Wales & West Utilities – NOMs Rebasing Approach

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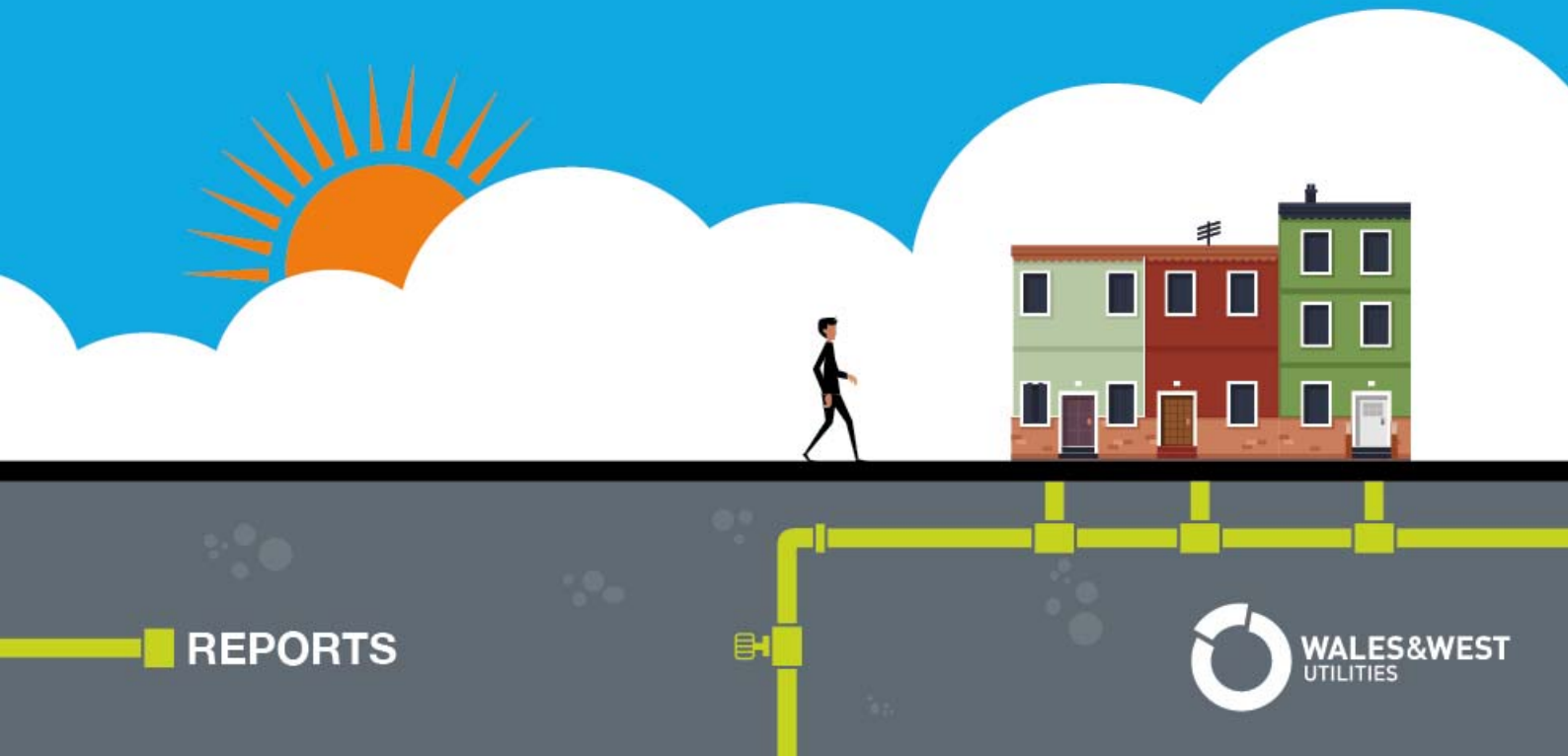

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Introduction

As part of the RIIO-GD1 framework, a secondary deliverable covering asset health and criticality was specified as part of a suite of outputs related to asset reliability. This secondary deliverable is defined within Special Condition 4G of the gas transporter licence. Associated incentive/penalty arrangements are defined within Special Condition 4H.

