

UNC Modification	At what stage is this document in the process?
<h1>UNC 0843:</h1> <h2>Establishing the Independent Shrinkage Charge and the Independent Shrinkage Expert</h2>	<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="border: 1px solid green; background-color: #28a745; color: white; padding: 2px; display: flex; align-items: center; justify-content: center;"> 01 Modification </div> <div style="border: 1px solid #17a2b8; padding: 2px; display: flex; align-items: center; justify-content: center;"> 02 Workgroup Report </div> <div style="border: 1px solid #ffc107; padding: 2px; display: flex; align-items: center; justify-content: center;"> 03 Draft Modification Report </div> <div style="border: 1px solid #ffc107; padding: 2px; display: flex; align-items: center; justify-content: center;"> 04 Final Modification Report </div> </div>
<p>Purpose of Modification:</p> <p>To incentivise the reduction of greenhouse gas emissions and lower customer bills, this Modification introduces the role of the Independent Shrinkage Expert (ISE) who will establish:</p> <ul style="list-style-type: none"> the Independent Shrinkage Model (ISM), the Independent Shrinkage Model Methodology (ISMM), and the Independent Shrinkage Charge (ISC). 	
<p>Next Steps:</p> <p>The Proposer recommends that this Modification should be:</p> <ul style="list-style-type: none"> considered a material change and not subject to Self-Governance assessed by a Workgroup <p>This Modification will be presented by the Proposer to the Panel on 20 April 2023. The Panel will consider the Proposer's recommendation and determine the appropriate route.</p>	
<p>Impacted Parties:</p> <p>High: Consumers</p> <p>Medium: Distribution Networks Operators, Shippers, Suppliers</p>	
<p>Impacted Codes:</p> <p>UNC, Independent Gas Transporters UNC</p>	

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Timetable

Modification timetable:

Pre-Modification Discussed	23 March 2023
Date Modification Raised	03 April 2023
New Modification to be considered by Panel	20 April 2023
First Workgroup Meeting	27 April 2023
Workgroup Report to be presented to Panel	20 July 2023
Draft Modification Report issued for consultation	20 July 2023
Consultation Close-out for representations	10 August 2023
Final Modification Report available for Panel	14 August 2023
Modification Panel decision	21 September 2023

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1. Summary

What

When all metered gas volumes are subtracted from gas volumes that flow into LDZs, there are two mechanisms via which to account for any missing gas: Shrinkage and Unidentified Gas (UIG). First Shrinkage is removed from the total missing gas and the rest is allocated to UIG. Shrinkage consists of Own Use Gas, Theft of Gas, and gas leaks.

Numerous independent studies have shown that Gas Distribution Networks (GDN) have continually underreported Shrinkage volumes for many years. See appendix 1 for a comprehensive list of studies in methane leaks. Throughout this modification inaccurate reporting of Shrinkage will be referred to as Shrinkage model error.

The purpose of this Modification is to enable the more accurate allocation of Shrinkage model error to Gas Distribution Networks (GDN). For avoidance of doubt, this modification does not seek to change LDZ Shrinkage Quantities, as calculated by GDNs under the Shrinkage and Leakage Model (SLM), nor does it seek to make changes to the SLM. What it does do is shift Shrinkage model error out of Unidentified Gas (UIG) by the application of a new charge.

As Shrinkage currently contributes to 1% of the UK's total greenhouse gas emissions, inaccuracies in the Shrinkage and Leakage Model (SLM) damage the environment:¹ RIIO-GD2 is undermined, and by pushing Shrinkage into UIG the true volume of Shrinkage is hidden from view, weakening incentives. UIG by comparison is heavily incentivised via theft reduction incentives, performance measures by UNC's Performance Assurance Committee, capping the volume of UIG that can be retrieved from consumers, and more.

Currently, for the leakage element of Shrinkage, the SLM uses set leakage rates and multiplies these across the lengths of pipes that are in the ground, along with temperature and pressure data. This estimation method is shown to have flaws. For example:

- 1) Numerous studies show that Shrinkage volumes are understated.² For example, Imperial College London's study using direct air measurement shows that the leakage element of the SLM is misreported by 30-35%.³
- 2) For Formula Year 2023/24 the Allocation of Unidentified Gas Statement (AUGS) has allocated UIG 8,497 GWh of the forecasted 11,713 GWh of UIG to known contributors. It is arguable that some or all the 3,216 GWh of unaccounted-for gas is attributable to under-reported Shrinkage levels.⁴ For comparison, 2,278 GWh of Shrinkage is currently self-reported by GDNs.
- 3) IGT Shrinkage is set as 0 under the UNC, which is contrary to the 19 GWh of IGT Shrinkage that Shippers need to pay as UIG due to Shrinkage model error.

¹ https://www.gasgovernance.co.uk/sites/default/files/ggf/book/2022-02/2021-22%20Shrinkage%20and%20Leakage%20Model%20Review_Consultation%20FINAL.pdf

² See appendix 1

³ [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](#).

⁴ [AUG statement 23/24](#)

- 4) For formula year 2023/24 AUGS has allocated 6,823 GWh to the Theft of Gas contributor. This is a large variance from the 1,218 GWh of Theft of Gas that is forecast by the Retail Energy Code. It is arguable that some or all of the excess 5,605 GWh is attributable to Shrinkage model error.

Underestimating Shrinkage via Shrinkage model error directly increases in Unidentified Gas (UIG), as UIG is the balancing mechanism. This has the direct impact of inflating customer bills, as UIG is a line item in the Price Cap set by Ofgem.

Making changes to the SLM is problematic, as it is written into GDN's licence conditions, and attempts to change the SLM are strongly resisted by GDNs. To get around such resistance, and to create an incentivisation mechanism that will follow lowest cost of implementation and least amount of change to current licences, this Modification does not propose to change the SLM or LDZ Shrinkage Quantities. The SLM can continue to be managed by the GDNs, and GDNs can continue to self-report Shrinkage volumes.

Instead, 0843 creates a new charge to ensure that Shrinkage model error is covered by the UNC Party that creates it: the Independent Shrinkage Charge (ISC)

The ISC will be calculated by the Independent Shrinkage Expert (ISE) as detailed in the "How" section and in the business rules.

Why

This Modification should be made to lower greenhouse gas emissions and customer bills. We are currently in a climate emergency, and as such also signed up to the COP 26's Global Methane Pledge to reduce the output of methane by 30%.⁵

If Daily Metered and Non-Daily Metered volumes are substituted 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 expertise of the Allocation of an Unidentified Gas Expert (AUGE). If GDNs under-report Shrinkage the extra cost is ultimately fed through to the customer via the Shipper/Supplier relationship, as UIG is a line item in the Price Cap. In parallel, under the mains replacement programme, GDNs will also be under-incentivised to find and fix gas leaks. Unfortunately, Shippers have no way to reduce the causes of Shrinkage model error.

Making changes to the SLM is also met with strong resistance by GDNs – see Shrinkage Forum minutes throughout the years for attempts by Shippers to make GDNs accountable for Shrinkage model error - who are protective over their calculation. This is understandable: if GDNs were obliged to purchase 3 TWh of gas as it is found to be due to Shrinkage model error the financial impact would be significant. At a price cap of £0.08 per kWh, 3 TWh equates to £240,000,000. Around 12 TWh of UIG are currently paid for by Shippers.

Throughout the years, efforts to amend the SLM by Shippers have been disregarded by the GDNs. This has meant that most Shippers no longer attend the Shipper Forum. The argument against amending the SLM is usually that it is set in the licence and unalterable. Other arguments are based on the cost of making a change to the SLM being too expensive. If GDNs are underreporting Shrinkage by 30-35% as found in the independent study by ICL, then the business case for change is not only sufficient, it is compelling.

This Modification seeks to navigate around any licence concerns by creating a new mechanism that sits alongside the SLM but does not amend the SLM in any way. It also seeks to allay cost concerns, by implementing a role that will retrieve data based on its merits, rather than the inherent bias of an UNC Party.

⁵ [Global Methane Pledge](#)

How

To tackle the issue of Shrinkage model error, this Modification will create the role of Independent Shrinkage Expert (ISE) that shall be procured by the CDSP in line with the Framework for the Appointment and Operation of an Independent Shrinkage Expert as found in the appendices of this modification document.

The ISE will use Independent Shrinkage Model Methodologies (ISMM) to create an Independent Shrinkage Model (ISM) via which to estimate an independent account of Shrinkage model error.

The methodologies used by the ISE to create the ISM shall be the purview of the ISE. It is assumed by the modification proposer that methodologies employed by the ISE might include:

- utilising already extant pipeline data
- studies such as the leakage rates developed off the back of the National Leakage Tests
- those noted within the appendix:
 - o Satellite data
 - o Methane inventories
- direct measurement

NB: The inclusion of the above presumed methodologies is not to say that these should be used, as doing so would fetter the discretion and independence of the ISE. However, they have been included here as per the request of the 0843 workgroup.

The relevance of the ISE using data sources, and the costs associated with the retrieval of data from said sources, must be evidenced within their tender bid. Where the ISE identifies that costs required to be covered to fulfil the retrieval of data for the completion of the ISM is above what was agreed upon during the tender process, then such costs will be agreed upon within the DSC Contract Management Committee (CoMC) or a DSC CoMC Sub-Committee. Where there is potential for a split vote, due to Transporters abstaining from voting, for example, there will need to be a clear decision from CoMC on how 50/50 votes will be dealt with.

Having established methodologies for the upcoming year, the ISE will retrieve data to create their data set, as appropriate, and create an estimation of shrinkage model error, as described in the business rules. Where there is a difference between the LDZ Shrinkage Quantities (LSQ) estimated by the SLM and the Independent LDZ Shrinkage Quantities (ILSQ) estimated by the ISM, the ISE will recommend to the Authority, via the publication of the Independent Shrinkage Statement (ISS), the approval of the Independent Shrinkage Charge (ISC).

The IGT ISC will be calculated by subtracting IGT Shrinkage from Independent IGT Shrinkage Quantities (IISQ). E.g. If IGT Shrinkage is 0 GWh and IISQ is 10 GWh then the IGT ISC will be 10 GWh.

The GDN ISC will be calculated by subtracting LDZ Shrinkage Quantities and IGT ISC from Independent LDZ Shrinkage Quantities. E.g., if LDZ Shrinkage Quantities = 1000 GWh, the IGT ISC is 10 GWh and Independent LDZ Shrinkage Quantities = 1200 GWh, the ISC would be 190 GWh.

IGTs will purchase gas within the LDZ that their network resides, therefore minimising the impact to Gemini which currently works at LDZ level.

If the ISC(s) is approved by the Authority, Transporters and IGTs will be obliged to purchase volumes of gas to cover the ISC. If the ISC is a negative value, the ISC will not apply.⁶

⁶ Within the 0843 workgroup on 23/05, GDNs noted that negative values would impact their licence obligations and have been excluded on this basis.

