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Decarbonisation Working Group

27th February 2019

Agenda

1. **Introductions (13:30-13:40)**
   - *Overview of what we wish to achieve from the meeting.*
   - *Run through of action log*
2. **Discussion of overall environmental package and comparison with other sectors' proposals (13:40-14:25) (Ofgem)**
   - *Open discussion:*
     - *What specific mechanisms are missing?*
     - *Do GDNs perceive specific barriers to proposing their own ambitious business plans, bespoke outputs or uncertainty mechanisms?*
3. **Shrinkage incentives (14:25-15:25) (GDNs Common View)**
   - *Role of Shrinkage in GD2*
4. **Heat decarbonisation framework (15:25-15:55)**
   - *Feedback received at joint working group that these do not leave important gaps*
   - *Open discussion:*
     - *Do participants agree that the framework captures likely heat decarbonisation activities in RIIO-GD2?*
5. **Any other business (15:55-16:05)**
   - *Actions for completion will be circulated by Ofgem.*
   - *Date of next meeting: 16th April 2019 (London)*

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Discussion of overall Environmental Package and comparison with other sectors' proposals.

Open discussion.

Shrinkage Overview

Joint GDN Presentation
Presenter: Matt Marshall (Cadent)

Shrinkage

Brief overview of Shrinkage

What is Shrinkage?

Shrinkage refers to gas which is lost from the transportation network.

Shrinkage is a combination of Leakage, Own Use Gas and Theft of Gas.

Shrinkage	Leakage
Shrinkage is combusted gas that isn't metered that is used either during routine operations or lost through theft.	Leakage is un-combusted gas escaping from the transportation system through leaking or venting equipment.
Includes: Own Use Gas and Theft of Gas.	Includes: LP and MP Mains, services, AGI leakage and venting and third party damage.

Shrinkage
Why are emissions important?

Why reduce emissions?

The Climate Change Act 2008 set the country's emission reduction targets. The target for reduction is at least 80% by 2050.

Shrinkage is the dominant element of GDNs business carbon footprint and accounts for more than 1% of GB green house gas emissions.

Lowering emissions contributes to UK government emissions targets and safeguards the global environment for future generations

Regulator rewards emission reduction and incentivises Gas Distribution companies to implement enduring improvement

Lowering emissions contributes to reducing customer bills and network safety

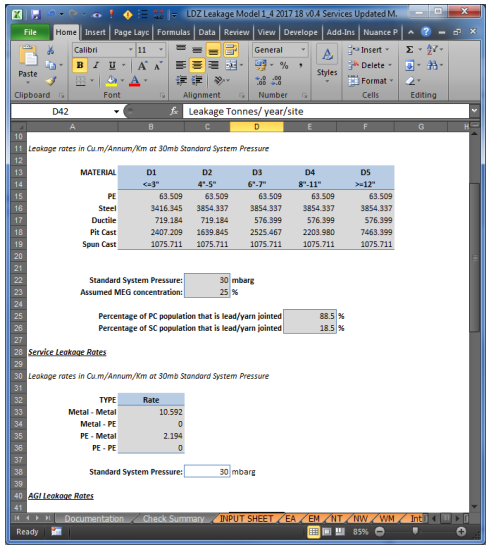
Shrinkage
Modelling emissions

How do we model Shrinkage?

Each GDN uses the Leakage Model that was developed by Advantica and approved by Ofgem.

DNs have a Licence condition to continuously examine ways of improving the accuracy of this model.

The model is updated with large volumes of actual asset records and performance data which is reviewed and processed annually in order to provide an accurate Shrinkage RRP assessment.



No. of Networks	Length of Pipe (Low Pressure and Medium Pressure)	No. of Above Ground Installations	No. of Services
2,348	233,147km	110,082	21,675,063

Shrinkage
Emissions Reduction

Using the Leakage Model for directing emission reduction

Networks are broken down into Network Identification Polygons (NIPs) which vary in size and network composition. For example, *Nottingham LP (2,000km+)* is a large NIP whereas *Barlestone Village LP (9km+)* is a small one.

