Code Modification Forum Agenda

Wednesday,21 June 2023

Hybrid Meeting at Clayton Hotel/Teams

Time: 10:30

No.	Item	Duration (minutes)	Time
1.	***Review of Minutes from last meeting***	5	10:30 - 10:35
2.	***Review of Action Items from last meeting***	5	10:35 - 10:40
3.	***GNI Scheduled Maintenance Update*** - ***Operational Maintenance*** - ***IT Maintenance/updates***	5	10:40-10:45
4.	***Gas Quality – Proposed Changes Update- UK***	10	10:45- 10:55
4a	***Gas Quality- Proposed Changes Update-Renewable Natural Gas***	5	10.55-11:00
5.	***Code Modification Proposal A111- Amendment to Code of Operations to increase oxygen limit for biomethane entry points on the transmission network***	10	11.00-11:10
6	***Biomethane Update – GNI Presentation***	20	11.10-11.30
7	***Code Modification Proposal A109 -Amendment to Code of Operations to specify the basis of calculation of charge in respect of an adjustment to a metered quantity (Metered Quantity Adjustment). For Mention***	5	11:30-11:35
8.	***Proposed Code Modification Proposal A111- Amendment to Code of Operations to the existing Supplier of Last Resort clauses to update new options on Capacity Products and revised arrangements around Supplier of Last Resort invoicing***	5	11:35 - 11:40
9.	***Status of Code Modification Proposals/Version 5.04 of Code of Operations/ Update on Gas Market Portal***	10	11:40-11.50
10.	***Gas and Electricity Interaction***	5	11:50-11:55
11.	***NGEM Exercises -GNI Presentation Update***	15	11.55-12:10
12.	***Hydrogen Injection Update – GNI Presentation***	35	12:10- -12.45
13.	***AOB Items / Next Meeting***	5	12.45- 12.50

Code Modification Forum

Minutes of Hybrid Meeting at Clayton Hotel– 21 June 2023

The Transporter opened the meeting and referred to the thirteen item Agenda.

1.Standing Items

1.1 Approval of minutes of previous meeting

The Minutes of the meeting of 23rd of April 2023 were discussed with one participant indicating that the draft Minutes did not fully reflect the contribution of one member to the biomethane agenda item. It was decided that the issue would be taken up offline by the GNI secretariat with the potential that the draft minutes may be amended. The CMF Mailing List will be informed of such amendment.

1.2 Review of action items

Action Item C572 and C575 would remain open to 16th of August 2023 meeting.

In relation to Action Item C572 (Transporter to monitor on ongoing basis the adequacy of the initial 25% tolerance for RNG Entry Points) this would continue indefinitely and would be determined once there was a critical mass of these Entry Points. In relation to Action Item C575 (Transporter to furnish required data to the CRU in connection with the tariff review in relation to SPC Settings for CNG Offtakes) the Transporter is presently preparing responses to subsequent CRU queries to the Data Analysis presentation it had made about rolling average SPC setting methodology.

1.3 GNI Scheduled Maintenance Update

The Transporter referred to Slide 5 which detailed that it does not plan to undertake any maintenance activities during the Gas Year 2022/23 which will interfere with gas flows. Any maintenance activities on Transporter infrastructure/equipment relating to the Bellanaboy Entry Point will be coordinated with planned maintenance shutdown by the Corrib Operator which is planned to start on the 15th of July for a four-week period.

1.4 Gas Quality Update

GAS QUALITY – EU/UK

Michael Crowley, Asset Policy & Performance Manager at the Transporter, presented an update on UK Gas Quality developments, referring to Slides 8 to 11.

Mr. Crowley stated that the results of the National Grid 'Network Penetration Analysis' indicated the potential for low WOBBE gas to be delivered to the NSMP terminal for c. 18-days per year due to offshore outages. However, he noted that following further clarification from National Grid there are two other terminals delivering offshore gas to St Fergus and that all three terminals will have a WOBBE > 47.2 MJ/m3. Mr. Crowley indicated that for low WOBBE gas to be present at the St. Fergus terminal there would have to be an outage or some sort of technical issue at the other two terminals. Mr. Crowley stressed that this is difficult to quantify probability, but likely less than 18-days per year. In addition, the NSMP terminal have indicated a lower WOBBE gas of 46.9 MJ/3 – fractionally below the lower limit. St Fergus is unlikely to see gas at lower limit of 46.5 MJ/m3, which will further mitigate the impact at Moffat.

Mr. Crowley also notified the forum that the Transporter has had meetings with EIRGRID on the potential impact of the proposed changes on the powergen sector in ROI. These meetings have resulted in the Transporter detailing the concerns raised by the powergen sector at the Code Modification Forum and presenting EIRGRID with the Health & Safety Executive (HSE) conclusions in relation to the impact of gas quality changes on Great Britain (GB) electricity supplies. Both parties have agreed to meet again in July to discuss how best to coordinate response - if low WOBBE gas does impact ROI electricity supplies. A Shipper Representative stated that the powergen sector was gratified by the Transporters' meetings with EIRGRID and offered the support and engagement of colleagues in the EAI further down the line in this process. The CRU also indicated that there had been engagment with EIRGRID on this topic to understand the potential implications of lower WOBBE gas for Ireland.

Mr. Crowley also presented on the European gas quality standard EN 16726 which is currently being revised, primarily to introduce a WOBBE range at both Entry & Exit (non-binding). He outlined that there is no standard WOBBE rate in the EU and that EN 16726 is currently be revised as the EU wants common gas quality specification. The proposed Entry and Exit range are as follows;

- Proposed Entry range: 46.44 to 54.00 MJ/m^3
- Proposed Exit range: 46.44 to 53.00 MJ/m^3

Although the proposed WOBBE exit range is wide, the expectation is that end-users will see a much smaller variation in practice, to be managed by a WOBBE classification system. If WOBBE range < 3.7 MJ/m3: the customer is classified as "specified", meaning that no further action required. Mr. Crowley outlined that gas appliances should detail to this specification. If WOBBE bandwidth > 3.7 MJ/m3: customer is classified as "exempt", meaning that consideration needs to be given to potential mitigation measures, subject to Cost/Benefit Analysis (CBA). He said that the CBA will probably be carried out by the competent authority, which in the case of Ireland will more than likely be the CRU.

Mr. Crowley concluded the presentation by noting that the Transporter will be proposing a Code Modification with regard to the UK gas quality change, with a target date for submission of the Code

Modification aligning with the National Gas UNC Modification. The specific detail of what part of the Code of Operations intended to be updated is indicated on slide 11.

GAS QUALITY – Renewable Natural Gas

Yvette Jones, Renewable Gas Project Manager at the Transporter, reported that a Code Modification Proposal (A111) to increase the upper limit for oxygen for biomethane injected into the transmission network has been issued along with supporting documentation by the Transporter on the 15th of June 2023. She noted that this modification will allow for oxygen upper limit of 0.5% (current limit is 0.2%) at Biomethane entry points in the transmission network. The supporting documentation circulated included the explanatory memorandum, proposed legal text, Penspen consultancy report and a report analysis summary.

Ms. Jones wanted to acknowledge that the Transporter is open to having one to one conversation with end users about implications arising from this Code Modification. A Shipper Representative felt that this Code Modification did not allow for equal access for all Biomethane producers at different entry points. The Transporter agreed to consider this concern but wanted to outline that it is not a like for like comparison for Biomethane entry at transmission and distribution levels. The CRU emphasised that no change would be completed to the code mode before any necessary changes to GNI's safety case were completed. The CRU highlighted the importance of engaging with the CRU's safety division re this. The Transporter has also outlined that the safety submission is expected in the coming weeks A Shipper Representative has questioned some of the findings of the Penspen report, specifically surrounding Propane and LPG being injected into the network and questioned whether this needs a separate Code Modification. The Transporter did not believe it did.

2 Biomethane Update

Padraig Fleming, Biomethane Commercial Manager at the Transporter, gave an update on Biomethane and the Biomethane for Shrinkage proposal, referring to slides 15 to 23. Mr. Fleming gave a background on overall potential Shrinkage demand and the objectives of the Shrinkage proposal. He also outlined the questions to be considered when developing the Biomethane for Shrinkage contract, the timelines for this proposal and the potential regulatory changes arising from this proposal.

In response to the overall presentation, the CRU noted that the proposal being developed could raise a number of regulatory questions and highlighted the importance of raising them through any resultant Code Modification Proposal. The CRU also noted the forthcoming consultation paper on PC5, which would put forth proposals on biomethane and that feedback would be welcomed through the consultation process. A Shipper representative raised a question as to why Biomethane cannot be procured under the current process on the trading platform. The Transporter believes that the industry is only starting off and wants to have long term securement with partners, but also wanted to note that it has had very early conversation with Marex-Spectron about the potential for

procuring Biomethane for Shrinkage on the trading platform. The Transporter also detailed that there is a need for reverse compression, which challenges were acknowledged by a Shipper Representative, who indicated he would like to see the Transporter open more conversations about reverse compression with National Gas. The CRU noted the PC5 consultation paper again, which discussed such matters as reverse compression. In doing such the CRU highlighted potential for other options to be considered re managing the volume of gas on the network.