Joint Office of Gas Transporters

As with LDZ Shrinkage Quantities, the GDNs and IGTs will need to purchase gas to cover the ISCs via their Shipper on Gemini daily. The CDSP will load Daily ISC values into Gemini and the GDNs and IGTs will need to contract with a Shipper(s) to cover the Daily ISC. A small change to the Transporter licence may be required here to ensure that the GDN and IGTs are not prohibited from buying the ISC.

As with LDZ Shrinkage Quantities, after the end of the Formula Year, the ISE will compare gas that that the ISE forecast to be lost via their ISM, and that which they observed being lost via the ISM. Where there is a difference then this value will need to be either returned to GDNs and IGTs or an additional charge will need to be levied. As with LDZ Shrinkage Quantities, the ISC will be subtracted from missing gas prior to UIG being apportioned to Shippers.

This should lower bills, as UIG is a line item in the Price Cap, and, by virtue of accurate cost allocation, incentivise GDNs and IGTs to fix sources of Shrinkage.

The Modification also proposes to introduce the Framework for the Appointment and Operation of an Independent Shrinkage Expert. Like the AUGE Framework, the CDSP will be used to procure the ISE.

NB: modification IGT165 has been established to ensure that the ISE is able to have jurisdiction over the IGTs.

2. Governance

Justification for Authority Direction

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.

Requested Next Steps

This Modification should be considered a material change and not subject to Self-Governance.

This Modification is likely to have a material impact on existing and future gas consumers, by more accurately allocating Shrinkage.

Any delay in the implementation of this Modification will negatively impact the environment and customer bills, as detailed above.

3. Why Change?

Greenhouse gases (GHG) pose an existential threat. This is recognised by the 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 devastating 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 84x more potent than CO2 as a greenhouse gas. 16 TWh of methane that enters the gas distribution network is currently unaccounted for. Current rates of methane leaks are estimated off the back of the National Leakage Tests performed in 2002, which have been shown to be inaccurate. Inaccuracies in this test lead to the deficient application of RIIO-GD2. This change seeks to remedy that deficiency.

4. Code Specific Matters

Reference Documents

The AUGE currently exists under the AUG Framework. Work has been undertaken within 0828R to establish what an ISE Framework would look like. The ISE Framework should be based on principles of impartiality, environmentalism, and best outcomes for end-consumers.

5. Solution

Note for legal text provider: paragraphs that begin with "for avoidance of doubt" and those within the "further solution notes" are guidance notes, and are not intended to be drafted into code.

1. **Procurement:** As per the Framework, the Independent Shrinkage Expert (ISE), shall be appointed (procured via tender), and engaged by the CDSP through an ISE contract. The CDSP will seek to procure an ISE to deliver the requirements as set out within this Modification. In the event that a suitable candidate is not available to be appointed, the CDSP will consult with the [Uniform Network Code Committee] regarding the appropriate next steps.
2. **High-Level Functions of the ISE:** the CDSP shall ensure that the ISE shall
 - 2.1. develop an Independent Shrinkage Model (ISM), Independent Shrinkage Model Methodologies (ISMM) and the Independent Shrinkage Statement (ISS), as set out in the *Framework for the Appointment and Operation of an Independent Shrinkage Expert* (as found in appendix 2; hereafter "Framework" or "Framework Document", which must be a UNC Related Document);
 - 2.1.1. For avoidance of doubt, the initial content of the Framework Document is provided as an Appendix to this modification proposal. As a UNC Related Document,

Commented [DM1]: Procurement is covered in Framework.

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Commented [DM3]: added for workgroup 22022024

Commented [DM4]: Removed as "the CDSP cannot be held responsible or be liable under the UNC, if the appointed ISE cannot deliver the functions set out for them to deliver." AUG Expert has action such as these encoded, so there is a precedent to place obligation on ISE within code. See TPD, E, 9.4 for example.

~~the Framework Document may be modified if the UNCC votes by majority vote in favour of a proposed change. Whilst the ISCs are applied at LDZ level, the data contained within the ISS will, where appropriate, be more granular, to assist pipeline owners to resolve causes of Shrinkage model error.~~

2.2. estimate the Independent LDZ Shrinkage Quantities (ILSQ) and Independent IGT Shrinkage Quantities (IISQ) based on the ISM and ISMM; and calculating the Independent Shrinkage Charge (ISC) for both GDNs and IGTs

2.3. adhere to the timetable set out in the Framework; and

2.4. review the ISM on an annual basis, as per timetable set out in the Framework.

3. **Liability:** Liability arrangements shall mirror that which is set up for AUGÉ under TPD Section E 9.3

4. **Costs:** Where ISE identifies that costs required to be covered to fulfil the retrieval of data for the completion of the ISM is above what was agreed upon during the tender process ~~requires a contract variation, then such costs agreement on such contract variations~~ will be determined within the UNCC, or a Sub-Committee as so decided upon by the UNCC.

4.1. In the absence of a clear majority vote (if GDNs abstain from voting for additional funds for the ISE, causing voting deadlock, for example) a 50% or greater vote in favour shall be an approval of funds.

5. **Calculating the IGT ISC and the GDN ISC:**

5.1. IGT ISC: The IGT ISC will be calculated by subtracting IGT Shrinkage from Independent IGT Shrinkage Quantities (IISQ). E.g. If IGT Shrinkage is 0 GWh and IISQ is 10 GWh then the IGT ISC will be 10 GWh.

5.2. GDN ISC: The GDN ISC will be calculated by subtracting LDZ Shrinkage Quantities and IGT ISC(s) from Independent LDZ Shrinkage Quantities. Eg if LDZ Shrinkage Quantities = 1000 GWh, the IGT ISC is 10 GWh and Independent LDZ Shrinkage Quantities = 1200 GWh, the ISC would be 190 GWh.

6. **Recommending the ISC:** Where the GDN ISC and/or the IGT ISC are positive values, the ISE will provide detail to the Authority so that they may execute ~~disapproval (mirrors TPD Section N, 3.1.8)~~. Where there is an absence of a decision made by the Authority by the start of the Formula Year, then the ISC shall apply. If the decision from the Authority to disapprove the ISC(s) is made after the start of the Formula Year, then the CDSP will reverse payments made to purchase gas to cover the ISC by adding to the Amendment Invoice. The CDSP requires the values a minimum of 10 business days ahead of the 1st April of any given year.

6.1. ~~Where disapproval of an IGT ISC and/or GDN ISC is executed, the previous Formula Year's ISC in the relevant LDZ will apply.~~

~~6.2. For avoidance of doubt, the inclusion of a mechanism that allows Authority disapproval has precedent under TPD Section N, 3.1.8~~

7. **Negative ISC Values:** If the GDN ISC is a negative value, the GDN ISC will not apply. If the IGT ISC is a negative value, the IGT ISC will not apply. This shall still be reported to the Authority for consideration.

7.1. For avoidance of doubt, the negative ISC might be applied by the GDNs as part of their SLM exercises (i.e. see appendix 4 for an overview of SLM), if they so choose.

8. **Effect on UIG:** As with LDZ Shrinkage Quantities, the GDN ISC and/or the IGT ISC will be subtracted from missing gas before UIG is apportioned to Shippers.

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Commented [DM6]: Moved to framework section 10 as per 0843 WG 06032024

Commented [DM7]: Moved to glossary in further solution notes

Commented [DM8]: Timetable BR deleted and moved here

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Commented [DM10]: UNCC can decide on what is needed without needing to put this into code?

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9. **Recovery of ISC:** If the GDN ISC and/or IGT ISC are not disapproved by the Authority, GDNs and IGTs will be obliged to purchase volumes of gas to cover the respective ISCs. ~~The same mechanism to purchase gas for LDZ Shrinkage will be employed for purchasing ISC.~~

9.1. For avoidance of doubt, a similar mechanism to purchase gas for LDZ Shrinkage will be employed for purchasing ISC.

~~9.1.9.2.~~ For the avoidance of doubt, the ISE, within the ISS, will divide the Yearly GDN ISC into Daily GDN ISC (365 equal parts), and will divide the Yearly IGT ISC into Daily IGT ISC (365 equal parts). CDSP will load the Daily ISC amounts into Gemini and GDNs and IGTs will contract with a Shipper(s) to purchase the respective ISCs.

~~9.2.9.3.~~ For avoidance of doubt, the proposed solution is for the GDN ISC to be added to LDZ Shrinkage (provided by the GDN) prior to loading into Gemini and will be considered under the XRN and not under 0843. IGTs will purchase gas within the LDZ that their network resides, therefore minimising the impact to Gemini which currently works at LDZ level. I.e., Gemini will not be required to operate at a level less granular than LDZ level due to 0843.

Commented [DM16]: For avoidance of doubt statement updated for CDSP 23022024

10. **Reconciliation of ISC:** following the application for the ISC for the coming year, the ISE will observe Shrinkage model error. After the Formula Year concludes, where observed Shrinkage model error is more or less than that which is accounted for under the LDZ Shrinkage Quantities and the ISC, and after the GDNs and IGTs have provided their revised LDZ Shrinkage Quantities, the ISE will issue a Reconciliation Statement. This will contain rationale for change, and updated ISC, and Yearly and Daily ISC values (how the ISE relays the rationale is their choice).

Commented [DM17]: added for DMi

10.1. Where the observed ILSQ remain the same, but LSQ reduce then the ISC will increase; or

10.2. Where the observed ILSQ increases, and LSQ decreases then the ISC will increase by the sum of the two variances; or

10.3. Where observed ILSQ decreases below the LSQ, then the ISC will be 0.

10.4. The GDNs will issue the reconciliation statement for the SLM by 31st July following the conclusion of the Formula Year, and the ISC reconciliation will need to wait for this event to conclude before being completed.

~~10.5.~~ The ISE will be expected to produce a reconciliation report even if the Authority, at the start of the Formula Year, disapproves the ISC(s). This will be based on GDN Shrinkage values. Where the Authority rejected the ISC at the start of the Formula Year, Authority approval will be needed if the ISC reconciliation values are to prevail. If the GDN ISC and IGT ISC were not disapproved by the Authority at the start of the Formula year, the ISE reconciliation report would be automatically applied

Commented [DM18]: added following commentary following questions from Xoserve

11. **Reconciliation of ISC continued:** where reconciliation increases ISC, increased Daily ISC will need to be recovered by the GDNs and/or IGTs. Where reconciliation decreases ISC, this will go into the Amendment Invoice – the Amendment Invoice is detailed in UNC Section S.

12. ISE Data Retrieval: The ISE will be able to request relevant data from UNC Parties, and UNC Parties will not be able to unreasonably withhold that data. UNC Party Non-compliances can be escalated to the Authority by the ISE. Data shared between UNC Parties and the ISE shall be transferred and stored securely. Data shall be provided by UNC Parties to the ISE within timeframes stipulated by the ISE to enable ISE to collate the ISMM and ISM.