Different Shrinkage elements have different impacts, for example;

Increasing and decreasing system pressures in a large NIP has a greater impact on emissions than doing that in a small NIP.

Whereas…

Replacement of 2km of 4inch Cast Iron at 30mb has the same impact regardless of the age, condition, history or the location of the pipe.

Shrinkage
Sensitivity of Shrinkage components

Outperformance potential of modelled Shrinkage components – based on 2017/18 Leakage Model v1.4 (Cadent example)

Component	Scenario	Impact	Outperformance Potential
Average System Pressures	+/-1mb	+/-32 GWh	Key driver that GDNs can influence and are all targeting optimal level by end of RIIO-GD1
Theft of Gas	+/-5% volume change	+/-2.6 GWh	Increased throughput would be influenced by, for example, increased Powergen site volumes
MEG Saturation	+/-5% Saturation	+/-2.5 GWh	Key driver that GDNs can influence
LTS Offtakes	+/-5% volume change	+/-2 GWh	Unrealistic to reduce numbers
District Governors	+/-5% volume change	+/-2 GWh	Would require large scale volumes
Own Use Gas	+/-5% volume change	+/-1.5 GWh	Increased throughput would be influenced by, for example, increased Powergen site volumes
NTS Offtakes	+/-5% volume change	+/-1 GWh	Unrealistic to reduce numbers
Service Transfer/Relays	+/-5% services replaced	+/-0.5 GWh	Linked to Mains Replacement
Service Governors	+/-5% volume change	+/-0.2 GWh	Would require large scale volumes
3rd Party Damage	+/-5% reduction	+/-0.2 GWh	Little ability to influence
AGI Venting	N/A - Fixed volume	N/A	No scope to reduce emissions

The Shrinkage Forum has provided a mechanism to review with the industry key components of the Shrinkage calculation (for example, AGI Venting, 3rd party damages, permeation of PE, Own Use Gas, Service calculations)

Shrinkage
Shrinkage incentives

Incentive purpose:

There is a two part incentive mechanism in place to encourage GDNs to reduce business emissions and shrinkage on their networks to efficient levels

- The Shrinkage Incentive rewards the GDNs for reducing the volume of combusted gas used/stolen from the network based on the in year gas price.
- The Environmental Emissions Incentive rewards the GDNs for reductions in the un-combusted gas leakage volumes to the environment using an incentive value based on the social value of carbon.

Output measure:

Shrinkage Incentive and Environmental Emissions Incentive.

Shrinkage
Baseline forming

Incentive/penalty is calculated by outperformance or underperformance of agreed baselines, any benefits come from doing things above and beyond the proposed Mains Replacement programme.

