


UNC Workgroup Report	At what stage is this document in the process?
<h1>UNC 0799:</h1> <h2>UNC arrangements for the H100 Fife project (100% hydrogen)</h2>	<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="border: 1px solid #00a651; border-radius: 5px; padding: 5px; display: flex; align-items: center; gap: 5px;"> 01 Modification </div> <div style="border: 1px solid #0072bc; border-radius: 5px; padding: 5px; display: flex; align-items: center; gap: 5px;"> 02 Workgroup Report </div> <div style="border: 1px solid #9933cc; border-radius: 5px; padding: 5px; display: flex; align-items: center; gap: 5px;"> 03 Draft Modification Report </div> <div style="border: 1px solid #ff9900; border-radius: 5px; padding: 5px; display: flex; align-items: center; gap: 5px;"> 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 Workgroup recommends that this Modification should not be subject to Self-Governance. The Panel will consider this Workgroup Report on 21 April 2022. The Panel will consider the recommendations and determine the appropriate next steps.</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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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	16 May 2022
Final Modification Report available for Panel	17 May 2022
Modification Panel decision (<i>at short notice</i>)	19 May 2022

 Any questions?

Contact:
Joint Office of Gas Transporters

 enquiries@gasgovernance.co.uk

 0121 288 2107

Proposer:
Joel Martin – Scotland Gas Networks plc

 joel.martin@sgn.co.uk

 07966 317785

Transporter:
Scotland Gas Networks plc

Systems Provider:
Xoserve

 UKLink@xoserve.com

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 role 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 electrolyzers 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 back up, 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/42754/xrn5298-h100-fife_phase1-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 Fife H100 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 Recommendations

Workgroup's Recommendation to Panel

The Workgroup asks Panel to agree that:

- This Modification should proceed to consultation.