Code Modification Forum Agenda

Wednesday,26 April 2023

Hybrid Meeting at Ashling 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***	10	10.55-11:05
5	***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***	10	11:05-11:15
6.	***Status of Code Modification Proposals/Version 5.04 of Code of Operations***	5	11:15 - 11:20
7.	***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***	10	11:20-11:30
8.	***Gas and Electricity Interaction***	5	11:30-11:35
9.	***NGEM Exercises -GNI Presentation Update***	5	11:35-11:40
10.	***Code Modification Improvements***	10	11:40 -11:50
11.	***AOB Items / Next Meeting***	10	11.50- 12.00
12	***GNI Presentation – Biomethane Update***	60	12.00- 13.00

Code Modification Forum

Minutes of Hybrid Meeting at Ashling Hotel– 26 April 2023

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

1.Standing Items

1.1 Approval of minutes of previous meeting

The Minutes of the meeting of 15 February 2023 were approved

1.2 Review of action items

Action Item C572 and C575 would remain open up to 21 June 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 referred to the Data Analysis Presentation it had made to the CRU with a proposed rolling average SPC setting methodology. The Transporter is presently preparing responses to subsequent CRU queries.

The CRU stated that while it had not decided on its attitude to this proposal it required further data supporting a rationale as to why CNG stations should get the benefit of a less onerous 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 shutdowns by the Corrib Operator.

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 7 and 8.

He reported that the HSE has recommended proceeding with proposed changes to Great Britain(GB) gas quality based on the proposals set out in their gas quality consultation, namely;

- To reduce the lower WOBBE limit from 47.2 to 46.5 MJ/m3
- To increase the Oxygen (O2) content from 0.2 to 1.0% for system pressures< 39 bar-g
- To replace the Incomplete Combustion Factor (ICF) and Sooting Index (SI) with a Relative Density (RD) limit<0.7

The HSE has proposed a 2-year implementation period for reducing the lower WOBBE limit to allow the Market and power generators time to prepare for the change. On 6 April National Gas (NG) replaced ICF and SI with a RD limit <0.7. GNI consider that this change is a technical simplification rather than a significant change and it will be included in the upcoming proposed Code Modification Proposal in relation to the lower WOBBE limit change, the alignment of Entry and Exit Wobbe limits and the possible requirement to reduce the lower Gross Calorific Value (GCV). The change in the lower WOBBE limit would not take effect until 6 April 2025, aligning with GB.

Referring to the HSE proposal to increase the Oxygen limit, Mr. Crowley pointed out that as this was only applicable to system pressures <38 bar it was not relevant to the Republic of Ireland (ROI) as the ROI only takes gas from the higher pressure 85-bar system at Moffat. GNI will continue to engage with NG to assist ROI market participants to prepare for the proposed changes including potential enhancement to systems to provide advance warning of low WOBBE gas flows and would be engaging with NG when launching their enabling Unified Code Modification

In relation to the expected physical effect of the proposed change on the Irish system after 6 April 2025, Mr. Crowley pointed out that that at present some low WOBBE gas is currently delivered to the St Fergus Terminal in Scotland which supplies Moffat. This gas is blended with gas from adjacent fields and terminals to ensure it meets the current GSMR specification. Under the new regime NG expect this situation to continue during normal operation, however, if there is an outage on adjacent fields/terminals in the future, then low WOBBE gas might enter the National Grid system at St.Fergus with consequent penetration to Moffat. NG have indicated that this might occur on approximately 18 days a year during the period 2025-2027.

GAS QUALITY – Renewable Natural Gas

Yvette Jones, Renewable Gas Project Manager at the Transporter, reported that a Code Modification Proposal to increase the upper limit for oxygen for biomethane injected into the transmission network has been drafted and would be circulated in April with a consultant's report on the issue which is due to be received by the Transporter.

She reported that notwithstanding studies indicating that a 1% oxygen limit would not result in negative impacts (if managed correctly) it was decided to propose a maximum content of 0.5% and would require that a transmission biomethane injection facility wishing to avail of this limit to provide analysis impacts data to GNI. She referred to the four studies;

and gave a summary of the specific analysis protocols and outcomes of each study. The next step was the finalization and summarization of each report and the issue of the Code Modification Proposal.