Commented [DM19]: Links to TPD, E, 9.4.5: "Each Transporter and User shall, to the extent provided in the AUG Statement, cooperate with and provide data to the AUG Expert in connection with the preparation of the AUG Table." Added from who to who for DMi as per 0843 WG 06032024

~~12.12.1.~~ For avoidance of doubt, the ISE will need to be added to the Data Permissions Matrix.
For the AUGE process, in UNC there is a clause related to data being provided: "9.4.5 Each Transporter and User shall, to the extent provided in the AUG Statement, cooperate with and provide data to the AUG Expert in connection with the preparation of the AUG Table. Something similar could be applied for the ISE process and creation of the ISM."

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13. **Engagement with the ISE:** The ISE will enable engagement with their activity via the Independent Shrinkage Sub-Committee, formed under UNCC, and attended by ISE, CDSP and interested parties, , as per the timetable set out in the Framework.

~~13.1. For avoidance of doubt, this is a review group to seek consensus on topics, it is not a decision-making group. Topics that interested parties would like to be considered by the ISE can be shared with the ISE outside of the consultation period via the Independent Shrinkage Sub-committee or in writing.~~

Commented [DM20]: Deleting as this is set out in the ToR, as agreed in 0843 WG 06032024

14. **Granularity:** The GDN and IGT ISCs shall be applied at LDZ level to enable them to be deducted from UIG.⁷

14.1. For avoidance of doubt, IGTs may operate in several LDZs. Where this is the case, the IGT may be required to cover several IGTs ISCs. These will be recouped at the LDZ level.

~~15. IGT Shrinkage: For the avoidance of doubt, where the ISC is applied to an IGT, and volumes of gas charged to the IGTs must not also be charged to GDNs. To be clear, the GDN ISC cannot be purchased by the IGTs and the IGT ISC cannot be purchased by GDNs. The IGTAD may need to be amended to ensure that the IGTs are mandated to purchase Daily IGT ISC volumes. Currently, IGTAD Section C covers "IGTS Shrinkage", so it is reasonable to assume that the legal text may need to be updated within this section.~~

Commented [DM21]: added for DMI, who noted that workgroup may need to stipulate which sections of UNC may need to be updated for each business rule. I have agreed to ask workgroup whether they are of the same opinion.

~~15.1.14.2. For avoidance of doubt, the method that they will use to pay the ISC will be the same as GDNs and is detailed in appendix 4. In short, CDSP will load Daily IGT ISC values into Gemini, and the IGTs will need to contract with a Shipper(s) to purchase gas volumes.~~

Commented [DM22]: Moved to Further solution notes as per WG 06032024

~~16.15. Funding:~~ Gas Distribution Networks and IGTs will fund the role of the ISE ~~in a split that is so determined by the XRN.~~

~~16.1.15.1.~~ For avoidance of doubt, funding areas that will need to be allocated: Gemini development and any other impacted systems, contract establishment, contract variation. The precedent here is that AUGE is 100% Shipper funded. The precedent here is that AUGE is 100% Shipper funded.

~~16. 17-~~

17. Glossary:

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~~17.1. The Independent Shrinkage Model Methodologies (ISMM) are the techniques used to retrieve data sources that will feed into the ISM.~~

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~~17.2. The Independent Shrinkage Model (ISM) is mechanism that interprets the ISMM to calculate the Independent Shrinkage Charge(s)~~

~~17.3. The Independent Shrinkage Statement (ISS) is the document that describes how the ISMM have been used within the ISM to calculate the ISC~~

⁷ There is value in this being less granular than LDZ. However, as this would create complexity and cost above and beyond what is currently required it has been removed from this section.

- 17.4. The GDN Independent Shrinkage Charge (ISC) = ILSQ – LSQ.
- 17.5. IGT Shrinkage – as defined by IGTA Section C.
- 17.6. The IGT Independent Shrinkage Charge (IGT ISC) = Independent IGT Shrinkage Quantities
- 17.7. LDZ Shrinkage Quantities (LSQ) are defined in TPD Section N, 1.4.4
- 17.8. Independent LDZ Shrinkage Quantities (ILSQ) mirrors LSQ insofar as it is a calculation of the amount of Shrinkage. However, the difference here is that the calculation is done by the ISE, not by the GDNs.
- 17.9. IGT Shrinkage Quantities mirrors LSQ insofar it is a calculation of the amount of Shrinkage. However, the difference here is that the calculation is done by the ISE, not by the IGTs. Please note that the volumes of Shrinkage calculated by the IGTs at time of writing is 0.
- 17.10. Daily ISC Values – the ISC will be divided into 365 equal parts prior to being loaded into Gemini so that volumes of gas can be purchased on a daily basis. This is similar to the activity which takes place for Shrinkage currently.
- 17.11. Yearly ISC Values – can be used synonymously with ISC, but if differentiation between Daily and Yearly is required, then this definition provides clarity.
- 17.12. Reconciliation Statement - is the report that the ISE produces subsequent to the Formula Year concluding in which an ISC has applied. It contains rationale for changes to the ISC, and updated ISC, and Yearly and Daily ISC values.

17.18.

Further solution notes:

1. **Mission statement:** The Independent Shrinkage Expert will not amend Shrinkage. The ISE will remove Shrinkage model error from UIG by applying new charges to GDNs and IGT: the GDN Independent Shrinkage Charge (GDN ISC) and the IGT Independent Shrinkage Charge (ISC). By detailing rationale behind the calculation of Shrinkage model error within their annual statement, and by virtue of the application of the charge, the ISE will thereby incentivise Transporters to reduce the causes of Shrinkage model error. How this works is set out in the following business rules. For avoidance of doubt, arrangements for GDNs and IGTs to receive money to cover the cost of purchasing IGT ISC and GDN ISC are not detailed within this modification.
2. **Cost recovery:** For the avoidance of doubt, TPD E9.3 stipulates the terms of engagement and cost recovery for the AUGÉ, and an equivalent piece of legal drafting may be needed for the ISE. Interested parties can engage with the ISE on their ISMM during the consultation process.
3. **Transmission Shrinkage model error:** For the avoidance of doubt, Transmission Shrinkage model error is out of scope of this Modification. Transmission already accounts for all Shrinkage and does not use UIG as a balancing mechanism. It can therefore be appropriately incentivised by Ofgem without additional analysis.
4. **Licence Changes:** For avoidance of doubt, licence changes may be required for GDNs and IGTs. For example, the Special Conditions of the Gas Transporter Licence prohibit GDNs from purchasing gas other than that needed to cover Shrinkage. As this is a new charge, the Authority may need to consider whether a licence change is needed. The modification proposer is not aware of a similar requirement for IGTs, but licence changes for IGTs may need to be considered. For example, allowing IGTs to cover the IGT-ISC.

Commented [DM23]: Added for DMI

5.4. ISMM Assumptions: The methodologies used by the ISE to create the ISM shall be the purview of the ISE. It is assumed by the modification proposer that methodologies employed by the ISE might include:

- 5.4.4.1. utilising already existing pipeline data
- 5.2.4.2. studies such as the leakage rates developed off the back of the National Leakage Tests
- 5.3.4.3. those noted within the appendix eg Imperial College London's study which notes ~30% more methane above London than is currently reported by GDNs
- 5.4.4.4. potentially direct measurement.

6.5. Appeals: for the avoidance of doubt, the Authority can be consulted where a UNC Party has concerns as regards the processes that are implemented under 0843 or IGT165 via the standard appeals processes in the UNC. Shrinkage: for avoidance of doubt, the 0843 will not amend Shrinkage. 0843 removes Shrinkage model error from UIG and applies it to GDNs and IGTs as the GDN ISC and the IGT ISC.

Commented [DM24]: Added for DMI

7.6. Principles: The ISE will be led by principles of impartiality (they shall not show bias towards any UNC Party), net-zero (all its activities in the operation of the role of ISE and the impacts of Shrinkage model error on UK's environmental record shall be considered here), accuracy (accurate underlying data that will enable Transporters to reduce the causes of leaks, for example), and best outcomes for end-consumers.

8.7. IGT ISC Recovery: For avoidance of doubt, for ease of implementation for the CDSP, the GDN ISC could be added to LDZ Shrinkage prior to loading into Gemini and could be considered under the XRN and not under 0843. IGTs will purchase gas within the LDZ that their network resides, therefore minimising the impact to Gemini which currently works at LDZ level. I.e., Gemini will not be required to operate at a level less granular than LDZ level due to 0843.

9.8. Procurement: As per the Framework, the Independent Shrinkage Expert (ISE), shall be appointed (procured via tender), and engaged by the CDSP through an ISE contract for the purposes of:

9.1.8.1. developing an Independent Shrinkage Model (ISM), Independent Shrinkage Model Methodology (ISMM) and the Independent Shrinkage Statement (ISS) - to be clear:

9.1.1.8.1.1. The ISMM are the techniques used to retrieve data sources that will feed into the ISM,

9.1.2.8.1.2. the ISM is mechanism that interprets the ISMM to calculate the Independent Shrinkage Charge(s)

9.1.3.8.1.3. The ISS is the document that describes how the ISMM have been used within the ISM to calculate the ISC

9.2.8.2. estimating the Independent LDZ Shrinkage Quantities (ILSQ) and Independent IGT Shrinkage Quantities (IISQ) based on the ISM and ISMM; and calculating the Independent Shrinkage Charge (ISC) for both GDNs and IGTs and recommending to the Authority that this should be applied to the GDNs and IGTs

10.9. Methodologies: The ISE will use methodologies to create an Independent Shrinkage Model (ISM) via which to estimate an independent account of Shrinkage model error. The methodologies used by the ISE to create the ISM shall be known as the Independent Shrinkage Model Methodologies (ISMM).

10.1.9.1. The methodologies used by the ISE to create the ISM shall be the purview of the ISE.

10.2.9.2. These may or may not only be desk based if reasonable.

~~10.3.9.3.~~ The relevance of the prospective ISE using data sources, and the costs associated with the retrieval of data from said sources, must be evidenced within their tender bid, so that the Stakeholder Evaluation Panel, as formed by the CDSP for the purpose of evaluating tender bids, can make an informed choice as to the validity of the tender bid.

~~10.4.9.4.~~ Where ISE identifies that costs required to be covered to fulfil the retrieval of data for the completion of the ISM is above what was agreed upon during the tender process, then such costs will be determined within the UNCC, or a Sub-Committee as so decided upon by the UNCC.

~~10.5.9.5.~~ The ISE may contract with third parties to provide data for the completion of the ISMM. Cost benefit analysis shall be required to evidence the requirement of a data collection activity.

~~10.6.9.6.~~ Interested parties can engage with the ISE on their ISMM during the consultation process.

~~10.7.9.7.~~ Topics that interested parties would like to be considered for inclusion within the ISMM by the ISE can be shared with the ISE outside of the consultation period via the Independent Shrinkage Sub-committee or in writing.