3 Code Modification Proposals

3.1. A109 - Proposal to amend Code of Operations to specify basis of calculation of charge in respect of an adjustment to a meter quantity (Meter Quantity Adjustment)

The Transporter reported that the Instruction and accompanying Rationale had issued. Ancillary to this Proposal the CRU had instructed the Transporter to draft and circulate a Monthly Meter Data Cleanse Process Business Rules document. This was circulated on 1st of February 2023. The review period expired on 3rd of March 2023 without Industry comment. The CRU have raised concerns in this document relating to field operation activities, disbursement account arrangements, notifications to shippers, valuation of adjustment quantity and question of referring to process document in the Code of Operations. Regarding the questions referring to process documents the Transporter question whether there was too much internal procedure documentation included and believes that it would be better to show a more high-level document to the Code Modification Forum.

3.1. A111- Proposal to amend Code of Operations to increase the upper limit for oxygen to 0.5% at biomethane entry points on the transmission system

This Code Modification Proposal has issued and been circulated with supporting documentation. It was agreed that the Industry review period would extend to the next Forum meeting on 16th August with written submissions to be received by COB on Friday 11Th August. The Transporter committed to forward all correspondence to the CRU and to present at the meeting slide/s with anonymised synopses of the correspondence

2.2. A112 – Amendment to Code of Operations to the existing Supplier of Last Resort clauses to update new options on Capacity Products and revised arrangements around Last Resort invoicing

Mr. Douglas O'Brien, Gas Point Register Manager at the Transporter, provided a follow up presentation on the new Code Modification Proposal A112 to incorporate in the Code of Operations amendments to the existing Supplier of Last Resort clauses, to update new options on Capacity Products, and to revise arrangements around Supplier of Last Resort invoicing which was first presented at the Code Modification Forum on the 26/04/2023.

Mr. O'Brien notified the forum that the Transporter hopes to issue to the Code Modification by the end of June, allowing feedback from industry in July and then submission to the Code Modification Forum in August 2023. A Shipper Representative believed that the last SOLR cases that have happened to date have had satisfactory outcomes, which the Transporter agreed with commenting that all end users were in the NDM sector which reduced potential difficulties. The CRU stated that this modification will be most relevant to the Retail sector and suggested that the main review arena would be in GMARG with the Code Modification Forum ratifying the outcome of the GMARG review when completing its own review process. The Transporter confirmed that the GMARG Secretariat would be fully briefed on all documentation and submissions and no definitive finalization of the modification would be sought until GMARG confirmed that the matter had been adequately reviewed at this forum. The Transporter acknowledged it was intending to present the SOLR change in process to GMARG on the 22nd of July 2023.

2.3. Status of Code Modification Proposals / Version 5.04 of Code of Operations/ Update on Gas Market Portal

Number	Proposal	Proposer	Status
A099	CNG Supply Point Capacity Setting	GNI	In abeyance
A111	Proposed increase on oxygen limit for biomethane entry points on the transmission network	GNI	Under Review

The Transporter reported that a new version - 5.04 of the Code of Operations was issued on the 8th of June 2023 and is available on the GNI website and on the newly relaunched Gas Market Portal. He stated that the Gas Market Portal is a SharePoint site created by the Transporter which will now be used to exclusively issue Code Modification Forum documents.

3.Other Agenda Items

3.1. Gas and Electricity Interaction

There was no presentation made at this agenda item.

3.2. Update on Emergency Exercises

Paul Crowley, GNI Grid Engineer at the Transporter, presented an update on NEC (GB) - Exercise Everest which will take place on the 3rd/4th/5th of October 2023. Mr. Crowley noted that the NGEM exercise will run simultaneously with NEC exercise and that will use real-time data. He also stated that it was a 'whole of system 'exercise will include the whole system including the UK, RoI and IoM and electricity interaction. GNI wanted to open the door to any potential Shipper involvement in this exercise.

Mr. Crowley also informed the forum that the large gas contacts exercise is scheduled for July and the new GTMS functionality test with gas stakeholders is scheduled for September. A Shipper Representative queried what the functionality text involved and Mr.Crowley stated that this referred to the use of the GNI GTMS system to issue market messages to Industry during an emergency.

Any Other Business

Next Meeting

The next meeting is scheduled to be held virtually on the 16th of August 2023.

Hydrogen Update

Dr. Ali Ekhtiari, Future Networks Engineer at the Transporter presented a Hydrogen update with presentation slides. Dr. Ekhtiari opened the presentation by giving an overview on prosumers and the renewable gas network. He explained green hydrogen and biomethane were coming from

renewable sources. He described the GNI Network Innovation Centre and the ongoing research under the following headings;

- Research and testing
- Hydrogen compatibility, functionality, and operational procedures
- Partnerships and academic input
- Evidence base for Hydrogen Safety Case
- Training Skills and knowledge

Dr Ali then Then referred to development projects with projected timelines;

HyTest Project -2022 – completed. The hydrogen blend testing had yielded positive results where a 20% hydrogen blend showed with a considerable emissions reduction, high CV values and within the Wobbe Index range in the Code of Operations. No leaking was detected during pre-testing or operations for all pipework and ancillary equipment, domestic appliances operated safely, and domestic flow meters were consistently accurate

End User Consideration Project 2023- ongoing. Here they were considering operating scenarios – categorizing end-users in different segments- estimating hydrogen storage capacity in the transmission system, investigating optimum hydrogen injection locations and liaising with GNI Future Networks Team to understand constraints and inform operating scenarios. They were studying scenarios using a natural gas/ biogas/hydrogen (green hydrogen) blend with the criteria of minimizing emissions, maximizing green hydrogen input while meeting end-users energy requirements, minimizing hydrogen gas storage and using the storage to maintain consistent gas quality

Off Grid Dx Network 2024

Us Dx Network to test – unspecified future date

The CRU note that just hydrogen blends had been tested so far but noted the positive results affecting end -users and the optimizing of the gas transportation studies. Dr.Ali answered a number of technical queries and confirmed his readiness to answer industry queries on an ongoing basis

Open CMF actions

ID	Action	Responsibility	Date Raised	Delivery Date
C572	Transporter to monitor the ongoing basis the adequacy of the initial 25% Tolerance for RNG Entry Points	Transporter	27/3/2019	Ongoing
C575	Transporter to furnish required data to CRU in connection with tariff review in relation to Supply Point Capacity Settings	Transporter/ CRU	25/3/2020	Ongoing

5.Calendar of meetings for 2023

CMF Date	Location
14 February 2023 (Wednesday)	Virtual
26 April 2023 (Wednesday)	Ashling Hotel Dublin/Hybrid
21 June 2023 (Wednesday)	Clayton Hotel Cork/ Hybrid
16 August 2023 (Wednesday)	Virtual
18 October 2023 (Wednesday)	Ashling Hotel Dublin /Hybrid
13 December 2023 (Wednesday)	Virtual

7. Attendees

	Name	Representing
1	Kieran Quill	GNI
2	Stephen O'Riordan	GNI
3	Doug O'Brien	GNI
4	Conor Murphy	GNI
5	Ali Ekhtiari	GNI
6	Emerson O'Callaghan	CRU
7	Sean Mac an Bhaird	CRU
8	Keith Deacon	AXPO
9	Martin Regan	Marex
10	Paul Crowley	GNI
11	Bryan Hennessy	Flogas
12	Andrea Ahern	Consultant
13	Padraig Fleming	GNI
14	Michael Crowley	GNI
15	Avian Egan	GNI
16	Paul Hoey	Electric Ireland
17	Kevin Murray (T)	BGE

18	Paul Murphy	ESB
19	William Carr	ESB GT
20	Stephen O'Hare	GMO-NI
21	Andrew Kelly	New Fortress Energy
22	Suzanne Linehan	GNI
23	Mark Phelan	Electric Ireland
24	Theresa Lennon Crean (T)	SSE
25	Michael Murphy (T)	Killowen Biogas
26	Neal Fenton (T)	Nephin
27	Brian McGlinchey(T)	Vermilion Energy
28	Sam Clutterbuck (T)	Ceres Energy
29	Kevin Murray (T)	BGE
30	Peter Colleran (T)	Nephin
31	James White (T)	Energia
32	Henry Molloy (T)	Tynagh

Code Modification Forum

Wednesday, 21 June 2023 at Clayton Hotel, Cork and via Teams

Agenda

1. Review of minutes from last meeting
2. Review of open actions
3. Update on Maintenance Plan
4. Gas Quality – Proposed Changes Update- UK/ Renewable Natural Gas

4a Gas Quality – Proposed Changes Update- Renewable Natural Gas

5. Code Modification Proposal A111- Amendment to Code to increase oxygen limit for biomethane entry points on transmission network
6. Biomethane Update – GNI presentation
7. Code Modification Proposal A109 –Amendment to Code of Operations to specify the basis of calculation of charge in respect of an adjustment to a metered quantity (Metered Quantity Adjustment). For mention
8. Proposed Code Modification Proposal A112- Amendment to Code of Operations to the existing Supplier of Last Resort Clauses, to update new options on Capacity Products and revise arrangements around Supplier of Last Resort invoicing
9. Status of Code Modification Proposals/Version 5.04 of Code of Operations/ Update on Gas Market Portal

10. Gas and Electricity Interaction

11 . NGEM Exercises – GNI Presentation Update

12 . Hydrogen Injection Update – GNI Presentation

13. AOB Items / Next meeting

Gas Networks Ireland

1. Review of minutes from last meeting

- Minutes of CMF meeting of 26 April 2023 were issued on June 2023.