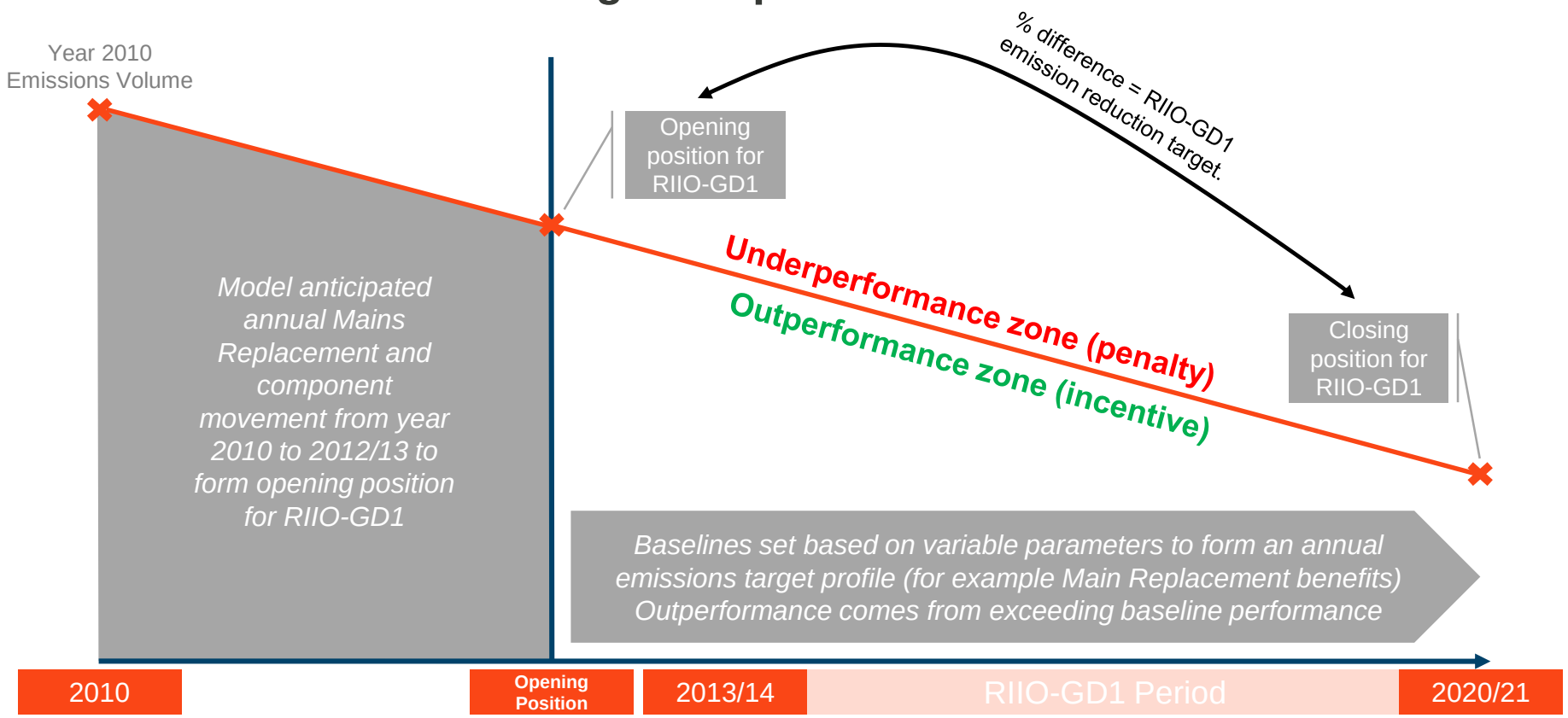
GDN proposals were broadly based on the following calculation assumptions:

1. Take a starting point (2010 performance year).
2. Model mains and service replacement benefits based on the mains replacement plan for each future year until the end of RIIO-GD1.
3. Average system pressure assumptions were included for future years.
4. Output formed proposals for Shrinkage baselines.

(final baselines were established individually for each GDN by OFGEM)

Shrinkage
Baseline forming

Incentive baseline forming example



Shrinkage
Baseline forming

RIIO-GD1 Shrinkage reduction targets

Network	2013/14 Baseline (GWh)	2020/21 Baseline (GWh)	Reduction Target
Cadent – EoE	526	444	15.3%
Cadent – Lon	289	238	17.5%
Cadent – NW	388	314	19.8%
Cadent – WM	330	281	15.5%
NGN	455	379	16.7%
SGN – Sco	234	186	20.5%
SGN – Sou	638	525	19.3%
WWU	431	373	14.0%