11. ~~Glossary:~~

~~11.1. — The Independent Shrinkage Model Methodologies (ISMM) are the techniques used to retrieve data sources that will feed into the ISM,~~

~~11.2. — The Independent Shrinkage Model (ISM) is mechanism that interprets the ISMM to calculate the Independent Shrinkage Charge(s)~~

~~11.3. — The Independent Shrinkage Statement (ISS) is the document that describes how the ISMM have been used within the ISM to calculate the ISC~~

~~11.4. — The GDN Independent Shrinkage Charge (ISC) = ILSQ – LSQ.~~

~~11.5. — IGT Shrinkage — as defined by IGTAD Section C.~~

~~11.6. — The IGT Independent Shrinkage Charge (IGT ISC) = Independent IGT Shrinkage Quantities~~

~~11.7. — LDZ Shrinkage Quantities (LSQ) are defined in TPD Section N, 1.4.4~~

~~11.8. — Independent LDZ Shrinkage Quantities (ILSQ) mirrors LSQ insofar it is a calculation of the amount of Shrinkage. However, the difference here is that the calculation is done by the ISE, not by the GDNs.~~

~~11.9. — IGT Shrinkage Quantities mirrors LSQ insofar it is a calculation of the amount of Shrinkage. However, the difference here is that the calculation is done by the ISE, not by the IGTs. Please note that the volumes of Shrinkage calculated by the IGTs at time of writing is 0.~~

~~11.10. — Daily ISC Values — the ISC will be divided into 365 equal parts prior to being loaded into Gemini so that volumes of gas can be purchased on a daily basis. This is similar to the activity which takes place for Shrinkage currently.~~

~~9.8. Yearly ISC Values — can be used synonymously with ISC, but if differentiation between Daily and Yearly is required, then this definition provides clarity.~~

~~11.11. — IGT Shrinkage: . For the avoidance of doubt, where the ISC is applied to an IGT, and volumes of gas charged to the IGTs must not also be charged to GDNs. To be clear, the GDN ISC cannot be purchased by the IGTs and the IGT ISC cannot be purchased by GDNs. The IGTAD may need to be~~

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amended to ensure that the IGTs are mandated to purchase Daily IGT ISC volumes. Currently, IGTAD Section Section C covers "IGTS Shrinkage", so it is reasonable to assume that the legal text may need to be updated within this section. The method that they will use to pay the ISC will be the same as GDNs and is detailed in appendix 4. In short, CDSP will load Daily IGT ISC values into Gemini, and the IGTs will need to contract with a Shipper(s) to purchase gas volumes

Commented [DM25]: added for DMI, who noted that workgroup may need to stipulate which sections of UNC may need to be updated for each business rule. I have agreed to ask workgroup whether they are of the same opinion.

6. Impacts & Other Considerations

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

No

Consumer Impacts

Consumers: removing Shrinkage model error from UIG and applying it to GDNs as the ISC will act as an incentivisation mechanism to reduce the causes of the Shrinkage model error– as it currently stands, Shippers cannot reduce Shrinkage model error. Incentivising the reduction of gas leaks aims to reduce greenhouse gas emissions. Reducing methane emissions facilitates Net Zero. As less gas would be lost to the atmosphere, wholesale gas costs, Shrinkage costs, and UIG costs would be reduced, ultimately lowering bills. UIG is a line item in the domestic Price Cap, and so leaving Shrinkage model error in UIG has the direct effect of negatively impacting society's poorest and most vulnerable.

This aligns with Ofgem's strategic vision:

- 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 RII0-GD2. This mod would ensure that GDNs are appropriately incentivised, thereby reducing consumer costs and increasing confidence in the reliability of energy infrastructure.

Environmental cost: the environmental impact of gas leaks on all consumer groups is 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.

Commented [DM26]: Clarifying that this an incentivisation mechanism for the reduction of the causes of Shrinkage model error

Impact of the change on Consumer Benefit Areas:

Area	Identified impact
Improved safety and reliability	Positive

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<p>This change would provide incentivisations so 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 Modification would incentivise the reduction of gas leaks, it aims to reduce the inherent danger of gas leaks.</p>	
<p>Lower bills than would otherwise be the case</p> <p>Better incentivisation, aims to reduce costs attributable to gas lost from the system and knock on environmental costs. This aims to lower bills and help protect the environment.</p>	Positive
<p>Reduced environmental damage</p> <p>By incentivising the reduction of Shrinkage model error, this modification aims to reduce greenhouse gas emissions, supporting the journey to net zero. Natural gas is a potent greenhouse gas that is 84x more potent than CO2. Approximately 16 TWh of gas were lost from the total system in 2021/22. 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.</p>	Positive
<p>Improved quality of service</p> <p>Increases confidence in customers that our gas system is operated efficiently</p>	Positive
<p>Benefits for society as a whole</p> <p>As above: via incentivising Shrinkage model error reduction this Modification would lower bills and GHG emissions. The economic impacts of climate change are detailed within the linked government webpage.</p>	Positive

Cross-Code Impacts

See IGT165 – this is an enabling modification under the IGTUNC. IGT165 enables the ISE to have jurisdiction over the IGTs and IGT UNC Parties to not unreasonably withhold data on request.

. 19 GWh of IGT Shrinkage is currently purchased by Shippers via UIG, as detailed in the AUG Statement.

EU Code Impacts

N/a

Central Systems Impacts

The new charge to cover ISE costs may 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

"Efficient and economic operation of the pipe-line system" - this mod will incentivise the reduction of gas leaks leading to efficiency in the operation of the pipe-line system. It will also lead to economic improvements via the accurate allocation of costs for the operation of the pipe-line system. "Efficient discharge of the licensee's obligations" this is positive as licensees are obliged to ensure that the environment is not negatively impacted and that accuracy in data is maintained and assured independently. "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." Via lowering UIG, this will be achieved by making the price cap more accurately reflective of actual costs. "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" - facilitates net zero.

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

Relevant Objective	Identified impact
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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: 1. no reserve price is applied, or 2. 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;	Neutral
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	Neutral
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).	Neutral
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

A) Is achieved, as costs are pushed to the correct parties (Transporters), aa) is better achieved as it will allow transporters to better price their services, e) is better achieved as it aligns with net-zero.

8. Implementation

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

9. Legal Text

1. See the Framework for the Appointment of an Independent Shrinkage Expert for suggested text.

10. Recommendations

Proposer's Recommendation to Panel

Panel is asked to:

- Agree that Authority Direction should apply

11. Appendices

Appendix 1 - Literature Review – methane measurement - academic papers

[This appendix not only provides rationale for the implementation of a ISE but also provides an overview of the UK methane inventory, methane measurement methods, and studies in other countries on Shrinkage volumes.](#)

Commented [DM27]: Added for GDNs

Contents:

1. (2023) Major UK methane greenhouse gas leak spotted from space
2. (2022) Continuous CH₄ and δ¹³CH₄ measurements in London demonstrate under-reported natural gas leakage
3. (2022) Street-level methane emissions of Bucharest, Romania and the dominance of urban wastewater
4. (2019) Assessing London CO₂, CH₄ and CO emissions using aircraft measurements and dispersion modelling
5. (2017) Characterization of interferences to in situ observations of δ¹³CH₄ and C₂H₆ when using a cavity ring-down spectrometer at industrial sites
6. (2016) Spatial and temporal variability of urban fluxes of methane, carbon monoxide and carbon dioxide above London, UK
7. (2017) Natural gas and climate change
8. |

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1. (2023) Major UK methane greenhouse gas leak spotted from space

<https://www.bbc.co.uk/news/science-environment-66811312>

<https://egusphere.copernicus.org/preprints/2023/egusphere-2023-2246/#:~:text=Here%20we%20present%20the%20monitoring,estimates%20using%20surface-based%20mobile.>

Wales and West Utilities over a three month period leaked gas that could have powered 7,500 homes for a year. University of Leeds worked with GHGSat, a satellite data company, and Royal Holloway University of London, who provided on ground measurement, to detect and quantify the leak.

2. (2022) Continuous CH₄ and δ¹³CH₄ measurements in London demonstrate under-reported natural gas leakage

<https://acp.copernicus.org/articles/22/3595/2022/acp-22-3595-2022-discussion.html>

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Long-term methane stable isotope analysis coupled with mole fraction measurement has been used to link isotopic signature to gas leaks in London, UK.

Location: Imperial College London, Huxley roof

Method: $\delta^{13}\text{CCH}_4$ values were made using a Picarro G2201-i isotopic analyser beginning in early 2018; 2 years continuous measurements 2018 - 2020. Simulations completed with UK Met Office Lagrangian dispersion model NAME.

Results: Isotopic source values revealed a predominance of natural gas CH_4 with source values higher than -45 ‰ in ~74-80 % of the afternoon data. In contrast, simulated sectoral contributions using UK NAEI and EDGAR inventories showed the largest fractions from waste sectors, leading to a simulated underestimation of observed $\delta^{13}\text{CCH}_4$.

These results suggest that natural gas leaks in London are under-reported in both inventories. The underestimation of mole fractions in the NAEI-25km and NAEI-2km might be accounted for by missing natural gas emissions in the NAEI inventory for London.

UK NAEI emissions are approximately 2.5 times smaller than the EDGAR emissions for the London area, but 8 % smaller than the EDGAR emissions across the UK.

Subtracting the 25 km NAEI emissions from the 25 km EDGAR emissions shows largest differences between inventories were in: London, Birmingham and the Leeds-Sheffield area, which have higher emissions in the EDGAR inventory.

3. (2022) Street-level methane emissions of Bucharest, Romania and the dominance of urban wastewater

<https://doi.org/10.1016/j.aesoa.2022.100153>

An example of a city-level study that explores the source apportionment of methane emissions. (A paper similar to this one for London is soon to be published).

Abstract: "Mobile surveys were conducted in the urban areas of Bucharest while continuously measuring CH_4 and C_2H_6 for locating enhanced CH_4 mole fractions above local atmospheric background, which are referred to as a leak indication (LI). The flux rates were determined for identified clusters of LIs. An annual city-wide total emission estimate was calculated by scaling up the flux rates. Multiple locations, where CH_4 exceeded the daily atmospheric background mole fractions, were measured for $\delta^{13}\text{CCH}_4$, $\delta^2\text{HCH}_4$, and $\text{C}_2:\text{C}_1$ ratios for tracing contributing CH_4 sources. As Europe seeks to cut urban emissions, studies like this will be useful for identifying targets for mitigating emissions and for assessing future governmental regulation of greenhouse gas (GHG) emissions."

4. (2019) Assessing London CO_2 , CH_4 and CO emissions using aircraft measurements and dispersion modelling

<https://doi.org/10.5194/acp-19-8931-2019>

Pitt, J. R., Allen, G., Bauguitte, S. J.-B., Gallagher, M. W., Lee, J. D., Drysdale, W., Nelson, B., Manning, A. J., and Palmer, P. I.: Atmos. Chem. Phys., 19, 8931–8945.

