Consultation Overview

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.

The Network Asset Risk Metric (NARM) Methodology ("the Methodology") objectives are:

- Provide transparent, logical links between:
  - The asset data that we collect through inspections, maintenance, and other asset management activities;
  - The data that we record in asset management systems;
  - Asset management decisions
  - Asset investment decisions
- Facilitate the monitoring of asset performance - the monitoring of the performance in relation to the development, maintenance, and operation of an efficient co-ordinated and economical transmission system and enable:
  - The robust estimation of current monetised risk, forecast/future monetised risk, single-year monetised risk, and the long-term monetised risk delivered by investments to prevent asset failures;
  - The robust estimation of the current monetised risk and long-term monetised risk benefits delivered, or expected to be delivered, through interventions on specific assets or groups of assets;
  - The identification and quantification of drivers leading to changes in monetised risk over time.
- Allow the assessment of network expenditure - the assessment of historical and forecast network expenditure on the NTS and enable to provide inputs to help explain and justify, through Cost Benefit Analysis (CBA):
  - Investment plans for managing and renewing our assets (where in scope for NARM assessment); and
  - Outturn delivery of investment options (costs, volume and risk benefits).
- Allow comparative analysis of performance over time between: different NARM asset categories and between individual NARM assets on the NTS; geographic areas of, and NARM assets within, the NTS; the NTS and other networks within the same sector; the NTS and networks outside Great Britain with similar assets should similar approaches as set out in the NARM Methodology be applied to estimate monetised risk for those networks; and the NTS and Distribution Networks within Great Britain.
- Communicate relevant information - the communication of relevant information regarding the NTS between Ofgem and other interested parties in a transparent manner and enable Ofgem to establish our Baseline Network Risk Outputs (BNRO) and to undertake an objective assessment of our BNRO delivery.

The NARM approach, underpinned by the new Long Term Risk Benefit (LTRB) and Unit Cost of Risk Benefit (UCR) measures, provides additional benefits:

- Demonstrates that the investments delivered deliver the maximum long-term benefits to customers, and deters companies from prioritising short-term measures where these are not in the consumers best interests
- Ensures companies are appropriately incentivised to select, prioritise and target these investments as efficiently as possible

Long term risk valuation is an essential step towards justifying investment through Cost Benefit Analysis (CBA); the calculated LTRB delivered by investment delivers fully quantified monetised benefit values for direct use in a CBA. Through Methodology development, we have developed risk trading, or asset investment optimisation, decision support models and tools, which fully systemise the calculation of LTRB. This investment optimisation capability allows the best combination of investment to be selected, delivering customer service requirements at the lowest cost. Investment optimisation and risk-based investment planning is beyond the scope of this document.

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

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.

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

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.

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

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

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

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

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."*

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

The Validation Report describes:

- Which data inputs to the Methodology are important in quantifying monetised risk
- The impact that these sensitive inputs 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

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.

This Consultation

NGGT originally consulted on its Methodology for Network Output Measures (NOMs) in May 2018. The NOMs Methodology was accepted by Ofgem in July 2020. Outcomes of the initial consultation were to improve the NOMs Methodology:

- To improve the sensitivity testing and modelling of alternative supply and demand scenarios
- To undertake a validation exercise to ensure the numbers produced by the Methodology were fit for purpose, to identify potential improvements and to give further information to Ofgem to allow them to issue final acceptance.

During this time, we were required to undertake a rebasing of our RIIO-1 target, to enable monetised risk to be used for RIIO-1 close-out, through the NOMs Incentive Mechanism and develop our RIIO-2 business plan, which allowed the transition between RIIO-1 and RIIO-2 to be observed.

This has meant it had not been possible to incorporate the findings of the validation exercise into our written Methodology (although it must be emphasised that these data improvements have been incorporated for the business plan cost/benefit analysis and RIIO-2 target setting).

The new Network Asset Risk Metric (NARM) approach introduces the concept of long-term monetised risk benefit (LTRB) and the unit cost of risk benefit (UCR) which is not covered explicitly in the original NOMs Methodology. LTRB is also known as the Baseline Network Risk Output (BNRO).

The changes made to upgrade our approved RIIO-1 NOMs Methodology to a RIIO-2 NARMs Methodology are as follows:

- The Main Methodology document has been updated to reflect the new requirements of NARMs and improvements identified through validation
- The three existing supporting documents: Probability of Failure, Consequence of Failure and Service Risk Framework; have been updated to incorporate improvements and errors identified through validation
- A new supporting document covering the creation of the LTRB and UCR metrics (this has previously been communicated through the commentary delivered with the NARMs data table submission)

This update does not include the following:

- Updates to baseline monetised risk numbers following updates to company systems (e.g. migration of AIM to C55; asset register refreshes)
- Changes to include our new ISO14224 Equipment Unit taxonomy, which refines how we describe and define an asset
- Updates to key model assumptions, such as the value of a loss of life, or carbon valuations (unless changed as part of the validation work). This is because these valuations will not have been used this business plan CBAs or our submitted NARMs analysis

These model changes could generate significant changes to risk outputs and require further discussion with Ofgem to agree a process and timescales prior to implementation.

For clarity, this new NARMs Methodology is fully aligned to the monetised risk and LTRB values used for RIIO-1 close-out, RIIO-2 business plan justification (including cost/benefit analysis) and RIIO-2 NARM BNRO target setting.

Key Changes

The following significant changes have been made to the assumptions and valuations, since approval of the NOMs Methodology

Change	Impact
Update to use a 1 year in 20 year demand scenario, using Future Energy Scenario (FES) 2021 base demands and Steady Progression future demands	The net impact of all these changes is a 20% increase in base year (2021) Availability and Reliability Risk. For further details see Validation Report (Section 9)
Update to the use of the Quarterly System Entry Capacity (QSEC) Reserve and Step Prices to value the loss of capability to transport and supply gas	
Removal of the flow swap capability in the event of a 1 in 20 year demand event (as unlikely to be granted)	
Increase in the compensation value of a loss of supply[1]	
Creation of a new Long Term Risk Benefit & Network Risk Outputs supporting document	No change in monetised risk valuations
Correction of errors and omissions in Main Methodology and supporting documents following validation	
Update to Action Plan in the Validation Report to reflect current status	

Next Steps

The Methodology, in addition to being a licence obligation, also forms part of National Grid's ISO55001 accredited Asset Management System and Objectives (AMSO). The AMSO includes processes for:

- Performance evaluation: including asset performance & health monitoring
- Improvement: including management review, audit and assurance

AMSO annual monitoring will be used as a basis to review the Methodology in addition to the annual review requirement specified in the RIIO-2 licence. The key parameters used in the Methodology, such as predicted rates of deterioration, costs of interventions and maintenance will be maintained and reviewed through these mechanisms.

As per License requirements, we will continue to review the Methodology, at least on an annual basis. Actual modifications to the data and assumptions contained within the Methodology will be made should we believe this would drive an improvement in the quantification of the asset risks and improve its decision making processes. We will always consult on more major changes to our Methodology and proposals will be submitted to Ofgem for approval.

[1] This is a change from £20 to £30 per day as per RIIO-1 requirements. We are aware of the new £60 compensation for loss of supply for RIIO-2, but this has not been implemented due to the need to align RIIO-1 and RIIO-2 risk valuations. This change will be implemented in later revisions