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Outputs & Incentives - Repex Stakeholder Engagement Group – Meeting 2

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18/10/18

Contents

- GD2 objectives and behaviours we are trying to incentivise
- Types of outputs
- Structure of outputs
- Options for managing risk in GD2

Aim's of today's discussion

What are the objectives of GD2?

How might we structure outputs in GD2?

- Types of outputs
- Structure of outputs

How can we manage risk around the price control?

- Uncertainty mechanisms, volume drivers, depreciation schedules, risk allocation

What are the options for outputs in GD2?

GD2 objectives and benefits of the repex programme

Framework Decision – headline objectives:

Our objective for RIIO-2 is to ensure that regulated network companies deliver the value for money services that both existing and future consumers want. In particular, that the price controls:

- Give due attention to mitigating the impact of networks on the environment
- Are designed so that networks play a full role in addressing consumer vulnerability issues.

To do so, they should develop and maintain a reliable, safe and secure network that is flexible in supporting the transition to a low-carbon future.

To be achieved through:

- Stronger consumer voice
- Fair returns
- Respond to changes in network usage
- Drive innovation and efficiency
- Simplifying price control

Some of the benefits repex provides to consumers

Initial thinking only – further development/consultation to follow

Benefits include:

- Risk removal / safety
- Cost efficient project delivery
- Well justified investment in network assets
- Cutting emissions
- Meeting legal obligations (e.g. HSE)
- Improving network resilience
- Minimising disruption
- Improving the customer experience
- Improving network efficiency / reducing opex
- Future-proofing the network

Types of outputs

Output Categories

Initial thinking only – further development/consultation to follow

- We are looking to make the output categories for RIIO-2 as intuitive and simple as possible, reducing overlap and potential confusion.
- We are proposing to consolidate existing output categories into three new categories as described below.
- We welcome early views from stakeholders; there will be further opportunities to provide formal feedback at a later stage.

Improve the Customer Experience

- *All consumers, including those who are vulnerable, should receive a safe, high quality, and reliable service*

Support the energy system transition

- *Network companies have to enable the transition to a low carbon, consumer-focused energy system*

Improve the network and its operation

- *A network in better condition will be safer, greener, more reliable, and more responsive to change*

Initial thinking only – further development/consultation to follow

Our July framework decision set out three types of outputs for RIIO-2

- ✓ Licence obligations:
  - ✓ Minimum standards with associated licence obligations
  - ✓ Failure to meet could lead to enforcement action and penalties
  - ✓ Not directly linked with specific funding

- ✓ Price Control Deliverables:
  - ✓ Specific deliverables with funding attached (eg high value capital project)
  - ✓ Clear methodology of what happens when activity is not delivered, delivered late, or delivered to a lower specification or standard
  - ✓ We expect companies to work closely with stakeholders and their customer/ user groups to put forward proposals. Consequences for non-delivery will be determined by Ofgem through stakeholder engagement consultation.

- ✓ Output Delivery Incentives (ODIs):
  - ✓ Will apply where service quality improvements beyond the minimum standard is in the interest of consumers
  - ✓ Will reward or penalise performance; overall cost to not exceed value of performance
  - ✓ Could be relative or absolute
  - ✓ We propose to set a number of common metrics within each sector, determined by Ofgem through stakeholder engagement/ consultation. There will also be opportunities for companies to put forward proposals for individual ODIs in collaboration with their stakeholders and customer/user groups.

Mapping GD1 repex-related outputs into GD2 terminology

Initial thinking only – further development/consultation to follow

Note: we are not suggesting all of the primary outputs and secondary deliverables from GD1 will be carried over into GD2. This slide is presented as an illustrative example to help guide discussion about the different categories of outputs for GD2, using examples from GD1.

Licence obligations

- [HSE obligations]

Price control deliverables

- Risk-removed outputs
- Fractures/failures & GIBs
- Tier 1 volumes
- Tier 2B/3 and other mains volumes
- No. of services transferred and relaid
- Other volume-based targets for specific repex activities

PCD's are the most relevant category for repex

Output delivery incentives

- Shrinkage reduction
- NOMS

Structure of outputs

Options for structuring outputs

Initial thinking only – further development/consultation to follow

- Industry level: absolute vs relative targets
- GDN level: aggregate vs intensity
- Annual vs 5yr
- Fixed vs flexible
- Adjustable vs revisable
- Linked to other components of price control
- Minimum delivery level vs ambitious target

Options for managing risk in GD2

Options for dealing with uncertainty

Initial thinking only – further development/consultation to follow

- Some volumes or measures may be difficult to forecast
- Therefore, there is value in considering options for uncertainty mechanisms alongside the discussion of output options
- Some key uncertainty mechanisms include:

Volume drivers

Target thresholds

Reopeners

Ex-post review/closeout

Pass-throughs

ofgem Making a positive difference for energy consumers

Our core purpose is to ensure that all consumers can get good value and service from the energy market. In support of this we favour market solutions where pratical, incentive regulation for monopolies and an approach that seeks to enable innovation and beneficial change whilst protecting consumers.

We will ensure that Ofgem will operate as an efficient organisation, driven by skilled and empowered staff, that will act quickly, predictably and effectively in the consumer interest, based on independent and transparent insight into consumers' experiences and the operation of energy systems and markets.

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Mains Risk Removed (Primary Output)

Ofgem Stakeholder Group - Repex

18 October 2019

SGN

Your gas. Our network.

Contents

1. How the Primary Output is measured
2. Background to the MRPS system
3. Principles of the 20% / 80% approach
4. Output calculation methodology
5. Relative GDN risk variation
6. Stakeholder engagement

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How is it measured?

