

UNC Final Modification Report	At what stage is this document in the process?
<h1 data-bbox="134 324 657 416">UNC 0799:</h1> <h2 data-bbox="129 450 1054 593">UNC arrangements for the H100 Fife project (100% Hydrogen)</h2>	<div data-bbox="1209 318 1477 640"> <div data-bbox="1209 318 1477 398">01 Modification</div> <div data-bbox="1209 398 1477 479">02 Workgroup Report</div> <div data-bbox="1209 479 1477 560">03 Draft Modification Report</div> <div data-bbox="1209 560 1477 640">04 Final Modification Report</div> </div>
<p>Purpose of Modification:</p> <p>Introduction of amended arrangements into the UNC to facilitate the use of 100% Hydrogen gases specifically required for the industry H100 Fife Ofgem Network Innovation Competition project.</p>	
<p>Next Steps:</p> <p>The Panel recommends implementation.</p>	
<p>Impacted Parties:</p> <p>High: Consumers (within the project area), CDSP, Shippers, Suppliers & Distribution Network Operators</p> <p>Low:</p> <p>None: Independent Gas Transporters</p>	
<p>Impacted Codes:</p> <p>Uniform Network Code</p>	

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Timetable	
Modification timetable:	
Date Modification Raised	07 January 2022
New Modification to be considered by Panel	20 January 2022
First Workgroup Meeting	25 February 2022
Workgroup Report to be presented to Panel	21 April 2022
Draft Modification Report issued for consultation	22 April 2022
Consultation Close-out for representations	20 May 2022
Final Modification Report available for Panel	25 May 2022
Modification Panel consideration	16 June 2022
Supplemental Report Stage:	
Supplemental Workgroup Meeting	23 June 2022
Final Modification Report available for Panel	21 July 2022
Modification Panel decision	21 July 2022

 Any questions?

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1 Summary

What

This UNC Modification seeks to introduce arrangements into the UNC to facilitate the SGN Network Innovation Competition project entitled H100FIFE. The H100FIFE project is a 100% Hydrogen network trial project managed and operated by SGN and forecast to operate from quarter one 2023 until 31st March 2027. The project plans to convert at least 270 existing natural gas consumers in Fife from a methane-based energy source to a 100% Hydrogen energy source. The H100FIFE project is seen as critical to provide evidence to support the wider roll out of 100% Hydrogen use for heat on the GB gas network aligning with government targets to meet carbon net zero targets in 2045 (Scotland) and 2050 (England & Wales). The project derived evidence will include safe operation of the network, security of supply as well as the ability to utilise commercial arrangements laid out in the UNC for a Hydrogen-based energy source. Several changes to the UNC are anticipated to be required spanning a number of UNC Sections. SGN had anticipated utilising the derogation framework set out in UNC Modification 760 to implement required changes into the UNC, however at this point in time it is not clear whether Modification Proposal 760 will (a) be implemented by Ofgem and (b) if implementation is approved whether the timescales for implementation will align to the H100FIFE project timelines.

Why

A cornerstone of the H100FIFE project is to facilitate Hydrogen gas supply to end consumers using the existing industry commercial frameworks laid out in the UNC with minor Modifications implemented where necessary to enact change and to aid clarity of specific H100FIFE project requirements. The existing industry arrangements detailed in the UNC are specific to methane gas with the term gas being defined in General Terms Section C Interpretation 3.1.1 as a gas consisting of *hydrocarbons or mixture of hydrocarbons and other gases consisting primarily of methane*. Modification of the UNC to widen industry arrangements to include Hydrogen within the definition of 'gas' is an obvious requirement, albeit restricted at this stage to arrangements associated with the H100FIFE project only and not including the wider natural gas networks. The definition of gas in primary legislation is wider than the UNC definition and the Gas Act 1986 includes Hydrogen within its definition of gas.

How

As the H100FIFE project is itself time bound, arrangements to facilitate Hydrogen will be included as transitional text in the UNC covering the period the project will operate from and to. The changes will also be restricted to the relevant Supply Meter Points associated with the project, which will be identified using the existing Network Identifier field in CDSP central systems as H100FIFSGN. This will introduce a distinct set of arrangements specifically for these Supply Meter Points (where they are required). Implementation of UNC changes detailed in this Modification Proposal will be switched on upon confirmation of H100FIFE project specific regulatory and legal requirements being satisfied. These requirements will include Ofgem sign off on specific project conditions and also confirmation from the Health and Safety Executive (HSE) of acceptance of the SGN H100FIFE project Case for Safety.

2 Governance

Justification for Authority Direction

The Proposer believes that the changes which would be introduced by the implementation of this Modification, albeit restricted to a small number of Supply Meter Points, requires Authority direction due to the significant linkages with the HSE and case for safety sign off, (GS(M)R) interactions, Gas (Calculation of Thermal Energy)

Regulations interactions, requirements to maintain Shipper/Supplier competition and, as this Modification focuses on the introduction of Hydrogen into UNC arrangements for the first time, it is considered appropriate that Ofgem should have oversight and ultimate sign off on the Modification's implementation.

Requested Next Steps

This Modification should:

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

Modification 0799 will therefore follow Authority Direction procedures.

3 Why Change?

The H100FIFE project focuses on three main elements all of which will be managed under the umbrella of SGN group companies.

- The first of the three elements is Hydrogen gas production which will be operated by SGN Futures (H100) Limited with two purpose-built Hydrogen gas electrolysers and Hydrogen storage vessels. This first element is outside of UNC arrangements and the scope of this Modification Proposal, although the existing UNC definition of a Connected Delivery Facility will apply to the Hydrogen gas production facility.
- The second element which will be owned and operated by Scotland Gas Networks Plc, is the gas transportation network which will require a new purpose-built low-pressure network to be constructed in parallel with the existing natural gas network to supply Hydrogen to consumer's homes. Scotland Gas Networks PLC will enter into a Network Entry Agreement with SGN Futures (H100) Limited which will specify the Network Entry Provisions between the two parties.
- The third element is the consumer interaction which will require Hydrogen appliances to be installed in consumers' homes along with Hydrogen ready gas meters. This element will be implemented by SGN Futures (H100) Limited.

It is the second element covering the introduction of 100% Hydrogen into the regulated gas network which requires Modifications to the UNC to permit the commercial arrangements between gas transporters and gas Shippers to function.

A main H100FIFE project objective is to ensure the end consumer experience of using 100% Hydrogen is identical to natural gas, including the ability to switch gas Supplier. A further objective requires the H100FIFE project to ensure end consumers are not charged more than their equivalent natural gas charges (both transportation charges and energy supply costs). As a result of the lower calorific value of Hydrogen, approximately 12 (MJ/M³) compared to the natural gas calorific value ranging from 38 to 41MJ/M³, the volume of gas used by consumers will be approximately three times greater to deliver an identical equivalent energy requirement.

To ensure consumers are not charged more for the energy they consume due to higher recorded Hydrogen metered volumes, SGN in conjunction with the CDSP are implementing a solution to adjust end consumers' metered volumes. This will ensure energy allocation and transportation charges remain reflective of the actual energy consumed at the end consumers' premises.

The existing UNC arrangements largely synchronise for Hydrogen gas utilisation compared to natural gas as the core of the UNC arrangements are focused on energy (kWh) as opposed to the individual elements of the specific type of gas utilised. There are a small number of changes required to facilitate the specifics of Hydrogen as a

gas compared to methane, including changes required to clarify how existing arrangements will work for Hydrogen, as well as specific changes to carve out obligations which are not suitable at this stage for the H100FIFE project.

As the H100FIFE project is time limited in its operation UNC transitional arrangements are considered appropriate at this stage for the changes associated with this UNC Modification. The H100FIFE project will also be defined in the UNC which will permit the changes detailed in this UNC Modification to apply only to the H100FIFE project specific Supply Meter Points. It may be possible to extend the Modifications this UNC Modification would introduce to future projects as and when they are required by modifying the UNC rules to other UNC defined projects, such as the planned Hydrogen village project.

The H100FIFE project plans to introduce Hydrogen gas into the Total System via a new LDZ embedded entry point which will require volume and energy measurement to be recorded in line with existing arrangements. A gas Shipper will be registered against this H100 new entry point and the energy introduced into the Total System will be registered against this Shipper's energy User Daily Quantity Input (UDQI). It is anticipated that no UNC changes will be required to facilitate this part of the project and existing arrangements for gas entry directly into the LDZ will be utilised for Hydrogen energy.

4 Code Specific Matters

Reference Documents

1. UNC General Terms Section C – Interpretation 3.1.1 – definition of gas.
2. UNC TPD Section H – Demand Estimation and Forecasting
3. UNC TPD Section I – Entry Requirements
4. UNC TPD Section J – Offtake Requirements
5. UNC TPD Section M – Supply Metering
6. UNC TPD Section N – Shrinkage
7. UNC TPD Section R - Storage
8. SGN H100FIFE – website for project details reference - <https://www.sgn.co.uk/H100Fife>
9. Gas Safety (Management) Regulations - <https://www.legislation.gov.uk/ukxi/1996/551/contents/made>
10. Gas (Calculation of Thermal Energy) Regulations 1996 (amended 1997) - <https://www.legislation.gov.uk/ukxi/1997/937/contents/made>

Knowledge/Skills

No additional skills or knowledge are required.