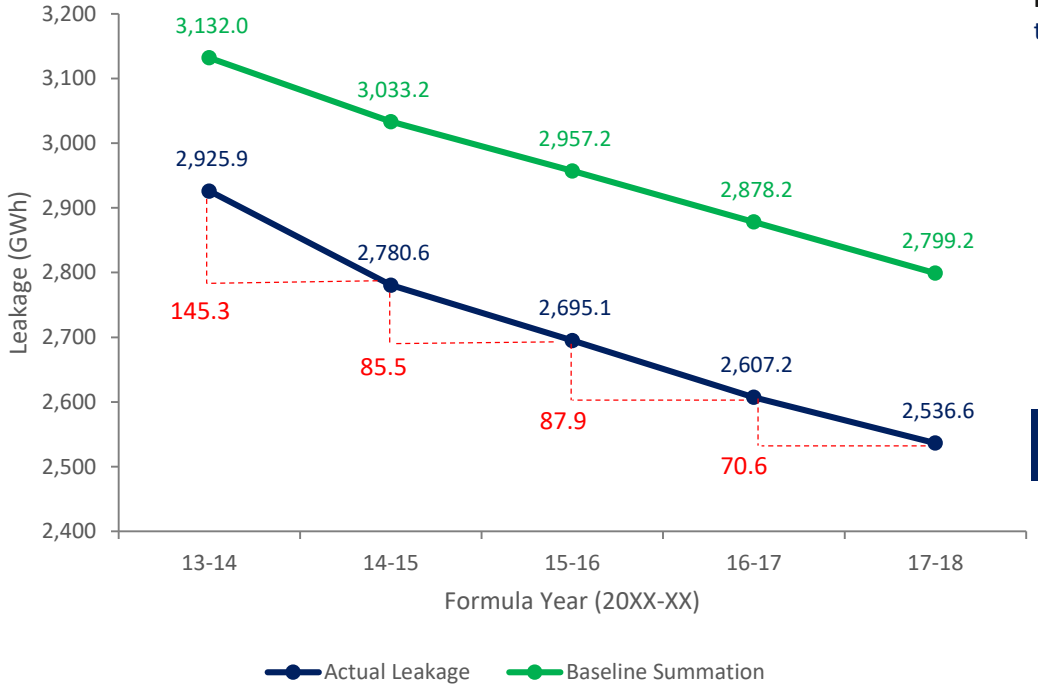
GDNs submitted their output proposals using the broad methodology described, OFGEM issued more challenging targets however the calculations used for forming these targets are unknown.

Baselines shown based on version 1.4 of Leakage Model

GDN's have reduced leakage by 103.6 GWh per year, on average

YoY leakage reduction across all GDNs

The blue data labels represent actual in year leakage figures for all GDNs
The red data labels represent YoY reduction in leakage



*Baseline summation is all GDN baseline figures added together

GDN leakage reduction split by component

(Negative numbers) represent the GWh saving which can be attributed to each shrinkage component
Positive numbers represent the GWH disbursements which can be attributed to each shrinkage component

Shrinkage component	13-14	14-15	15-16	16-17	17-18
LP Mains Asset (Replacement)	(73.3)	(61.2)	(63.9)	(55.7)	(58.3)
Service Replacement	(26.9)	(32.7)	(27.2)	(28.2)	(24.9)
Pressure (ASP)	(40.1)	(33.6)	(11.8)	21.7	18.4
MEG	5.3	(0.5)	(3.3)	(6.4)	(1.8)
Other Leakage	6.5	(17.4)	20.7	(19.2)	(4.1)
Total	**(128.5)**	**(145.3)**	**(85.5)**	**(87.9)**	**(70.6)**

Overview of outperformance

	GWh / year	Contribution
Actual total reduction in shrinkage 13/14 - 17/18 (*)	389.3	
Baked in Repex as Baseline (#)	332.8	85%
Additional reduction due to Repex	19.3	5%
Additional reduction due to other actions (ASP, MEG, etc.)	37.2	10%