- The risk removed primary output is a measure of the reduction in “incidents per annum” in a GDN relative to an opening position at the start of GD1
- An incident can be simply defined as “fatalities, serious injuries or major structural damage arising from a gas explosion where the failure of an iron pipeline has resulted in gas entering a building and igniting”
- Each iron pipe has a risk score which is calculated using the MRPS system
- The sum of risk scores for all iron pipes in a GDN gives the total iron risk

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MRPS

- MRPS stands for Mains Risk Prioritisation System
- It was developed in the late 90's by [now] DNVGL to risk assess iron pipes
- It is a decision support tool that enables the prioritisation of iron pipes for replacement
- It uses pipe failure history, pipe pressure, pipe location and property characteristics
- There are four key elements
  - Mains Fracture Factor (MFF) – Likelihood of a fracture occurring; pipe diameter, failure history
  - Gas Ingress Factor (GIF) – Likelihood of gas entering a building; proximity of pipe, open/closed ground
  - Gas History Factor (GHF) – History of events in the local area
  - Consequence Factor (CF) – Likelihood of an ignition; cellar in property, operating pressure

Risk Score = MFF x GIF x GHF x CF

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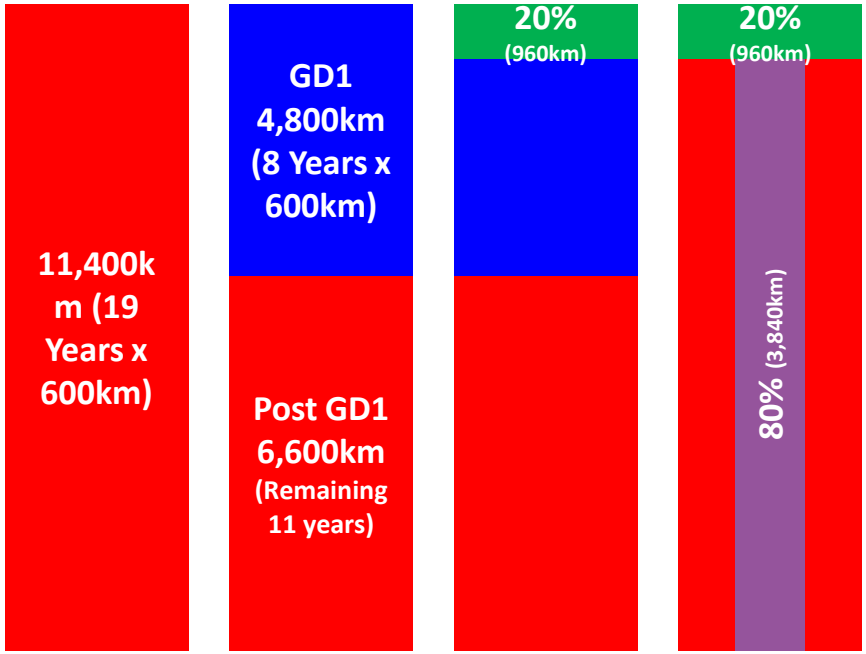
20% / 80% Approach – Tier 1 only

- 20% (by length) must be selected from the highest risk pipes
- 80% (by length) can be selected from the remaining population
- Assume total population of Tier 1 = 11,400km (beginning of GD1)
- The example on the right illustrates an eight year programme of 4,800km (600km per year)
  - 20% = 960km
  - 80% = 3,840km



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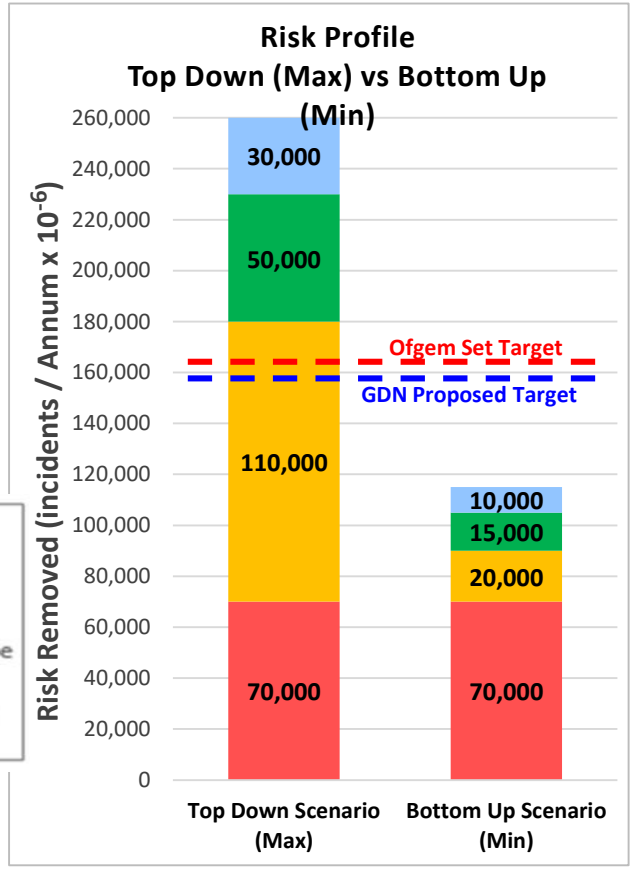
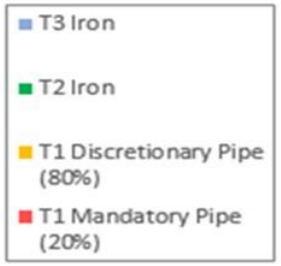
Example Primary Output "Range"

For any given length of T1, T2, or T3 iron the potential for risk removed will be across a wide range





- The maximum possible risk reduction (if you went solely top down in each Tier) is 260,000
- The minimum possible risk reduction (if you went solely bottom up in each Tier) is 115,000
- The range is significant at 145,000
- The actual risk reduction will fall between these two extremes
- Where you land depends upon the discretionary pipes selected (the mandatory pipes are fixed)
- The risk reduction achieved each year will typically go down as the pipes with a higher risk are decommissioned
- GDNs were required to propose a risk target in their business plans and Ofgem set the final target in FPs

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Methodology for calculating output

- The risk score of any given iron pipe is dynamic; its risk score can go up or down
- These dynamic changes are the result of changes in the MRPS calculation e.g.
  - New pipe failures
  - Gas in building events
  - New open / closed ground
  - Property demolition
- It was agreed that these factors MUST not be included within the actual risk claimed as they are NOT a function of the work completed (decommissioned length off risk)
- The risk scores for each pipe were therefore LOCKED in at the beginning of GD1 and continue to be the reference point for calculation risk removed
- This in turn creates a complex process for GDNs to cross reference work done today against a pipe list which is now over 5 years old and getting older

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GDN Relative Risk - Benchmarking