5 Solution

Business rules:

The following business rules (The H100FIFE Project Rules) will apply only to the H100FIFE project LDZ System Entry Point and H100 Supply Meter Points on a transitional basis: -

1. Establish a transitional set of rules (the H100FIFE Project Rules) which will be ringfenced to H100 Supply Meter Points and the H100 LDZ System Entry Point. The rules should apply from a date notified by the Transporters until 31/03/27.
2. All obligations and provisions detailed in the UNC will apply equally to H100FIFE project LDZ System Entry Point and H100 Supply Meter Points, Users and Transporters unless specified in the rules set out in the H100FIFE Project Rules.
3. Amend the definition of gas for the purposes of the H100FIFE project LDZ System Entry Point and H100 Supply Meter Points to mean a gas consisting of predominantly Hydrogen.
4. Supply Meter Points which are connected to the H100FIFE project network and are being supplied with Hydrogen gas will be defined as H100FIFSGN using the pre-existing Network Indicator field in CDSP central systems. Any Supply Meter Point (at the point in time when the Supply Meter Point is converted from natural gas to Hydrogen gas) whose Supply Meter Point Reference Number is already established shall retain this Supply Meter Point Reference Number for the duration of the H100FIFE Project trial period.
5. The relevant Transporter will publish on a secure platform hosted by the CDSP and keep up to date information accessible by relevant industry parties detailing all H100 Supply Meter Points which are connected to the H100FIFE project network and the date on which Hydrogen gas was first supplied to the H100Supply Meter Point, this date being the start of the gas day on which Hydrogen was first supplied to the relevant H100 Supply Meter Point and a date (where applicable) on which Hydrogen gas was last supplied to the H100 Supply Meter Point. The provision of the information will also constitute notice pursuant to Section J 2.4.1 and 2.4.3 to a Registered User of a change in the relevant characteristics of gas offtaken at a H100 Supply Meter Point where the Registered User has requested that it be given notice of a change in such gas characteristics.
6. The Metered Volume as defined in TPD M 1.5.3 (d) will be amended to include a further adjustment (in addition to the correction for temperature and pressure) to reflect the conversion of the Hydrogen recorded volume to that of an equivalent natural gas volume by means of a Multiplication Factor applied to the calculated Metered Volume. The Multiplication Factor will be used to calculate a natural gas equivalent Metered Volume for the purposes of calculating a Metered Quantity using a natural gas calorific value. The Multiplication Factor will be set to reflect the Declared CV for the duration of the H100FIFE project trial period.
7. Exclude H100 Supply Meter Points from UNC TPD Section H 1.6 NDM Sample requirements. Meter readings from H100FIFE project H100 Supply Meter Points will reflect larger Hydrogen gas consumption volumes and as such will not be reflective of natural gas consumption. It would therefore not be appropriate to use H100 Supply Meter Point's daily offtake of gas for the purposes of the development of End User Categories and Demand Models.
8. The Standard Offtake Requirements as defined in TPD J 2.1.2 refer to requirements of gas composition and pressure referenced in Section 16(1) of the Act (The Gas Act 1986 as amended in The Gas Act 1995). The Act points to The Gas Safety (Management) Regulations 1996 Part 8 (Schedule 3) which details the content and other characteristics of gas. It is anticipated that the H100FIFE project case for safety (reviewed by the HSE) will provide an alternative to the requirements detailed in Part 8 of the Gas Safety (Management) Regulations 1996 relating specifically to Schedule 3 applicable to the Hydrogen content of gas (currently $\leq 0.1\%$ (molar)). Therefore, Standard Offtake Requirements applicable to the H100FIFE project will be required to reference this case for safety and for the purposes of transparency the Transporter will make the Hydrogen gas characteristics available to the industry (included in the industry document referenced in business rule #5).

9. The Transporter will take account of any available data or relevant Shrinkage information pertaining to the H100FIFE project network which may impact upon the Assessed LDZ Shrinkage in relation to the requirements detailed in UNC TPD Section N 3.3 for the relevant LDZ (for the H100FIFE project this will be the Scotland LDZ).
10. The storage associated with the H100FIFE project is part of the Connected Delivery Facility and is upstream of the LDZ System Entry Point and as such UNC TPD Section R is not relevant to the H100FIFE project.
11. For the purposes of the Regulations (The Gas (Calculation of Thermal Energy) Regulations 1996) (as amended 1997) the calculation of thermal energy for H100 Supply Meter Points will be declared pursuant to Regulation 7, 8, 9 and 10 (Part III). The H100 LDZ System Entry Point and H100 Supply Meter Points will be registered as being part of the Scotland LDZ (LDZ SC) in CDSP central systems as the creation of a new LDZ is currently deemed not cost efficient, however a distinction will be drawn to recognise that the calculation of thermal energy is carried out pursuant to Regulation 7 and therefore is a separate charging area for the purposes of the Regulations. To ensure accurate consumer billing and Shipper energy allocations Business Rule # 6 will apply to H100 Supply Point Metered Volumes and Metered Quantities. Therefore, for the purposes of the H100FIFE project, UNC OAD Section F 1.2 (a), (b) and (c) will reflect that there will be established a H100FIFE project Charging Area pursuant to Regulations 7, 8, 9 and 10 and that the Scotland LDZ will also represent the H100 Charging Area.
12. H100 Supply Meter Points will attract the same gas Transportation charges as detailed in UNC TPD Section Y and reflected in the published Scotland Gas Networks transportation charging statement.
13. The H100FIFE project Transporter will ensure there is an agreement in place with a gas producer to meet security of supply requirements as detailed in the H100FIFE Project Case for Safety as agreed with the HSE. As such the Transition Rules for the H100FIFE project should include H100 Supply Meter Points in the scope of TPD Section Q 1.9.1 (dis-application of TPD Section Q).
14. The H100 Hydrogen production facility will be defined as a Connected Delivery Facility as referenced in UNC TPD Section I 1.2.2.
15. The H100 Connected Delivery Facility is a LDZ System Entry Point and as such is a (Individual and not an Aggregate) System Entry Point which will facilitate delivery of gas to the Total System by a Delivering User.
16. The H100 Hydrogen production facility operator will be SGN Futures H100 Limited and who will be defined as a Delivery Facility Operator (DFO) – in line with UNC TPD I 1.2.3.
17. A LDZ System Network Entry Agreement will be in place between the Transporter (Scotland Gas Networks) and the DFO (SGN Futures H100 Limited) in line with I 1.3 which will include Gas Entry Conditions (in line with I 2.4), Measurement Provisions (I 2.5) and Local Operating Procedures (I 2.6).

6 Impacts & Other Considerations

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

None.

Workgroup Participants were assured that consumers would be able to switch in the same way as currently, both before and after Faster Switching go-live. The CDSP representative assured Workgroup Participants that there is no dependency overlap between the two projects.

Consumer Impacts

The H100FIFE project is seen as the first step on proving Hydrogen as a viable, safe and effective means of delivering a decarbonised energy source for heat to domestic customers. The outputs and innovative learnings of the H100FIFE project will provide evidence to take forward an expansion of 100% Hydrogen networks across the UK including the utilisation of industry commercial frameworks to provide a basis for the interaction between industry parties. The successful implementation of this Modification will impact on the consumers connected to the H100FIFE project network (at least 270 consumers) by facilitating a carbon neutral energy source and also providing Hydrogen appliances and access to an affordable energy source. The H100FIFE project uses a voluntary approach to opting consumers into the project and therefore does not obligate consumers to participate. In relation to Ofgem priorities and objectives the implementation of this Modification would align to Ofgem's enduring priority to focus on advancing decarbonisation of energy sources, enabling investment in low carbon infrastructure at a fair price, to deliver a future retail market that works for all consumers and the planet and also to ensure energy system governance, including Ofgem, are fit for the future.

Workgroup response:

A Workgroup Participant pointed out that consumers would see no change to their charging arrangements.

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

One of the primary objectives of the H100FIFE project is to deliver a safe, secure, and affordable decarbonised energy source to consumers with as little impact on the consumer experience as possible.

The Modification focuses on aligning UNC obligations and outputs for Hydrogen in relation to Transporter and Shipper interactions. This is to ensure that the consumer experience in relation to energy costs and ability to switch Supplier are maintained throughout the H100FIFE project lifespan as they would be for a natural gas supply. The new consumer experience would facilitate a carbon neutral energy source with little difference to that of a natural gas energy source. Consumers will have the option to opt into the H100FIFE project trial or remain with a natural gas supply. Consumers will also have the option to switch back to a natural gas supply from Hydrogen as and when they may choose to do so.

Workgroup response:

The trial will only include Domestic Consumers.

Workgroup Participants were assured that in-depth consumer liaison related to the project will be carried out by SGN's H100 project team. The liaison with consumers will be led by the SGN project team and would not require the Supplier to be involved in the communication processes.

The Proposer noted that the Supplier would need to be aware that a consumer is on the trial in the event that the consumer makes a direct approach to the Supplier. A consumer information pack will be prepared as a project artefact.

