has been broken down by project to enable a distinction to be made between the projects or schemes driving over and under-delivery.

| Project | Baseline | | | Outturn | | |
|---|---|---|---|---|---|---|
| | Allowance (£m) | Risk Benefit (R£m) | UCR (£/R£) | Expenditure (£m) | Risk Benefit (R£m) | UCR (£/R£) |
| 001 | 350 | 500 | 0.70 | 360 | 700 | 0.51 |
| 002 | 200 | 600 | 0.33 | 240 | 550 | 0.44 |
| 003 | 100 | 240 | 0.42 | 60 | 200 | 0.30 |
| 004 | 50 | 160 | 0.31 | 60 | 300 | 0.20 |
| 005 | 300 | 500 | 0.60 | 420 | 480 | 0.88 |
| 006 | - | - | - | 60 | 270 | 0.22 |
| Total | 1000 | 2000 | 0.5 | 1200 | 2500 | 0.48 |

1.17. For the purposes of this example, the upper and lower thresholds for the Unit Cost of Risk Benefit which are used to evaluate whether a project is in a Clearly Identifiable Over-Delivery or Clearly Identifiable Under-Delivery scenario will be set at 1.00 and 0.25 respectively.

1.18. In line with the criteria outlined in Chapter 10, project 6 has been identified as driving Over-Delivery of the Baseline Network Risk Outputs. An ex-post efficiency assessment of the associated costs will therefore be carried out by Ofgem.

| Term | Description | Value |
|---|---|---|
| $CIO_{OR}$ | the Network Risk Outputs from the projects meeting the criteria for a Clearly Identifiable Over-Delivery or Under-Delivery in the view of the licensee | R£270.0m |
| $CIX_{OR}$ | the costs associated with the projects meeting the criteria for a Clearly Identifiable Over-Delivery or Under-Delivery in the view of the licensee | £60.0m |
| $CIO_{OD}$ | the determined Network Risk Outputs from the projects meeting the criteria for a Clearly Identifiable Over-Delivery or Under-Delivery | R£270.0m |
| $CIX_{OD}$ | the determined costs associated with the projects meeting the criteria for a Clearly Identifiable Over-Delivery or Under-Delivery | £60.0m |

*Adjustment of the Outturn position*

1.19.   The outturn position is then normalised to account for the projects identified as driving Over-Delivery or Under-Delivery.

| Term | Description | Value |
|------|-------------|-------|
| NIR$_{OD}$ | Contribution of Non-Intervention Risk Changes | 0 |
| CIO$_{OD}$ | The Network Risk Outputs from projects that meet specified criteria for Clearly Identifiable Over-Delivery or Under-Delivery projects | R£270.0m |
| CIX$_{OD}$ | the determined efficient additionally incurred costs or unspent allowances associated with Clearly Identifiable Over-Delivery or Under-Delivery projects | £60.0m |
| NRO$_{OAD}$ | the adjusted Outturn Network Risk Output (ONRO) $$NRO_{OAD} = NRO_{OR} - NIR_{OD} - CIO_{OD}$$ This equates to an over-delivery of R£230.0m. $$Over\ Delivery = NRO_{OAD} - NRO_{BL}$$ | R£2,230.0m |
| NXP$_{OAD}$ | the licensee's incurred costs (NXP$_{OR}$) adjusted for CIX$_{OD}$ $$NXP_{OAD} = NXP_{OR} - CIX_{OD}$$ | £1140.0m |
| UCR$_{OAD}$ | the adjusted out-turn Unit Cost of Risk Benefit $$UCR_{OAD} = \frac{NXP_{OAD}}{NRO_{OAD}}$$ | £0.51/R£ |
| JUS | The proportion of Justified Over-Delivery. | 100% |

*Calculating Final Allowed Expenditure*

1.20.   For the purposes of this example, the Delivery Adjustment Factor (DAF) is set to 0%, in line with the RIIO-2 values. This means that the Baseline Unit Cost of Risk can be used to determine the allowed expenditure for each portion of the marginal over or under-delivery.