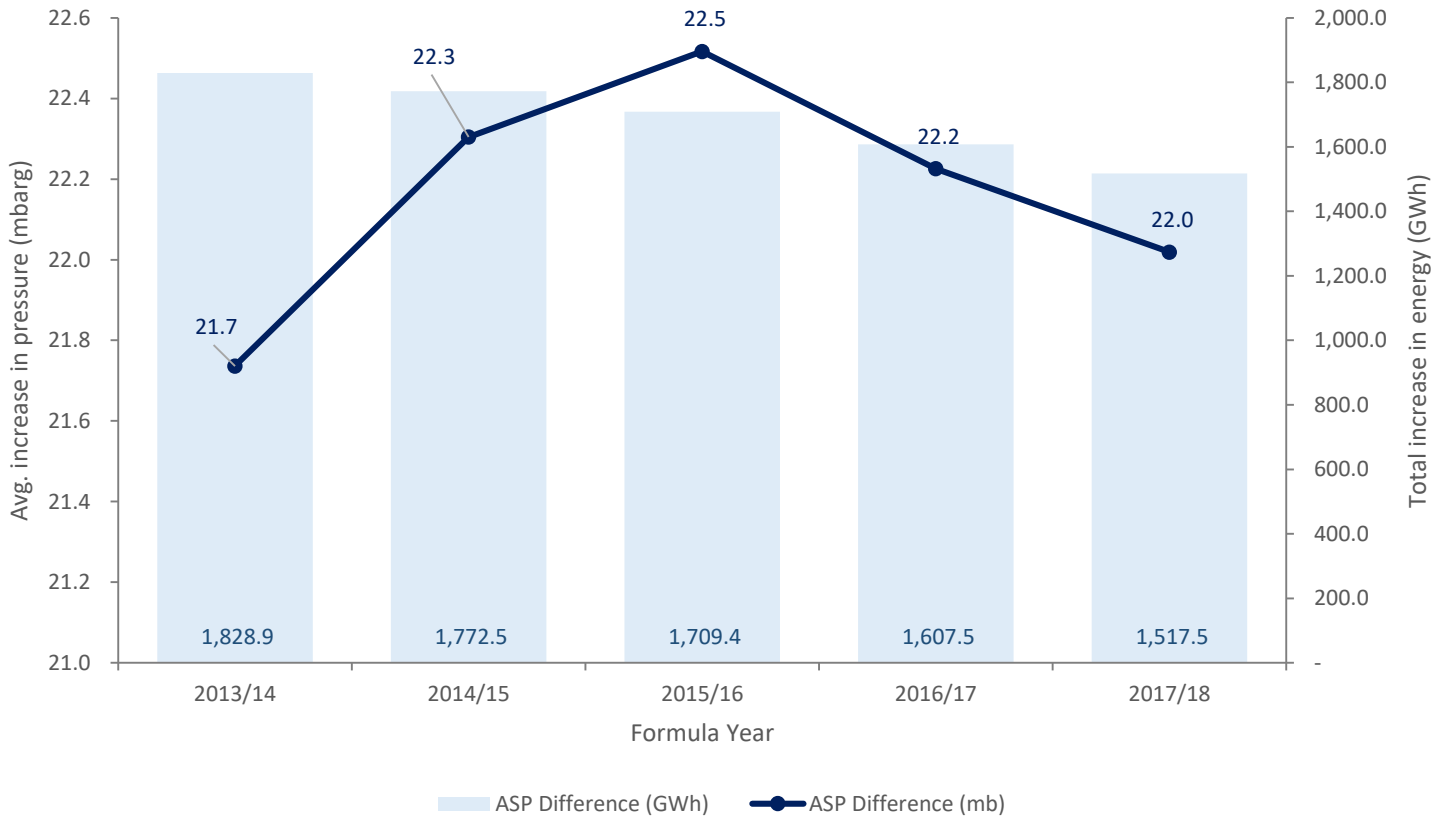
*** = starting position (actual) - finishing position (actual);**
i.e. 2925.9 - 2536.6 = 389.3

 # = starting position (Baseline) - finishing position (Baseline);
i.e. 3132.0 - 2799.2 = 332.8

Having no pressure control in all distribution networks will cancel out all of the leakage reduction made in GD1

Scenario 1: Running all GDN's without pressure control

The graph below illustrates how leakage will increase (in GWh), across all GDNs, if they were forced to operate at maximum pressures*. GDN system pressures would increase by 21.7-22.5 millibar, on average. The effect this has will increase leakage by 1517.5-1828.9 GWh

