UNC Modification	At what stage is this document in the process?

UNC 082x:

Introduction of an Independent Shrinkage Expert

01 Modification
02 Workgroup Report
03 Draft Modification Report
04 Final Modification Report

Purpose of Modification: A recent independent study notes that, from early 2018 onwards, gas leaks above cities are 30-35% higher than is reported by Gas Distribution Networks. To lower greenhouse gas emissions, increase the robustness of RIIO-GD2 incentivisation, and reduce end-consumer costs, this Modification proposes to introduce a new role to the UNC: the Independent Shrinkage Expert (ISE). The ISE will be responsible for the production of the Shrinkage and Leakage Model (SLM), including updating or replacing the National Leakage Tests (NLT) through innovation, and will be led by principles of impartiality, environmentalism, and best outcomes for end-consumers.

Next Steps:

The Proposer recommends that this Modification should be:

- considered a material change and not subject to Self-Governance
- assessed by a Workgroup.

This Modification will be presented by the Proposer to the Panel on 17 November 2022. The Panel will consider the Proposer's recommendation and determine the appropriate route.

Impacted Parties:

High: Gas Distribution Networks, Shippers, Suppliers, Consumers

Low:

None:

Impacted Codes: UNC

Contents

Timetable

Modification timetable:	
Pre-Modification Discussed	27 October 2022
Date Modification Raised	28 October 2022
New Modification to be considered by Panel	17 November 2022
First Workgroup Meeting	24 November 2022
Workgroup Report to be presented to Panel	15 June 2023
Draft Modification Report issued for consultation	16 June 2023
Consultation Close-out for representations	06 July 2023
Final Modification Report available for Panel	11 July 2023
Modification Panel decision	17 August 2023

Any questions?

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1. Summary

What

Gas leaks account for approximately 1% of the UK's greenhouse gas emissions. Incorrect calculating leakage rates leads to under-incentivisation by RIIO-GD2, damaging the environment.

The Shrinkage and Leakage Model (SLM) is calculated annually by the Gas Distribution Networks (GDN). The GDNs then use this model to calculate the amount that they need to pay towards gas that is lost via leaks, own-use-gas, and upstream theft, and ultimately it feeds into the RIIO-GD2 incentivisation mechanism, which ensures that leak repairs and pipeline replacements are performed at a rate that is environmentally and economically efficient.

The annual SLM exercise mainly looks at own-use-gas and upstream theft, which account for a combined total of about 5% of Shrinkage. The vast majority of Shrinkage (around 95%), however, consists of Leakage.[1]

Leakage is calculated based on the National Leakage Tests (NLT), and, as these tests are not updated or redone, leakage remains static at about 0.5% Total LDZ throughput. By comparison, the Theft of Gas element of UIG is assumed by AUGE to be 1.48% of Total LDZ throughput.[2]

The National Leakage Tests, however, were carried out in 2002, and have not been updated since this date. Despite repeated requests by UNC Parties to review the leakage model, and independent reports outlining that the leakage model needs to be reviewed, as using the NLTs to estimate leaks could be greatly inaccurate.[3] These requests to redo the tests are dismissed as overly expensive.[4] For example, independent research by Imperial College London notes that there is three times more methane above London than is reported as being lost via gas leaks.[5]

Calculation of UIG is also affected by total Shrinkage. If Daily Metered and Non-Daily Metered volumes are subtracted from Total LDZ throughput, there are currently two mechanisms that are used to account for any gas that is missing: Shrinkage and Unidentified Gas (UIG). First Shrinkage is removed from any missing gas and the rest is deemed to be UIG. UIG is then distributed amongst Shippers by the independent Allocation of Unidentified Gas Expert (AUGE) through allocation. Misallocating gas leaks into UIG directly increases customer's bills and masks the extent that gas leaks are contributing to the UK's total greenhouse gas emissions.

Why

Methane is a powerful greenhouse gas. It is 84 times more potent than CO_2.[6] The UK government's Net Zero Strategy seeks to decarbonise all sectors of the UK economy to meet their net zero target by 2050, and the UK was one of over 100 countries who pledged to reduce methane emissions 30% by 2030 as part of COP26 as part of the Global Methane Pledge.[7]

[1] These percentage values are taken from "Shrinkage and Leakage Model Review 2021-22 – Final Report", p.14.

[2] See AUG Statements for both 21/22 and 22/23.

[3] https://www.gasgovernance.co.uk/Shrinkage/Consultations

[4] See above link, page 15.

[5] Energy UK GRG shrinkage study. GDNs response to the study dismissed ICL's findings as the product of natural causes and landfill. This is counter-argued by ICL within this article and this paper.