| Delivery Element (DE) | Network Risk Output (NRO_FAC) for each Delivery Element (DE) | Final Allowed Unit Cost of Risk (UCR_FAC) for each Delivery Element (DE) | Final Allowed Expenditure (R£m) (NRO_FAC x UCR_FAC) |
|---|---|---|---|
| Baseline | R£2000m | = $UCR_{BL}$ - $DAF_{BL}$ x ($UCR_{BL}$ - $UCR_{OAD}$)<br><br>= £0.5/R£ | = R£2000m x £0.5/R£<br><br>= £1000m |
| Justified Over-Delivery | =Maximum [0, JUS x ($NRO_{OAD}$ – $NRO_{BL}$)]<br><br>= 100% x R£230m<br><br>= R£230m | = $UCR_{BL}$ – $DAF_{OJ}$ x ($URC_{BL}$ - $UCR_{OAD}$)<br><br>= £0.5/R£ | = R£230m x £0.5/R£<br><br><br><br>= £115m |
| Justified Under-Delivery | Not relevant | Not relevant | Not relevant |
| Unjustified Over-Delivery | Not relevant | Not relevant | Not relevant |
| Unjustified Under-Delivery | Not relevant | Not relevant | Not relevant |
| **Total**<br><br>**(NXP_FAC)** | $NXP_{FAC} =$ $\sum_{DE}(NRO_{FAC} \times UCR_{FAC}) +$ $Justified\ CIX_{OD}$ | = £1115m + £60m<br><br>= **£1175m** | |

1.21. Final Allowance Expenditure is arrived at by adding costs associated with any justified over or under-delivery projects into the allowance calculations.

## Example 4: Assigning Risk Sub-Categories

1.22. The manner in which projects and interventions are assigned a risk sub-category is sector-dependant.

- Electricity Transmission: Projects are allocated to a Risk Sub-Category according to the asset category delivering the highest risk benefit.

- Gas Transmission: Interventions are allocated to a Risk Sub-Category according to the average Unit Cost of Risk Benefit they deliver.

- Gas Distribution: As there is no subdivision of BNRO and therefore only one Risk Sub-Category (network level), the terms Risk Category and Risk Sub-Category can be used interchangeably in a Gas Distribution context.

1.23. An example for Electricity Transmission has been included below for clarity.

*Assignment of Risk Sub-Categories*

| Project A | | | |
|---|---|---|---|
| **Asset Category** | **Volume** | **Cost** | **Risk Benefit** |
| OHL Conductors | 20km | £20m | R£10m |
| OHL Fittings | 20km | £40m | R£20m |
| OHL Towers | 40 | £10m | R£5m |
| | | **Total:** £70m | **Total:** R£35m |

1.24. For the above project, the associated Risk Sub-Category would be OHL Fittings as this is the asset category delivering the greatest Risk Benefit.

1.25. It should be noted that the assignment of a Risk Sub-Category to a project does not affect the associated Unit Cost of Risk. The total Risk Benefit of a project is required to be used in these calculations (as above) and not the Risk Benefit delivered through the asset defining the Risk Sub-Category.

$$UCR = \frac{NXP}{NRO} = \frac{£70m \ (Total \ Project \ Cost)}{R£35m \ (Total \ Risk \ Benefit \ Delivered)} = \frac{£2}{R£}$$

76

## Appendix 5    NARM Methodology parameters that are fixed for the RIIO-2 period

1.1.  The following table contains list of parameters that the network companies propose to hold fixed within their NARM methodologies for the duration of RIIO-2.

### Parameters to be fixed over RIIO-2 for reporting purposes

| Parameter | Parameter Description | Parameter Purpose | Common to Sector or Licensee Specific | Reference to Methodology (e.g. document, section, paragraph) | Rationale for fixing over RIIO-2 | Is this parameter updated for investment planning purposes? | Units | Fixed Values* | Next proposed review and/or update. |
|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |

This table has been redacted for this version of the Handbook at some licensees' request.  We intend to engage with licensees to agree final version for publication in future versions of the Hanbook.  The final version will contain only redactions that licensees have demonstrated to be necessary and justified.

* If single fixed value then enter the value.  If not a single fixed value then please explain how the values will be fixed.

# Appendix 6

# Appendix 7    NARM Methodology synopses

1.1.    The following are NARM methodology synopses provided from the network companies for inclusion within the NARM Handbook.

## Electricity Transmission

1.2.    In April 2016, Ofgem directed  the Electricity Transmission networks to modify the Network Output Measures (NOMs) methodology, to, amongst other requirements, develop the use of a network risk measure in place of the replacement volumes that made up the original RIIO-T1 agreement.

1.3.    A key feature of the direction was to establish a common currency for the assessment of risk across multiple asset categories, and, between both UK and international Transmission Owners.

1.4.    There is a common methodology document that establishes the principles of the NARM methodology and its application in the Electricity Transmission sector. In addition to this common methodology statement, there are two different methodologies, one for the Scottish TOs and one for NGET which are specified in respective Network Asset Risk Annex (NARA) documents. Due to differences in the asset base and functionality in each network, there are company specific calibration values included in a Licensee Specific Appendix (LSA). The LSAs are not publicly available as each TO's assets and operations remain confidential. With this in mind, a Calibration, Testing and Validation exercise were completed in August 2018 to validate that each TO's models performed in a comparable manner.