Gas Networks Ireland

2. Review of open actions

ID	Action	Responsibility	Status	Priority
C572	Transporter to monitor on ongoing basis the adequacy of the initial 25% tolerance for RNG Entry Points	Transporter	Open	Medium
C575	Transporter to furnish required data to CRU in connection with the tariff review in relation to SPC Settings for CNG Offtakes	Transporter	Open	High

In relation to C575 the Transporter has made a Data Analysis Presentation to the CRU with a proposed rolling average SPC setting methodology. The Transporter is presently preparing responses to subsequent CRU queries

Gas Networks Ireland

3. 2022/2023 Maintenance Days

GNI DOES NOT PLAN TO UNDERTAKE ANY MAINTENANCE ACTIVITIES DURING THE GAS YEAR 2023 WHICH WILL INTERFERE WITH GAS FLOWS.

ANY MAINTENANCE ACTIVITIES ON GNI INFRASTRUCTURE/EQUIPMENT RELATING TO THE BELLANABOY ENTRY POINT WILL BE CO-ORDINATED WITH PLANNED MAINTENANCE SHUTDOWNS BY THE CORRIB OPERATOR WHICH ARE PLANNED TO STSART ON 17th July FOR A 4 WEEK PERIOD

Gas Networks Ireland

GB Gas Quality Update

Code Modification Forum Update

21st June 2023 update

Overview

- Update on National Gas (NG) discussions about probability of low WOBBE gas at the St Fergus terminal
- Opened a dialogue with EIRGRID to discuss the potential impact of low WOBBE gas on electricity supplies in Republic of Ireland (ROI)
- Update on European gas quality standard EN 16726
- Update on the timeline for proposed Code Modification to realign gas quality in the Code with the Gas Safety Management Regulations (GSMR) specification

Probability of low WOBBE gas at St Fergus

- NG “Network Penetration Analysis”: indicated the potential for low WOBBE gas to be delivered to the NSMP terminal for c. 18-days per year due to offshore outages:
  - Clarified in further discussions with NG that there are 2 x other producer terminals delivering offshore gas into St Fergus
  - NG Expectation is that blended gas from all 3 x terminals will have a WOBBE > 47.2 MJ/m3 (based on historic flows and WOBBE of other 2 x terminals)
- Would require technical issue or outage at other 2 x terminals for the overall blended WOBBE < 47.2 MJ/m3
  - Difficult to quantify probability, but likely less than 18-days per year
- In addition the NSMP terminal have indicated a lower WOBBE gas of 46.9 MJ/3
  - St Fergus is unlikely to see gas at lower limit of 46.5 MJ/m3, which will further mitigate the impact at Moffat

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Opened dialogue with EIRGRID

- GNI has held a number of discussions with EIRGRID on potential impact of the proposed changes on the power sector in ROI
  - GNI has articulated the concerns raised by the power-sector at the Code Modification Forum meetings
  - Taken EIRGRID through the Health & Safety Executive (HSE) conclusions in relation to the impact of gas quality changes on Great Britain (GB) electricity supplies
- Plan to meet again in July to discuss how best to coordinate response - in the event that low WOBBE gas does impact ROI electricity supplies

European gas quality standard EN 16726

- Currently being revised, primarily to introduce a WOBBE range:
  - Currently proposing a wide WOBBE range at both Entry & Exit (non-binding):
    - Proposed Entry range: 46.44 to 54.00 MJ/m^3
    - Proposed Exit range: 46.44 to to 53.00 MJ/m^3
  - Although proposed WOBBE exit range is wide, expectation is that end-user will see a much smaller variation in practice, to be managed by a WOBBE classification system:
    - Based on annual variation in WOBBE range or the “WOBBE bandwidth”
    - If WOBBE bandwidth < 3.7 MJ/m3: customer is class “specified” – no further action required
    - If WOBBE bandwidth > 3.7 MJ/m3: customer is class “exempt” – consideration needs to be given to potential mitigation measures, subject to Cost/Benefit Analysis (CBA)
- Revision of EN 16726 is expected to be completed in 2025
  - Should Entry & Exit specification in Code be realigned now, or wait until 2025?

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Timeline for Code Modification

- Target date for submission of the Code Modification to realign with the GSMR gas quality specification is still Sep-23 (will submit earlier if possible), with scope:
  - Appendix No.1 of Part G of Code (Entry Specification)
    - Reduce lower WOBBE limit from 47.2 to 46.5 MJ/m3
    - Replace Incomplete Combustion Factor (ICF) and Soot Index (SI) with a Relative Density (RD) < 0.7
  - Appendix No.2 of Part G of Code (Exit Specification)
    - Currently WOBBE range at the Exit is wider than that in Entry specification
      - Not possible for WOBBE to materially increase as gas passes through the system
    - *Should Exit specification be realigned now or wait until 2025 for revision of EN 16726?*

Gas Networks Ireland

4a Gas Quality – Renewable Natural Gas

Gas Quality – Renewable Natural Gas

Oxygen Code Modification

- Code Modidication Proposal A111 has issued and been circulated with supporting documentation

- This Modification will allow for oxygen upper limit of 0.5% (current limit is 0.2%) at Biomethane entry points in the transmission network

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5. Code Modification Proposal A111- Amendment to Code of Operations to increase oxygen limit for biomethane entry points on the transmission network

Issued and circulated on 15 June 2023

Documents issued with Code Modification Proposal

- Explanatory Memorandum
- Proposed Legal Text
- Penspen Report
- Report Analysis Summary

6. Biomethane/Shrinkage Code Mod Forum Update

Padraig Fleming

21 June 2023

Shrinkage

- Shrinkage Background
- Shrinkage Proposal outline
- Discussion

Shrinkage Demand

KWh per annum	Gas Year 22/23	Gas Year 23/24	Gas Year 24/25	Gas Year 25/26	Gas Year 26/27
Own Use Gas in AGI's	74,548,932	74,354,434	75,288,307	71,375,506	71,154,862
Distribution Shrinkage	161,026,393	165,591,625	165,427,900	165,397,930	166,062,135
Transmission UAG	217,434,384	236,582,290	232,709,313	220,615,200	219,933,210
Subtotal Exc. Compression	**453,009,709**	**476,528,349**	**473,425,520**	**457,388,636**	**457,150,207**
Compressor Stations	533,606,399	613,704,454	618,201,314	585,341,344	587,487,644
TOTAL Shrinkage	986,616,107	1,090,232,803	1,091,626,834	1,042,729,980	1,044,637,851

Volumes

- Currently circa. 450GWh – excluding Compressor Stations.
- Future requirements – under review

Cost

- 2021 total cost €60m
- 2022 total cost (forecast) €90m (shrinkage costs are based on spot prices on the wholesale gas market, no hedging) = **10.24 c/KWh**

Shrinkage Objectives

1. Decarbonise shrinkage gas or own-use gas
2. Stimulate biomethane market and act as a demand activation measure
3. Encourage gas shippers and biomethane suppliers & producers to engage with each other
4. Encourage the next tranche of biomethane producers to start projects in anticipation of tender (additionality)
5. Publish a gas purchase agreement that will help the market to develop
6. Provide an opportunity for Gas Networks Ireland to show leadership in a meaningful way in support of its strategy
7. Prompt policymakers to support producers