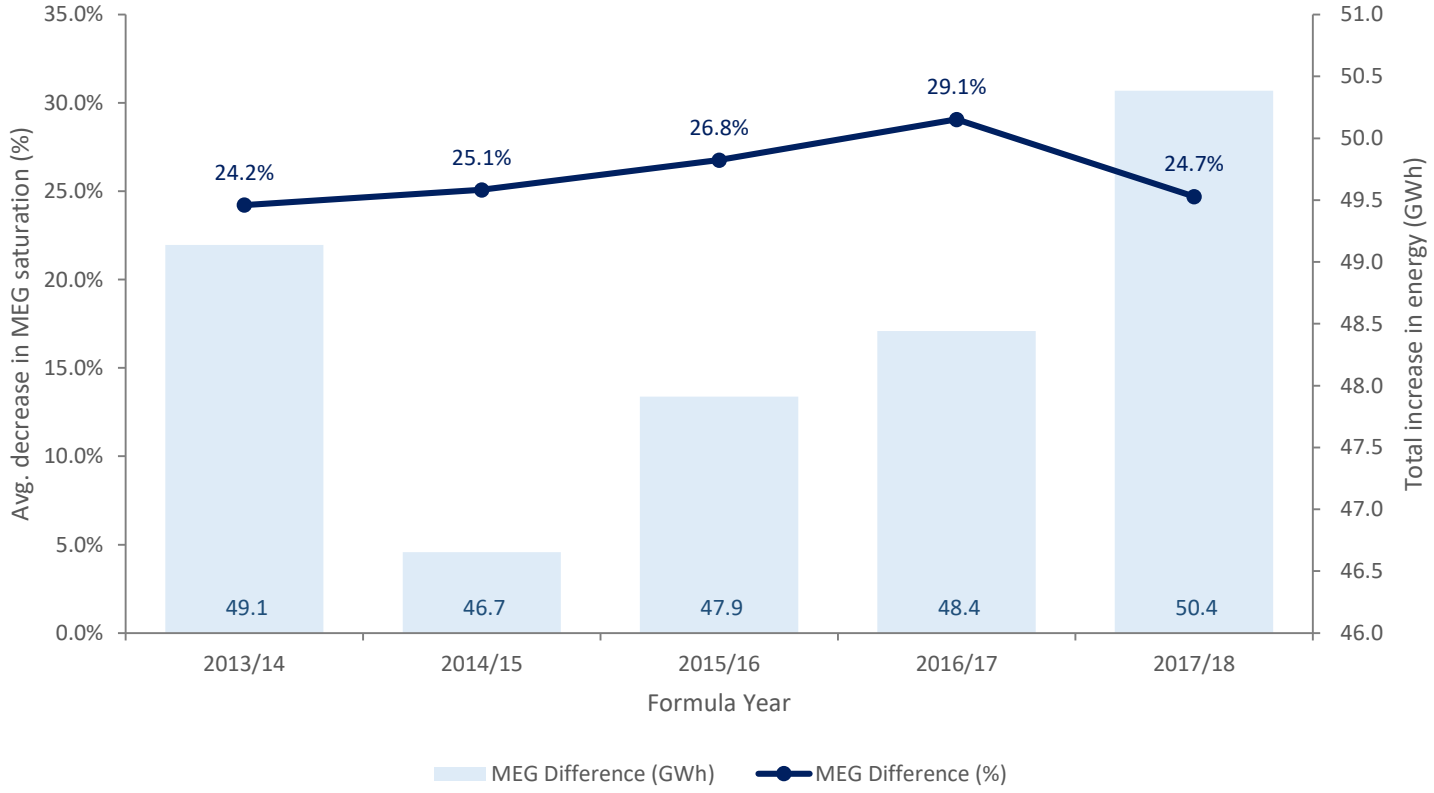


*Maximum operating pressures = 50mbar for mixed material networks, 70 mbar for all PE systems

Operating SGN, NGN & Cadent without MEG will increase annual leakage by 46.7 – 50.4 GWh