[6] https://energy.ec.europa.eu/topics/oil-gas-and-coal/methane-emissions_en

[7] Launch by US, EU and Partners of the Global Methane Pledge

A recent study notes that, from early 2018 onwards, gas leaks above cities are 30-35% higher than is reported by Gas Distribution Networks.[8]

Any under-forecasting within the SLM will cause UIG to increase and will decrease the effectiveness of RIIO-GD2 incentivisation, thereby undermining the effectiveness of the Net Zero Strategy. Currently, gas losses attributable to UIG and Shrinkage amounts to approximately 16 TWh.[9]

For 2020/2021, GDNs reported 2,256.24 GWh of natural gas as being lost via leaks. 35% underreporting increases this by 789.68 GWh to 3,184.29 GWh.[10][11] The environmental impact of 3 TWh of CH_4 being lost via leaks is the equivalent of 12,229,331 tonnes of CO_{2e}.[12]

Underreporting of gas leaks can therefore be extrapolated to be the equivalent of 20,727,679 flights from London to New York per year.

As GDNs currently pass through costs attributable to gas leaks to Shippers, Suppliers, and ultimately the end consumer, any recalculation of Shrinkage may be passed through in such a manner and so could need to be considered as part of the Price Cap.

However, through enabling more accurate application of the incentivisations already enforced under RIIO-GD2, gas lost to the atmosphere via leaks will be more accurately managed and reduced, thereby lowering customer bills and lessening the environmental impact of natural gas leaks within the UK.

How

To reduce greenhouse gas emissions and end-consumer costs[13], this Modification introduces a new role to the UNC: the Independent Shrinkage Expert (ISE). The ISE will be responsible for the production of the Shrinkage and Leakage Model, including updating or replacing the National Leakage Test via innovative methods (for example, direct measurement of methane levels in the air coupled with modelling rather than estimation), and will be led by principles of impartiality, emissions reduction, and best outcomes for end-consumers.

Creation of an ISE Framework

The AUGE currently exists under the AUG Framework. Work will be needed to establish what an ISE Framework would look like. Workgroup will create the ISE Framework, which should be based on principles of impartiality, emissions reduction, and best outcomes for end-consumers.

2. Governance

Justification for Authority Direction

[8] Continuous CH4 and δ13 CH4 measurements in London demonstrate under-reported natural gas leakage; see also London produces up to a third more methane than estimates suggest | Imperial News.

[9] This figure is a summation of observed levels of UIG from the AUG Statement and Shrinkage levels as reported by the GDNs

[10] Cadent: 1,120.0 GWh (1,038.5 GWh Leakage); NGN: 312.24 GWh (312.17 GWh Leakage); SGN: 641.8 GWh (594.1 GWh leakage); WWU: 320.57GWh (311.97 GWh leakage); Total: 2394.61 GWh (2,256.24 GWh Leakage)

[11] At the current average price cap of 7.8p/kwh, 789.68 GWh equates to £61,595,040.

[12] The Gas (Calculation of Thermal Energy) Regulations 1996; Convert TWh to m3: 3 TWh * 1,000,000,000 (convert to kWh) * 3.6 (joules) / 39.0 (calorific value) / 1.02264 (Volume Correction) = 270,792,337 m3 * 84 (to convert to CO2 equivalent) / 1.86 (convert to kg) = 12,229,331,410 kg of CO2e.

[13] Costs are two-fold: 1) costs of the gas element in a consumers bill 2) the ongoing environmental cost and the knock on impact that has to the wider global economy

The Modification:

(i) is likely to have a material effect on:

(aa) existing or future gas consumers; and

(bb) competition in the shipping, transportation or supply of gas conveyed through pipes or any commercial activities connected with the shipping, transportation or supply of gas conveyed through pipes; and

(cc) the operation of one or more pipe-line system(s); and

(dd) matters relating to sustainable development, safety or security of supply, or the management of market or network emergencies; and

(ee) the uniform network code governance procedures or the network code Modification procedures; and

(ii) is unlikely to discriminate between different classes of parties to the uniform network code/relevant gas transporters, gas shippers or DN operators.[14]

This Modification is likely to have a material impact on existing and future gas consumers, by more accurately allocating Shrinkage and this Modification aims to reduce greenhouse gas emissions through more accurate application of the plans outlined in RIIO-GD2; reputational and financial incentivisations to reduce gas leaks under RIIO are baselined by figures provided within the SLM.

Requested Next Steps

This Modification should:

- be considered a material change and not subject to Self-Governance.
- be assessed by a Workgroup.