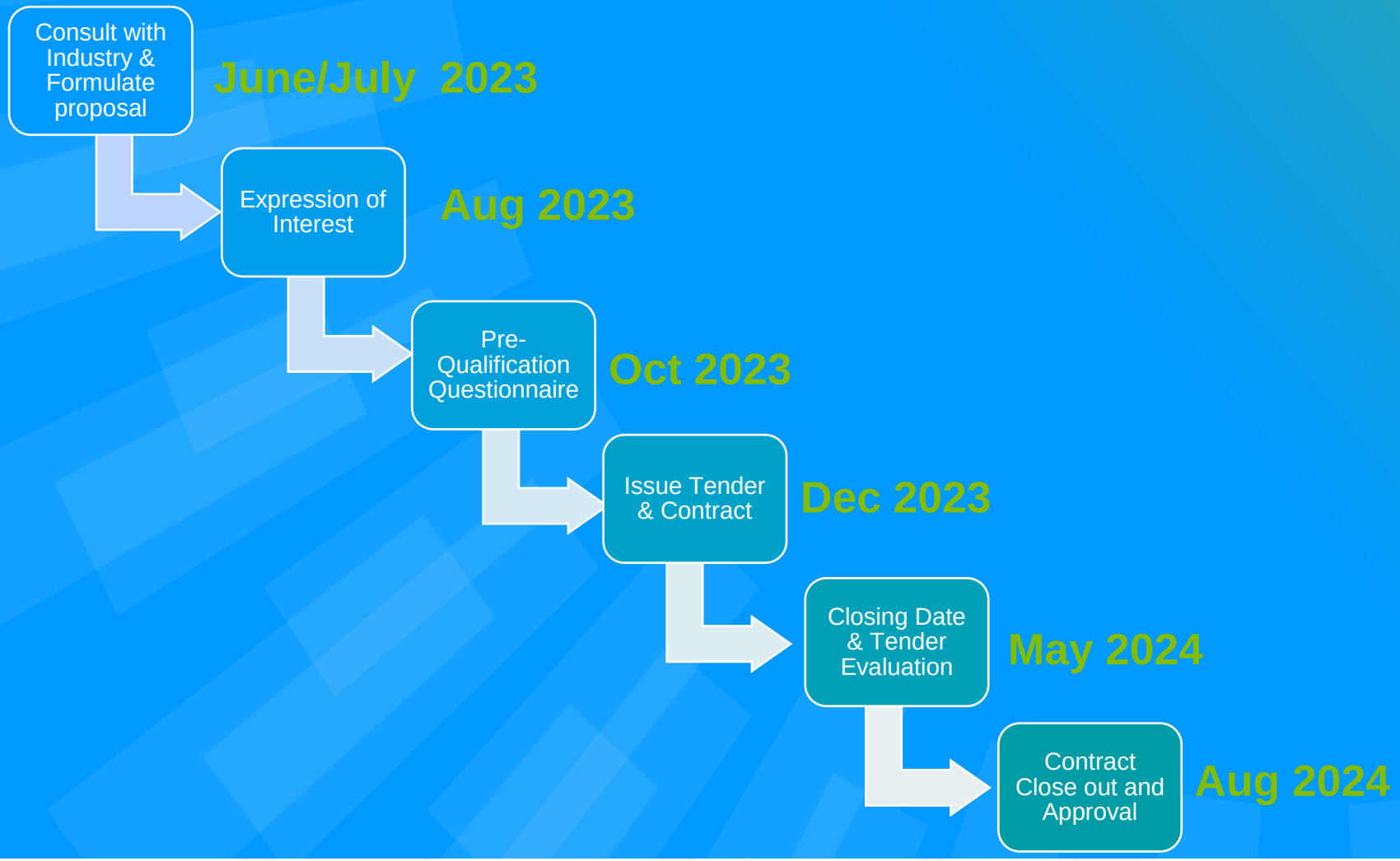
Shrinkage Proposal

Gas Networks Ireland

Shrinkage Contract Proposal Questions to be considered

1. Duration – up to 15 years – starting date
2. Volume between (20% to 40%)
3. Keep tender process open to allow time for planning (within reason)
4. Producer Additionality?
5. GNI owns Green Certs
    a) must be renewable
    b) must have certification process complete
    c) supports pass through?
6. Contract with Shipper (producers may become shippers)
7. Scoring design questions
    a. Broad or narrow type of plant – Operations/Biodiversity/Digestate Use?
    b. Restricted planning requirements – Full Planning permission?
    c. Preferred connectivity/delivery?
    d. Financial capability?
    e. Timelines – Gov. target 2025 & 2030.
8. Hydrogen – demonstration project

Timelines


Consult with Industry & Formulate proposal
June/July 2023
Expression of Interest
Aug 2023
Pre-Qualification Questionnaire
Oct 2023
Issue Tender & Contract
Dec 2023
Closing Date & Tender Evaluation
May 2024
Contract Close out and Approval
Aug 2024

Regulation: Proposed changes and next steps...

The **Code of Operations** will need to be updated to reflect any new means of purchasing shrinkage gas.

- This will need to meet the **approval of the CRU** and will require some level of buy-in from **gas shippers** to ensure that these measures pass quickly though the Code Modification Process.

The following approach is thus proposed;

- GNI Regulatory Affairs and Business Development representatives to **meet with the CRU** bilaterally to provide a high-level overview of the proposal;
- Develop a detailed paper outlining the regulatory basis for the proposed updates together with a comprehensive overview of the proposal, including volumes, terms of procurement, its benefits and impacts on gas tariffs;
- Present high-level overview of proposal to gas shippers at the **Code Mod Forum**; and
- Initiate Code Modification Proposal and progress through the Code Modification Process, culminating in CRU instruction to update the Code of Operations to facilitate purchase of Biomethane for shrinkage gas purposes.

Thank you

Gas Networks Ireland

7. Code Modification Proposal A109

Instruction and Rationale issued

Draft Ancillary document – GNI Monthly Meter Data Cleanse Process circulated for Industry review on 1 February

Queries on document from CRU relate to:

- **Field Operation Activities**
- **Disbursement Account arrangements**
- **Notifications to Shippers**
- **Valuation of Adjustment Quantity**
- **Question of referring to Process Document in the Code of Operations**

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8. Proposed Code Modification Proposal A111

- Amendment to Code of Operations to the existing Supplier of Last Resort clauses to update new options on Capacity Products and revised arrangements around Supplier of Last Resort invoicing.

Code Modification A111 – Supplier of Last Resort

Amendment to the Code of Operations to the existing Supplier of Last Resort clauses to update new options on Capacity Products and revised arrangements around Supplier of Last Resort invoicing.

In 2022 GNI actioned 2 SoLR events, both events to date were NDM only. Now need to make changes to the Code of Operations to address SoLR for Suppliers to the 250 DM & LDM sites.

GNI is proposing a number of changes that will simplify the arrangements and utilise the existing GTMS systems with minimal changes to bookings and invoicing

A draft SoLR Procedure was shared with GMARG April 2023. Separate sections within to address NDM/DM/LDM as each category has unique characteristics and details

- How the SoLR transfer is effected
- How billing is done
- Some technical details (LDM/GTMS/Entry Cap)
- Intended to explain to industry how an SoLR event is managed operationally

The CRU (in discussions with BGE and GNI) has drafted an SoLR procedure which will form the basis for the final Code Mod SoLR procedure

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Code Modification A111 – Supplier of Last Resort

GNI's suggested changes;-

- New capacity arrangements month of SoLR event/rest of event
- Revised billing arrangements month of SoLR event/rest of event
- Allow SoLR to use short-term capacity arrangements from 2nd month of event
- Allow SoLR to transfer sites to their main portfolio from 2nd month of event
- The final SoLR procedure will be included as an annex to the Code of Operations and will not be finalised until all SoLR Code Modifications are approved at Code Mod.
- Primary approval body for the proposed SoLR Procedures is the Code Modification Forum (GMARG will be kept informed)

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9. Status of Code Modification Proposals / Version 5.04 of Code of Operations

Number	Title of Proposal	Proposer	Status
A099	CNG Supply Point Capacity Setting	GNI	In abeyance
A111	Proposed increase on oxygen limit for biomethane entry points on the transmission network	GNI	Under review

Gas Networks Ireland

Gas Market Portal

Portal is now live

- All wholesale market documentation will now be shared through the Gas market portal.
- The portal contains a consolidated version of the code of operations along with all relevant documentation from CMF meetings and individual Code Modifications.
- Due to the cyber security reasons individual users and domains had to be whitelisted.
- If you have any issues accessing the Gas Market Portal please contact Conor at conor.murphy1@gasnetworks.ie.