Impact of the change on Consumer Benefit Areas:	
Area	Identified impact
<p>Improved safety and reliability</p> <p>The H100FIFE project will operate to ensure security of supply obligations are maintained and safe and secure operation of the pipeline system will be in accordance with the procedures set out in the H100FIFE Project Case for Safety.</p>	None
<p>Lower bills than would otherwise be the case</p> <p>It is intended that the H100FIFE project is a trial project to prove the supply of a Hydrogen energy source. The economics of the project have been designed to ensure that consumers taking part will not incur any additional costs other than what they would normally incur from a natural gas energy supply.</p>	None
<p>Reduced environmental damage</p> <p>The H100FIFE project is primarily designed to deliver all of the intended environmental objectives detailed below: -</p> <ul style="list-style-type: none"> • a reduction in Greenhouse Gas emissions • new providers and technologies • a move to Hydrogen or lower greenhouse gases • the journey toward statutory net-zero targets • decarbonisation. <p>An assessment will be made using the Ofgem guidance document (Carbon Costs Guidance) during the Workgroup discussions. The Proposer estimates that 662 tonnes of CO₂ per annum will be saved following the connection of 300 domestic properties to the H100 network, based on an average annual quantity of 12,000kWh at a natural gas CO₂ emission of 0.184kg/kWh.</p>	Positive
<p>Improved quality of service</p> <p>Implementation of this Modification Proposal would ensure continuity of industry commercial arrangements detailed in the UNC for Hydrogen and as a result would support the current value chains across the industry.</p>	None
<p>Benefits for society as a whole</p> <p>The implementation of this Modification proposal will facilitate H100FIFE project objectives to deliver a carbon neutral energy source in the form of Hydrogen gas. The learnings and demonstrable outputs from the H100FIFE project will potentially lead to the successful role out of Hydrogen usage across GB, which in itself will lead to environmental benefits to society as a whole.</p>	Positive

Workgroup Participants noted that the choice of the multiplication factor may influence the degree to which consumers' costs vary from those that would be charged if they were using Natural Gas. The overall intention is that costs should be a close approximation and, in any event, not more than the cost for a Natural Gas supply.

A Workgroup Participant queried whether the rising wholesale cost of Natural Gas might result in a situation where Hydrogen could become more cost effective than methane. It was noted that the costs for Hydrogen manufacture do, in part, link with wholesale energy costs. Workgroup Participants agreed that this question would not influence the validity of this project.

30 March 2022 the Project will use “green Hydrogen” which uses electrolysis (the separation of Hydrogen and oxygen molecules by applying electrical energy to water) powered by a renewable source of electricity, such as wind. (Otherwise the Hydrogen would not be considered ‘green’). As a backup, electricity from the Grid will be used, green tariffs may be used to procure this.

Cross-Code Impacts

None. There are no IGT Supply Points in the area identified for the H100FIFE Project.

Workgroup response:

Workgroup Participants identified that there may be impacts across to the Retail Energy Code (specifically the Metering Codes) and potentially the amendments to MDD to accommodate a Hydrogen meter.

A Workgroup Participant asked whether there may be an impact on the Smart Energy Code if the Hydrogen meters are operating as Smart Meters communicating on the DCC network. The project team noted the interaction with the smart metering programme and the need for a smart electricity meter to be in place for the gas meter to operate in smart mode.

The Workgroup was advised that the meters are SMETS2 compliant and are therefore suitable for use in this context.

The Proposer noted that the Hy4Heat project has led to the development of two Hydrogen meters, one of which (so far) is MID certified. For further information please see: <https://www.hy4heat.info/wp10>

EU Code Impacts

None.

Workgroup Participants did not raise any areas of EU Code impact for discussion.

Central Systems Impacts

The CDSP have instigated a change proposal to support the implementation of this Modification Proposal under XRN5298 (<https://www.xoserve.com/media/43145/xrn5298-singular-cp.pdf>) in relation to Option 2 – the business rules included in this Modification Proposal have been established to support this change request option.

Workgroup Participants reviewed the papers provided relating to XRN 5298 on 11 March 2022.

Workgroup Participants noted that the proposal would be reviewed in May 2022 by the DSC Change Management Committee and that the costs are likely to be significantly lower as there will not be any requirement to accommodate a dual-fuel meter type (switchable between methane and Hydrogen).

Performance Assurance Considerations

A Workgroup Participant noted that the meters will be SMETS2 type meters and that, with only around 300 meter points in the trial, there is unlikely to be any significant effect on matters of interest to the PAC.

A Workgroup Participant noted that as there are no new obligations upon Shippers there will be no additional surveillance required for PAC’s consideration. The meters in the trial will operate within the current billing processes so will operate within settlement, as for natural gas meters. The use of the multiplication factor in the calculations will make this transparent to the settlement process.

Workgroup Impact Assessment

Panel Questions

1. Does the Modification have a potential impact on (Switching) SCR?

Proposer response:

Faster switching change proposal is due to be implemented in July 2022 by Xoserve. There are no system solution impacts on this change proposal stemming from XRN5298. The MOD 799 system solution design has taken into account faster switching functionality.

Workgroup response:

See comments above relating to Central Systems Impact. Workgroup Participants were assured that there is no impact.

2. Do the Workgroup agree with the Proposer's view on SCR?

Workgroup response:

See comments above relating to SCR impact. Workgroup Participants agreed with the Proposer.

3. Does the Modification have any potential IGT & other Code impacts?

Proposer response:

There are no IGT customers included in the H100 project trial area and therefore IGT supply points will not be impacted by UNC Modification 0799. No changes are required to the IGT UNC document. Existing REC rules/functionality associated with the MDD will facilitate the new multiplication factor linked to the H100 customer meter for Hydrogen.

Workgroup response:

See comments above relating to Cross-Code impacts. Workgroup Participants agreed that no IGT customers will be affected.

Additional Workgroup Impact Assessment areas

Project costs especially relating to meters.

Workgroup Participants discussed costs associated with changing out of meters.

The Proposer agreed that stranded meter costs arising as a result of supporting the trial will be met by the project.

The Proposer confirmed that other relevant costs incurred in supporting the project will be considered on a case-by-case basis.

The Proposer confirmed that as is normal practice, the MAP can collect its assets.

Arrangements specific to meters and metering (for example MAM choices, meter exchange) will be further discussed at the Metering Experts Group under REC meeting on 13 April 2022.

<https://recportal.co.uk/web/metering-expert-panel>

MDD data

The Proposer confirmed that a project specific meter will be recorded on the MDD. A Workgroup Participant enquired if the Meter ID for a Hydrogen meter could be re-usable in future. The Proposer

confirmed it is likely that this may not be possible as the approach being used for the H100Fife project is utilising the multiplication factor, which is not necessarily going to work going forward.

Workgroup Participants briefly discussed the Hydrogen village trial which may have to use different arrangements. This is to be finalised at a future date. The principle may be applicable, but the maths may be different depending on the location and other factors.

Hydrogen cost vs natural gas cost

Workgroup discussed whether Hydrogen production costs are envisaged to be higher than prevailing natural gas NBP cost. The Proposer confirmed that there will be a commercial bespoke arrangement between the Hydrogen producer and the single gas entry Shipper to purchase Hydrogen molecules at a contractual price. Any additional Hydrogen cost will be borne by the project either way. The customer will not face any additional costs associated with using Hydrogen.

Workgroup Participants wanted to record the following two points:

1. **For the avoidance of doubt** the difference in this arrangement is that a *single* gas Shipper will supply 100% Hydrogen into the total system, but end consumers can continue to use the gas Supplier of their choice and the associated Shipper of that gas Supplier. The associated Shipper doesn't have to do anything different to normal.
2. From the customer's point of view the tariff will be as it is today – chosen by the customer and not specifically related to the H100Fife project. The only difference will be the meter and the meter arrangements which will be entirely arranged and supported by the project. The charging arrangements will take the 100% Hydrogen into account through the multiplication factor associated with the meter. The customer will not be adversely affected by this – their experience is intended to be identical to what it would be if they were using natural gas, including the ability to switch gas Supplier.

Workgroup Participants noted that the multiplication factor must be set as accurately as possible to avoid customers having unrealistic expectations of Hydrogen cost.

Appliance performance

When asked by the Workgroup, the Proposer confirmed the intention is that the Hydrogen appliances will have similar energy output ratings to existing natural gas appliances. They should give a similar customer experience in line with the objectives of the trial.

Implementation considerations

Workgroup Participants discussed the HSE consideration of the H100 Fife Project Case for Safety, noting that there are two aspects:

1. The HSE will provide an indicative view in April in 2022
2. In November 2022 it is expected that the HSE will provide a letter of assistance.



HSE Review Status

Ofgem require an update in April on SGN engagement with SGN as part of the funding agreement

- Indication of any significant 'showstoppers' so far in the process
- Informal progress update

Letter of assistance would only be supplied once all evidence is assessed

Figure 1: HSE slide detailing the expected steps for HSE review of H100 Project Case for Safety

Workgroup noted that the HSE letter of assistance essentially signals that the HSE is not fundamentally objecting to the project. The assumption is that if this letter of assistance is not forthcoming then the legal text is worded such that without this the legal text is unusable. Implementation of the Modification is reliant on the provision of this letter of assistance.