Special Condition 4G covers two outputs: 'asset health, criticality and risk' (HCR) and 'capacity utilisation'. Together they are known as the Network Output Measures (NOMs). The capacity utilisation measure has been fully defined, and reports have been submitted as part of the RRP for each year of RIIO-GD1. This document focuses only on HCR.

Initially, the HCR output was established as a set of indices: HI1 to HI5 for asset health, CI1 to CI4 for criticality and RI1 to RI5 for asset risk. Following direction from Ofgem, each Gas Distribution Network (GDN) submitted workbooks containing targets for the HCR output against their own individual methodologies. These targets included the following points:

- Position as at 1 April 2013
- Position as at 31 March 2021 without intervention
- Position as at 31 March 2021 with intervention

Ofgem rejected the workbooks approach having identified that the indices, as they stood, did not allow a comparison between asset groups, since each index was unique to an individual asset group. Therefore, a new methodology was derived, which expressed health as a form of reliability (failures per annum), criticality as a form of monetary consequence and risk in the form of monetised risk. Special Condition 4G requires the licensees to work together to develop and submit a NOMs Methodology for HCR.

The GDNs submitted the first NOMs Methodology in September 2015.

In its letter dated 15 December 2015, Ofgem specified that it was minded to support the submission of the NOMs methodology if aspects of the document were updated and re-submitted in March 2016. Ofgem also issued direct modifications to the NOMs Methodology under Special Condition 4G. The modifications were listed in Annex 1 to that letter. Item 4 in Annex 1 specified:

"Tracking is completed by July 2017 to establish targets using the new NOMs Methodology to ensure the new targets have an equivalent impact as the original targets."

The term 'equivalent impact' is judged to be the same as the term 'equally challenging' used *in* 'Part E: Rebasing of Special Condition 4H', where 4H.14 states that "the Network Outputs remain equally challenging as those set out in the Workbook".

The Safety and Reliability Working Group (SRWG) has interpreted this requirement to mean that each GDN will 'rebase' their 2013 business plan interventions, using the new monetised risk (MR) methodology and report the equivalent risk delta. This will allow Ofgem to evaluate the delivery of planned investment and quantify any under and over performance. The new baseline will state what any given GDN's investment outputs would have been, had the MR

methodology been used at 1st April 2013 – the start of the GD1 period. 'Intervention' in this context means the company's Business Plan for RIIO GD1 as amended by the Final Proposals (FPs) published by Ofgem on 17th December 2012.

Within the 2017 rebasing submission, WWU will report the following monetised risk outputs:

1. The monetised risk position as of 1 April 2013
2. The projected monetised risk as of 31 of March 2021, assuming no interventions were carried out from the start of the RIIO period
3. The projected monetised risk as of 31 March 2021, assuming that the interventions, published in FPs by Ofgem and accepted by the GDNs, will be carried out during the period
4. The monetised risk position as of 31 March 2017, showing the monetised risk position today, this captures the sum of actual interventions undertaken during GD1 to date

Points 1 to 3 reflect the FP position, the agreed business plan at the start of GD1. In particular, it should be stressed that the position in 2021 (Point 3) is a forecast of the risk position based on the FP; it does not represent where WWU believe they will outturn due to variations between FP workloads and actual workloads. Point 4 is a statement of the actual position in 2017; this is not necessarily the position in 2017 that might have been envisaged when the FP was agreed.

Scope

The SRWG submitted a document to Ofgem in July 2017 entitled Rebasing Methodologies. The document sets out

- the various approaches that could be adopted to restate the 2013 position for monetised risk
- a series of tests to ensure the monetised risk targets set for RIIO-GD1 have an equivalent impact as those targets set in FPs using the HI/RI indices approach