1.5.    The original T1 NOMs targets were modified in the Electricity Transmission Licence SpC 2M to equivalent rebased monetised risk targets in January 2021.

1.6.    As part of a wide range of assessment criteria to determine when to make asset interventions, Transmission Owners are increasingly adopting Monetised Risk into internal business processes, such as replacement prioritisation, maintenance optimisation and outage planning. This has direct benefits in terms of directing Capital and Operational expenditure; and delivering consumer value.

1.7.  For RIIO-T2, the NARM methodology builds upon this body of work to consider the Monetised Risk Benefit, measured over the longer term, with asset interventions within the price control period. Evaluating the differences in the Long-term Risk benefit of intervention options further promotes optimal investment.

1.8.  Asset Risk is defined as the Probability of the Failure (PoF) of each asset multiplied by the Consequences of Failure (CoF). The full details of the method employed to establish PoF and CoF by each TO are described in their respective Network Asset Risk Annexes (NARA).

## Gas Transmission

1.9.  The Methodology for Network Risk Metrics (NARM) defines how National Grid Gas plc ("NGGT"), in its role as holder of the Gas Transporter Licence in respect of the NTS (the "Licence"), will meet the requirements of the Special Conditions 3.1 and 9.2 of the RIIO-2 License.

1.10.  The Methodology is outlined in the main overview document, which summarises the approaches adopted to calculate monetised risk and long term monetised risk. The Methodology also includes several supporting documents, which detail the methods and valuations used; and a validation report which describes how we have ensured the outcomes of the applied Methodology are fit and appropriate for their intended objectives.

### Probability of Failure

1.11.  This document is aimed at stakeholders who wish to obtain a more detailed understanding of how asset failure and deterioration rates, or Probability of Failure (PoF), are calculated. All assets are modelled using Pipeline or Above Ground Installation (AGI or Site) asset risk models. A risk model describes the relationships between the failure rate (likelihood of failure per annum) and the assessed consequences of failure (number of events and monetary value of consequence, per-annum), which are then combined to calculate the annualised monetised risk of each individual asset.

1.12.  The approach taken allows asset-level monetised risk calculations to be undertaken. However, there are key differences between how Pipelines and Sites assets have been treated in the asset risk models which underpins how the failure

rate analysis was undertaken. This is explained in the document with a worked example.

**Consequence of Failure**

1.13.  This document is aimed at stakeholders who wish to obtain a more detailed understanding of how the impact of asset failure, or Consequences of Failure (CoF), are calculated.

1.14.  The consequences of failure are generally the same for both Sites and Pipelines assets. As such, the document is structured by service risk measure, rather than being split by Pipelines and Sites. Where differences in consequence calculations exist, these are noted in the relevant section.

**Service Risk Framework**

1.15.  The foundation of the Methodology is the Service Risk Framework (SRF). This consists of a set of measures that in totality describes the service performance requirements of the asset base from the perspective of NGGT, its customers and stakeholders. The modelled service risk measures, which form part of our Service Risk Framework, are summarised in the figure below.

| Category | Service Risk Measure |
|---|---|
| Safety | Health and Safety of the General Public and Employees |
| | Compliance with Health and Safety Legislation |
| Environment | Environmental Incidents |
| | Compliance with Environmental Legislation and Permits |
| | Volume of Emissions |
| | Noise Pollution |
| Availability and Reliability | Impact on Network Constraints |
| | Compensation for Failure to Supply |
| Financial | Shrinkage |
| | Impact on Operating Costs |
| Societal and Company | Property Damage |
| | Transport Disruption |
| | Reputation |

1.16. All assets on the network either directly or indirectly contribute to the delivery of one or more of the measures within the SRF.

1.17. The impact of an asset failure on one or more of the measures within the SRF provides a consistent method of assessing and articulating the consequence of asset failure and ultimately its associated monetised risk value. The SRF contains service valuations arising from the direct costs of an asset failure, e.g. cost of gas lost, asset replacement, and excludes secondary costs, e.g. impact on share value; legal costs etc. The Pipelines and Sites models share the same SRF to ensure that service risk measures valuations are assigned and treated consistently across the asset base.