3. Why Change?

Greenhouse gases (GHG) pose an existential threat. This is recognised by UK government in their Net Zero Strategy:

> *"We are at a crossroads in our history. As we recover from the impact of the pandemic on our lives and livelihoods, we know that it will not be enough to go back to the way things were before. The science is clear, we know that human activity is changing our climate and that this will have a devasting impact on human lives, the economy, and the natural world – ranging from the extinction of some species and the melting of ice caps to extreme weather patterns threatening our homes, businesses, and communities."*

Methane is widely accepted to be 84 times more potent than CO_2 as a greenhouse gas.[15] 16 TWh of methane that enters the gas distribution network is currently unaccounted for. Current rates of methane leaks are estimated based on the National Leakage Tests performed in 2002, which have been shown to be inaccurate. RIIO-GD2 plans are based on replacement mains as estimated to be required because of the calculation of losses based on the 2002 NLT results. Given that the 2002 NLT results have been shown to be inaccurate, the basis for the plans for mains replacement should now be updated. i.e. Inaccuracies in this test lead to deficient application of RIIO-GD2. This proposal seeks to remedy that deficiency.

[14] To be clear, I believe the modification will have a material impact on (i)(aa), (i)(bb), (i)(cc), (i)(dd), (i)(ee), and (ii).

[15] https://www.edf.org/climate/methane-crucial-opportunity-climate-fight

4. Code Specific Matters

Reference Documents

What is UIG? (especially slide 17) https://www.xoserve.com/media/41729/unidentified-gas-education-pack.pdf

When creating the ISE Framework, the AUGE framework could be used as a strawman, comparison and guide.

Licence requirement for the Shrinkage and Leakage Model Part C 4.4.9 and 4.4.17: (example given is for WWU)

Gas Transporter Licence Special Conditions
https://epr.ofgem.gov.uk/Content/Documents/Wales%20and%20West%20Utilities%20Limited%20-%20Special%20conditions%20consolidated%20-%2003-09-2021%20-%20Previous%20Version.pdf

5. Solution

The AUGE currently exists under the AUG Framework. Work will be needed to establish what an ISE Framework would look like. The ISE Framework should be based on principles of impartiality, emissions reduction, and best outcomes for end-consumers.

NB: the solution should be the product of thorough analysis by a workgroup.

1. The role of Independent Shrinkage Expert (ISE) will be implemented via tender.
2. The ISE must be independent. i.e. the ISE must not have interests (financial or otherwise), other than those set out within the ISE Framework, that would bias any of their outputs.
3. The ISE will review the Shrinkage and Leakage Model on an annual basis.
4. The ISE will use innovative means to detect methane output. For example air methane concentrations coupled with modelling.[16]
5. The ISE will base their outputs on clear evidenced-based research.
6. The ISE will enable engagement with their activity via a forum, if appropriate.
7. The ISE will be bound by the principles of best end consumer outcomes, emissions reduction, environmentalism, and impartiality.
8. The ISE will ensure that leakage rates are accurately set, enabling efficient application of RIIO-GD2, and, ultimately, supporting UK's Net Zero Strategy.[17]
9. Appointment to the role should be for a minimum of four years, in line with AUGE's average tenure.
10. The role will be funded by GDNs. Precedent: AUGE is 100% Shipper funded.

Further considerations:

1. Due consideration is needed on who coordinates and manages the procurement of the ISE. It is initially proposed that this should be carried out by a code administrator.
2. Part of the solution would have to be based on the procurement process. Renegotiation rules will need to be considered.
3. Intellectual property rights - if there's a physical element, and systems are created (to manage the NLT and the SLM, for example), consideration is needed on who owns the systems and processes. It

[16] For example: 'Continuous CH4 and δ13CH4 measurements in London demonstrate under-reported natural gas leakage' by Eric Saboya, Giulia Zazzeri, Heather Graven, Alistair J. Manning, and Sylvia Englund Michel

[17] Net Zero Strategy

should be ensured that a conversation is had on how ownership of ISE products is managed to obtain best outcomes.

4. Performance management need to be considered as part of a workgroup.
5. Requirements need to be compiled.
6. The above can be used as a rough framework for the initial WG agenda.

6. Impacts & Other Considerations

Does this Modification impact a Significant Code Review (SCR) or other significant industry change projects, if so, how?

The Digital Platform for Leakage Analytics Project being led by Cadent with National Grid and Scotia Gas Network supporting. The project is looking at how to model the emissions which may lead to a new way to model leakage. The Modification intends to work alongside the project and does not have no impact or prevention on the project.

Consumer Impacts

Consumers: reduced gas leaks will reduce greenhouse gas emissions. As less gas would be lost to the atmosphere, wholesale gas costs, Shrinkage costs, and UIG costs will be reduced, ultimately lowering bills.

This aligns with Ofgem's strategic vision[18]:

- facilitating net zero
- energy consumers receiving good value energy services
- minimise costs
- a data-enabled energy sector.