- From the outset of GD1 (and in prior price control periods) the total risk in each of the GDNs has been different.
- To some extent this is linked to the methodology employed back in the 1980's when paper based records were recorded in electronic asset repositories and digitised onto mapping systems
- This is most noticeable when comparing the average length of an iron pipe for each GDN
- Some GDNs recorded an entire single pipe from one end of the street to the other
- Other GDNs broke that same pipe down into smaller sections to reflect changes in topography
- As a result, one 6" pipe could be represented quite differently in each GDN with either a single risk score or multiple risk scores
- Total risk across the whole GDN is still normalised for total length but individual pipe risk scores can be distorted
- In other words, you could deliver the same "length off risk" in two GDNs but the total risk removed for the pipes selected could be quite different

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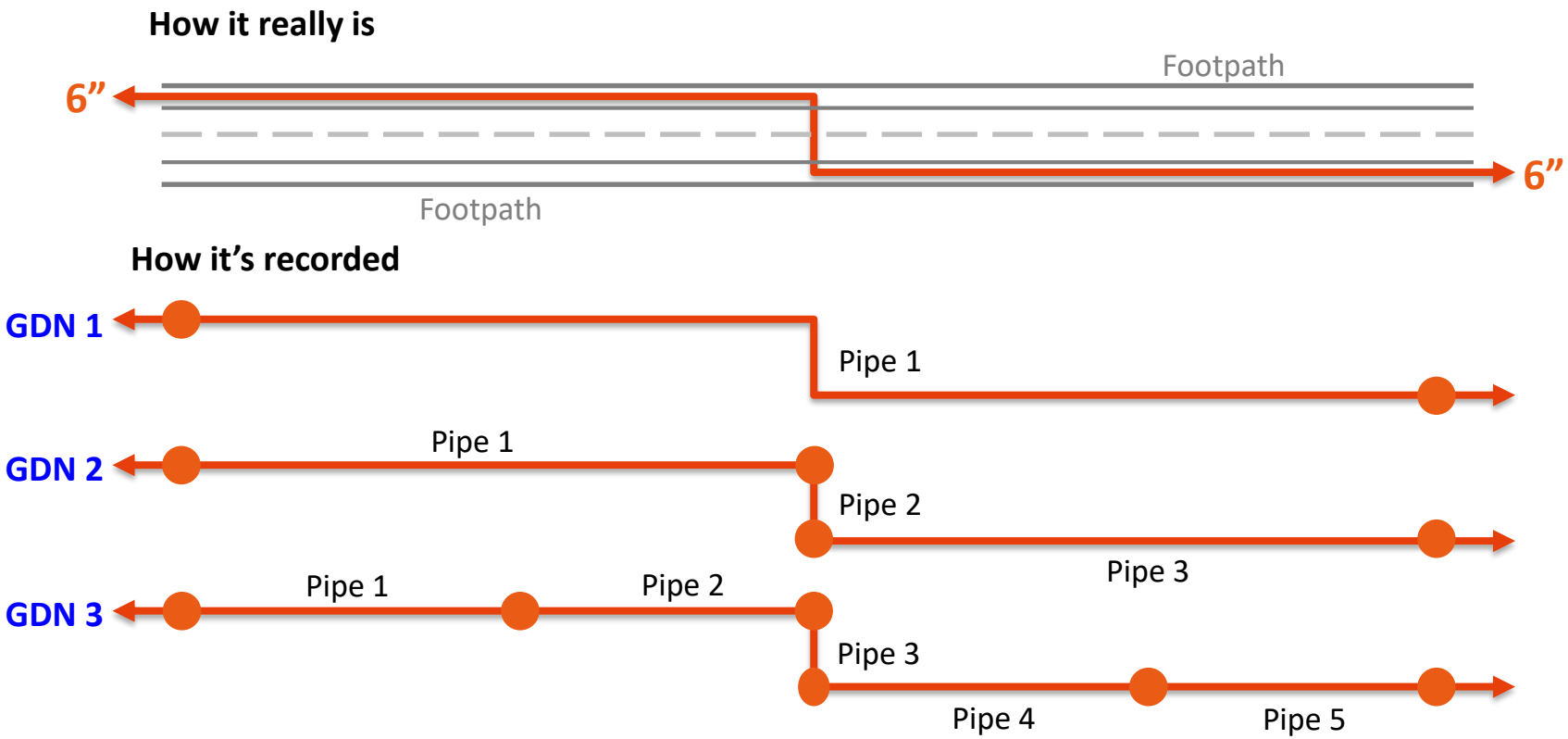
Pipe Topology



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Stakeholder Engagement

- The process of defining a risk removed target is complex and unpredictable without having a fully developed set of projects to deliver
- Individual pipes scores can change (dynamic growth) and tracking against an out of date set of locked in risk scores is complicated
- GDNs have different pipe topologies which result in different risk profiles which are difficult to compare and contrast at pipe level
- Explaining all of this to Ofgem and subsequently setting output targets was challenging from the outset
- Explaining this process and the variables to a wider stakeholder group is likely to be more challenging and the output may not be that valuable as an insight from their perspective
- We therefore need to carefully consider the value of this measure as a future output measure for GD2

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Planned Interruptions and Length Abandoned

RSEG Meeting 18th October2018

Planned Interruptions

- Interruption outputs are already covered by the Customer & Social stakeholder group
- We feel that it would be in no-one's interest to have the Interruptions output(s) covered by two groups and the best place for it to sit would be with the Customer & Social stakeholder group
- However, as most of the Planned interruptions are driven by replacement work, the Repex teams will work closely with the C&S representatives to contribute to and inform the discussions

Abandonment Length

- For GD1 there is only one specific output – “Length of main off risk”
- However, there are several sub-categories each with separate allowed workloads
  - Tier 1
  - Tier 2A
  - Tier 2B
  - Tier 3
  - Iron mains > 30 metres from property
  - Steel
  - Other materials

Length outputs GD2 – thoughts for discussion (1) Mandatory replacement

- Tier 1 – Guaranteed length of +ve scoring iron abandonment
  - Forecast <= 2” steel encountered during operations (indicative but not fixed length).
- Tier 2A – no fixed length but indicate likely dynamic growth for GD2
  - Cost adjustment mechanism as for GD1.
- Non-standard materials (principally asbestos and PVC)
  - Treat as T2A – indicative length but cost adjustment based on what is found and abandoned.