This document describes the approach WWU has taken for each asset group, namely

- Mains
- Services
- Risers
- Offtakes & PRIs
- Governors
- LTS pipelines

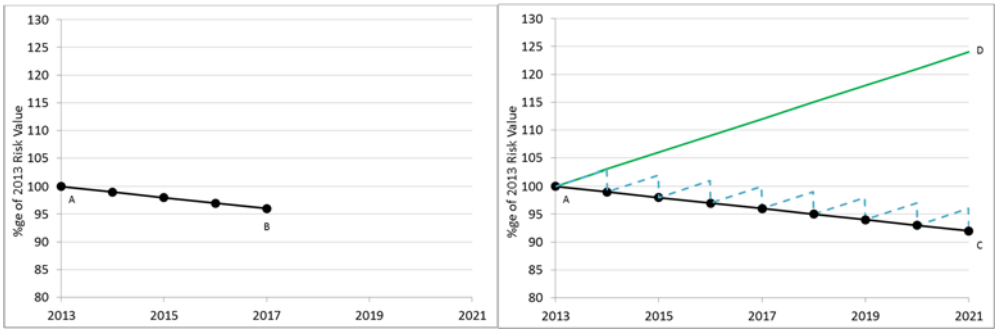
This document also provides an assessment by asset group against the tests proposed to ensure the new targets meet the requirement of having an equivalent impact of those targets agreed in FPs

Process

As the Monetised Risk Methodology has been established during the RIIO-GD1, there are currently no associated output targets set. To enable the setting of targets we have to

- calculate the 2017 position showing the current position for monetised risk based on the actual intervention plan delivered to date in RIIO-GD1
- take the current position for monetised risk and roll this back to 2013
- deteriorate the 2013 position to 2021 without any intervention on assets
- show the 2021 position with the impact of the intervention plan agreed in Final Proposals

This is illustrated below



1. Point A is the monetised risk position as of 1 April 2013
2. Point D is the projected monetised risk as of 31 March 2021, without intervention
3. Point C is the projected monetised risk as of 31 March 2021, with intervention
4. Point B is the monetised risk position as of 31 March 2017

Rebasing the 2013 monetised risk position

There are two broad methodologies that can be used to calculate the rebase starting position:

- Re-construct the 2013 asset base and apply the MR methodology
- Apply the MR methodology to today's assets, extrapolate performance to account for interventions since 2013

The following table details the approach taken by WWU for each primary asset group

Model	Methodology to Derive the 2013 Starting Position
LTS Pipelines	• WWU has had a programme of improving data quality and digitising LTS pipelines in RIIO-GD1. For this reason, the 2017 data was seen as the most accurate and therefore a 2017 dataset was used (in pipe sections, i.e. 11000 pipes rather than 200). This was then updated to incorporate 2013 known asset condition. This uses methodology 1.2 from 'Rebasing Methodologies' document but is a hybrid with methodology 1.1 as known conditions are used rather than unpicking interventions. The 2017 position was the modelled deterioration after 4 years, not the actual dataset. This was done to ensure consistency in setting targets. • All failure data was based on actual failure rates calculated by ICS consulting. These were network specific based on UKOPA faults. Each failure rate was normalised by diameter and age, then attributed to pipe sections by length. This ensures modelled failure numbers match actual failures at a population level.
Distribution Mains	• Methodology 1.2 from 'Rebasing Methodologies' document. 2017 asset base snapshot taken from core system. Failure rates calculated using data extracted from core system. • To establish the 2013 asset base, a pipe snapshot as of 31/03/2017 archived in our core system (ESRI) was used. The extract included a number of attributes such as material and diameter. These attributes were used to cohort the assets ready for MR modelling. As this snapshot comes from the company's core ESRI system, it is as accurate as it is possible to be. • All interventions carried out on these pipes between 2012/13 and 2016/17 were reversed by cohort to return the dataset back to an approximate 2013 position. Growth mains were also removed from the total length of the relevant cohorts. • The distribution mains model uses an average failure rate. To calculate the 2013 rate: o A failure rate across a seven year period (Jan 2007- December 2013) has been used. Failure rates were calculated by dividing the count of mains leaks in these years by both the live mains length in 2013 taken from archived data and the number of years of data available (seven).
Services	• Methodology 1.2 from 'Rebasing Methodologies' document. 2017 asset base snapshot taken from core system. Failure rates calculated using data extracted from core system. • To establish the 2013 asset base, the number of services was calculated based on the service population in 2017 based on DDS customers and the length of live mains as of 2017. • All interventions carried out on services between 2012/13 and 2016/17 were reversed by cohort to return the dataset back to an approximate 2013 position. Growth services were also removed from the total length of the relevant cohorts. • In line with the agreed industry practice, a WWU specific failure rate has been used in the services model. To calculate the 2013 rate: • A failure rate across a seven year period (Jan 2007 - December 2013) has been used. Failure rates were calculated by dividing the count of service leaks in these years by both the live services total population in 2013 taken from archived data and the number of years of data available