Abstract: "We present a new modelling approach for assessing atmospheric emissions from a city, using an aircraft measurement sampling strategy similar to that employed by previous mass balance studies. Unlike conventional mass balance methods, our approach does not assume that city-scale emissions are confined to a well-defined urban area and that peri-urban emissions are negligible. We apply our new approach to a case

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study conducted in March 2016, investigating CO, CH₄ and CO₂ emissions from a region focussed around Greater London using aircraft sampling of the downwind plume. For each species, we simulate the flux per unit area that would be observed at the aircraft sampling locations based on emissions from the UK national inventory, transported using a Lagrangian dispersion model. To reconcile this simulation with the measured flux per unit area, assuming the transport model is not biased, we require that inventory values of CO, CH₄ and CO₂ are scaled by 1.03, 0.71 and 1.61, respectively. However, our result for CO₂ should not be considered a direct comparison with the inventory which only includes anthropogenic fluxes."

(2018) Assessing fugitive emissions of CH₄ from high-pressure gas pipelines in the UK

<https://doi.org/10.1016/j.scitotenv.2018.02.240>

Abstract: Natural gas pipelines are an important source of fugitive methane emissions in lifecycle greenhouse gas assessments but limited monitoring has taken place of UK pipelines to quantify fugitive emissions. This study investigated methane emissions from the UK high-pressure pipeline system (National Transmission System - NTS) for natural gas pipelines. Mobile surveys of CH₄ emissions were conducted across four areas in the UK, with routes bisecting high-pressure pipelines (with a maximum operating pressure of 85 bar) and separate control routes away from the pipelines. A manual survey of soil gas measurements was also conducted along one of the high-pressure pipelines using a tunable diode laser. For the pipeline routes, there were 26 peaks above 2.1 ppmv CH₄ at 0.23 peaks/km, compared with 12 peaks at 0.11 peaks/km on control routes. Three distinct thermogenic emissions were identified on the basis of the isotopic signal from these elevated concentrations with a peak rate of 0.03 peaks/km. A further three thermogenic emissions on pipeline routes were associated with pipeline infrastructure. Methane fluxes from control routes were statistically significantly lower than the fluxes measured on pipeline routes, with an overall pipeline flux of 627 (241–1123 interquartile range) tonnes CH₄/km/yr. Soil gas CH₄ measurements indicated a total flux of 62.6 kt CH₄/yr, which equates to 2.9% of total annual CH₄ emissions in the UK. We recommend further monitoring of the UK natural gas pipeline network, with assessments of transmission and distribution stations, and distribution pipelines necessary.

Commented [DM29]: new

5. (2017) Characterization of interferences to in situ observations of $\delta^{13}\text{C-CH}_4$ and C₂H₆ when using a cavity ring-down spectrometer at industrial sites

<https://doi.org/10.5194/amt-10-2077-2017>

"An example study conducted on a UK compressor station, carried out by the LSCE Paris group a few years ago now and linked with an NPL survey of the site. This was from the early days of the laser-based instruments and there were difficulties in extracting good ethane data." (Dave Lowry, RHUL)

6. (2017) Evaluating methane inventories by isotopic analysis in the London region

<https://www.nature.com/articles/s41598-017-04802-6>

Abstract: "A thorough understanding of methane sources is necessary to accomplish methane reduction targets. Urban environments, where a large variety of methane sources coexist, are one of the most complex areas to investigate. Methane sources are characterised by specific $\delta^{13}\text{C-CH}_4$ signatures, so high precision stable isotope analysis of atmospheric methane can be used to give a better understanding of urban sources and their partition in a source mix. Diurnal measurements of methane and carbon dioxide mole fraction, and isotopic values at King's College London, enabled assessment of the isotopic signal of the source mix in central London. Surveys with a mobile measurement system in the London region were also carried out for detection of methane plumes at near ground level, in order to evaluate the spatial allocation of sources suggested by the inventories. The measured isotopic signal in central London ($-45.7 \pm 0.5\%$) was more than

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2‰ higher than the isotopic value calculated using emission inventories and updated $\delta^{13}\text{C}$ -CH₄ signatures. Besides, during the mobile surveys, many gas leaks were identified that are not included in the inventories. This suggests that a revision of the source distribution given by the emission inventories is needed.”

7. (2017) Origins and trends in ethane and propane in the United Kingdom from 1993 to 2012

<https://www.sciencedirect.com/science/article/pii/S1352231017301103>

Abstract: “Continuous, high frequency in situ observations of ethane and propane began in the United Kingdom in 1993 and have continued through to the present day at a range of kerbside, urban background and rural locations. Whilst other monitored C₂ – C₈ hydrocarbons have shown dramatic declines in concentrations by close to or over an order of magnitude, ethane and propane levels have remained at or close to their 1993 values. Urban ethane sources appear to be dominated by natural gas leakage. Background levels of ethane associated with long range transport are rising. However, natural gas leakage is not the sole source of urban propane. Oil and gas operations lead to elevated propane levels in urban centres when important refinery operations are located nearby. Weekend versus weekday average diurnal curves for ethane and propane at an urban background site in London show the importance of natural gas leakage for both ethane and propane, and road traffic sources for propane. The road traffic source of propane was tentatively identified as arising from petrol-engine motor vehicle refuelling and showed a strong downwards trend at the long-running urban background and rural sites. **The natural gas leakage source of ethane and propane in the observations exhibits an upwards trend whereas that in the UK emission inventory trends downwards. Also, inventory emissions for natural gas leakage appeared to be significantly underestimated compared with the observations. In addition, the observed ethane to propane ratio found here for natural gas leakage strongly disagreed with the inventory ratio.**”

8. (2016) Spatial and temporal variability of urban fluxes of methane, carbon monoxide and carbon dioxide above London, UK

<https://acp.copernicus.org/articles/16/10543/2016/acp-16-10543-2016-discussion.html> Long-term (3-year) measurements on methane fluxes in London.

Results: The wintertime increase above background in CH₄ concentrations and the accompanying enrichment in $\delta^{13}\text{C}$ were consistent with North Sea natural gas and attributed to losses of CH₄ from over-pressurized pipelines in response to (or anticipation of) an increase in demand and to incomplete combustion upon boiler ignition.

Annual CH₄ emissions (72 tons km⁻²) were more than double the LAEI value suggesting that sources are not as well characterized by the inventory. A shortfall in inventoried CH₄ emissions can be explained by the existence of temperature-dependent sources related to natural gas usage and perhaps also of biogenic origin (e.g. sewage).

9. (2017) Natural gas and climate change

https://pure.manchester.ac.uk/ws/portalfiles/portal/60994617/Natural_Gas_and_Climate_Change_Anderson_Broderick_FOR_DISTRIBUTION.pdf

Policy support paper that covers many aspects of natural gas and climate change, concluding that: “By 2035 the substantial use of fossil fuels, including natural gas, within the EU’s energy system will be incompatible with the temperature commitments enshrined in the Paris Agreement.”

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The paper cites uncertainty in methane leakage (*from across the full supply chain, not specific to downstream distribution networks*) as critical in understanding the role that natural gas may play as a viable bridging fuel in the transition to a low carbon economy:

"In order to quantify the maximum level of EU natural gas consumption compatible with existing EU targets and the Paris Agreement, the relative lifecycle carbon intensity of a range of potential natural gas sources must be more fully understood, particularly methane leakage."

The research alludes to the challenge of super-emitter sources and the difficulty in identifying and assessing them:

"The production and distribution of natural gas releases methane both deliberately and inadvertently. The exact amount varies widely across locations and production technologies, and through time at a given location. Close monitoring shows that in most supply chains a small number of sites, or pieces of equipment, are responsible for a large proportion of methane emissions, however, they are difficult to identify a priori. Leakage rates affect the relative contribution of methane to the climate change impact of natural gas supply chains."

10. (2015) Plume mapping and isotopic characterisation of anthropogenic methane sources

<https://www.sciencedirect.com/science/article/abs/pii/S1352231015002538>

Methane stable isotope analysis coupled with mole fraction measurement has been used to link isotopic signature to methane emissions from landfill sites, coal mines and gas leaks in UK.

Location: London and SE England

Method: Targeted areas, when the methane plume was intercepted, air samples were collected and analysed using $\delta^{13}\text{C}-\text{CH}_4$ isotopic analysis by CF-GC-IRMS (high precision method).

Results: Methane from landfill isotope signatures -60.2 ± 1.4 to $-55.2 \pm 0.6\%$. Methane of constant origin for the methane of $-36.3 \pm 0.3\%$ consistent with a dominantly thermogenic North Sea gas source. It suggests that there are other leaks in the gas distribution system along with the storage tank ("gasometer") that is located in the middle of the transect. 24 ppm north of Bacton where pipelines bring all southern and much northern North Sea Norwegian gas onshore, as well as gas from the interconnector pipeline to Belgium. Samples collected had ^{13}C signatures of $36.3 \pm 0.3\%$ and $-35.7 \pm 1.2\%$.

11. (2023) Fugitive Methane Across the UK Gas Distribution Network from Terminals to Cities:

Characterisation and Methodology Development <https://meetingorganizer.copernicus.org/EGU23/EGU23-15766.html>

(1990) A study of leakage from the UK natural gas distribution system

[https://doi.org/10.1016/0301-4215\(90\)90060-H](https://doi.org/10.1016/0301-4215(90)90060-H)

Abstract

This paper studies leakage from the UK natural gas distribution system. British Gas maintains that the leakage rate is around 1% of supply. This paper estimates a Low, Medium and High Case leakage rate of 1.9%, 5.3% and 10.8% respectively. The authors are confident that the leakage rate is above 1.9% and consider it more likely that the leakage rate is between the Medium and High Case. This investigation has been very cautious in that only leakage from the low pressure, medium pressure and service pipelines has been calculated. No

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estimates of leakage from the broader supply system have been included because of lack of verifiable information. The implications of these leakage rates for energy policy are considered.

(2018) Assessing fugitive emissions of CH4 from high-pressure gas pipelines in the UK

<https://doi.org/10.1016/j.scitotenv.2018.02.240>

Abstract

Natural gas pipelines are an important source of fugitive methane emissions in lifecycle greenhouse gas assessments but limited monitoring has taken place of UK pipelines to quantify fugitive emissions. This study investigated methane emissions from the UK high-pressure pipeline system (National Transmission System - NTS) for natural gas pipelines. Mobile surveys of CH4 emissions were conducted across four areas in the UK, with routes bisecting high-pressure pipelines (with a maximum operating pressure of 85 bar) and separate control routes away from the pipelines. A manual survey of soil gas measurements was also conducted along one of the high-pressure pipelines using a tunable diode laser. For the pipeline routes, there were 26 peaks above 2.1 ppmv CH4 at 0.23 peaks/km, compared with 12 peaks at 0.11 peaks/km on control routes. Three distinct thermogenic emissions were identified on the basis of the isotopic signal from these elevated concentrations with a peak rate of 0.03 peaks/km. A further three thermogenic emissions on pipeline routes were associated with pipeline infrastructure. Methane fluxes from control routes were statistically significantly lower than the fluxes measured on pipeline routes, with an overall pipeline flux of 627 (241–1123 interquartile range) tonnes CH4/km/yr. Soil gas CH4 measurements indicated a total flux of 62.6 kt CH4/yr, which equates to 2.9% of total annual CH4 emissions in the UK. We recommend further monitoring of the UK natural gas pipeline network, with assessments of transmission and distribution stations, and distribution pipelines necessary.