10. Gas and Electricity Interaction

11. Security of Supply (SoS) / NGEM Update

June 2023

12. Hydrogen Injection Update

Admissible Hydrogen and End Users' Consideration

Dr. Ali Ekhtiari
Future Network Engineer - Lead Researcher

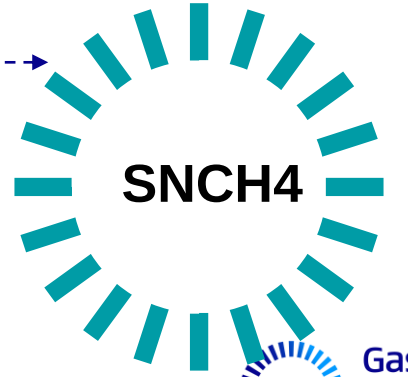
Prosumers and Renewable Gas Network

Sewage sludge, animal waste, vegetables, houshold biowaste

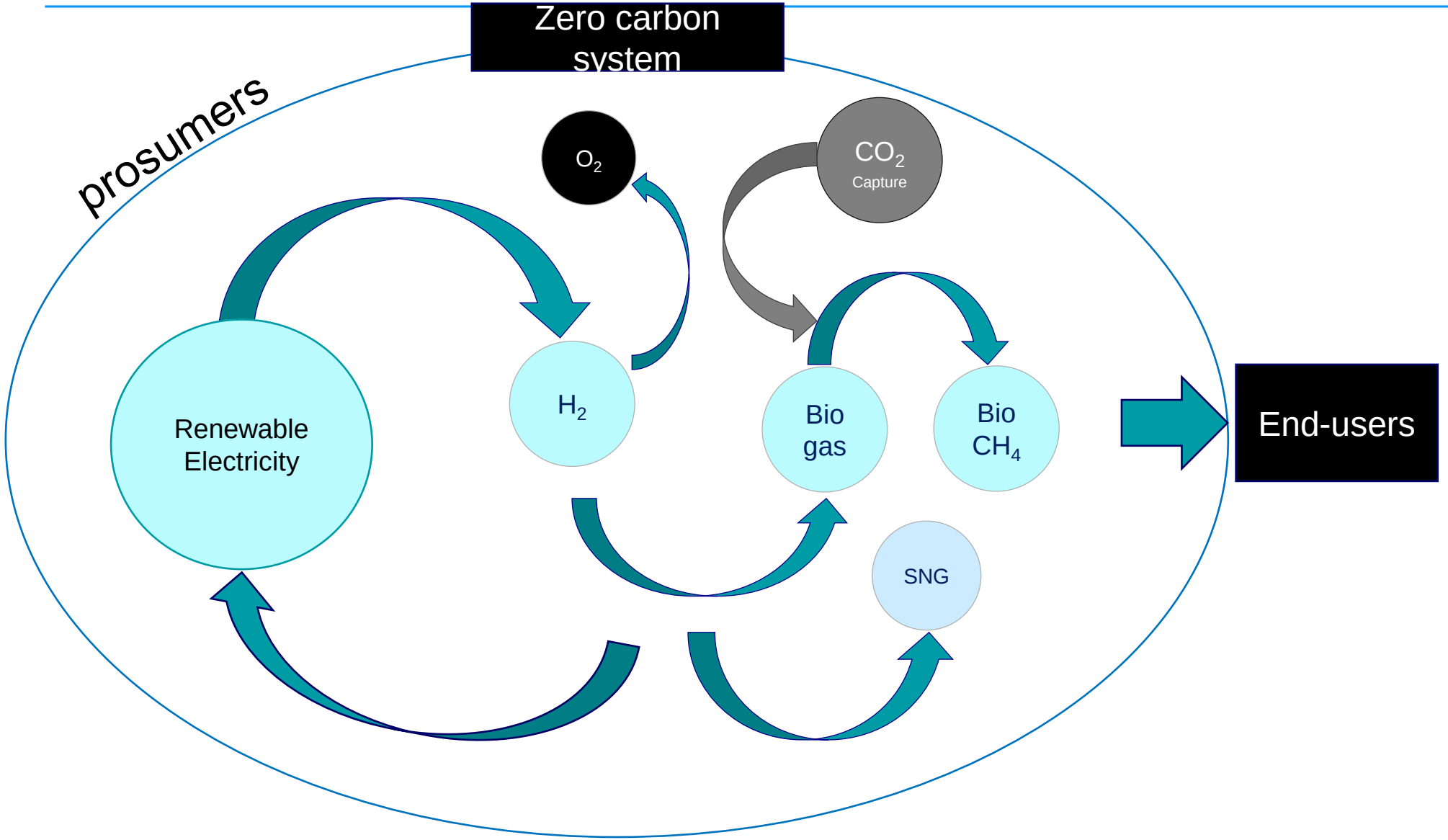
Upgrading to Biomethane by removing CO2

Converting renewable electricity to green gas using Power-to-Gas (P2G) system - electrolysers

Methanation system to generate synthetic gas (SNG)



Prosumers and Renewable Gas Network



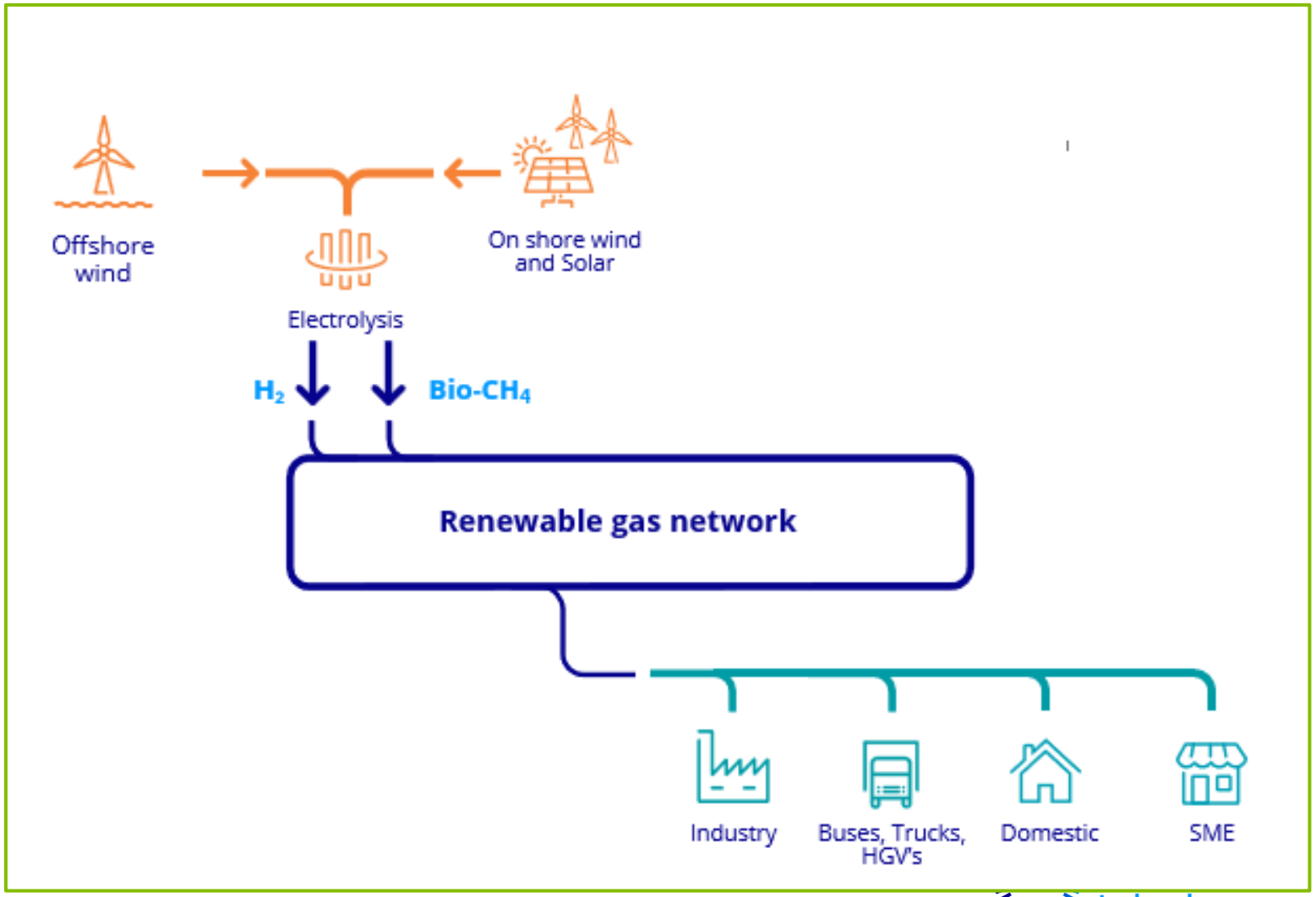
Green Hydrogen

Green **Hydrogen** and **Biomethane** are coming from renewable sources and will be transported into the gas network.

Key Questions?

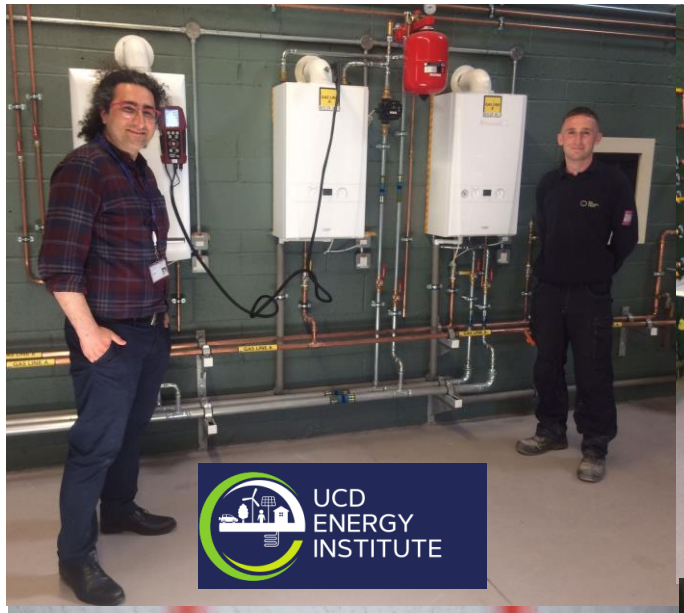
1. What are the end-users' equipment limitations?

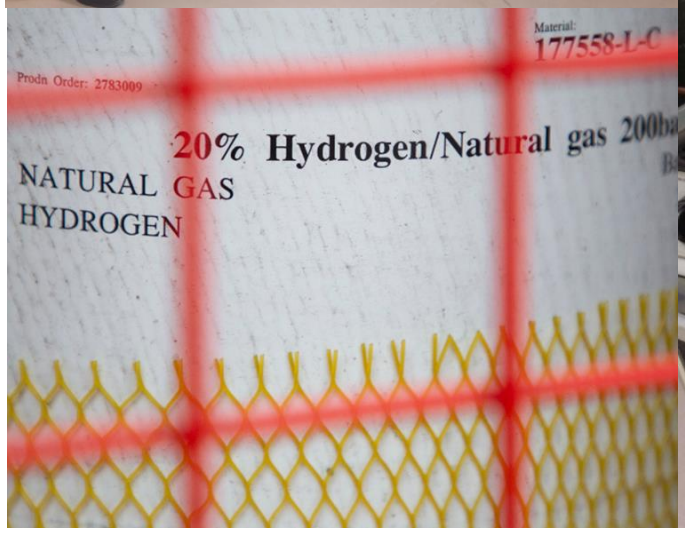
2. How to adapt the gas network to have admissible hydrogen?