	(seven).
Risers	• Methodology 1.3 from 'Rebasing Methodologies' document. GD1 surveyed assets, with adjustment for deterioration and known interventions between 2012/13 and 2016/17, represent the 2013 riser's asset base. • At the time of submitting our GD1 plans, there was a lack of information related to risers and laterals. As such, it is not possible to have a complete asset base extract for 2012/13. • The model's asset base for 2013 includes all assets that have been surveyed in the first four years of GD1, and have been assessed as in scope of the MOBs classification. In line with the rest of the industry, the risk Table 7.3 is a statement of what is definitely known to be in the asset base at 2012/13. Consequently, an element of the asset base (that which has not been surveyed) is not included in the model. We have carried out an 'out-of-model' calculation for the risk associated with un-surveyed assets and have included this in the narrative that supports Table 7.3. • Known interventions carried out on risers and laterals between 2012/13 and 2016/17 have been reversed to return the dataset to its 2012/13 position. • The failure rates are based on 2017's failures and adjusted by asset, using the industry agreed PIE risk-scoring methodology. The risk score is also adjusted in line with the deterioration rates within the riser model to forecast the risk scores for our assets in 2013. This approach was agreed with the working group following direction from DNV GL
Offtakes	• Rewind consistent with Methodology 1.2 of 'Rebasing Methodologies' (Current dataset adjusted to model 2013 dataset) • Took an extract from SAP database to establish current population and used this as the reference population for 2013 • Set all condition scores back to last known values from pre-2013 surveys (CBRM model) and then wound these forward in the model to get the 2013 starting values • Where an asset was replaced or reformed, it was set as being in poor condition i.e. condition grade 5
Governors	• Rewind consistent with Methodology 1.2 of 'Rebasing Methodologies' (Current dataset adjusted to model 2013 dataset) • Took an extract from SAP database to establish current population and used this as the reference population for 2013 • Governor interventions are based on adjustments being made to the condition-based age, "age_effective", of the asset. Therefore, the rewind was carried out by adjusting the age_effective values. o For district and industrial & commercial governors which have not been intervened on since 2013, age_effective was simply rewound by 3 years. Those governors that have been intervened on since 2013 re. replacements/refurbs were set back to condition grade 5 i.e. a condition-based age of 35 years o Service governor age_effective values were not rewound, due to higher variability in the age_effective values and pending the results of ongoing surveying of service governor conditions • Fencing and kiosks that were replaced have been in poor condition and so their condition scores were set to 5

Calculating the 2021 without intervention position

The Monetised Risk models have been designed to analyse the impact of asset deterioration on monetised risk. The details of how this is done by asset group can be found in the NOMs Methodology document.

For WWU, the reported 2021 position without intervention is simply the 2013 position deteriorated by the Excel models.

Calculating the 2021 with intervention position

WWU have applied the Final Proposal workloads to the monetised risk models to give the forecast 2021 level of monetised risk with intervention.