Appendix 2 - Framework for the Appointment and Operation of an Independent Shrinkage Expert

Document Control

Version	Date	Reason for Change
0.1	10/01/2023	First Draft
0.2	13/02/2023	Suggestions from 0828R meeting 2

0.3	22/02/2023	Suggestions from 0828R meeting 3
0.4	21/03/2023	Suggestions from 0828R meeting 4
0.5	10/06/2023	Suggestions from 0843

Preamble

1. Development of Rules
2. Amendments
3. Approved Amendments

Main body

1. Definitions
2. The Framework
3. Responsibilities under the tender process for the position of ISE
4. Tendering process
5. Generic Terms of Reference for Appointed ISE
6. Responsibilities for the creation of the ISE
7. Creation of ISMM
8. Creation of ISM

Appendix

1. Text to be added to Section V of the UNC's Transportation Principal Document

Preamble

1. Development of Rules

The requirement to have in place a "Shrinkage and Leakage Model" (SLM) is specified in the Special Standard Conditions of the Transporter Licence. This Framework for the Appointment and Operation of an Independent Shrinkage Expert (hereafter the "Framework") will detail how the Independent Shrinkage Expert (ISE) will annually develop the Independent Shrinkage Model (ISM), Independent Shrinkage Model Methodology (ISMM), and the Independent Shrinkage Statement (ISS) to create an accurate account of Shrinkage model error. Where there is a difference between the quantity of Shrinkage that is calculated via the SLM and ISM,

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the ISE will recommend to Ofgem that an Independent Shrinkage Charge (ISC) is used. If approved by Ofgem, Transporters will be obliged to purchase gas to cover the ISC.

2. Amendments

Should a Code Party or the CDSP wish to propose amendments to any of the Framework, such proposed amendments shall be submitted to the Uniform Network Code Committee and considered by the Uniform Network Code Committee or any relevant sub-committee where the Uniform Network Code Committee so decide by majority vote. For avoidance of doubt, if the proposed change to the Framework requires a contractual change, this contractual change will be managed by the CDSP as soon as reasonably practicable.

3. Approved amendments to the Framework

In the event that a proposed amendments is approved by a majority vote of the Uniform Network Code Committee, the amendment shall be implemented as soon as reasonably practicable, taking into account the proposed change and the contractual implications.

Where the Uniform Network Code Committee fails to achieve majority approval, the proposed amendment shall be considered in accordance with the provisions set out in Section 7 of the Uniform Network Code Modification Rules unless the Uniform Network Code Committee determines otherwise.

Each revised version of a Document shall be version controlled and retained by the Joint Office on their website.

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Main body

1. Definitions

1.1 Unless otherwise stated, terms in this **Framework for the Appointment and Operation of an Independent Shrinkage Expert** (this "Framework") shall have the meanings given to them in the Uniform Network Code. Such terms will be capitalised within quotation marks where first used in the Framework.

1.2 In this Framework:

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- "The Committee" - The Uniform Network Code Committee (UNCC), or an authorised technical workstream or sub committee appointed by the UNCC to administer the Independent Shrinkage Expert process.
- The Independent Shrinkage Sub-Committee (ISSC) - is a sub-committee of the UNCC. It meets monthly to discuss the development of the ISMM, ISM, ISS, ISC, and related matters. It is not a decision-making body. It is attended by the ISE, CDSP, and interested parties.
- "Code Parties" – signatories to the Uniform Network Code
- "Generic Terms of Reference" – the standard terms of reference to be applied as basis of the contracts between the CDSP and the ISE for the maintenance of the Independent Shrinkage Model
- "Stakeholder Evaluation Panel" – a group of interested parties (including the CDSP), ~~drawn from or nominated by DSC CoMC,~~ who will be volunteers, and participate in the development of procurement materials (including terms and conditions) and the selection of a preferred tenderer for the role of ISE. The CDSP will also ensure that communication of the requirement to stand up this session will come a month in advance. The Stakeholder Evaluation Panel will need a minimum of 4 participants from a broad range of industry participants.

2. The Framework

The process described here sets out:

- ISE appointment;
- Publication of the Independent Shrinkage Model (ISM) and Independent Shrinkage Model Methodology (ISMM) within the Independent Shrinkage Statement (ISS);
- Publication of the Reconciliation Statement;
- High level process for the maintenance and development of the ISM and the ISMM;
- ISE principles

○ In all activity undertaken by the ISE, including creating new or updated iterations of the National Leakage Tests (NLT) (if deemed appropriate by the ISE – for avoidance of doubt the GDNs can continue to use whatever information they deem to be accurate in the SLM) through innovation, shall be administered via the principles of: impartiality (they shall not show bias towards any UNC Party), net-zero (all its activities in the operation of the role of ISE and the impacts of Shrinkage model error on GB's environmental record shall be considered here), accuracy (accurate underlying data that will enable Transporters to reduce the causes of leaks, for example), and best outcomes for end-consumers.

3. Responsibilities under the tender process for the position of ISE

3.0 The Committee may delegate its obligations for the definition of criteria for appointment and for overseeing the selection process to the Stakeholder Evaluation Panel (this should be made up of as equal as possible variance of parties to ensure impartiality).

3.1 The CDSP, on behalf of the Committee, and in conjunction with a Stakeholder Evaluation Panel will:

3.1.1 Produce a clear set of criteria for the appointment of the ISE detailing (without limitation):

- (a) the ability of the ISE to produce the ISM and the ISMM which shall be in line with the Generic Terms of Reference, contained in this Framework plus any other criteria agreed by The Committee;
- (b) the evaluation of the cost of undertaking the role of the ISE over the period stated in the tender document;

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- (c) the consideration of the relevant knowledge and expertise of the candidates; and
- (d) ability of the prospective ISE to follow and consider relevant industry developments. E.g. new studies into leakage rates, new studies into Own Use Gas deficiencies, outputs from other initiatives such as the Digital Platform for Leakage Analytics. Such relevant research should be evidenced within the ISS, regardless of whether the research has any impact on the calculation of the ISCs to ensure research traceability.

3.2 The CDSP, in conjunction with the Stakeholder Evaluation Panel, will:

- 3.2.1 use the criteria developed under 3.1 to assess each submitted tender bid;
- 3.2.2 where more than one prospective candidate responds to the tender for the position of ISE (“the Interested Parties”) the Stakeholder Evaluation Panel shall:
 - (a) Assess the compliant responses against the criteria specified in the tender document;
 - (b) Select and appoint the appropriate preferred bidder as the “Prospective ISE”.
 - (c) If no one applies or there are no suitable candidates, the CDSP will restart the procurement process at a time mutually agreed between the CDSP and the Stakeholder Evaluation Panel.
 - (d) If the second procurement exercise is unsuccessful, the CDSP will approach the Uniform Network Code Committee for advice on next steps.

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- 3.2.3 organise any meetings held in relation to the ISE appointment;
- 3.2.4 for avoidance of doubt, provide commercial resource to prepare a tender document;
- 3.2.5 organise the advertisement of the tender to all interested parties, in accordance with relevant legislation;
- 3.2.6 communicate to Code Parties the progress and outcome of the tender process;
- 3.2.7 invite the Prospective ISE to take up the appointment;
- 3.2.8 where the selected ISE does not accept the appointment, invite the next most favoured ISE in turn; and
- 3.2.9 upon acceptance of appointment, establish the contract with the Prospective ISE, in accordance with the Generic Terms of Reference.

4. Tendering process

4.1 This section details the processes undertaken by the CDSP, to appoint an ISE using a tender process.

4.1.1 The CDSP, in conjunction with the Stakeholder Evaluation Panel, will prepare a tender document to be made available when required to all interested parties (interested parties can be any consultancy, or set of individuals, who, upon reading the publicly available tender invitation document, and engaging in the tender process, put forward a tender bid – interested parties must declare a conflict of interest as part of the tender process).

4.1.2 The tender will detail:

- (a) that the aim of the tender is to appoint a Party, the ISE, to compile a publicly available ISM and ISMM;

- (b) that the ISE will annually develop methodologies (ISMM), to assist in the annual creation of the ISM;
- (c) as part of the review and consultation cycles, the ISE must make available the necessary information to Code Parties in good time to allow the update of the ISM, in accordance with the timetable contained within this Framework;
- (d) the ISE must hold a public consultation to provide an opportunity to allow Code Parties to discuss the ISM and ISMM, in accordance with the timetable contained within this Framework;
- (e) the requirement to allow Code Parties to submit representations and queries about the ISM in accordance with the timetable contained within this Framework;
- (f) that the ISE must consider adjusting ISM and/or the ISMM in response to those representations;
- (g) that the ISE must adhere to the Generic Terms of Reference contained within this Framework, as well as any other criteria The Committee notifies to the CDSP prior to the tender document being issued; and
- (h) that the ISE maintains good relations with The Committee and the CDSP to be available for discussion on any relevant issues, and to answer any general queries promptly.
- (j) their ability to interact with other relevant industry bodies and experts across the Gas and Electricity industries to ensure they can benefit from broader industry expertise;
- (k) their acceptance of the proposed terms and conditions under which the service will be provided.

4.1.3 When issued, the tender will be for an initial term agreed by the CDSP in conjunction with the Stakeholder Evaluation Panel with an option for extension. 0843 is an enduring solution and a amendment to the UNC ~~will~~would be needed to remove the role.

4.1.4 The CDSP will administer the tender process and will conduct it in accordance with all relevant legislation and generally accepted best practice.

4.1.5 Each tender response will detail:

- (a) how the prospective ISE will comply with the Generic Terms of Reference and any other criteria agreed prior to the tender;
- (b) an outline of the method(s) to be used by the prospective ISE, and why such a proposed solution(s) would be suitable. For example, if field exercises will be undertaken, why are they reasonable.
- (c) an outline of the data (either collated by the ISE or retrieved from Parties or the CDSP) that would need to be collated for such use, and the methods to be used for acquiring such data. Methodologies employed by the ISE might include: utilising already existing pipeline data, and studies such as the leakage rates developed off the back of the National Leakage Tests and those noted within the appendix, but also potentially direct measurement.
- (d) the likely time for such work to be carried out;
- (e) the cost of performing the services;
- (f) contact details to query any aspect of the tender.