An Industry Representative referred to an ongoing failure to observe indicated progress timelines stating that the Transporter's engagement with and development of the biomethane industry was unreasonably slow. He stated that a single upper oxygen limit should apply for both the transmission and distribution systems noting that there was an upper oxygen limit of 1% already in place for the distribution system and that it was accepted that a 1% limit was feasible at transmission entry point. He queried whether there was a specific Safety Case reason for this differentiation.

He drew he meeting's attention to obligations in law which the representative stated required producers of biogas be granted non-discriminatory access to the gas system (Distribution and Transmission). In addition, he pointed to this requirement to facilitate access for RNG and the requirement to remove barriers that could prevent that access. He further noted that Code Mod A091 set an oxygen limit of < -1%mol for renewable gas entry points to the distribution system and that the information provided by GNI prior to the meeting stated that an oxygen limit of 1% in relation to the transmission system would not result in negative impacts. In this context the Industry Representative stated that their position continued to be that a single upper oxygen limit should apply to all RNG Entry Points.

Separately the Industry Representative expressed their disappointment that the studies undertaken by GNI in relation to the proposed injection of Biomethane at the Mitchelstown CGI had not also been undertaken in respect of the existing RNG Facility at Portlaw in particular when RNG was being produced in Portlaw and the application to connect Portlaw had been made in August 2012, prior to the commencement by GNI of the CGI proposed for Mitchelstown. He also requested an update on the Safety Case for the Mitchelstown CGI.

Ms. Jones responded that the Transmission and Distribution systems had different characteristics, that a number of studies and report documents made up the Safety Case submission and GNI had taken a prudent decision to propose a 0.5% limit.

2 Code Modification Proposals

2.1. 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 1 February. The review period expired on 3 March without Industry comment. It was expected that the finalized document would be agreed with the CRU in the near future.

2.2. 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 Last Resort invoicing

Mr. Douglas O'Brien, Gas Point Register Manager at GNI, introduced a proposed new Code Modification Proposal A111 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.

Mr. O'Brien indicated that these proposed changes were prompted by two recent SoLR events which fortunately only affected NDM sites but raised questions about the arrangements for the over 250 DM and LDM sites which have the benefit of capacity booking products not envisaged when the existing SoLR provisions were incorporated in the Code of Operations. The proposed changes involve;

- New capacity arrangements during the month of the SoLR event and subsequently
- Revised billing arrangements during the month of the SoLR event and subsequently
- Proposed to allow SoLR to use short -term capacity arrangements from second month of event
- Proposed to allow SoLR to transfer sites to their main portfolio from second month of event
- Primary approval body for the proposed SoLR is the Code Modification Forum (GMARG will be kept informed)

The Code Modification Proposal, which will be given the number A111 is expected to issue before the next Forum Meeting in June

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

Number	Proposal	Proposer	Status
A099	CNG Supply Point Capacity Setting	GNI	In abeyance
A111	Amendment to SoLR provisions in the Code of Operations	GNI	Proposed new Code Modification Proposal to issue

A new version - 5.04- of the Code of Operations will issue in the near future

3.Other Agenda Items

3.1. Gas and Electricity Interaction

There was no presentation made at this agenda item

3.2. NGEM Update- Report on Exercise Dara

Aidan Bugler, GNI Network Operations Emergency Manager at GNI, presented an update on **Exercise Dara – the Gas/Electricity/Oil Emergency Exercise** which took place on 9th and 16th September 2022. The exercise was organised by the Department of the Environment, Climate and Communications (DECC) with the object to address in emergency scenarios the following;

1. operational plans,
2. crisis communications,
3. emergency response structures
4. coordinated real-time decision making

The feedback broadly fell into three categories;

- Proposals for improvements for the management of a national energy emergency
- Proposals for improvements to emergency communications
- Clarifications in relation to existing emergency plans

These proposals will feed into emergency planning exercises in 2024

Mr. Bugler took the meeting through a presentation which was subsequently circulated to the Code Modification Forum Circulation List.