On 30 March 2022, the Ofgem representative stated that Ofgem's view is that it is not likely to wait for the HSE letter of assistance to be forthcoming before making a decision. The H100 Fife Project Case for Safety would not be in existence without this letter and therefore the legal text itself would not function. Hence the Modification would not be implementable.

Hydrogen Regulator

Workgroup Participants asked the Ofgem representatives for confirmation as to who the regulator for Hydrogen is. C Yates confirmed by email to the Joint Office on 03 March 22:

This is something Ofgem and BEIS has looked at and agreed over the past year with our legal and policy teams.

- 1. Any substance in a gaseous state which consists wholly or mainly of "Hydrogen" falls within the definition of "gas" in the GA86 (section 48(1)). All references to gas in the GA86 can therefore be read as including Hydrogen, specifically in relation to GEMA's principal objective, functions and duties.*
- 2. GEMA has the power to grant a licence for (and therefore regulates) the activities listed below (sections 7, 7ZA, 7A and 7AB of the GA86):*
 - i. Gas transportation (either conveyance of gas in an authorised area or through pipes being conveyed to or from a country or territory outside of GB);*
 - ii. For the operation of gas interconnectors;*
 - iii. Gas supply and gas shipping; and*
 - iv. Smart meter communication services.*
- 3. GEMA therefore is the regulator of gas transportation networks including Hydrogen.*

Workgroup response:

On 11 March 2022 Workgroup Participants noted the response provided by Ofgem and were assured that it is the relevant regulator. A Workgroup Participant pointed out that Ofgem has a broad remit beyond electricity and natural gas and, for example, also has jurisdiction for Heat Metering networks.

Rough Order of Magnitude (ROM) Assessment

On 11 March 2022 Workgroup Participants reviewed the detailed design considerations that led to the proposed solution. (See above under Central Systems Impacts) The costs will be met from the H100 Fife project budget.

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.	None
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.	Positive
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.	None
f) Promotion of efficiency in the implementation and administration of the Code.	None
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.	None

The Proposer considers that the Relevant Objectives are furthered, as follows:

- a) *Efficient and economic operation of the pipe-line system* - The Ofgem document “Guidance on the treatment of carbon costs under the current industry code objectives” has been reviewed and it is considered that the carbon costs associated with the reduction in greenhouse gas emissions resulting from the H100FIFE project will be positive in terms of the efficient and economic operation of the pipe-line system.
- c) *Efficient discharge of the licensee’s obligations* – The implementation of this Modification Proposal would support the delivery of the H100 project which is funded under SGN’s Special Condition 3.9 Net Zero Pre-

construction Work and Small Net Zero Projects Re-opener & Special Condition 5.2 RIIO-2 network innovation allowance.

- d) *Securing effective competition between (i) Shippers & (ii) Suppliers* – the implementation of the Modification Proposal would ensure the continuation of consumers’ ability to switch gas Supplier (and Shipper) for Hydrogen consumption.

Workgroup response:

Relevant Objective a)

Workgroup Participants noted SGN’s NIC submission which can be found here:

https://www.ofgem.gov.uk/sites/default/files/docs/2020/11/nic_2020_h100_fife_final_submission_20.10.20_-_redacted_ofgem_publication_applied.pdf

Workgroup noted the 662tCO₂/annum is the expected greenhouse gas emissions reduction associated with the trial which will end April 2027. Further emissions reductions are possible through additional potential phases. This Modification should help further decarbonisation of the UK gas industry.

Some Workgroup Participants stated that the Modification enables parties to test the ability to transition to Hydrogen. This is positive for Relevant Objective a) as it enables re-use of some of the infrastructure and allows for planning towards a future transition.

Some Workgroup Participant believed that the use of the Multiplication factor model is better for the consumer than other methods of dealing with the different CV, for example using the Guaranteed Standards of Service payments used in HyDeploy. This is positive for Relevant Objective a)

Relevant Objective c)

The Workgroup noted that the Modification supports SGN in better achieving its licence condition through this H100 Fife project.

Relevant Objective d)

Workgroup Participants noted that the Modification essentially extends the competition arrangements to a new fuel.

On 11 March 2022 Workgroup Participants noted that the arrangements allow the continuation of existing arrangements so are neutral in respect of Relevant Objective d).

Relevant Objective g)

Some Workgroup Participants noted that there may be a case for Modification 0799 being positive for Relevant Objective g) because it allows a path to be forged towards Net Zero targets, which are in legislation:

The Climate Change Act 2008 (2050 Target Amendment) Order 2019:

<https://www.legislation.gov.uk/ukxi/2019/1056/made>

An equivalent piece of legislation exists for Scotland:

<https://www.legislation.gov.uk/asp/2019/15/contents>

The Proposer added their general agreement to the argument above relating to Relevant Objective g).

In summary Workgroup Participants did not raise any fundamental issues regarding this Modification.

8 Implementation

The Proposer suggests a potential implementation date to support the H100FIFE project target commissioning date in relation to the physical works to install the new gas network and the provision of the infrastructure to produce Hydrogen gas. This is forecast to be 01 January 2023 and, as a part of the preparation works to realise the H100FIFE project goals, the implementation of this Modification proposal is key to underpinning the supporting industry arrangements. As specified in this Modification Proposal an Implementation Date should be triggered as soon as possible after the following points are confirmed: -

1. The relevant Ofgem H100Fife specific project conditions are satisfied.
2. The H100Fife regulatory model is agreed with Ofgem.
3. The HSE provide a letter of assistance to the H100 project in relation to the H100FIFE Project Case for Safety.
4. The relevant Xoserve system requirements detailed in XRN5298 are implemented.

9 Legal Text

Legal Text has been provided by Scotland Gas Networks plc and is published alongside this report here: <https://www.gasgovernance.co.uk/0799> .

The Workgroup has considered the draft Legal Text on 23 March 2022 and a further iteration on 30 March 2022 and is satisfied that it meets the intent of the Solution. The Workgroup noted that an explanatory Table should be supplied prior to consultation and that the draft Legal Text required some small formatting changes to make it consistent. The Workgroup was comfortable with the line-by-line review of the draft Legal Text.

Text Commentary

This is published alongside this report here: <https://www.gasgovernance.co.uk/0799>.

Text

This is published alongside this report here: <https://www.gasgovernance.co.uk/0799>.

10 Consultation

Panel invited representations from interested parties on 20 April 2022. All representations are encompassed within the Appended Representations section.

The following table provides a high-level summary of the representations. Of the six representations received five supported implementation, and one was not in support.

Representations were received from the following parties:

Organisation	Response	Relevant Objectives
Cadent Gas Limited	Support	a) positive c) positive d) positive

Centrica	Support	a) positive c) no response d) no response
E.ON	Support	a) positive c) positive d) positive
ScottishPower	Oppose	a) negative c) negative d) negative
Scotland Gas Networks Ltd and Southern Gas Networks Ltd	Support	a) positive c) positive d) positive
Wales & West Utilities	Support	a) none c) positive d) none f) positive

Please note that late submitted representations will not be included or referred to in this Final Modification Report. However, all representations received in response to this consultation (including late submissions) are published in full alongside this Report and will be taken into account when the UNC Modification Panel makes its assessment and recommendation.

11 Panel Discussions 16 June 2022

Discussion

The Panel Chair summarised that Modification 0799 would facilitate the use of 100% Hydrogen gases specifically required for the industry H100 Fife Ofgem Network Innovation Competition project.

Panel Members considered the representations made noting that, of the six representations received five supported implementation and one was not in support.

Some Panel Members agreed with respondents and the Proposer that this Modification would work to demonstrate 100% Hydrogen can be used as an alternative to natural gas.

Potential implementation/systems implementation

Panel Members briefly discussed the need to allow enough lead time for Shipper/Supplier systems to be updated as well as central systems.

The implementation needs to take into account the H100FIFE project target commissioning, currently forecast to be Q2 / Q3 2023.

Panel Members noted the four conditions must be satisfied before implementation can be triggered:

1. The relevant Ofgem H100Fife specific project conditions are satisfied.
2. The H100Fife regulatory model is agreed with Ofgem.

3. The HSE provide a letter of assistance to the H100 project in relation to the H100FIFE Project Case for Safety.
4. The relevant Xoserve system requirements detailed in XRN5298 are implemented.

Upon questioning SGN confirmed for Panel that the relevant Supply Meter Points associated with the SGN H100 Fife project will be identified as H100FIFSGN using the existing network identifier field in the central systems.

Panel Members discussed the extent of Shipper and Supplier Engagement prior to the Modification. SGN confirmed that a Supplier Engagement Day was held and the company is now engaging one to one with Suppliers with portfolio in the area. It was noted that this is not really related to UNC.

A Panel Member noted that some Suppliers have now been able to assess some costs, through engagement with SGN. Shipper/Supplier internal costs are not considered within the Modification. There is some concern at the potential scale of these costs measured in a manner which is proportionate per meter point. All systems must be amended for a very small number of customers, these costs are substantial. The innovation funding does not cover this.

A Panel Member confirmed they supported the idea of the trial to establish viability of 100% Hydrogen, but questioned whether this was being done in the most efficient way. There are some quite considerable Supplier impacts. If these changes are to be made for the long term that would be fine. However, the changes required here (and the burden is on all Suppliers not just those in the trial area) are for this trial and may not be applicable going forward. Asking all Suppliers to make the internal changes is not the most efficient way of doing this. The Panel Member wished to know whether the project could work with a targeted group of Suppliers instead.