(g) The ISE shall confirm to the CDSP before their appointment that they do not hold any interest or duty which would or potentially would conflict with the performance of their duties under their contract with the CDSP;

(h) their independence and impartiality, and their process for identifying and managing conflicts of interest during the lifetime of the contract.

4.1.6 Once all tenders have been received, the CDSP in conjunction with the Stakeholder Evaluation Panel (SEP) will select in accordance with the evaluation criteria the top-ranked tender for appointment. The SEP will be involved in setting the evaluation criteria and requirements.

4.1.7 Once the tender process has been completed the CDSP will use reasonable endeavours to contract with the highest ranked acceptable party (based on the SEP assessment of the agreed criteria) that wishes to become the ISE by 1 month before the first formal activity is needed (15 March). CDSP will consider contracting with the next highest ranked party if they fail to reach agreement with the immediately previous higher ranked party.

4.1.8 In the event that the re-tendering deadline is not met, The Committee will decide by a majority vote on whether to:

(a) maintain the current ISM, ISMM, and ISC for another year; or

(b) grant additional time to the CDSP and Stakeholder Evaluation Panel on the understanding that any additional time granted will not jeopardise the publication of the ISM and ISMM.

4.1.9 Once the tender process has been completed and the CDSP have contracted with an interested party to be the ISE, the Stakeholder Evaluation Panel in agreement with the UNCC will review the tender process and incorporate any updates that are believed are required to this document.

5. Generic Terms of Reference for Appointed ISE

5.1 This section will include the main principles the ISE will operate under, once appointed.

5.1.1 The ISE will create the ISM by developing appropriate, detailed methodologies (the ISMM) and collecting necessary data.

5.1.1.1 where reasonably required, Code Parties must comply with the ISE's requests for data made under 5.1.1. Data shall be provided by UNC Parties promptly within timeframes stipulated by the ISE to enable ISE to collate the ISMM and ISM.

5.1.1.2 non-compliance with 5.1.1 may be escalated to the Authority

5.1.1.3 The ISE will provide a GB-wide service,

5.1.1.4 Where possible the information within the ISS should be presented in a way that it can be used by GDNs and IGTs to make an informed decision on how to reduce their exposure to the ISCs.

5.1.2 The decision as to the most appropriate methodologies and data will rest solely with the ISE. The ISE may consider any issues raised by any stakeholders during the development and compilation of the ISM.

5.1.3 The ISE will determine what data is required from Code Parties (and other parties as appropriate) to ensure appropriate data supports the creation of the ISM.

5.1.4 The ISE will determine what data is available from parties to ensure appropriate data supports the creation of ISM, if deemed appropriate by the ISE, and parties should provide data where requested.

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5.1.5 The ISE will determine what relevant questions should be submitted to Code Parties, and any other parties as deemed appropriate by ISE, to ensure appropriate methodologies and data are used in the creation of ISM.

5.1.6 The ISE will use the latest data available where appropriate.

5.1.7 Where multiple data sources exist the ISE will evaluate the data to obtain the most statistically sound solution, will document the alternative options and provide an explanation for its decision.

5.1.8 Where data is open to interpretation the ISE will evaluate the most appropriate methodology and provide an explanation for the use of this methodology.

5.1.9 Where the ISE considers using data collected or derived using sampling techniques, then the ISE will consider the most appropriate sampling technique and/or the viability of the sampling technique used.

5.1.9.1 The ISE will either procure services for the collection of data or collect their own data, the prospective ISE should confirm and include in their tender what costs they forecast they will incur to gather the data they require.

5.1.9.2 ISE activity that is not included in the tender bid: the cost of reasonable contract variations outwith the contract's original scope should be determined by the UNCC.

5.1.10 The ISE will present the ISM in draft form (the "Draft ISM"), to Code Parties seeking views and will review all the issues identified and submitted in response.

5.1.11 The ISE will provide the Draft and final ISMM and ISC to UNC Parties via the ISS for publication.

5.1.12 The Authority ~~may disapprove the IGT ISC and or the GDN ISC, and the Authority's final determination on whether the ISCs shall be applied~~ shall be binding, subject to any appeals being raised.

5.1.13 The ISE will undertake to ensure that all data that is provided to it by all parties will not be passed on to any other organisation, or used for any purpose other than the creation of the ISM, and ensure that they are following GDPR (General Data Protection Regulation) and taking consideration of commercial sensitivities and intellectual property.

6. Responsibilities for the creation of the ISE

6.1 Code Parties provision of data or information to the ISE

Where, the ISE requests data from Code Parties for the purpose of preparing the ISMM, the Code Parties shall use reasonable endeavours to provide the information requested within the timescales requested, such timescales having been previously notified to the Code Parties.

Non-compliance with requests shall be escalated to the Authority.

6.2 Code Parties Raising issues for consideration during the consultation period.

Code Parties may submit topic areas for consideration by the ISE during the consultation process. The submission must include a clear explanation of the topic, the reasons why this topic is relevant to the ISM, any accompanying data or suggestions as to how the data may be obtained by the ISE. Each topic submitted by a Code Party will be published (including the details of the Code Party) to the industry as part of the ISE's consultation response.

The ISE will provide a response to the topic detailing whether it is in or out of the scope of work and the rationale to support this.

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6.3 Code Parties Raising issues for consideration outside of the consultation period.

Code Parties may submit topic areas for consideration by the ISE outside the consultation process. The submission must include a clear explanation of the topic, the reasons why this topic is relevant to the ISE, any accompanying data or suggestions as to how the data may be obtained by the ISE. Each topic submitted by a Code Party will be published (including the details of the Code Party) to the industry as part of the ISE's consultation response.

The ISE will log the topic and will consider it during the development of the next applicable ISM and ISMM

6.4 Provision of and publication of data

A copy of all data and information requests from the ISE will be published to the industry as and when the request is made e.g. date, information request, request made to, data required by.

A record of all responses by organisation name (not anonymised), will be maintained and published. The report will show the response as one of "provided", "not provided" (i.e. request acknowledged but reason for no provision provided), or "no response to request".

Where applicable, a copy of the data provided to the ISE by the Gas Transporters and Shippers will be provided to the industry, in a suitable format. Where data is confidential or commercially sensitive, the fact that the data had been provided will be published, an organisation may request a copy of the information pertaining to them from the Gas Transporters and Shippers.

7. ~~Creation of ISMM and variation of contract~~

~~7.1 This section covers the activities and timescales for the creation, submission to The Authority and publication of the ISMM by the ISE.~~

~~7.1.1 The ISE will use appropriate methodologies (ISMM) for the calculation of the ISM~~

~~7.1.2 The ISE will justify the appropriateness of these methodologies within the ISMM~~

~~7.1.3 The draft ISMM will be published in accordance with the timetable (section 10) so that Code Parties are able to provide commentary and consultation responses.~~

~~7.1.4 The methodologies used by the ISE to create the ISM shall be the purview of the ISE. It is assumed by the modification proposer (an assumption that is provided following feedback from the 0843 workgroup) that methodologies employed by the ISE might include:~~

- ~~— utilising already extant pipeline data~~
- ~~— studies such as the leakage rates developed off the back of the National Leakage Tests~~
- ~~— those noted within the appendix of 0843~~
- ~~— direct measurement~~

~~7.1.5 ISE contract variations will be agreed upon via a DSC CoMC Sub-committee [not used]~~

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8. Creation of ISS

8.1 This section covers the activities and timescales for the creation, submission to The Authority and publication of the ISS by the ISE.

8.1.1 The ISE must provide a Draft ISS, including the methodology(s) and model(s), to the Joint Office for presentation and publication no later than the date specified in the timetable (section 10) each year.

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This date can be amended by the ISE as appropriate and agreed with the ISE Sub-Committee via a consultation.

8.1.2 The Draft ISS and presentation must detail:

- (a) How the ISE has adhered to the Generic Terms of Reference and to any other relevant provisions within its contract;
- (b) The methodology(s) and model(s) used by the ISE, and why such-a processes ~~es~~ ~~wasere~~ suitable; and
- (c) The data has been collated so far for such use, and the methods to be used for acquiring any further data.

8.1.3 Once published, any representations made in relation to the draft ISS must be received ISE within [21] calendar days.

8.1.4 The ISE will consider any submissions made, and will provide feedback for discussion at the meeting, which is to be held as soon as possible after the date specified in the timetable (section 10)

8.1.5 The ISE will review the ISS considering any comments and will adjust the ISS where it believes appropriate.

8.1.6 The Draft ISS, as revised by the ISE in accordance with ~~87.1.54~~, will be republished by the date specified in the timetable (section 10) on the Joint Office of Gas Transporters website.

8.1.7 The ISE will arrange an ISE Sub-Committee meeting to discuss the Draft ISS (as revised), along with any changes made, to be held as soon as possible after the Draft SLM.

8.1.8 Where in the opinion of the ISE no material issues have been raised, the Draft ISS will be treated as the Final ISS.

8.1.9 the Final ISS will be issued to the Authority for consideration on whether it is more accurate that the SLM by the date specified in the timetable (section 10). It shall also be provided to the Joint Office for publication on its website.

8.2 For avoidance of doubt, the AUGE may wish to consider the outputs of the ISE. This is not to say that the scope of the AUGE or ISE should be fettered in any way - any determination of what constitutes a contributor to the ISC or UIG should be the purview of the respective roles.

9. The application of the Independent Shrinkage Charge

9.1 Where there is a difference between LDZ shrinkage, as estimated by the Transporters, and Independent LDZ Shrinkage, as estimated by the ISE, the ISE will calculate the Independent Shrinkage Charge and provide this to the ~~CDSP and the~~ Authority. ~~The CDSP will load the Daily ISC(s) into Gemini no later than 10WD prior to 1st April. The Authority may disapprove the ISC(s).~~

~~9.2 Where the Authority has reviewed the Independent Shrinkage Charge together with all associated information as appropriate, and so validated that it provides a more accurate estimation, t The Authority shall approve the Independent Shrinkage Charges (IGT and GDN ISCs) and the Transporters shall pay the ISCs as per agreed timelines.~~ Where the Authority does not agree that the ISC(s) provide more accurate representations, the choice on whether to roll over the previous year's ISCs or apply 0 ISC(s) would rest solely with the Authority. Where the Authority requires assistance to inform this choice the ISE must comply.

9.3 Transporters must use the value(s) approved under ~~9.1 or~~ 9.2 to accurately purchase gas and report this to the Authority and Users.

10. Creation of Independent Shrinkage Statement

10.1 This section covers the activities and timescales for the creation, submission to The Authority and publication of the Independent Statement (ISS) by the ISE.