Length outputs GD2 – thoughts for discussion (2) Non-mandatory replacement

- Tier 2B / 3 / iron beyond 30m / >2” steel / elective <= 2” steel
  - All are considering what is justifiable / deliverable based on CBA and resource availability.
  - We will all be able to say in 2019 what our plans are for each category at the point Business Plans are submitted but the asset performance will change over the following years. The current “silo” approach restricts flexibility to deliver the best outcomes for stakeholders.
  - Need an output / allowance mechanism that is demonstrably robust and delivers value for customers but is flexible enough for us to dynamically target investment at the assets that need it.

- Rechargeable diversions – no output target
  - We will submit net costs based on indicative forecasts for workloads.
  - If there are known specific scheme(s) with high net costs to a GDN these will be highlighted separately.

NOMs- Monetised Risk

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Why do we have Monetised Risk?

- Network Output Measures (NOMs) are 2 of the 50+ output measures we are committed to deliver in RIIO-GD1
  - Network Capacity Measure (targets set in FPs)
  - Network Health, Criticality & Risk (Monetised Risk)

- A metric to demonstrate the benefit of investment in gas
- A common measure across GDNs – if we put the same asset through anyone's model it would give the same result
- Big differences exist across sectors

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HI/RI to Monetised Risk

- Started RIIO-GD1 with Health and Risk indices

Secondary Asset	Units	Criticality Index	HI1	HI2	HI3	HI4	HI5	Asset total
District Governors	Number of	Low	721	546	77	30	27	1401
		Medium	212	157	39	17	14	439
		High	71	30	6	2	3	112
		Very High	2	1	0	0	0	3

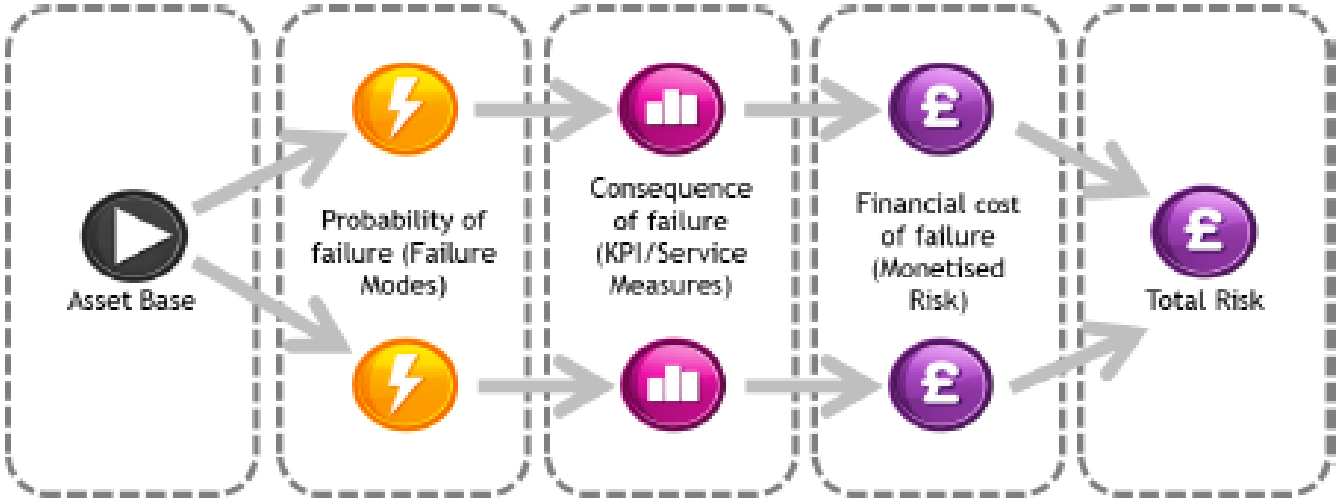
- Benefit of investment was measured by movement of assets between boxes in a 5x4 matrix of health and criticality
- Ofgem rejected this
  - Not comparable across asset groups or GDNs
  - Difficult to assess criticality
  - Wouldn't support risk trading
- In 2015 the GDNs submitted an alternative - event tree analysis (MR)
- Ofgem instructed GDNs to develop MR and abandon indices

Monetised Risk modelling - Scope

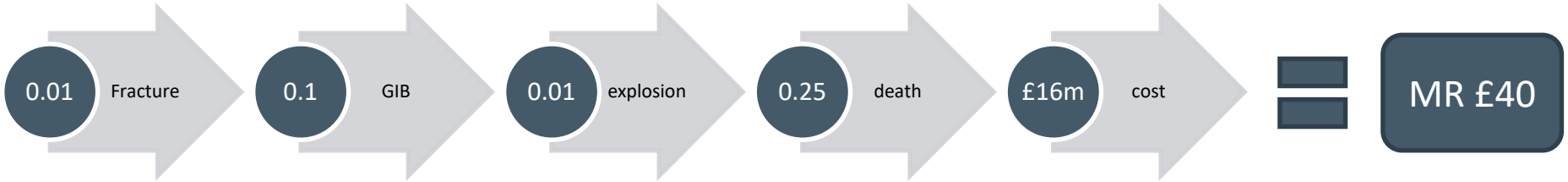
- Modelled 19 asset groups (47 in total) which cover off 90-95% of our intervention spend

Primary Assets	Secondary Asset
LTS Pipelines	LTS Pipelines - Piggable
	LTS Pipelines - Non Piggable
Distribution Mains	Iron Mains
	PE Mains
	Steel Mains
	Other Mains
Services	Services
Risers	Risers
Offtake/ PRS Filters & Pressure Control	Offtake Filters
	PRS Filters
	Offtake Slamshut/ Regulators
	PRS Slamshut/ Regulators
Offtake/PRS Pre Heating	Offtake Pre-heating
	PRS Pre-heating
Offtake Odorant & Metering	Odorisation & Metering
District, I&C and Service Governors	District Governors
	I&C Governors
	Service Governors