A Panel Members noted the concern over costs suggested in responses seems to indicate that they were not well appreciated through the UNC Modification process. The engagement appears to have been positive with those who have had the engagement, however for full competition every Supplier will need to be prepared in the same way to allow for the switching options in existence and to satisfy the switching requirements in the trial. The Workgroup Report does not cover this.

The Independent UNC Modification Panel Chair invited the Proposer to comment. J Martin confirmed that the requirement was to come up with a technical solution which delivered least impact to Shippers, so the solution was developed using existing industry data items (e.g. multiplication factor, standard data items in MDD). Perhaps wrongly, the Proposer has assumed that Shippers had this available in their systems. The cornerstone requirement for the project was the continuation and demonstration that existing UNC frameworks for competition are fully maintained.

A Panel Member noted the use of the phrase "least impact to Shippers" and noted this is why the existing factor was used but for Suppliers the need to engage with, bill and settle consumers is driving internal system/process costs

Some Panel Members confirmed the impact assessment of costs for Shippers/Suppliers is not possible until the final Modification is available. Engagement with SGN has enabled this to take place recently. It should be noted that for a combined Shipper/Supplier it is very difficult to disentangle these costs.

A Panel Member agreed confirming that it is unfortunately a common issue that Network Innovation projects do not fully consider Shipper / Supplier impacts. This should be taken into account by Ofgem when scoping these projects and setting funding.

The Proposer confirmed that a customer on the scheme, who decides to move to a different Supplier can switch out of the trial, and can in fact switch in and out during the trial as many times as they wish.

A Panel Member suggested that if the Shipper/Supplier is not prepared they would incur costs to take on any customer within the trial.

The Proposer confirmed that standard data item in MDD was used in the solution deliberately to enable this to work smoothly. The transitional legal text may also act as the basis for the production of additional text for any future 100% Hydrogen projects

The Independent UNC Modification Panel Chair invited the Ofgem representative and/or the BEIS representative to comment. The Ofgem representative H Brazier confirmed he wished only to observe the meeting.

The BEIS representative, I Badea, confirmed that the H100 Fife project is an Ofgem funded trial which is critical to enable the transition to Hydrogen.

The Ofgem representative confirmed they only wished to observe the meeting.

A Panel Member asked whether it was going to be possible to maintain choice during the trial and also asked whether we envisage a future where consumers can switch between methane and Hydrogen Shippers i.e. with parallel networks?

The Proposer confirmed that the design of solution is to use existing industry agreed data items i.e. multiplication factor in MDD. All Shipper systems are set up already today to accommodate the range of values. Suppliers would have to engage with customers and there will be a cost associated with that. He asked for clarification on the costs specifically associated with this Modification.

The Proposer confirmed that the project concept is not encouraging switching between methane and h2 and back again as customers choose. The systems solution is to tackle the difference between the energy density of methane and Hydrogen. The Modification facilitates 100% Hydrogen into existing UNC frameworks which currently deal with methane. He confirmed the eventual future envisaged is not one with parallel networks (one with methane and one with Hydrogen).

Panel Members discussed at length whether sending the Modification back to Workgroup would allow Parties to get to the bottom of these internal cost issues or the unintended consequences of this Modification.

The Proposer confirmed that in relation to Central system costs the focus has been on trying to keep processes and impacts centrally as minimal as possible during the trial. The central system costs will be dealt with at DSC Change Management Committee (using a decarbonisation investment budget under BAU this is covered by DSC arrangements within the Business Plan).

Panel Members suggested that Ofgem could seek cost impacts from Shippers/Suppliers on a confidential basis.

A Panel Member confirmed the purpose of the trial is to show that the customer could switch (not opt in or out). The Modification supports moving Supplier, not changing energy source. However, in a world where we have moved to 100% Hydrogen, there will be no methane network to switch back to.

A Panel Member asked what the materiality of the Shipper/Supplier internal costs would be – could this be obtained in a proportionate manner e.g. per meter? He also noted that the Workgroup Report implies that the arrangements may not be reusable for the Hydrogen village trials. He asserted that the materiality of those costs needs to be understood now.

A Panel Member noted that to enable a transition to Hydrogen we need to start somewhere and some cost is unavoidable. He asserted that if the Modification goes back to Workgroup, it's not clear that this would enable measurement of the costs and it is also not clear whether Workgroup Participants would disclose costs. Rather this information should be sought by Ofgem through an RFI so confidential information could be shared with the Regulator.

A Panel Member asked whether an alternative could be raised.

A Panel Member asserted that from a cost point of view nothing can be delivered in Workgroup and it might be more constructive to consider whether a change to the proposal could address these concerns.

The Independent UNC Modification Panel Chair suggested there was broad support for the Modification except for the fact that the internal Shipper/Supplier costs have not been taken into consideration.

A Panel Member asked whether the additional costs are related to switching Hydrogen or Hydrogen/methane switching or both? Is one approach to somehow limit competition to Suppliers already involved and in the trial area? Could a derogation be used?

The Proposer confirmed he had discussed the solution with REC and no REC changes had been identified.

A Panel Member asserted that given the Ofgem and BEIS interest, its highly likely the Modification would be implemented and it was Panel's job to make sure that unnecessary costs were minimised.

A Panel Member asked whether customers would be required to sign up to a Hydrogen tariff.

The Proposer confirmed that this was discussed thoroughly in Workgroup and there would be no requirement whatsoever for a Hydrogen tariff. There would be no change in customer experience. He confirmed additional engagement is possible.

The new Issue: Internal Shipper/Supplier systems costs have not been taken into account. Workgroup to aim to answer: What is the materiality of the impact of this Modification on Shipper/Suppliers?

The Modification would be sent back to Workgroup under Mod Rules 9.3.1 and 9.3.2.

Consideration of the Relevant Objectives

Panel Members considered Relevant Objective *a) Efficient and economic operation of the pipe-line system*, agreeing that implementation would have a positive impact because...

- Implementation of the Modification facilitates the use of 100% Hydrogen gas required for the SGN H100 Fife Ofgem Network Innovation Competition Project.
- It puts in place measure to enable the licensee's pipeline system to operate efficiently when the system transports both natural gas and Hydrogen.

Panel Members considered Relevant Objective *c) Efficient discharge of the licensee's obligations*, agreeing that implementation would have a positive impact because...

- This project is a necessary step to demonstrate that GB gas networks can be repurposed to transport Hydrogen which supports the UK Governments Net Zero obligations (governmental targets for meeting carbon net zero in 2045 (Scotland) and 2050 (England & Wales)).
- It puts in place arrangements that enable the licensee to discharge its obligations when transporting Hydrogen.

In discussing Relevant Objective *d) Securing of effective competition between Shippers and/or Suppliers*, Panel Members decided that on balance new issues had been identified and agree to continue further consideration of the Relevant Objectives once Workgroup had come back to Panel.

Determinations

Panel Members voted unanimously (13 out of 13) that new issues were identified as part of consultation and therefore Panel Members determined to send Modification 0799 back to Workgroup to assess the new issue further, with an interim report back to the July 2022 Panel meeting and a final report back to the August 2022 Panel Meeting.

12 Workgroup Supplemental Report

This Supplemental Report is made pursuant to the Modification Rules 9.5.4.

The purpose of Modification 0799 is to amend arrangements in the UNC to facilitate the use of 100% Hydrogen gases specifically required for the industry H100 Fife Ofgem Network Innovation Competition project from June 2023 for a duration of 5 years.

Following consultation in June 2022, six representations were made, five supported implementation, and one was not in support.

Panel Members determined during the UNC Panel meeting, that due to the concerns raised on a number of areas within the Final Modification Report (FMR), that this should be referred back to the Workgroup for further consideration.

The following questions were provided for discussion with Panel requesting a Supplemental Report is produced for consideration by August 2022 with an interim report to July Panel.

The Workgroup discussed each of the questions raised by those concerned. The following outlines the questions raised, a summary of the key areas discussed and the conclusions.

The Workgroup considered:

- A list of Supplier concerns.
- That an Ofgem Impact Assessment should be undertaken.
- That Ofgem should progress a Request for Information (RFI) from Suppliers, Agents and central industry parties to evaluate the costs of changes to systems and processes.

Concerns / Questions

Workgroup made its way through a list of questions submitted in advance from Centrica and Scottish Power, as well as additional questions posed as part of Workgroup discussions. The following captures the essence of the discussions.

- Is the Hydrogen supply invisible to the Supplier? Or will they need to know the Hydrogen status of the customer?
 - The Modification outlines specific rules to have an identifier to enable Shippers and Suppliers to recognise if Hydrogen is being supplied to a supply point, using an existing functionality. Various Reports will also be available to identify supply points. This will be available through the Data Enquiry Service. However, data fields and file formats changes are being avoided where possible to simplify the implementation.
 - There will be a Parallel Network for the trial only, this is not envisaged in the future.
 - Customers can remain on natural gas or move to Hydrogen for the period of the project.
 - Business Rules in the Modification should reduce or eliminate impacts on Shippers and Suppliers on having a Parallel Network for example conversion of energy volumes through a multiplication factor. The multiplication factor will convert Hydrogen volumes to an equivalent natural gas volume in line with consumption.
 - Concern was raised about the different daily Calorific Values (CVs). This will be addressed by agreeing the conversion factor with Ofgem. Some energy may be under allocated, but this is anticipated to be very small. The setting of a conversion factor for the duration had been agreed for this trial for simplicity. However, it is recognised with

larger trials this may need to be addressed with a different solution (for example a separate trial area LDZ).