Step	Requirement	Responsible Party	Latest date for delivery
1	Establish a timetable for the coming ISE Year: book meeting dates for all key industry meetings for the year and communicate those to the industry.	Code Administrator in conjunction with CDSP	15 April
2	Where applicable, present an overview of the approach to developing the ISS for the coming year at an Introductory Meeting with the Independent Shrinkage Sub-Committee, including (but not limited to): <ul style="list-style-type: none"> • Overview of high-level approach to the assignment for coming year; • Overview of proposed changes to methodology since the previous year (if not first year); • Summary of Industry issues and key changes (e.g. UNC Mods) since previous year and impact on methodology (if not first year) • Update on the log of items carried over from the previous year (if not first year) • Proposed data sources for all causes of Shrinkage to be included in the methodology Industry parties may provide feedback on the approach and the data sources, for consideration by the ISE.	ISE	By 15 th May

Commented [DM42]: Note on dates: 0843 WG 06032024 was concerned that the timetable was longer than 1 year, and I took an action to review. The timetable is longer than 1 year however this is only if you include the reconciliation timescales. So, to be clear, the dates for estimating shrinkage model error for the coming year run april to april and reconciliation runs on to Aug the subsequent year, meaning there will be overlap with estimation and reconciliation processes.

3	<p>Retrieve data to populate the ISS.</p> <p>Develop ISS, ISM, ISMM.</p> <p>Provide the industry with monthly updates on progress with the development of the ISS, including availability of data, new topics identified and any key issues which may impact on the Methodology</p>	ISE	Ongoing from May to Feb
4	<p>Present an update on the development of the ISS for the coming year at an Early Engagement Meeting with the Independent Shrinkage Sub-Committee, including (but not limited to):</p> <ul style="list-style-type: none"> • latest view of data sources for all topics and availability of data • update on development of the ISS for the coming year, including any new items to be added to the Methodology for the coming year. <p>Industry parties may provide feedback on the proposed data sources and outline of the approach.</p>	ISE	September
5	<p>Provide a proposed ISS for publication. The proposed ISS and presentation must detail:</p> <ol style="list-style-type: none"> a) How the ISE has adhered to the Generic Terms of Reference b) The methodology to be used by the ISE, and why such a process is the most appropriate approach; c) The data has been collated so far for such use, and the methods to be used for acquiring any further data; and e) Any specific matters the ISE wishes to draw to the industry's attention 	ISE	1st November

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6	At a meeting of the Independent Shrinkage Sub-Committee, present and discuss the proposed ISS to be held as soon as possible after the proposed ISS document has been published.	ISE	Mid-November
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<i>Step</i>	<i>Requirement</i>	<i>Responsible Party</i>	<i>Latest date for delivery</i>
7	Once the proposed ISS has been published, any responses to the ISE on the proposed ISS must be received by the ISE by 7 th December .	Code Parties	7 Dec
8	The ISE will consider any responses made and will provide feedback for discussion at a meeting of the Independent Shrinkage Sub-Committee.	ISE	7January
9	The ISE will review the Independent Shrinkage Statement in light of any comments (received in Steps 7 and 8) and will adjust the Statement where it believes appropriate. The proposed Independent Shrinkage Statement document, as modified by the ISE in accordance with this Step, will be republished on the Joint Office of Gas Transporters website.	ISE	21 Jan
10	At a meeting of the Independent Shrinkage Sub-Committee, present and discuss the modified Independent Shrinkage Statement along with any changes made, after the modified Independent Shrinkage Statement document has been published.	ISE	7Feb

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11	The Independent Shrinkage Expert will review the Independent Shrinkage Statement in light of any comments raised in the meeting referred to in Step 10 and will adjust the Independent Shrinkage Statement where it believes appropriate. For the avoidance of doubt changes can only be made to address specific concerns raised.	ISE	21 Feb
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Step	Requirement	Responsible Party	Latest date for delivery
12	The Independent Shrinkage Expert will provide the final Independent Shrinkage Statement (as updated as described in Step 11, if appropriate) to the Authority and the Joint Office of Gas Transporters for publication and notify ISCs to CDSP.	ISE	1 March
13	Where the Authority approves <u>does not disapprove</u> the Independent Shrinkage Statement, it will be treated as the final Independent Shrinkage Statement. The Shipper starts to procure daily shrinkage volumes based on notification quantity (unless disapproved by the Authority).	Authority	10 business days prior to 1 April
14	Reconciliation of ISC: following the application for the ISC for the coming year, the ISE will observe Shrinkage. After the Formula Year concludes, where observed Shrinkage is more or less than that which is accounted for under the LDZ Shrinkage Quantities and the ISC, and after the GDNs and IGTs providing their revised LDZ Shrinkage Quantities, the ISE will issue a Reconciliation Statement. The GDNs will issue the reconciliation statement for the SLM by 31 st July following the conclusion of the Formula	ISE	As soon as reasonably practicable after 31 st July and no later than 14 th Aug the following year (two week window)

Commented [DM43]: BRs note that the ISE's reconciliation needs to wait for the GDNs reconciliation to complete. This activity completes by 31st July, giving the ISE a minimum of one month to deliver their reconciliation.

Commented [DM44]: double check alignment between this and the BRs

	<p>Year, and the ISC reconciliation will need to wait for this event to conclude before being completed.</p> <p>For the avoidance of doubt, the CDSP will require the approved reconciled values 10 business days ahead of the date that the reconciled values are required to go live.</p>		
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10.2 The Authority's final determination in this process shall be binding on Code Parties.

10.3 The Code Parties may appeal the Authority's final determination, as per UNC, General Terms, Section A

10.4 At the end of each ~~Independent Shrinkage~~Formula Year, regardless of any Independent Shrinkage Statement outcome, the CDSP shall seek feedback from the industry, including the Independent Shrinkage Expert, on the activities and performance of the Independent Shrinkage Expert and industry for the creation of the Independent Shrinkage Statement. The CDSP shall produce a report for the UNCC and the Authority, and it shall be published on the Joint Office website.

10.5 Whilst the ISCs are applied at LDZ level, the data contained within the ISS will, where appropriate, be more granular, to assist pipeline owners to resolve causes of Shrinkage model error.

Appendix 3

Uniform Network Code Committee Independent Shrinkage Sub-Committee Terms of Reference

1. Introduction

The Uniform Network Code Committee (UNCC) agreed these updated terms of reference for the AUG Sub-Committee on 19 November 2020 and amendments shall only be made with the consent of the UNCC.

2. Scope of the Independent Shrinkage Sub-Committee

2.1 General

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The Independent Shrinkage Sub-Committee is defined as a sub-committee of the Uniform Network Code Committee, with certain rights and responsibilities relating to the Framework for the Appointment and Operation of the Independent Shrinkage Expert (the "Framework").

In particular, the ISE Framework defines an Independent Shrinkage Sub-Committee – an open meeting of interested parties, at set points throughout the annual cycle, to review and provide guidance/support to the ISE and discuss issues raised relating to the Independent Shrinkage Model Methodology.

The Independent Shrinkage Sub-Committee is chaired by the Joint Office of Gas Transporters and is attended by the Independent Shrinkage Expert (the "ISE"), the Central Data Services Provider (the "CDSP") and interested parties.

2.2 Meetings

The Independent Shrinkage Sub-Committee is to meet to support the creation of the Independent Shrinkage Statement as per the timescales in the Framework:

- Introductory Meeting of the Independent Shrinkage Sub-Committee - early may*
- Early Engagement Meeting of the Independent Shrinkage Sub-Committee – September*
- Meeting of the Independent Shrinkage Sub-Committee for the Independent Shrinkage Expert to present and discuss the draft ISS – Mid Nov*
- Meeting of the Independent Shrinkage Sub-Committee for the ISE to provide feedback on the consultation responses made on the draft AUG Statement and Table – no later than 7th Jan*
- Meeting of the Independent Shrinkage Sub-Committee, for the ISE to present and discuss the modified Independent Shrinkage Statement– no later than 7th Feb*

The Code Administration Code of Practice shall apply to the conduct of the meetings.

The ISE will also provide the industry with monthly updates on progress with the development of the ISS, including availability of data, new topics identified and any key issues which may impact on the Methodology. This information will also be published by the Joint Office.

2.3 Guidance and support to the ISE

The IS Sub-Committee will provide guidance/support to the ISE and discuss issues raised relating to the ISMM via its scheduled meetings, or in adhoc meetings, if required.

Topics on which the Sub-Committee would provide guidance/support to the UNCC on the use of funds for:

- Innovation Service – identify, assess and propose ways in which Shrinkage model error could be better and more equitably allocated*
- Advisory Service – provision of expert advice by the ISE on the independently adjudicated Shrinkage to industry Stakeholders*

The ISE and CDSP will gather the views of Sub-Committee attendees and seek a consensus view

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on the most appropriate and cost-effective use of these funds.

If there is no clear consensus, the ISE may be asked to provide further information to support the Sub-Committee or the expenditure may be deferred to a later date. The majority or consensus view of Sub-Committee members would be the leading factor in determining the most suitable next step.

If there is a consensus or widespread support, a proposal for use of the funds, including a summary of the views of the Sub-Committee attendees, will be presented to UNC Committee for a vote. Any commercially sensitive aspects of the proposal would be made available to UNC Committee members only.

2.4 Decision making

The Independent Shrinkage Sub-Committee has no voting capacity and voting related to the ISS is a matter of the UNCC only.

3.0 Document Control

Appendix 4: GDN's Shrinkage Reconciliation Process

Commented [DM45]: added for julie

- GDNs will assess the level of Shrinkage in the coming year in their network, in kWh terms.
 - For example / reference, please see the link which shows the [Cadent Final LDZ Shrinkage Quantity Proposals Formula Year 2023/24](#)
 - On p4 you can see the daily amounts by LDZ.
- Once the value has been agreed (and not disallowed by Ofgem), DNOs will send the daily values to the CDSP who will load them into Gemini.
- Each day, that Shrinkage energy quantity gets assigned within Gemini, to the DNO who has to buy that much gas.
 - The GDNs will have a contract with a Shipper to be their Shrinkage provider to go on the market and buy the gas for them.
 - This is briefly mentioned on Slide 16 of the [UIG Education Pack \(xoserve.com\)](#) and it is the first step in calculating daily UIG (i.e. total LDZ usage - Shrinkage etc).

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- This means that Shrinkage is not part of UIG but any under or over estimation, UIG would pick up the difference.
- Shrinkage does not appear on any itemised bills for the Shipper: it's gas that the DNOs need to buy to keep the network running, so it's part of the DNOs allowed costs and rolled up in Transportation pricing.
- After the end of the Formula Year, the GDN evaluates their original estimates and may do a reconciliation if they have bought the wrong amount of gas.
 - This goes onto the Amendment invoice as a change to the UIG energy amount on the Amendment invoice, using daily SAP prices, and looks very similar to an LDZ measurement error.
 - Each GDN publishes a document showing their workings out: [Assessment and Adjustment 2021-22 | Joint Office of Gas Transporters \(gasgovernance.co.uk\)](#)
 - That's the only time that anything to do with Shrinkage appears on an invoice the CDSP issue.