Monetised Risk Modelling



- Example – iron mains fractures



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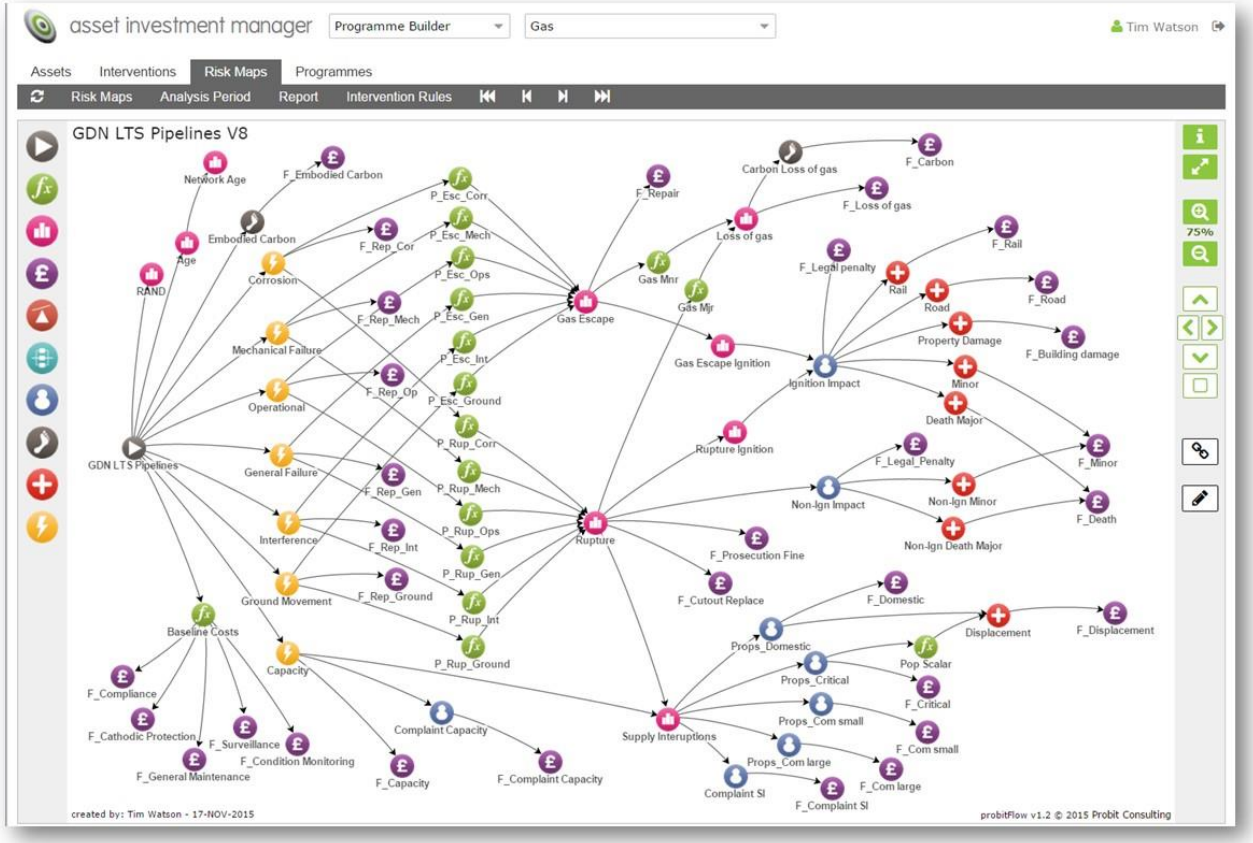
Many Branches make a full event tree (Risk Map)



Sum of all branches is monetised risk for an asset group

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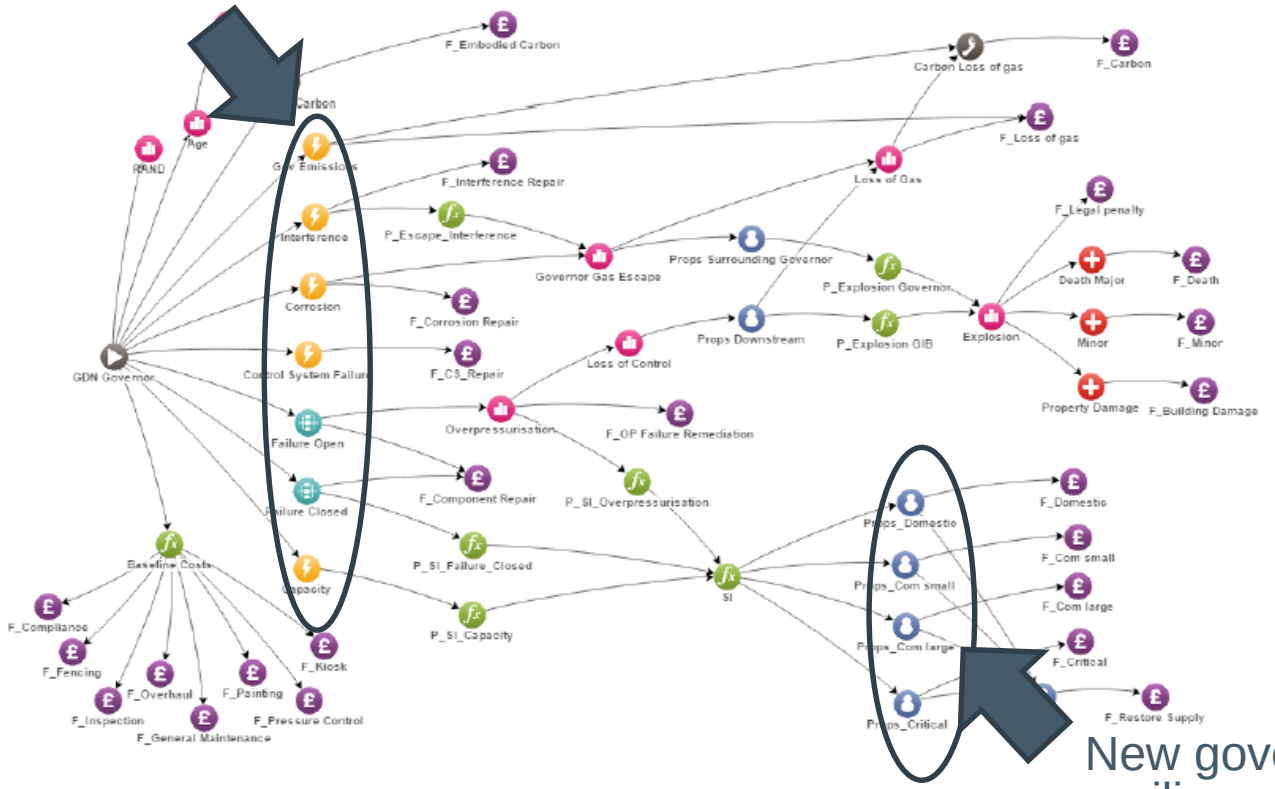
Modelling Impact of Intervention