- A static multiplication factor was chosen to limit the changes and impacts on individual supply points and on central systems. Using a Hydrogen CV would be a significant and disruptive change not deemed necessary for this smaller trial of 300 customers. The multiplication factor will be registered on the MDD Registration Document for that Hydrogen meter.
- The Hydrogen Meters will be Metric Smart Meters, however the smart meter display will not currently provide consumers with a reflective use of energy, this will be explained to customers entering the 3-4 year trial.
- Suppliers could potentially apply to Ofgem for a Derogation, this will need to be considered, along with Supplier Licence Conditions.
- Suppliers noted there would be a need for Supplier System changes to support the Modification and there would be associated costs.
- Suppliers may consider whether to apply to Ofgem for some mitigation for these costs.
- Stakeholder engagement will be robustly and vigorously undertaken with customers who decide to participate as they will need replacement boilers, cookers etc.
- It was believed there would be benefit knowing the equivalent gas flows. It was suggested that the DCC Flows should be reported and there should be some validation with the DCC.
- It was noted that no new Transportation or Amendment Invoices will be created.
- Join process – If a Shipper/Supplier acquires a customer in the control group area, how do they appoint SGN?
 - SGN confirmed they intend to be the Metering Agent.
 - Concern was expressed that this is not a standard process for most Suppliers. Suppliers will need to assess and amend processes, to manage the identification of Hydrogen customers and management of services. This is one process of many to be assessed.
 - Once enrolled, there will be a proactive communication process, between SGN and Suppliers, well ahead of the change of supply day, using existing standard processes set out in the Retail Energy Code (REC), which include Agent appointment and management processes. A summary form of the 13 April 2022 REC Metering Expert Panel minutes are available on the REC portal¹, the H100 Fife trial was discussed as item 8.1 and no significant issues were noted.
 - Customer engagement will take place to effectively ensure customer confusion is mitigated, for example who the appropriate contact points are.
 - An initial Supplier Engagement Day was arranged jointly by Ofgem and SGN and took place in early May.
- Leave process – How does a Shipper/Supplier de-appoint, will the de-appointment flow automatically get sent to SGN if they are the appointed 3rd party?

¹ These are available from the REC Portal on application

- SGN is the MOP, Suppliers can be oblivious to whether the SGN MOP is Hydrogen or methane based.
- Are customers being provided an SGN contact – the boilers, kitchen equipment will be specific so that any issues are not questions the Supplier should answer
 - As part of the customer journey development these issues will be covered. This process has begun.
- Suppliers may decide they need to have something on the customer account to identify them as Hydrogen Gas powered – this will be a system change
 - Dependent processes using a flag in central systems.
- SGN will install SMETS2 meters – are SGN migrating these meters to the DCC?
 - SGN metering will install meters and undertake safety testing. The gas Supplier will commission the SMETS2 meters with the DCC.
 - The SMETS2 meters will be compliant meters with the same testing as methane meters. Two manufacturers selected for the provision of SMETS2 compliant Hydrogen meters, using information which came out of the Hy4Heat programme.
- What meter manufactures are they using and can Suppliers communicate with these meters through the DCC?
 - The meters will be SMETS2 compliant meters with same ability to communicate as all others
 - A Separate session will be arranged with SECAS TABASC and SGN.
- How do Suppliers commission the meters – do they send engineers to site or do they ask SGN do it on their behalf?
 - The gas Supplier Agent will commission the SMETS2 meters with the DCC.
 - In regard to the management of the Supplier's preferred Metering Agent, SGN will be appointed as the Meter Asset Provider (MAP) and Meter Equipment Manager (MEM).
- Do Suppliers have any obligation to show 'Hydrogen Gas' on the customer's bill?
 - Workgroup Participants were unsure as to whether there was a Licence Requirement to show Hydrogen or Methane Gas on the customer's bill.
 - Discussion took place as to whether the Calorific Value / Conversion Factor have to be provided on the bill, this needs to be considered in line with the Gas Thermal Energy Regulations. Proposal will be to have a Declaration of CV (a best-case CV). The Parameters will be agreed with Ofgem.
 - The trial will be cost neutral for consumers. There will be no additional costs for the customer, there will be no monetary impact to customer bills, the costs will be covered by the Network Innovation Project's budget.
 - Concern was expressed that the bill should have some notes to identify Hydrogen supply, however it was noted that bespoke bills would be costly. SGN reassured the Workgroup that there will be engagement with consumers and it will be made clear that the bills may not align with metering equipment if that is needed once everything is clear. Customer bills will show metered volumes adjusted to provide accurate consumer energy consumption.

- Who does the Change of Supplier read come from, the Hydrogen reader or the appointed agent? If the latter, do they know how to read the meter?
 - The read will come from SGN Metering or the Supplier.
 - The gas meter will be like any other gas meter in terms of taking a read.
- How much of this is related to the Uniform Network Code (UNC)?
 - Much of the discussion at the Workgroup is aimed at establishing whether an Ofgem Impact Assessment required.
 - In terms of focusing on whether there are any possible or appropriate changes which could be made to the UNC Modification, the Proposer confirmed he did not anticipate making any changes to the Modification 0799 for UNC.
 - Workgroup briefly discussed whether another Modification would put less or no burden on Suppliers.
 - To ensure customer choice, the limitation / restriction of Suppliers for the trial could be explored. Although this was briefly considered, it was felt that this cannot be accommodated through the UNC. This would require a Derogation.
 - Some Workgroup participants felt that the Modification solution was constructed in an overly complex manner, switching and consumer choice appear to be creating complexity.
 - Regarding competition, some Workgroup Participants believed there was nothing that could be changed in the Modification to restrict the number of Suppliers likely to be involved.
 - The project outline is to test the accommodation of 100% Hydrogen with existing arrangements.
- Can Customers continue to use Price Comparison Websites?
 - Concern was raised around the impact of multiplication factors, and in terms of consumers being able estimate usage in order to use Price Comparison Websites (PCW). It was envisaged that customers would have to use cost information for PCWs and Third-Party Intermediaries (TPIs). The use of a static multiplication factor is to protect the Annual Quantity (AQ), and adjust metered volumes. As the AQ will be maintained, it was envisaged PCWs can be used in the same way because the cost of bills or kWh data can be entered.
- What happens to Change of Meter reads during the trial (methane and Hydrogen meters)? What about any exceptions arising?
 - Upon Meter Removal, SGN Metering will take a closing and opening read. This will be provided to the Supplier.
 - The complexities of switching back and forth from Methane and Hydrogen were considered. The costs would be covered by the project, but it was anticipated that consumers would not be allowed to repeatedly switch. If consumers chose to move back to Methane from Hydrogen, careful consideration on a case-by-case basis would have to be given if customer then wished to switch to Hydrogen again. It's unlikely this would be allowed.
 - Change of tenancy and house moves would need to be considered. This will be covered by SGN's customer journey activities.
 - The Supplier's Agent will install the Methane Meter.
 - Weekly Reports will be provided on the assets through an exception process.

- Can the existing DR agent provide the meter reading from a Hydrogen meter? If not, Supplier will have to suspend the meter from their Meter Read Orders and reinstate when the consumer reverts to methane.
 - The Hydrogen meters will be able to be read for the annual visual/physical read in the same way as normal.
- If there is a meter fault which Meter Operator (MOP) does the Supplier get to fix it?
 - SGN Metering as the Meter Operator will deal with physical meter faults.
- Is there a prepayment Hydrogen meter (e.g. for a customer who is in debt and needs a prepayment meter installed)
 - A Prepayment functionality should be available with Hydrogen as meters will be SMETS2 complaint.
 - Prepayment Meters are not currently excluded from the trial.
- A Workgroup Participant concluded that Suppliers will have to impact assess every and system where they interact with the consumer whether they gain or lose a Hydrogen consumer or not.

Supplemental Report Summary

Materiality of Shipper and Supplier Impacts

Workgroup Participants concluded that there were a reasonably large number of areas and processes which need to be addressed as to their impact on Shippers and Suppliers and Shipper's/Supplier's systems, whether or not the Shipper/Supplier has customers in the trial area. The materiality of this impact should be made known by Shippers/Suppliers themselves to Ofgem on a confidential basis.

Consideration of Supplier costs and possibility of Network rebates

Workgroup Participants asked whether there is any way of contributing to Supplier Cost impact as a result of the Modification.

The Proposer confirmed there was no budget in the trial for Supplier system impact costs. The Proposer noted that there exists a small amount in the budget associated with meter stranding costs as discussed at a previous Workgroup. Costs may be covered by this and will be considered on a case-by-case basis.