To ensure this gives an equivalent impact as those targets set in FPs we have modelled identical numbers of interventions and applied those interventions to assets of equivalent condition grades as those proposed in FPs. We seek to demonstrate this gives an equivalent impact through application of the following 4 tests:

Test	Description	Pass Criteria
1	Asset base test To ensure that the asset base used in the MR risk models reflects the actual 2013 asset base.	Green: The 2013 asset base represented in the model exactly represents the 2013 asset base Amber: The asset base is based on the best data available, but is not exactly as 2013 Red: A very large number of assumptions have been used to derive an asset base
2	Volumes of investment test To ensure the volume of the specific intervention driver is the same volume as that stated in the original FP business plan.	Green: The volume of interventions represented in the model exactly represents the number of interventions stated in the FP Amber: To map interventions a number of assumptions have had to be made Red: A very large number of assumptions have been used to assign interventions in the model
3	Asset condition/performance test To ensure that the modelled asset conditions and performance is the same as that of the 2013 asset base.	Green: The condition and performance of the assets represented in the model represents the condition/performance of the assets in 2013 Amber: A number of assumptions have been used to derive and assign an condition/performance Red: A very large number of assumptions have been used to derive and assign an condition/performance
4	Consequential test To identify if any investment is made in condition grades where it would not be expected.	Green: Interventions are mapped against assets with the same condition as the company based the GD1 plans on. Red: Interventions are not mapped against assets with the same condition as the company based the GD1 plans on.

Equivalent impact test results

The following table summarises the results of the 'equivalent impact tests

	1. Asset Base Test	2. Volumes of Investment Test	3. Asset Condition/ Performance test	1. Condition Grade Test
LTS Pipelines	The LTS data is from core systems following a significant data improvement project to digitise the LTS network and review the asset data.	The intervention plan has been taken directly from the FP.	Failure data forecast by the model has been compared to actual failure data and the results are consistent. However This asset group has low failure rates and as such a comparison with 1 year of data is not deemed appropriate	WWU listed named pipelines for intervention in FPs and we have modelled intervening on the same pipelines. Where assets weren't named we have modelled intervention on assets of equivalent condition grade
Mains	The mains asset base and performance is taken directly from the company's core systems. The dataset has been rolled back from 2017data which reflects all DR4 updates and as such is the most accurate reflection of the asset population	The intervention plan has been taken directly from the FP.	Modelled failure rates have been compared to actual failure rates and are comparable. It is not valid to compare against 1 year of data due to the impact of winter severity on failure rates of mains	Interventions not mapped to a specific condition of asset but to cohort level instead – FP volumes allocated across metallic mains proportionally to total population
Services	The services asset base and performance is taken directly from the company's core systems, but interventions have been rolled back by cohort and do not take into account DR4s/error reporting.	The intervention plan has been taken directly from the FP.	Modelled failure rates have been compared to actual failure rates and are comparable. It is not valid to compare against 1 year of data due to the impact of winter severity on failure rates of services	Interventions not mapped to a specific condition of asset but to cohort level instead. This is as per FPs

Risers	The asset base is represented in the model uses the best data available to WWU. Due to lack of data on risers in 2012/13 it is not possible to have a complete asset base extract for risers for 2012/13, so the known asset base following surveys in GD1 to date have been used in the model to represent the starting asset base.	The intervention plan has been taken directly from the FP.	Condition of the assets has been taken from the latest available surveys for the assets. So that performance as of 2013 is reflected as accurately as possible the model year and therefore the performance have been set to year 0 in the NOMS model to calculate 2013 values, and rolled forward 4/8 years to calculate the 2017 and 2021 values respectively	Interventions have been mapped to assets of an equivalent condition as in FPs.
Offtakes	The only slight difference between the modelled 2013 asset base and the actual 2013 asset base is that sites decommissioned post-2013 do not appear in the 2013 base data..	FP workloads were used to create the intervention plan. It was challenging to model site level interventions concurrently with system level interventions, but where appropriate hybrid interventions have been used to allow for the correct volumes of interventions to be modelled.	They survey data used to populate condition scores is from pre-2013 i.e. we do not have direct survey data for the entire asset population for 2013. This asset group has low failure rates and as such a comparison with 1 year of data is not deemed appropriate	The worst condition assets were selected.
Governors	The only slight difference between the modelled 2013 asset base and the actual 2013 asset base is that sites decommissioned post-2013 do not appear in the 2013 base data.	FP workloads were used to create the intervention plan.	They survey data used to populate condition scores is from pre-2013 i.e. we do not have direct survey data for the entire asset population for 2013. This asset group has low failure rates and as such a comparison with 1 year of data is not deemed appropriate	The worst condition assets were selected.