Capex replacement impact all failure modes



New governor for network resilience

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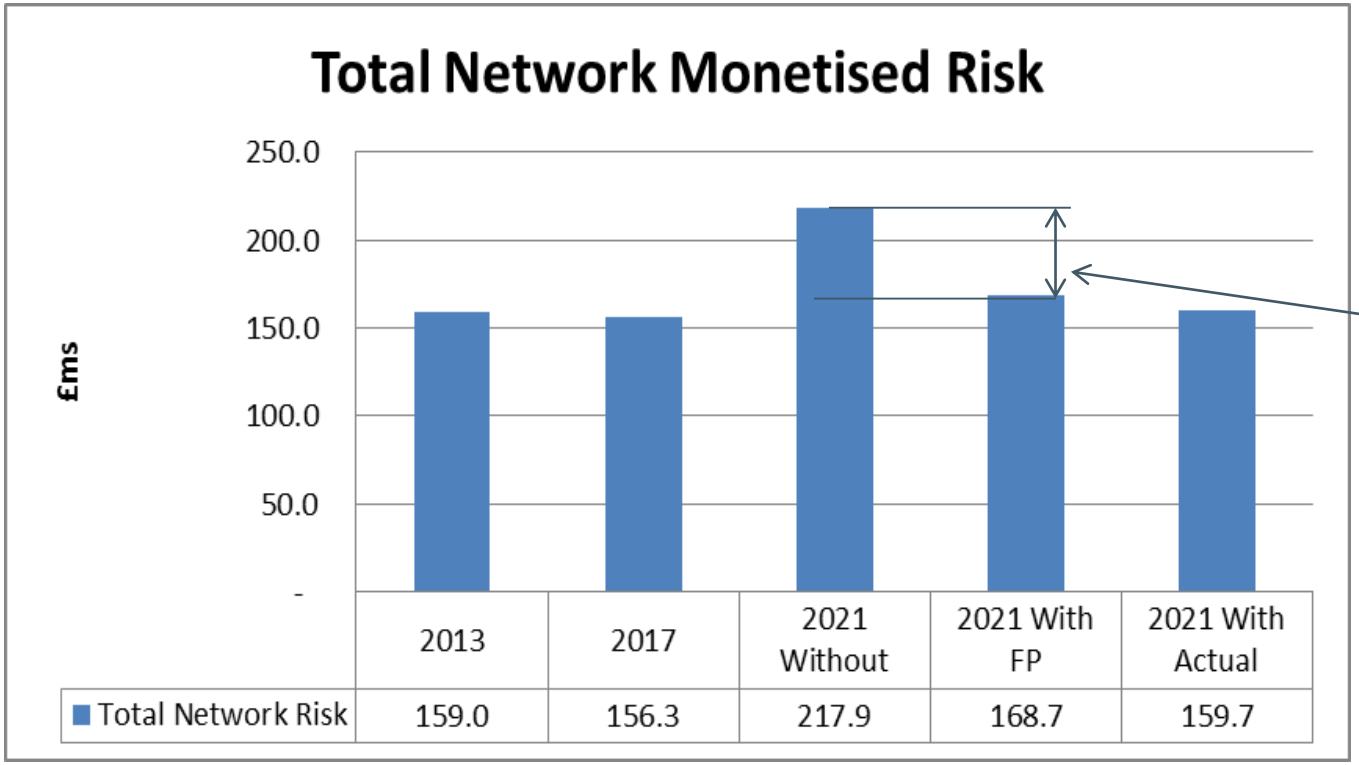
Results – all assets (sample GDN)



MR output target

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Value as an ouput

Pros

- Common currency to compare across assets
- Gives one simple measure that covers many outputs/outcomes
- There is potential to link cost to output

Cons

- Does not attract investment to high impact, low likelihood events. This is not palatable to HSE
- The level of risk removed will have a dependence on the condition of assets. Unlikely but if a GDN let the condition of their assets deteriorate they could be rewarded
- Has not history and is not tried and tested

Shrinkage

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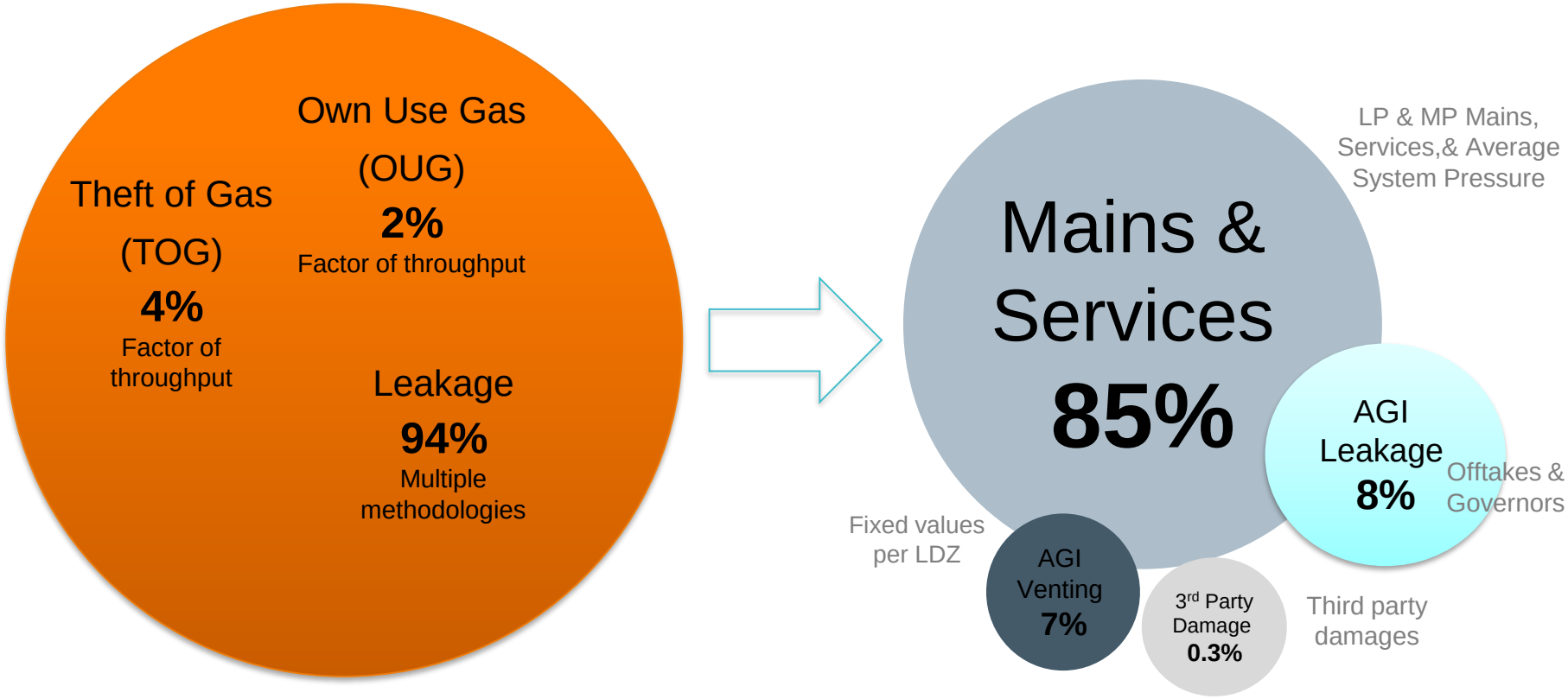
Components of Shrinkage/Leakage