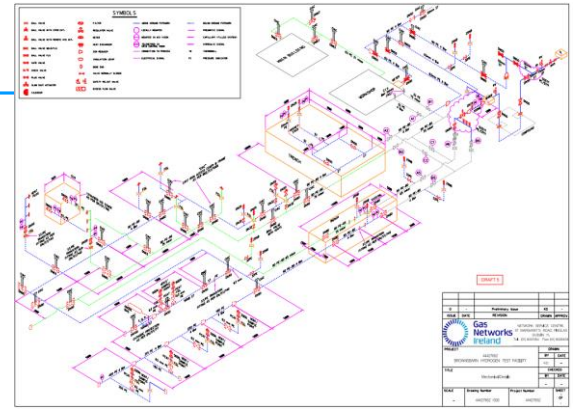
Network Innovation Centre

- Research and testing
- Hydrogen compatibility, functionality and operational procedures
- Partnerships and academic input
- Evidence base for Hydrogen Safety Case
- Training, skills and knowledge





Network Innovation Centre



Gas Network Innovation

2022

- **HyTest Project**
  (GNI/UCD).Test Hydrogen Blends on Domestic Appliances.
- **Facility Refurbishment Project**
- **End User Considerations Project:**
  Begin project

2023

- **End User Considerations Project:**
  Report Due Q4:2023
- **Off Grid Dx Network**
  Build Off Grid Distribution Network Assets with up to 20% Blend

Facility Enhancements

2024

- **Off Grid Dx Network**

Use Dx Network to test:
- -20% blend
- -Dx Materials
- -Network Innovation Materials

Work Packages in conjunction to UCD

- **Operational Procedures** Opportunity to review

Future

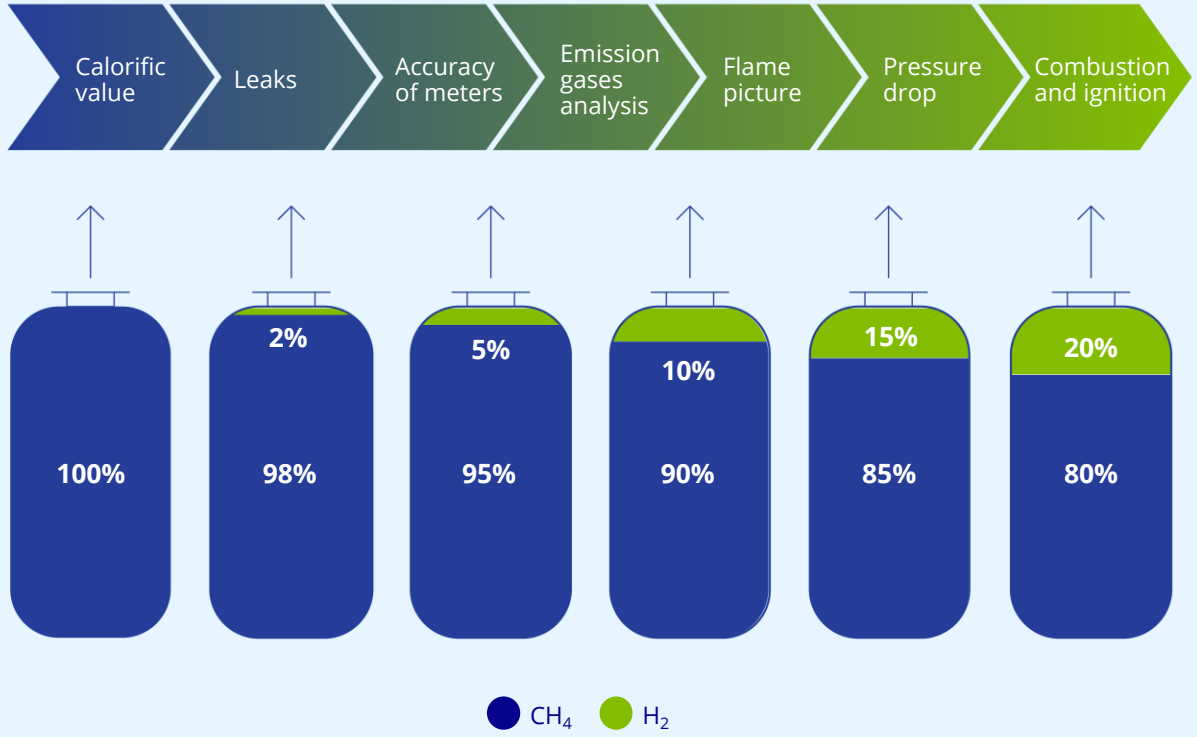
Use Dx Network to test
- -Hydrogen, Biomethane & NG Blend
- -100% Hydrogen
- -Network Innovation Materials