What is the current consumer experience and what would the new consumer experience be?

Direct bill costs: all consumer groups (Domestic Consumers; Small non-domestic Consumers; Large non-domestic Consumers; Very Large Consumers) currently pay for gas leaks at a rate that could be 35% higher than is currently incentivised under RIIO-GD2. This mod would ensure that GDNs are appropriately incentivised, thereby reducing consumer costs.

Environmental cost: the environmental impact of gas leaks to all consumer groups is exponentially higher. The knock on impacts of greenhouse gases on the climate crisis are much higher. This mod would ensure that GDNs are appropriately incentivised, thereby reducing the environmental impact of natural gas leaks in the UK.

Impact of the change on Consumer Benefit Areas:

Area	Identified impact
Improved safety and reliability This change would mean that the energy system can operate more safely and reliably in the future in a way that benefits end consumers. Gas leaks are dangerous - as this mod would reduce gas leaks, it would also reduce the inherent danger of gas leaks.	Positive

[18] https://www.ofgem.gov.uk/our-strategy-and-priorities

Lower bills than would otherwise be the case Through better incentivisation under RIIO-GD2, this will reduce costs attributable to gas lost from the system and knock on environmental costs.	Positive
Reduced environmental damage This will reduce greenhouse gas emissions through reducing natural gas leaks, supporting the journey to net-zero. Natural gas is a potent greenhouse gas that is 84x more potent than CO2. Approximately 16 TWh of natural gas were lost from the total system in 21/22. It will support the decoupling of leak estimation from party bias. Via accurate calculation of the environmental impact of gas leaks, it will support decisions on how to move away from GHG-intensive energy supply in the UK.	Positive
Improved quality of service Increases effectiveness of RIIO-GD2	Positive
Benefits for society as a whole As above: this Modification would lower costs and GHG emissions. The economic impacts of climate change are detailed within the linked government webpage.	Positive

Cross-Code Impacts

IGTs may need to have an equivalent Modification

EU Code Impacts

N/a

Central Systems Impacts

A new charge to cover ISE costs will need to be considered.

7. Relevant Objectives

Impact of the *Modification* on the Transporters' Relevant Objectives:

Relevant Objective	Identified impact
a) Efficient and economic operation of the pipe-line system.	Positive
b) Coordinated, efficient and economic operation of (i) the combined pipe-line system, and/ or (ii) the pipe-line system of one or more other relevant gas transporters.	Positive
c) Efficient discharge of the licensee's obligations.	Positive
d) Securing of effective competition: (i) between relevant shippers; (ii) between relevant suppliers; and/or (iii) between DN operators (who have entered into transportation arrangements with other relevant gas transporters) and relevant shippers.	Neutral

e) Provision of reasonable economic incentives for relevant suppliers to secure that the domestic customer supply security standards… are satisfied as respects the availability of gas to their domestic customers.	Positive
f) Promotion of efficiency in the implementation and administration of the Code.	Neutral
g) Compliance with the Regulation and any relevant legally binding decisions of the European Commission and/or the Agency for the Co-operation of Energy Regulators.	Positive

Impact of the *Modification* on the Transporters' Relevant Charging Methodology Objectives:

Relevant Objective	Identified impact
a) Save in so far as paragraphs (aa) or (d) apply, that compliance with the charging methodology results in charges which reflect the costs incurred by the licensee in its transportation business;	Positive
aa) That, in so far as prices in respect of transportation arrangements are established by auction, either: (i) no reserve price is applied, or (ii) that reserve price is set at a level - (I) best calculated to promote efficiency and avoid undue preference in the supply of transportation services; and (II) best calculated to promote competition between gas suppliers and between gas shippers;	Positive
b) That, so far as is consistent with sub-paragraph (a), the charging methodology properly takes account of developments in the transportation business;	Positive
c) That, so far as is consistent with sub-paragraphs (a) and (b), compliance with the charging methodology facilitates effective competition between gas shippers and between gas suppliers; and	Positive
d) That the charging methodology reflects any alternative arrangements put in place in accordance with a determination made by the Secretary of State under paragraph 2A(a) of Standard Special Condition A27 (Disposal of Assets).	Positive
e) Compliance with the Regulation and any relevant legally binding decisions of the European Commission and/or the Agency for the Co-operation of Energy Regulators.	Positive

8. Implementation

Implementation should be as soon as possible after approval by the Authority.

9. Legal Text

Legal text will be developed as part of the workgroup

10. Recommendations

Proposer's Recommendation to Panel

Panel is asked to:

- Agree that Authority Direction should apply.
- Refer this proposal to a Workgroup for assessment.