The Proposer confirmed they did not consider that network rebates are appropriate for this Modification. There are always costs of implementing change and historically the precedent is that all costs associated with the implementation of a particular Modification are covered by the Shipper, Supplier or Transporter organisation.

Some Workgroup participants suggested that since this is an industry trial which is funded and Supplier costs are completely excluded whereas all other elements are being funded, this seems disproportionate. Perhaps an "alternative" Modification could be developed.

Given that this Modification has gone out for consultation Workgroup Participants concluded that under the UNC no alternative can be raised according to the UNC rules.

Any potential new Modification would require a significant level of detail of the materiality in it, in order to enable or approve it.

Will the Modification be varied?

The Proposer did not plan to vary this Modification.

Cross Code impacts

A Workgroup participant asked whether the cross-code impact could be addressed. The question is whether these are being addressed by those Codes. The Proposer identified that there are cross code impacts but that there are no changes to REC nor SEC as a result of the implementation of this Modification. The meters used will be SMETS2 compliant and this has been discussed by the REC Metering Expert Panel. Workgroup Participants noted that TABASC will be engaging with SGN going forward. The Multiplication factor was discussed by the REC Metering Expert Panel, and there was nothing found to be of concern. From a SEC perspective no new data flows were identified therefore the conclusion is that it's not material. Workgroup Participants concluded that the cross-code impacts are not material and are being discussed by the appropriate groups.

Overall conclusion

All Workgroup participants wished to ask Ofgem to consider a financial impact assessment and the distribution of costs associated with this Modification 0799. This is because Workgroup participants concluded that financial impact assessment was not going to be achievable at Workgroup, and Workgroup participants also noted that this would be outside the scope of UNC Workgroups.

The Workgroup Chair and all Workgroup participants present at the meeting concluded that there were no further areas for further Workgroup assessment and wished the final supplemental report as written here to be considered by UNC Modification Panel on 21 July 2022.

13 Panel Discussions 21 July 2022

Discussion

The Panel Chair summarised that Modification 0799 would facilitate the use of 100% Hydrogen gases specifically required for the industry H100 Fife Ofgem Network Innovation Competition project.

Some Panel Members agreed with respondents and the Proposer that this Modification would work to demonstrate 100% Hydrogen can be used as an alternative to natural gas.

Panel Members agreed with Workgroup Participants in the Supplemental Report, suggesting that Ofgem could seek cost impacts from Shippers/Suppliers on a confidential basis.

Panel Members agreed with Workgroup Participants in the Supplemental Report, suggesting that Ofgem should progress a Request for Information (RFI) from Suppliers, Agents and central industry parties to evaluate the costs of changes to systems and processes.

Panel Members agreed with Workgroup Participants in the Supplemental Report, concluding that there were no further areas for further Workgroup assessment.

Panel Members were pleased at the number and variety of Workgroup attendees when the Modification went back to Workgroup for consideration of a Supplemental Report. This wider group of people was felt to be reassuring for all concerned.

Panel Members briefly discussed the effects of the Modification and the trial itself on competition within the trial area. The Modification does not allow for Suppliers to exclude themselves from the trial. Customers can move to and from Suppliers as normal. A Panel Member noted that Ofgem may wish to consider whether customers in the trial area are more or less attractive as customer propositions.

Ofgem noted that some Shippers/Suppliers have made known their concerns around costs but have not submitted any details of what those costs are and how they are calculated.

Consideration of the Relevant Objectives

Panel Members briefly reviewed their conclusions recorded on page 20 from 16 June 2022 Panel meeting in relation to Relevant Objective a) Efficient and economic operation of the pipe-line system.

Some Panel Members commented that the hydrogen pipeline is part of the SGN system.

A Panel Member disagreed with the statements made previously because the establishment of a parallel hydrogen pipeline is not de facto evidence of efficient and economic operation.

A Panel Member commented that the trials enable reductions in carbon for the future.

A Panel Member noted that the existing central systems are being used for the trial.

In relation to Relevant Objective c) Efficient discharge of the licensee's obligations, Panel Members noted what was said at previous panel on 16 June 2022 and had nothing further to add.

All Panel Members concluded the Modification 0799 would have a positive impact on Relevant Objective d) Securing of effective competition between Shippers and/or Suppliers, because the trial is continuing to facilitate customer switching as is currently available.

Determinations

Panel Members voted unanimously to recommend implementation of Modification 0799.

14 Recommendations

Panel Recommendation

Panel Members recommended that Modification 0799 should be implemented.

15 Appended Representations

Representation – Cadent Gas Limited

Representation – Centrica

Representation – E.ON

Representation – ScottishPower

Representation – Scotland Gas Networks Ltd and Southern Gas Networks Ltd

Representation – Wales & West Utilities

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20th May 2022
Your Reference: UNC Modification Proposal 0799

UNC Modification Proposal 0799 - UNC arrangements for the H100 Fife project (100% hydrogen)

Dear Bob,

Thank you for your invitation seeking representations with respect to the above Modification Proposal which Cadent would like to support.

Do you support or oppose implementation?

Support

Relevant Objective:

- a) Positive
- c) Positive
- d) Positive

Reason for support/opposition:

If implemented the modification will facilitate the use of 100% hydrogen gas within SGNs H100 Fife project. The transitional legal text may also act as the basis for the production of additional text for any future 100% Hydrogen projects.

Implementation

We agree with the triggers leading up to the implementation date suggested by the proposer within the modification.

Impacts and Costs

Costs are expected to be incurred through the Xoserve 'change' process.

Legal Text

We are satisfied that the legal text meets the requirements of the modification.

Are there any errors or omissions in this Modification Report that you think should be taken into account?

We have not identified any further errors or omissions.

Please provide below any additional analysis or information to support your representation

We trust that this information will assist in the compilation of the Final Modification Report. Please contact me on 07884 113385 (andy.clasper@cadentgas.com) should you require any further information.

Yours sincerely,

Andy Clasper

Representation - Draft Modification Report UNC 0799

UNC arrangements for the H100 Fife project (100% hydrogen)

Responses invited by: **5pm on 20 May 2022**

To: enquiries@gasgovernance.co.uk

Please note submission of your representation confirms your consent for publication/circulation.

Representative:	Oorlagh Chapman
Organisation:	Centrica
Date of Representation:	20/05/2022
Support or oppose implementation?	Support
Relevant Objective:	a) Positive
Relevant Charging Methodology Objective:	Not Applicable

Reason for support/opposition: Please summarise (in one paragraph) the key reason(s)

We support the intention of this modification to demonstrate 100% hydrogen can be used as an alternative to natural gas. We suggest an appropriate lead time is allowed for the implementation of this modification and the significant changes that are required via the CDSP change XRN5298 - H100 Fife Project Phase 1 to shipper and supplier platforms, billing systems and business processes to accommodate the H100 trial.

Implementation: *What lead-time do you wish to see prior to implementation and why?*

Significant changes are required, a minimum of 6 months lead time would be required. February 2023 release would be preferable.

Impacts and Costs: *What analysis, development and ongoing costs would you face?*

Material costs identified, level of change required to systems and bespoke processes to accommodate the H100 Trial are significant.

Legal Text: *Are you satisfied that the legal text will deliver the intent of the Solution?*

We are comfortable with the legal text and have no additional comments.

Are there any errors or omissions in this Modification Report that you think should be taken into account? *Include details of any impacts/costs to your organisation that are directly related to this.*

No

Please provide below any additional analysis or information to support your representation

N/a

Representation - Draft Modification Report UNC 0799 UNC arrangements for the H100 Fife project (100% hydrogen)

Responses invited by: 5pm on 20 May 2022

To: enquiries@gasgovernance.co.uk

Please note submission of your representation confirms your consent for publication/circulation.

Representative:	Clare Manning
Organisation:	E.ON
Date of Representation:	19/05/2022
Support or oppose implementation?	Support
Relevant Objective:	a) Positive c) Positive d) Positive
Relevant Charging Methodology Objective:	Not Applicable * <i>delete as appropriate</i>

Reason for support/opposition: Please summarise (in one paragraph) the key reason(s)

We absolutely support the intention of this modification and have actively participated in the working groups and engagement sessions. Our only reservation is that both shippers and suppliers will have to invest in costly system changes to ensure that the end consumer is billed correctly and these costs are not being borne by the project. Both shipper and supplier will have to invest whether or not they are actually the shipper/supplier or not for any sites partaking in the trial in case the customer wishes to change supplier. It may well be wasted investment, particularly given it is not proposed that future hydrogen trials will use an amended multiplication factor.

Implementation: What lead-time do you wish to see prior to implementation and why?

Implementation should be after the system changes have been implemented under XRN5298

Impacts and Costs: *What analysis, development and ongoing costs would you face?*

We will incur costs as a shipper via the Xoserve change process and the changes required to our invoicing system. As a supplier we will incur costs to change our consumer billing systems and our change of supply processes. We have not fully scoped out the extent of the changes required.

Legal Text: *Are you satisfied that the legal text will deliver the intent of the Solution?*

We are satisfied that the legal text will deliver the intent of the solution

Are there any errors or omissions in this Modification Report that you think should be taken into account? *Include details of any impacts/costs to your organisation that are directly related to this.*

None identified

Please provide below any additional analysis or information to support your representation

No further comments

Representation - Draft Modification Report UNC 0799

UNC arrangements for the H100 Fife project (100% hydrogen)

Responses invited by: 5pm on 20 May 2022

To: enquiries@gasgovernance.co.uk

Please note submission of your representation confirms your consent for publication/circulation.