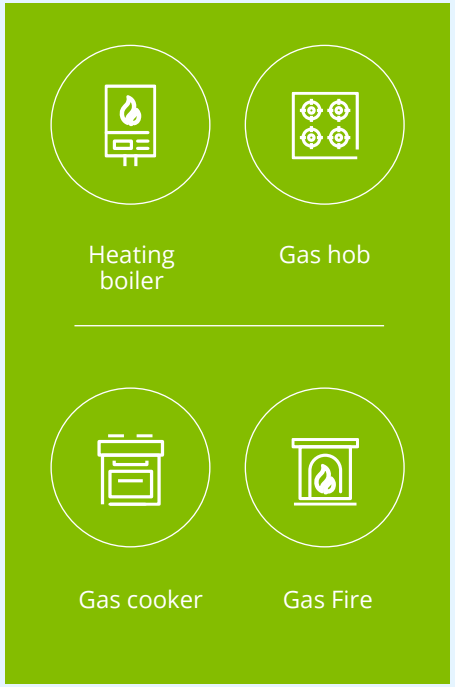
Hydrogen Development

Gas Networks Ireland

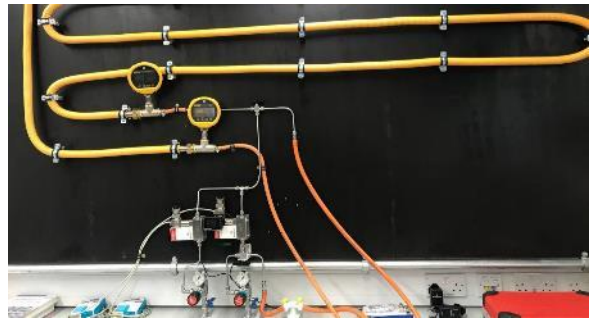
Phase #1 - HyTest Project

Hydrogen blend testing





Hydrogen Hub



UCD

Preparing for the Future: Hydrogen Blend Testing

Natural gas

2%

5%

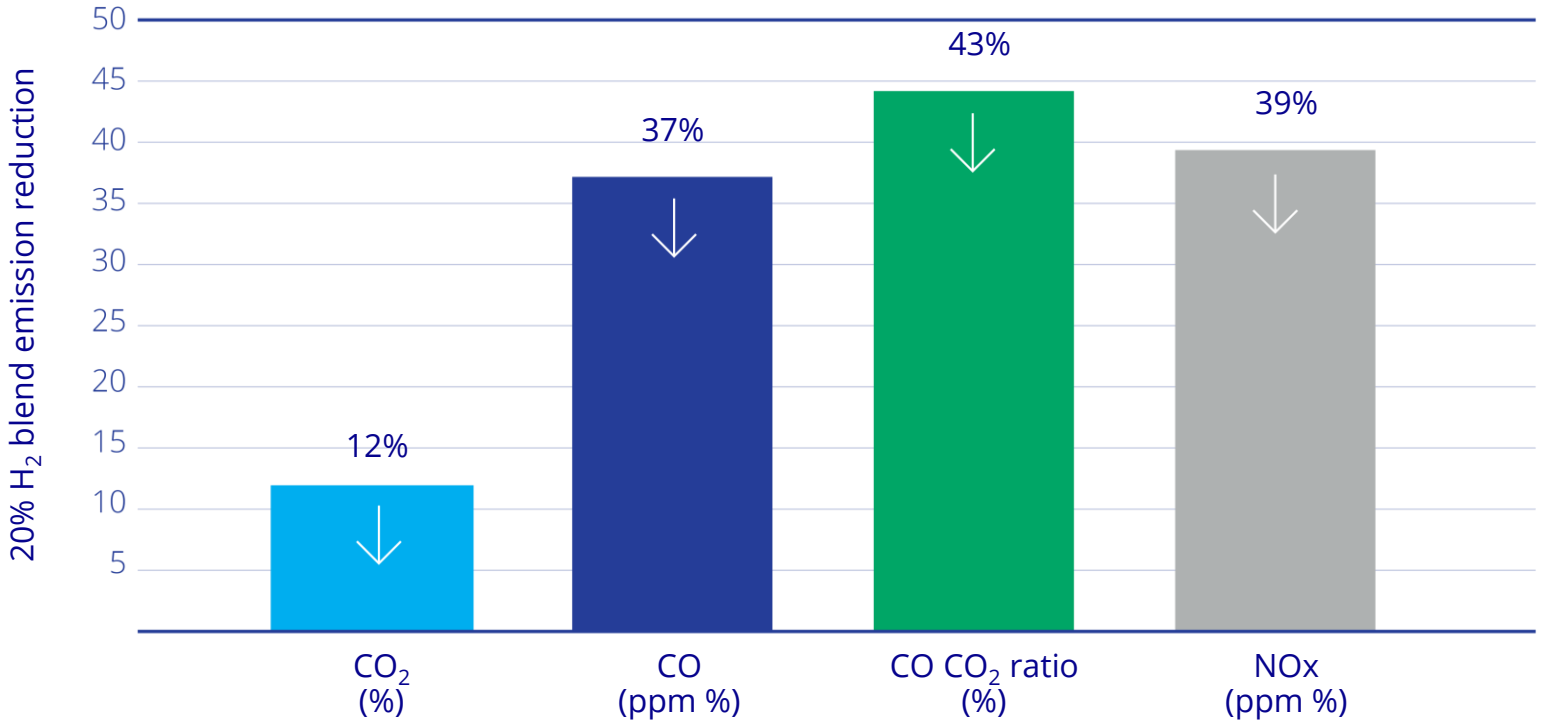
10%

15%

20%

Emissions Reduction

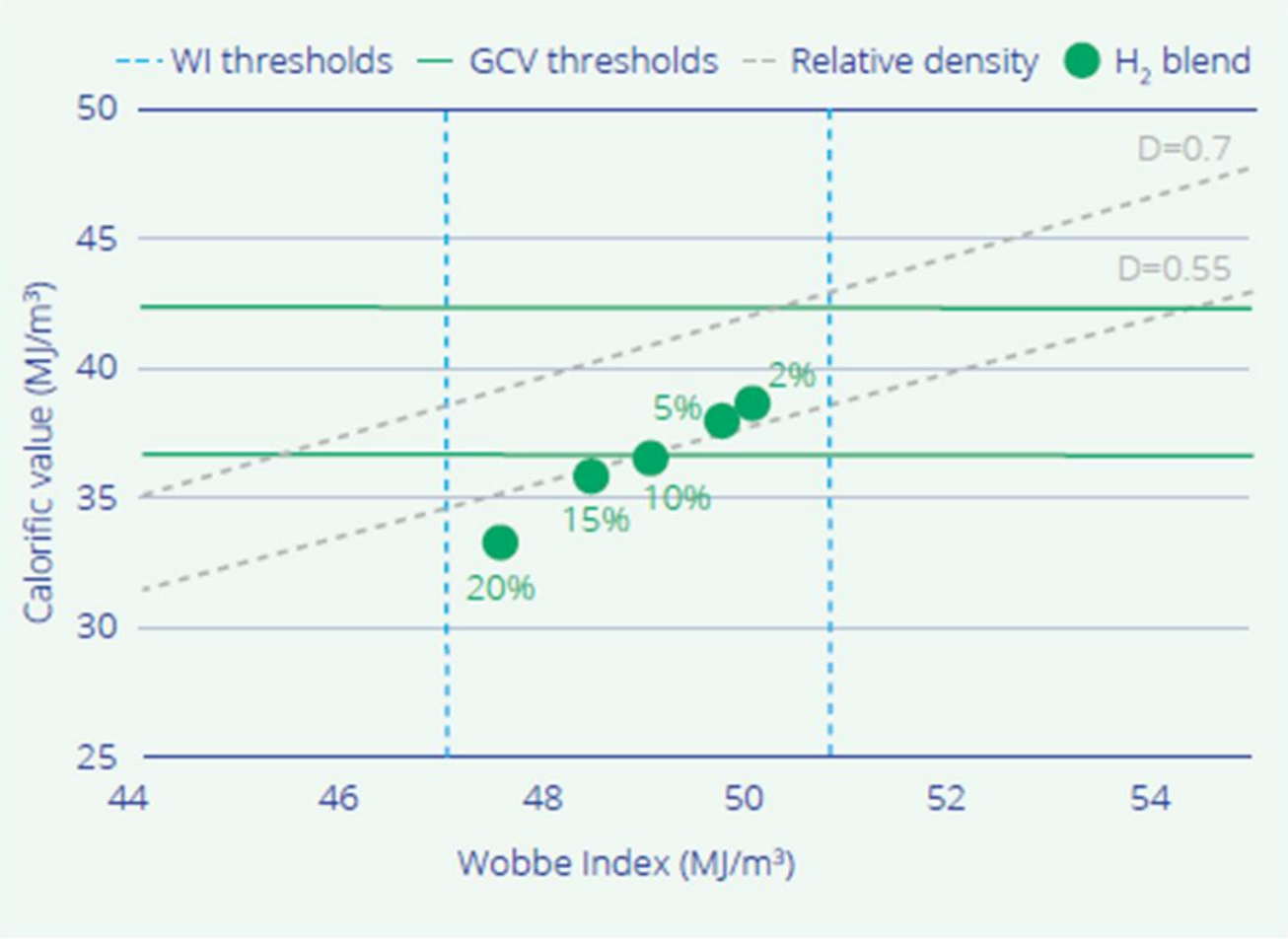
Average percentage reduction in emissions measured for the boilers at max. load setting tested with 20% hydrogen blend.



Average **percentage reduction** in emissions measured for the boilers tested with a 20% hydrogen blend with natural gas for domestic boilers running at maximum load settings.

- **Carbon Dioxide - 12%**
- **Carbon Monoxide - 37%**
- **Nitrogen Oxides - 39%**

Wobbe Index and Calorific Value



Wobbe Index and Calorific Value

- The Wobbe Index is an indicator of the interchangeability of fuel gases between gas burners.
- Blends of natural gas and hydrogen within the Wobbe Index range of the Code of Operation
- Gas appliances operated safely and effectively with hydrogen blends tested
- Blends of 10% hydrogen and greater have a Caloric Value (CV) below 36.9 MJ/m3

Publication of HyTest report

- Domestic gas appliances tested operated safely and effectively with various hydrogen blends ranging from **2% to 20%** hydrogen by volume.
- Substantial **emissions reduction** obtained by blending hydrogen with natural gas.
- **No leakage** was detected during pre-testing or operations for all pipework, connections, fittings, and valves at operating pressure.
- The domestic gas flow meter was consistently accurate when measuring gas volume flows containing **up to 20%** hydrogen compared to natural gas.

The Phase#1 Report

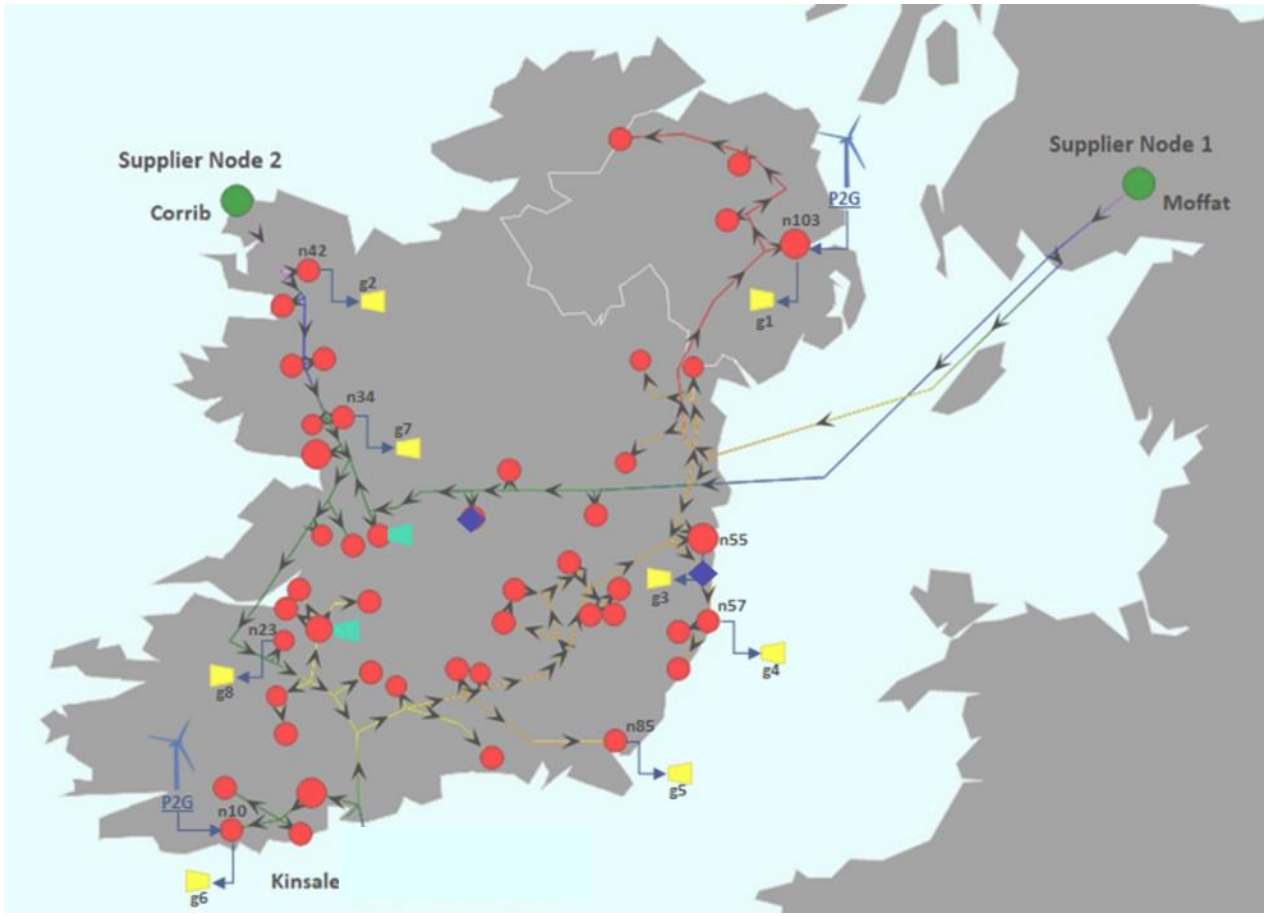
H2IRL HYDROGEN IRELAND CONFERENCE 2022
HYDROGEN: SECURING IRELAND'S GREEN ENERGY FUTURE