Scenario 2: Running SGN, NGN & Cadent without MEG

The graph below illustrates how leakage will increase (in GWh), across 3 GDNs, if they were forced to operate without MEG.
GDN MEG saturation levels would decrease by 24.2%-29.1%, on average. The effect this has will increase leakage by 46.7-50.4 GWh



The figures quoted in this slide apply to the following networks only: SGN, NGN & Cadent. WWU currently operate without MEG

Shrinkage
Key levers

Key emission reduction elements

Mains Replacement	MEG Saturations	System Pressures
Delivery of Mains Replacement programme detailed in Final Proposals will return OFGEM reduction target (baselines based on this element) Mains Replacement is biggest contributor to annual Shrinkage reduction, and could result in substantial penalty for under delivery. **Mains Replacement reduces benefits of both MEG Saturation and System Pressure**	MEG swells lead yarn joints in Cast Iron and Spun Iron mains. The greater the MEG saturation the more emissions reduce. Increasing the spread of MEG will also increase emission reduction. WWU Network and EA LDZ do not treat applicable mains with MEG. The viability of fogger locations is assessed annually. **Annual replacement of iron mains diminishes potential benefits from MEG**	Driving a reduction in average system pressures will reduce leakage from mains and so reduce emissions. There is a limit to the levels we can take pressures down to and still maintain customer requirements. This is the biggest contributing factor to all GDNs outperformance delivery. **Increased use of insertion and demands of low carbon sites could force system pressure increases**

Future performance should be focused on optimising network performance and not emissions in isolation.

Shrinkage
Future landscape

Future outperformance potential in RIIO-GD2

RIIO-GD1 incentive focused each GDN to reduce emissions by implementing enduring change within the 8 year period.

The introduction of an 8 year roller incentive to stimulate continued investment and improvement throughout the period embraced by all the GDNs as demonstrated by the outperformance projections.

The incentive will drive GDNs to maximise performance by the end of RIIO-GD1, but a roll over of the mechanism would add considerable risk in GD2.

Developing the network in the optimum and most efficient way across all processes may not necessarily mean further reductions in Shrinkage, and therefore to penalise networks for that would be unfair.

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Heat decarbonisation framework

Policy being consulted on - for discussion only

The nature of GDNs' role in long term heat decarbonisation is uncertain. It is premature to design outputs and incentives around any particular decarbonisation pathway.

Low/no regrets investment

- Low materiality
- Low stranding risk
- Well justified proposals could be base-funded

Innovation

- Including projects that feed into the evidence base for future heat decisions

Respond to changing gas demand

- GDN bespoke uncertainty mechanisms
- E.g. responding to local, regional or devolved policy

Accommodate significant Government policy

- Symmetrical reopener
- Triggered in years 2 or 3
- Material impact of *new legislation* on GDN

Feedback on heat decarb framework from Joint Working Group (30th Jan 2019)

Policy being consulted on - for discussion only

There is more that networks could be doing

High quality business plans should set out and justify GDN activities on heat decarbonisation

Aspects of the framework focus on decisions taken by other people

The framework is adequate to the kinds of projects GDNs envisage

The tone of the consultation could have been more ambitious

Given uncertainties it would be difficult to create incentives for heat decarbonisation

Heat decarbonisation framework

Feedback to date suggests the heat decarbonisation framework does not leave significant gaps.

- Do you agree?
- Are there any heat decarbonisation projects or activities that
  a) Could be justified given current heat policy uncertainties and
  b) Would be precluded under the proposed framework?

In December we suggested the trigger for the heat policy reopener would be (central) government legislation.

- What are the routes by which government(s) could restrict new build domestic connections?
  - CCC recommends building regulations
- Would these have consequences for the design of the heat policy reopener?

CCC view: "From 2025 at the latest, no new homes should be connected to the gas grid." (page 9)

Any other business (15:55-16:05)

- *Actions for completion will be circulated by Ofgem.*
- *Date of next meeting: 16th April 2019 (London)*

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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 practical, 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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