**Long Term Risk and Network Output Measures**

1.18. The purpose of this document is to describe how we have used the asset-level monetised risk valuations calculated using the Probability of Failure (PoF), Consequence of Failure (CoF) and Service Risk Framework (SRF) to set our Network Risk Output (NRO) targets. The same approach will be used to report the value delivered by investments and support cost benefit analyses (CBA) undertaken in support of plan justification for RIIO-2 close-out. Long-term Monetised Risk is defined by Ofgem as: "the Monetised Risk measured over a defined period of time greater than one year from a given start date and equal to the cumulative Single-year Monetised Risk values over the defined period".

1.19. We also discuss how the Long Term (Monetised) Risk Benefit (LTRB) metric and costs of delivering the LTRB outputs are used to define a further metric, the Unit Cost of (Long Term) Risk Benefit (UCR), which is used by Ofgem to assess the efficiency delivering the NARM NRO targets.

**Validation Report**

1.20. The Validation Report describes:

- Which data inputs to the Methodology are important in quantifying monetised risk.
- The impact that these sensitive inputes have on future monetised risk outputs reporting and on investment planning.
- How we have gained confidence to use these sensitive data inputs within the Methodology.

1.21.  It also describes how we have undertaken  significant improvements to ensure that an appropriate supply and demand scenario is used and that the sensitivity of adopting alternative supply and demand scenarios is tested.

## Electricity Distribution

1.22.  Not required for this issue.

## Gas Distribution

### Principles of the NARM Methodology

1.23.  The GD Monetised Risk (MR) methodology was developed to facilitate the assessment of the health, criticality, and risk of assets. The key principles in this assessment are:

- Asset Health is the probability that the asset fails to fulfil its intended purpose and thus gives rise to consequences for the network.

- The consequences (and therefore Criticality) can be assessed in monetary terms.

- The risk is determined from the product of the number of failures, the consequence of those failures and the likelihood of those consequences being seen and is measured as a Monetised Risk output.

1.24.  Event Tree Analysis (ETA) is a graphical technique for representing the mutually exclusive sequences of events following an initiating event (an asset failure) according to the various events that may mitigate/influence its consequences. These techniques have been followed in the development of the standard Event Trees used by the GD Monetised Risk methodology.

1.25.  This technique has been adopted due to its ability to translate probabilities of different initiating events into possible outcomes. The key benefits of this technique, are:

- that failure consequences are displayed in a diagrammatic way

- that it accounts for dependencies (problematic to models in other techniques)

- that it provides a quantitative output with relatively low uncertainty

- that the resource and capability requirements are manageable

1.26. The core principle is that Risk is the product of Probability of Failure (PoF) of an asset and the Consequence (PoC) that such failure could lead to and the cost (monetised value) associated with those Consequences.

1.27. The combination of these factors derives an annual Monetised Risk (Figure 5 – Broad Monetised Risk Process).

Asset Risk Value = PoF (Asset) x PoC x Cost of Consequence

Where the:

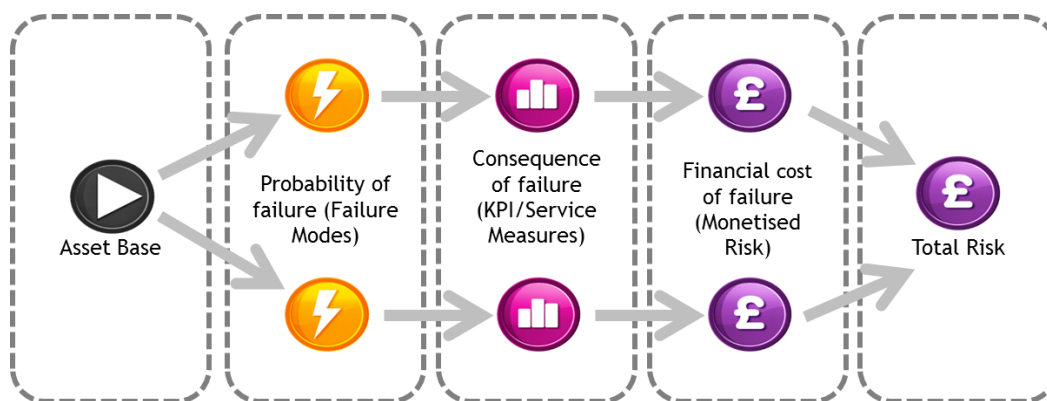Cost of Consequence= Consequence Quantity (units) x Unit monetary value



**Figure 5 – Broad Monetised Risk Process**

1.28. The Asset Risk Value calculation can be utilised to quantify the risk reduction following Intervention by comparing it to a base-line value (without-Intervention). As a result of Intervention, the PoF is reduced or maintained in line with the type of investment activity whilst PoC will generally remain unchanged, with the exception of system or network design alterations. This will in turn result in a reduction in the Asset Risk Value enabling the comparison of with/without Intervention scenarios in the form of Monetised Risk.