Shrinkage

Leakage

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The Shrinkage Output

Shrinkage is very simply the difference between gas entering a network and gas passing through consumer's meters

We assess this using a world class model that is under constant review

Most significant contributors to reducing Shrinkage:

- Mains/Service replacement
- Pressure Management
- Mains conditioning

Mains & Services

- Shipper interest in leakage rates (Energy UK report)

LP Asset length x **leakage rate** x average system pressure correction x MEG treatment

MP Asset length x **leakage rate**

- GDNs discounted new tests due to
  - Diminishing benefit
  - ability to carry out
  - Cost vs value to consumers

Other license/UNC requirements

Annual joint DN model review published

- Commitments to improvements
- Timelines
- Successes
- Network performance

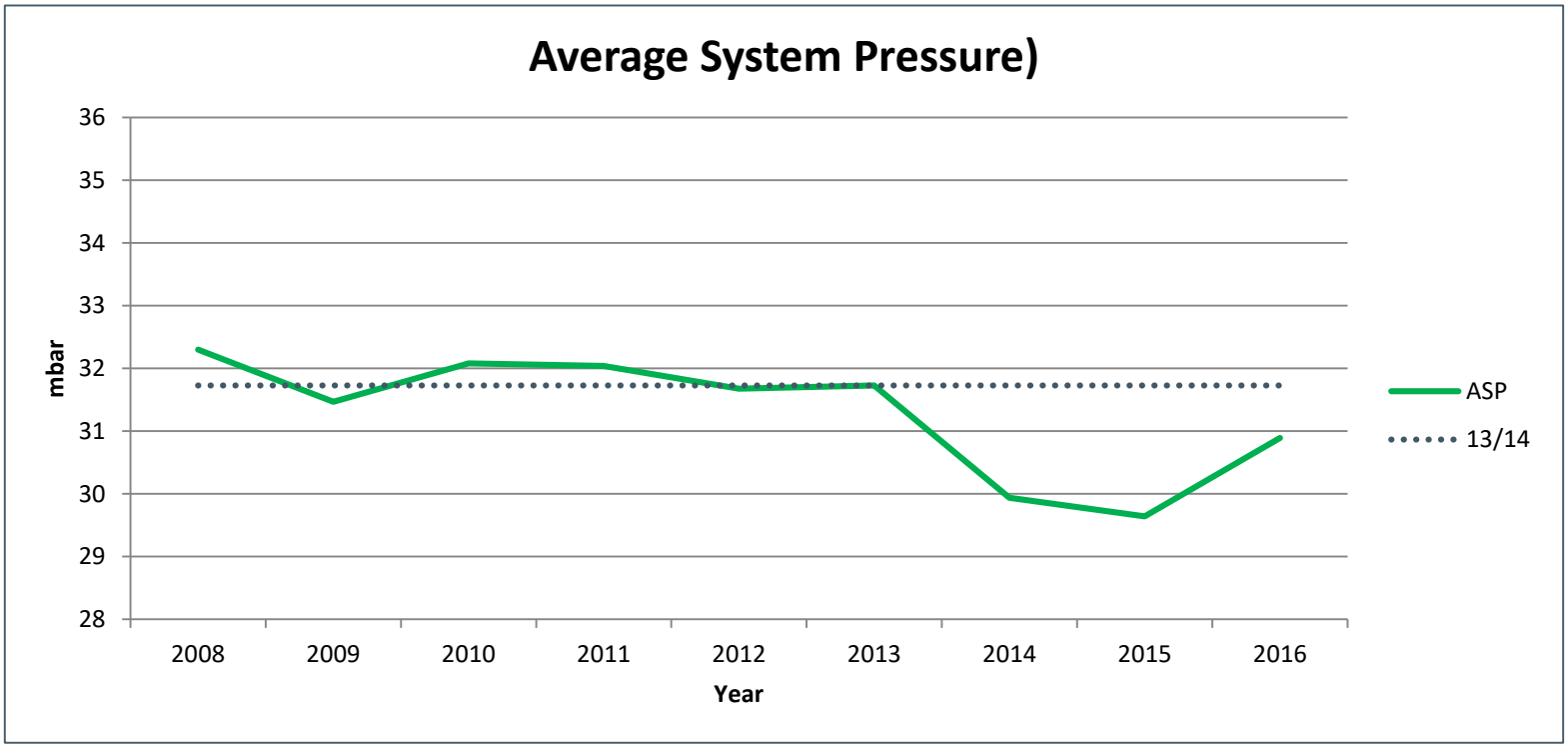
Smart metering report

Forums with shippers and other interested parties

RRP reporting

ASP

- Impacted significantly by winter severity
- More opportunity for networks who currently don't have intelligent control systems or who manage poorly



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Example of a network performance

Total of 378.5 GWh of Shrinkage (2.6 GWh saving from 2016)

34.7 GWh outperformance against 1617 OFGEM baseline.

1 GWh increase = £600k over remaining 4 years

Throughput increased in WS by 27% - due to Severn Power increasing consumption, this resulted in approx. 2 GWh of extra Shrinkage..