3.3 Code Modification Forum Improvements

The Transporter referred to Slide 29-30, informing the meeting that the industry review process on this document had now expired with Industry suggestions either excepted fully or on a modified basis. The only outstanding issue was the formulation of an indicative timeline on presentation of proposal and a subsequent progression tracker. This matter was being discussed with the CRU and it was expected that a finalised Code Modification Forum Improvements Document would be circulated before the next meeting

Any Other Business

Next Meeting

The next meeting is scheduled to be held at the Clayton Hotel, Cork on 21 June 2023. It will be hybrid, the second of three hybrid meetings in 2023. Participants are urged to enter this date in their diaries and, if at all possible, attend in person. GNI were hosting a stakeholder event in tandem with the meeting for attendees which would involve a guided Cork Harbour Boat Tour where significant physical infrastructure in the development of the Irish Gas industry would be identified and described

Biomethane Update

At the end of the Forum meeting GNI presented a Biomethane update with presentation slides. The first general update on the sector was given by Suzanne Linehan, Commercial Analyst at GNI, from a four-item presentation i.e.,

- Circular Economy Benefits of Biomethane
- EU Perspective
- Present Irish Position
- GNI activities in the sector

Subsequently, Stephen O'Riordan, Wholesale Manager at GNI gave a high-level overview presentation on a biomethane for shrinkage gas proposal. Mr. O'Riordan indicated and detailed the issues which would govern the development of this proposal;

- Term of Contracts
- Volume Commitments
- General T's & C's
- Price Premium

An Industry Representative stated that, in a European context, Ireland was a hostile place to ongoing development in the biomethane sector. In general, the meeting accepted that the current lack of a government support was a considerable stumbling block but a number of delegates from the biomethane sector expressed dissatisfaction with GNI's current readiness to accommodate the expected producer interest in the sector.

In relation to the biomethane for shrinkage gas proposal the response from the biomethane sector representatives was that this was an interesting but not business critical proposal which, given GNI's requirements might benefit just the larger early mover operations while other industry representatives pointed out the requirement for GNI to give equal non-discriminatory access to all industry players.

GNI emphasized its commitments to the sector, stressing its availability to prospective producer queries and committed to providing further ongoing updates to all stakeholders. In relation to the biomethane for shrinkage proposal it would;

- Meet with key gas shippers to get their views
- Engage with Scottish EPA to explore whether biomethane for shrinkage can be offset against compressor emissions
- Develop a detailed paper which establishes the regulatory basis and provides a comprehensive overview of the proposal
- Agree detailed proposal internally, submit paper to CRU and initiate Code Modification Proposal as require and progress through the Code Modification Process
- Develop tender documentation and issue tenders

5.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

6.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	Andrew Kelly	New Fortress Energy/SLNG
6	Colm Griffin (T)	GMO-NI
7	Brian McGlinchey(T)	Vermilion Energy
8	Keith Deacon (T)	AXPO
9	Theresa Lennon Crean (T)	SSE
10	David Lindsay	CRU
11	Emerson O'Callaghan	CRU
12	Michael Crowley(T)	GNI
13	Donovan P.G. Sheridan (T)	Prepaypower
14	Ian Mullins (T)	BGE
15	Paul Murphy	ESB
16	Yvette Jones (T)	GNI
17	Kevin Murray (T)	BGE

18	Mark Phelan	Electric Ireland
19	Martin Regan	Marex Spectron
20	Nicholas Lincoln	Nephin Energy
21	Sam Clutterbuck	Ceres Energy
22	Tom Nolan	Ormonde Organics
23	William Carr	ESB
24	James Cogan	Green Generation
25	Michael Murphy	Killowen Biogas
26	Billy Costello (T)	Green Generation

Code Modification Forum

Wednesday, 26 April 2023 at Ashling Hotel, Dublin 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 A109 – Calculation of Charges in respect of a Meter Quantity Adjustment (For Mention)
6. Status of Code Modification Proposals

7. 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 revise arrangements around Supplier of Last Resort invoicing

8. Gas and Electricity Interaction

9 . NGEM Exercises – GNI Presentation Update

10. Code Modification Forum Improvements

11. AOB Items / Next meeting

12. GNI Presentation –biomethane Update

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1. Review of minutes from last meeting

- Minutes of CMF meeting of 15 February 2023 were issued on 8 March 2023.