Representative:	Claire Louise Roberts
Organisation:	ScottishPower
Date of Representation:	20 th May 2022
Support or oppose implementation?	Oppose
Relevant Objective:	<p>a) Efficient and economic operation of the pipe-line system</p> <p>Negative – we are unclear as to how the proposer can claim that the Mod will facilitate the more efficient and economic operation of the pipe-line system when it requires the installation of a completely separate parallel network, with customers’ services being moved back and forth between networks as they join/leave the project.</p> <p>c) Efficient discharge of the licensee's obligations</p> <p>Negative – While we recognise that this Modification would facilitate SGN’s recovery of the costs of the H100 project under Special Condition 3.9, we are not persuaded that the project itself can be described as an obligation.</p> <p>d) Securing of effective competition:</p> <p>(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.</p> <p>Negative – We note the proposer’s view that the Modification will:</p> <p>“...ensure the continuation of consumers’ ability to switch gas Supplier (and Shipper) for hydrogen consumption.”</p> <p>However, while the proposals provide for customers to be able to switch supplier, they cannot be said to better facilitate switching compared to the status quo; rather, the proposer</p>

	<p>seems to be attempting to suggest that competition will not be undermined. This hardly meets the objective.</p> <p>Moreover, given the costs to implement the system and process changes that would be demanded by these proposals, we actually think shipper and supplier competition for these customers is likely to be severely dampened; especially in the current climate.</p>
<p>Relevant Charging Methodology Objective:</p>	<p>Not Applicable * <i>delete as appropriate</i></p>

Reason for opposition: Please summarise (in one paragraph) the key reason(s)

ScottishPower does not support implementation of this modification and its associated XRN5298.

In addition, ScottishPower don't support this particular Mod because the structure of the trial puts an unnecessary burden on all supplies and shippers to recognise and accommodate hydrogen customers who want to switch.

The Mod talks about hydrogen opted customers being able to switch back "as they would be for a natural gas customer" ... ScottishPower understands that these customers will have to switch appliances so they're hardly going to have a smooth switching experience! It seems unlikely they are going to switch in and out of hydrogen so better to have agreed arrangements with a number of suppliers and shippers for customers to switch back to methane

We do not agree that Shippers should have to bear the cost of potentially extensive system changes in the absence of any discernible benefit.

The project plans to convert c. 300 existing domestic natural gas customers to 100% hydrogen. The impact to individual parties is currently unclear, as supply point information has yet to be communicated. Nevertheless, as noted above, we are concerned that the level of change that would be required of our internal billing and settlement systems, along with the extra training requirements that our customer service agents would need, mean that the costs to deliver UNC 0799 would be very considerable.

UNC 0799 comes along in the midst of a cost-of-living-crisis, at a time when energy suppliers are already facing unprecedented financial constraints, making this moment all the less opportune to be asking energy suppliers to incur such significant costs that must inevitably make their way onto customers' bills.

Implementation: What lead-time do you wish to see prior to implementation and why?

ScottishPower does not wish to take part in the trial.

Impacts and Costs: *What analysis, development and ongoing costs would you face?*

We have not been able to complete a full impact assessment of this change in the limited time available; nevertheless, we firmly believe the change that would be required to implement UNC 0799 (and its associated XRN5298) would be of both material scale and cost to deliver.

Legal Text: *Are you satisfied that the legal text will deliver the intent of the Solution?*

No comment

Are there any errors or omissions in this Modification Report that you think should be taken into account? *Include details of any impacts/costs to your organisation that are directly related to this.*

Insert Text Here

Please provide below any additional analysis or information to support your representation

Representation - Draft Modification Report UNC 0799

UNC arrangements for the H100 Fife project (100% hydrogen)

Responses invited by: **5pm on 20 May 2022**To: enquiries@gasgovernance.co.uk*Please note submission of your representation confirms your consent for publication/circulation.*

Representative:	David Mitchell
Organisation:	Scotland Gas Networks Ltd and Southern Gas Networks Ltd
Date of Representation:	18 th May 2022
Support or oppose implementation?	Support
Relevant Objective:	<p>a) Positive</p> <p>c) Positive</p> <p>d) Positive</p>
Relevant Charging Methodology Objective:	Not Applicable

Reason for support/opposition: Please summarise (in one paragraph) the key reason(s)

As the proposer of this modification we support its implementation as it will facilitate the use of 100% hydrogen gas required for the SGN H100 Fife Ofgem Network Innovation Competition Project. The project plans to convert at least 270 existing domestic natural gas customers in Fife to a 100% hydrogen energy source via a new LDZ embedded entry point. This entry point will use the existing industry processes for recording energy usage. This project is critical to providing evidence to support the wider roll out of 100% hydrogen for use in the GB gas network which will assist with the drive to meet governmental targets for meeting carbon net zero in 2045 (Scotland) and 2050 (England & Wales).

This SGN H100 Fife project is timebound and therefore arrangements to facilitate hydrogen will be included in the UNC as transitional text covering the period that the project is operational. The UNC changes introduced by the Modification will be limited to the relevant Supply Meter Points associated with the SGN H100 Fife project and these will be identified as H100FIFSGN using the existing network identifier field in the central systems.

Joint Office of Gas Transporters

One of the main objectives of the H100Fife project is to ensure that the end consumer experience of using 100% Hydrogen is identical to that of using natural gas including the ability to switch gas supplier. SGN is working closely with the CDSP to implement a system solution to adjust end consumer's hydrogen metered volumes to an equivalent natural gas volume. This is as a result of the lower calorific value of hydrogen and hence a higher volume requirement. The solution will ensure that end consumers aren't charged more by their gas supplier for the additional volume of hydrogen consumed compared to the same energy use provided by a natural gas supply.

Implementation: *What lead-time do you wish to see prior to implementation and why?*

As the proposer of the Modification we are suggesting a potential implementation date to support the H100FIFE project target commissioning date in relation to the physical works required to install the new gas distribution network and the provision of the infrastructure to produce hydrogen gas. This is currently forecast to be Q2 / Q3 2023.

An Implementation Date should be triggered as soon as possible after the following points are confirmed: -

1. The relevant Ofgem H100Fife specific project conditions are satisfied.
2. The H100Fife regulatory model is agreed with Ofgem.
3. The HSE provide a letter of assistance to the H100 project in relation to the H100FIFE Project Case for Safety.
4. The relevant Xoserve system requirements detailed in XRN5298 are implemented.

Impacts and Costs: *What analysis, development and ongoing costs would you face?*

There will be Xoserve change costs to implement the change order.

Legal Text: *Are you satisfied that the legal text will deliver the intent of the Solution?*

As legal text proposer we are satisfied that the legal text will facilitate the intent of the proposed solution.

Are there any errors or omissions in this Modification Report that you think should be taken into account? *Include details of any impacts/costs to your organisation that are directly related to this.*

None Identified.

Please provide below any additional analysis or information to support your representation

None Identified.

Representation - Draft Modification Report UNC 0799

UNC arrangements for the H100 Fife project (100% hydrogen)

Responses invited by: 5pm on 20 May 2022

To: enquiries@gasgovernance.co.uk

Please note submission of your representation confirms your consent for publication/circulation.

Representative:	Richard Pomroy
Organisation:	Wales & West Utilities
Date of Representation:	20 th May 2022
Support or oppose implementation?	Support
Relevant Objective:	<p>a) None</p> <p>c) Positive</p> <p>d) None</p> <p>f) Positive</p>
Relevant Charging Methodology Objective:	Not Applicable

Reason for support/opposition: Please summarise (in one paragraph) the key reason(s)

We support this modification as it is a necessary step to demonstrate that gas networks can be repurposed to transport hydrogen and support the UK Governments Net Zero obligations.

It furthers relevant objectives (a) *Efficient and economic operation of the pipe-line system* because it puts in place measure to enable the licensee’s pipeline system to operate efficiently when the system transports both natural gas and hydrogen; (c) *Efficient discharge of the licensee's obligations* because it puts in place arrangements that enable the licensee to discharge its obligations when transporting hydrogen; (d) *Securing of effective competition between Shippers* because it puts in place arrangements that secures that competition will continue when hydrogen is transported; and (f) *Promotion of efficiency in the implementation and administration of the Code* because it makes clear the arrangements that apply in the case where a network chooses to transport hydrogen in accordance with the Gas Act and its licence.

Implementation: *What lead-time do you wish to see prior to implementation and why?*

This modification can be implemented following an Authority direction to do so.

Impacts and Costs: *What analysis, development and ongoing costs would you face?*

None, these arrangements will not impact the WWU network.

Legal Text: *Are you satisfied that the legal text will deliver the intent of the Solution?*

Yes

Are there any errors or omissions in this Modification Report that you think should be taken into account? *Include details of any impacts/costs to your organisation that are directly related to this.*

No

Please provide below any additional analysis or information to support your representation

This modification demonstrates that good preparation and quick responses to questions by the proposer can enable a detailed modification to proceed quickly through a workgroup.