ASP for mixed material networks increased by 1.5 mbar average from last year. Approx 7 GWh lost in leakage due the increase.

KM of mains data change from last year (Positive number = increase)

Total	PE	CI	DI	ST
114	487	-316	-38	-18

Incentivisation

Shrinkage Incentive

Environmental Emission Incentive

8 Year roller risk/Opportunity

Risk that good performing Networks in GD1 could be penalised if incentivisation stay in current form for GD2

Value as an output

Pros

- Common currency across networks
- Consistent model
- Demonstrates improvements in carbon impact
- Incentivisation has delivered excellent results

Cons

- Impacted significantly by winter severity
- How relevant is a measure of own use gas and theft of gas?

Ofgem RIIO-GD2 Repex working group

Gas in building events and Mains fractures

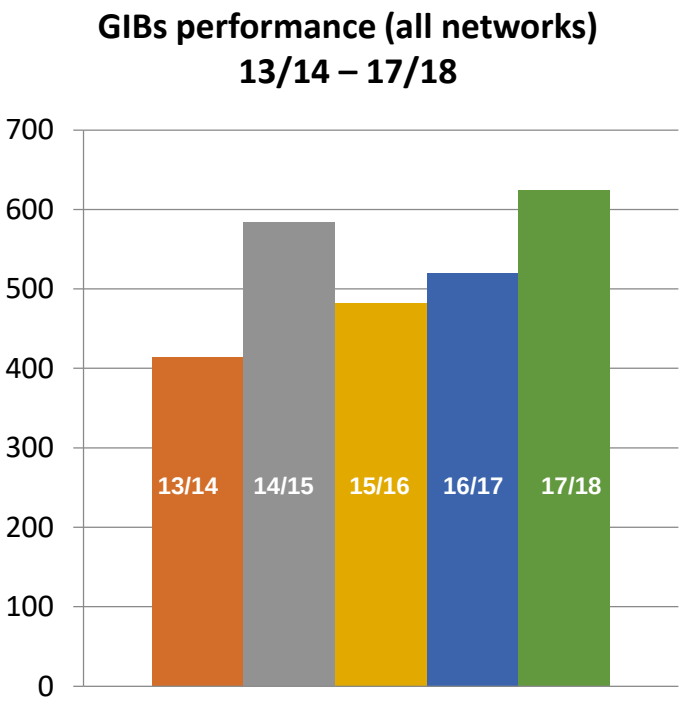
xx October 2018

Cadent

Your Gas Network

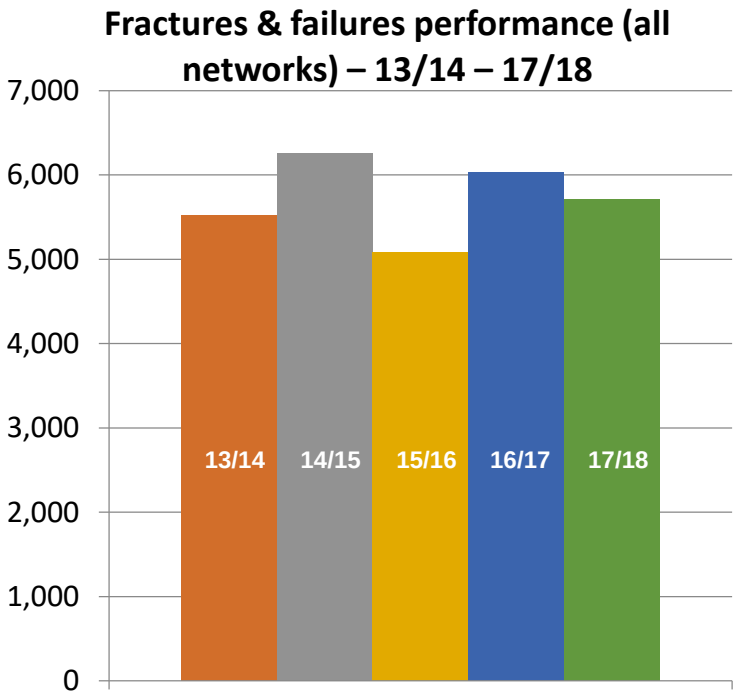
Gas in building events (GIBs)

- A gas in building (GIB) event sourced from the network is the final stage of the risk path leading up to ignition and the consequences of an explosion.
- Where gas concentrations reach certain limits, the event is reportable to the HSE under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR).
- For RIIO-GD1 Ofgem required GDNs to forecast incidences of GIBs over the 8-year period for both reportable and non-reportable events.
- GIBs are directly linked to mains replacement and targets were aligned to networks length of mains abandoned targets. However, there is a strong correlation with cold weather which can skew the number of events



Mains fractures & failures

- Mains fractures and failures are occurrences of cast iron/spun iron mains fractures and ductile iron mains failures.
- For RIIO-GD1 Ofgem required GDNs to forecast the number of fractures and failures over the 8-year period.
- Fractures and failures are a function of the iron mains populations and therefore targets were aligned.
- As more mains is replaced with PE, the occurrences of fractures & failures should fall.



Repex measures in GD2

- In RIIO-GD1 Ofgem set secondary deliverables to monitor ‘leading indicators’ of a company’s performance in order to ensure long term delivery and value for money.
- In RIIO-GD2 outputs categorisation will not be split between primary outputs & secondary deliverables but Licence obligations, Output Delivery Incentives and Price Control Deliverables.
- Mains replacement is the mitigation for GIBs and fractures & failures but impacted by uncontrollable factors such as cold weather
- Domestic services (replacement) is also a secondary deliverable in the current GD1 performance framework and there is a direct correlation with mains replacement i.e. as mains replacement work is completed, services will also be replace as a result.
- Due to lack of controllability and the direct alignment with mains replacement, in GD2 these measures (i.e. secondary deliverables) are better suited as reporting only measures