Phase #2 - End-Users' Consideration

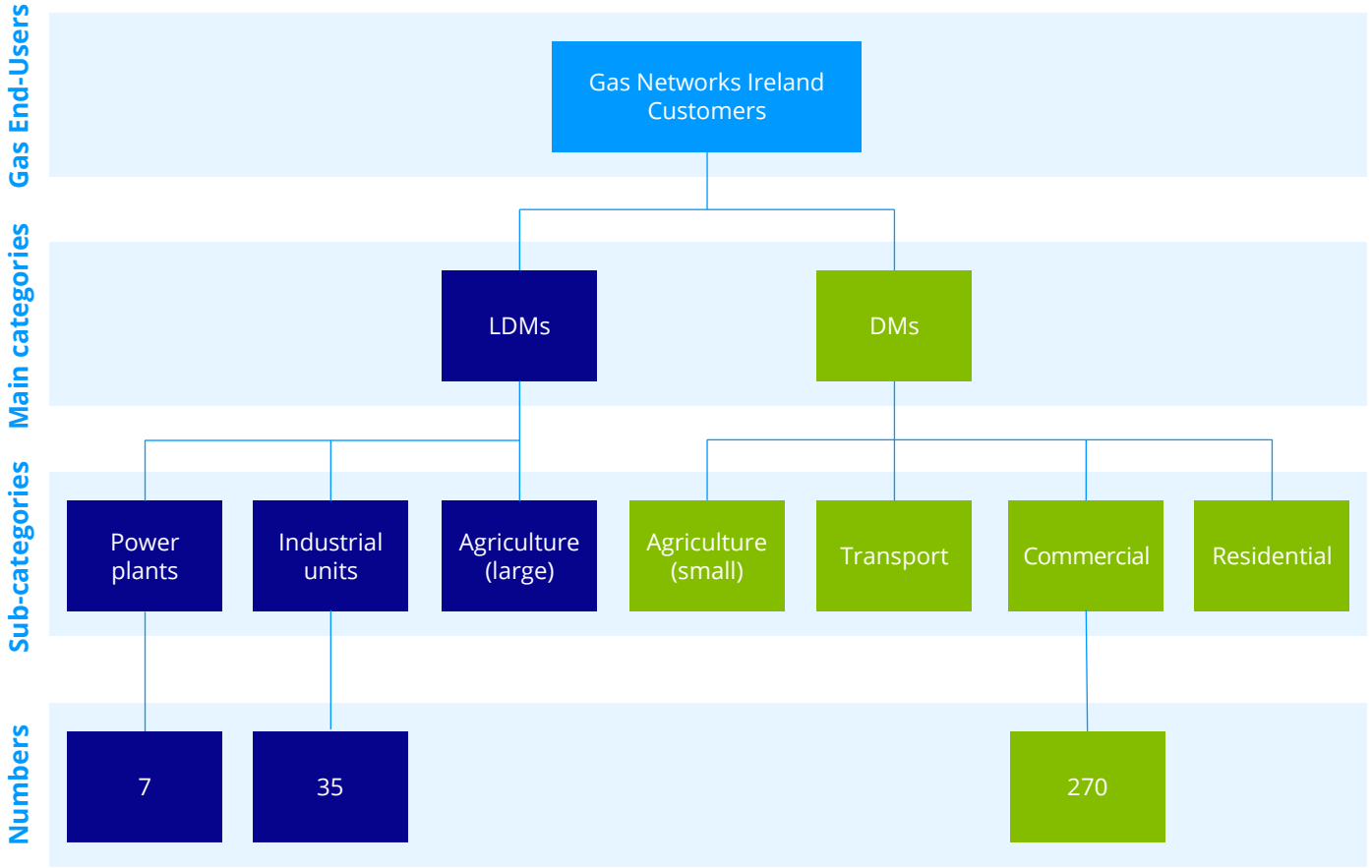
Operating Scenarios

End-use limits considerations

- Categorise, filter and cluster of Ireland's end-users in different segments
- Estimation of a Hydrogen Storage capacity in the gas transmission system
- Investigating the optimum locations to inject Hydrogen in Irish gas network
- Working closely with our Future Networks Team to understand constraints and inform potential operating scenarios



Mapping end-users' limits

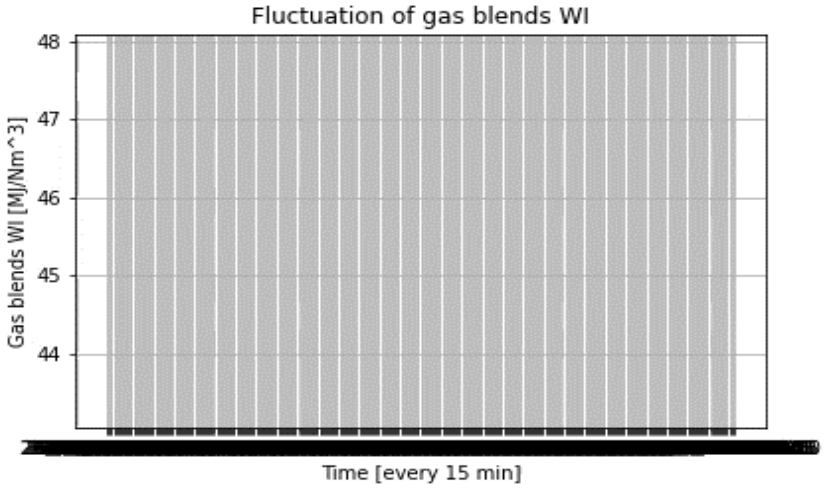


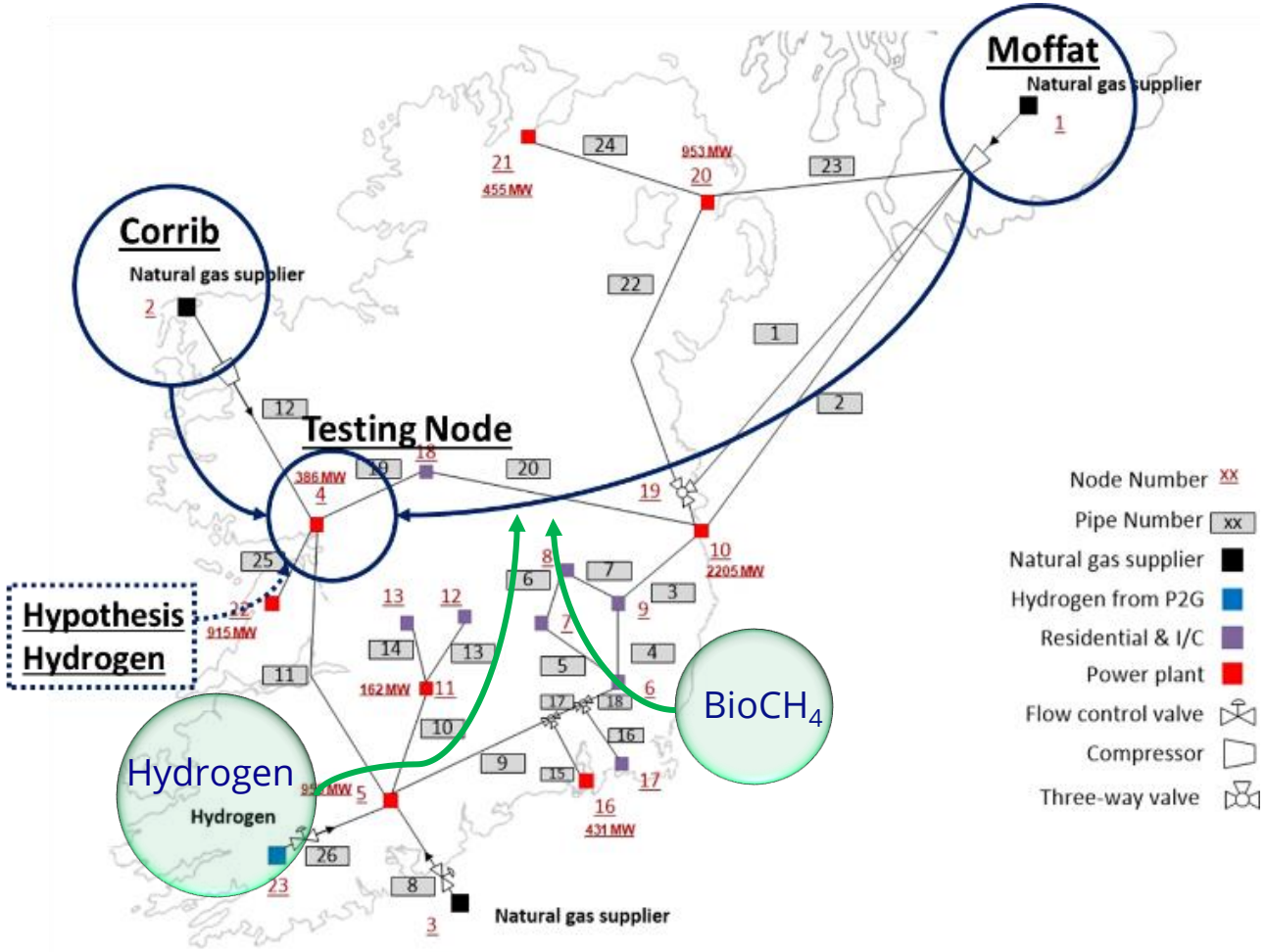
End-user adaptability

CV | WI

Optimising the H_2+$BiCH_4$+NG blends by:

1. Minimise the emissions;
2. Maximising green hydrogen input while meeting the energy needs of end-users;
3. Minimising the hydrogen gas storage;
4. Using hydrogen storage to maintain consistent gas quality.





13. AOB / Next Meeting

Next Meeting

- Next Meeting scheduled for 16 August 2023- Virtual Meeting

Code Modification Forum Meetings in 2023

Next Meeting

CMF Dates 2022	Location
15 February 2023 (Wednesday)	Teams Meeting
26th April 2023 (Wednesday)	Dublin (hybrid)
21st June 2023 (Wednesday)	Cork (hybrid)
16th August 2023 (Wednesday)	Teams Meeting
18th October 2023 (Wednesday)	Dublin (hybrid)
13th December 2023 (Wednesday)	Teams Meeting

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Thank you for your participation