1.29. For each asset group that falls within the remit of GD Monetised Risk methodology, an Event Tree has been produced which models each known Failure Mode that the Asset Group could experience. This determines which of the consequence measures would be impacted by a failure of that nature. The link is made through the Event Tree showing the outcomes that can occur and the probability of each outcome.

1.30. All Event Trees are common across the GDNs and any changes to the Event Trees are subject to a joint governance process.

1.31. It is important to note that the GD Monetised Risk methodology does not include the cost of preventative interventions, it only captures the impact that these interventions have on the total cost of failure i.e. total risk.

**Scope**

1.32. The assets that fall within the scope of the GD Monetised Risk are captured with each GDNs Network Asset Risk Workbook and are listed in the table below.

| Primary Assets for Event Tree Analysis | Reporting Secondary Asset |
|---|---|
| **A - Mains** | Iron |
| **A - Mains** | PE |
| **A - Mains** | Steel |
| **A - Mains** | Other |
| **B - Services** | Asset Cohort Level |
| **C- Governors** | District |
| **C- Governors** | I&C |
| **C- Governors** | Service |
| **D – LTS Pipelines** | Piggable |
| **D – LTS Pipelines** | Non-Piggable |
| **E – Offtakes & PRS** | Offtake Metering System |
| **E – Offtakes & PRS** | Offtake Odorisation System |
| **E – Offtakes & PRS** | Offtake Preheating |
| **E – Offtakes & PRS** | PRS Pre-Heating |
| **E – Offtakes & PRS** | Offtake Filters |
| **E – Offtakes & PRS** | Slam Shut & Regulators |
| **E – Offtakes & PRS** | PRS Filters |
| **E – Offtakes & PRS** | PRS Slam Shut & Regulators |
| **F - Risers** | Risers |

**Table 1 – Assets within scope for Monetised Risk assessment**

1.33. The interventions that apply to the asset types listed above that are within the scope of the GD Monetised Risk methodology are:

- Replace
- Refurb
- Repair; and
- Decommission.

**Application**

1.34.  The GD Monetised Risk methodology enables an assessment of the impact on monetised risk of both intervening or not intervening on an asset.

1.35.  The methodology was developed to provide a comparative analysis:

- Over time
- Between geographical areas;  and
- Between network assets at an asset group level.

1.36.  The GD Monetised Risk methodology provides a delta monetised risk position at the end of the RIIO-GD period. It does not currently report Long-Term Monetised Risk for Gas Distribution, this means that the NARMs metric for GD is different to the other sectors. Ofgem have an objective for NARMs to capture Long-Term Monetised Risk, however as NARMs (through its predecessor NOMs) has been validated as a retrospective reporting tool for the short-term in GD, this has not been possible. Consequently, the main change in the NOMS to the NARMs methodology is that at Ofgem's request, interventions in GD2 will be applied at the end of the period regardless of when the physical intervention was undertaken.

**Data**

1.37.  Data sources to populate the risk map are dependent on data available and its statistical validity. They are classified as follows:

- Company-specific data (including analysed data) from a known and reliable source.
- Pooled data (using best available source across all participating companies, with appropriate extrapolation to individual companies).
- Previous studies, industry-standard or default values. Data obtained from relevant industry studies or published data sets (e.g. cost of carbon; value of a life; data from RRP tables).
- No data source exists. Data is estimated or expert judgement used or derived through elicitation processes.

**Model and Methodology Development**

1.38. The Monetised Risk Models for Gas Distribution were developed by the GDNs in partnership with Asset Risk experts, ICS Consulting and engineering experts, DNVGL. We also called in support of other experts in their fields, namely PIE for pipelines modelling and SEAMS for deterioration modelling. This was an 18-month project with monthly updates to, and feedback from Ofgem.

1.39. The GD Monetised Risk framework was developed to support Ofgem's NOMs (and later NARMs) policy and its implementation has been in development between Ofgem and the Licensees for a number of years and has evolved and matured during this time. Due to the differing stages of industry practice and timings of the price controls for the network sectors, NOMs has been set out in different ways in the sectoral licences. For the Gas Distribution sector, the licence specifies Network Outputs relating to the position at the end of the price control period with and without interventions. These are specified in the Network Asset Risk Workbook and are related to achieving a target level of risk mitigation. This change in  risk delta, is confined to investment in certain asset categories. Mechanisms outside of NOMs will set minimum investment levels for some assets, such as for the gas mains replacement programme.