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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

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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

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4 GB Gas Quality Update

Code Modification Forum Update

26th April 2023 update

Update: HSE approves proposed changes:

- HSE has recommended proceeding with proposed changes to Great Britain (GB) gas quality based on the proposals set out in their gas quality consultation, namely:
  - To reduce the lower WOBBE limit from 47.2 to 46.5 MJ/m3
  - To increase the Oxygen (O2) content from 0.2 to 1.0% for system pressures < 39 bar-g
  - To replace the Incomplete Combustion Factor (ICF) and Sooting Index (SI) with a Relative Density (RD) limit < 0.7
- HSE has proposed a 2-year implementation period for reducing the lower WOBBE limit, to allow the Market and power generators time to prepare for change
- National Gas (NG) replaced ICF and SI with a RD limit < 0.7 on 06-Apr-23

Next steps

- Wasn't sufficient time to amend Code to replace ICF & SI with RD limit:
  - GNI will continue to monitor ICF and SI per the Code in the short-term
  - Replacing the ICF with SI with a RD is considered a technical simplification rather than a significant change and is not expected to have any impact of gas flows at Moffat
- GNI preference is to raise a combined Code Modification over Summer:
  - Reduce lower WOBBE limit from 47.2 to 46.5 MJ/m3
    - May also need to reduce the lower Gross Calorific Value (GCV) limit
  - Replace the ICF and SI with a RD limit < 0.7
  - GNI also plans to realign Entry and Exit WOBBE limit, so that Exit matches Entry limits
- GNI is planning to submit this modification by Sep-23 (and earlier if possible):
  - Implementation of any lower WOBBE limit change to be delayed to 06-Apr-25 (as in GB)

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Next steps … continued

- HSE approval to increase Oxygen (O2) limit from 0.2 to 1.0% (mol) for system pressures < 38 bar is not directly applicable to Republic of Ireland (ROI)
  - As GNI takes gas from the higher pressure 85-bar system at Moffat
  - GNI is proposing a separate Modification to increase the O2 limit for renewable gases on the Transmission (TX) system from 0.2% to 0.5% (mol)
    - This is a separate proposal to facilitate the development of the ROI renewable biomethane market, rather than being driven by changes to the GB O2 specification
- GNI will continue to engage with National Grid (NG) in GB to help develop arrangements to assist ROI market participants to prepare for proposed changes
  - Potential enhancement to systems to provide advance warning of low WOBBE gas flows and will engage with NG when they they launch their enabling Unified Code Modification

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4a Gas Quality – Renewable Natural Gas

Gas Quality – Renewable Natural Gas

Oxygen Code Modification

- Code modification to increase upper limit for oxygen for biomethane injected into the transmission network being drafted
- Modification will allow for oxygen upper limit of 0.5% (current limit is 0.2%)
- Drafting will be circulated for consultation in April 2023
- Awaiting completion of Penspen oxygen report before circulating

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Gas Quality – Renewable Natural Gas

Oxygen Code Modification

- Despite advances in upgrading technology, we believe that it will still be a challenge for biomethane to consistently meet the current upper limit of 0.2%
- Initial analysis and modelling used an upper oxygen limit of 1% to assess impacts
- Despite results showing that 1% would not result in negative impacts (if managed correctly), we have decided to propose a maximum content of 0.5%
- Data from other jurisdictions indicates that upgrading technology should be able to produce biomethane with an oxygen content below this threshold of 0.5%
- However, should a transmission biomethane injection facility wish to avail of this proposed increase to oxygen content limit (0.5%), analysis to identify possible impacts will need to be carried out

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Analysis Overview

- **GNI Network Planning** “Technical Note: Mitchelstown BNEF Analysis”
- **Dynaflow** “CFD Simulations of Biomethane Injection into Gas Network”
- **Penspen** “Biomethane – Oxygen Content Assessment”
- **Uniper** Impact Assessment

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GNI Network Planning "Technical Note: Mitchelstown BNEF Analysis"

Key Assumptions

- BNEF injection rate 5,000 scm/h increasing to 20,000 scm/h
- Oxygen injection of 1%
- Scenarios modelled on:
  - Average Winter Peak day for 2022-2023 and 2024-2025 gas year
  - Summer Minimum Demand day for 2022-2023 and 2024-2025 gas year
- Assumed that the network is operating in standard configuration unless otherwise stated

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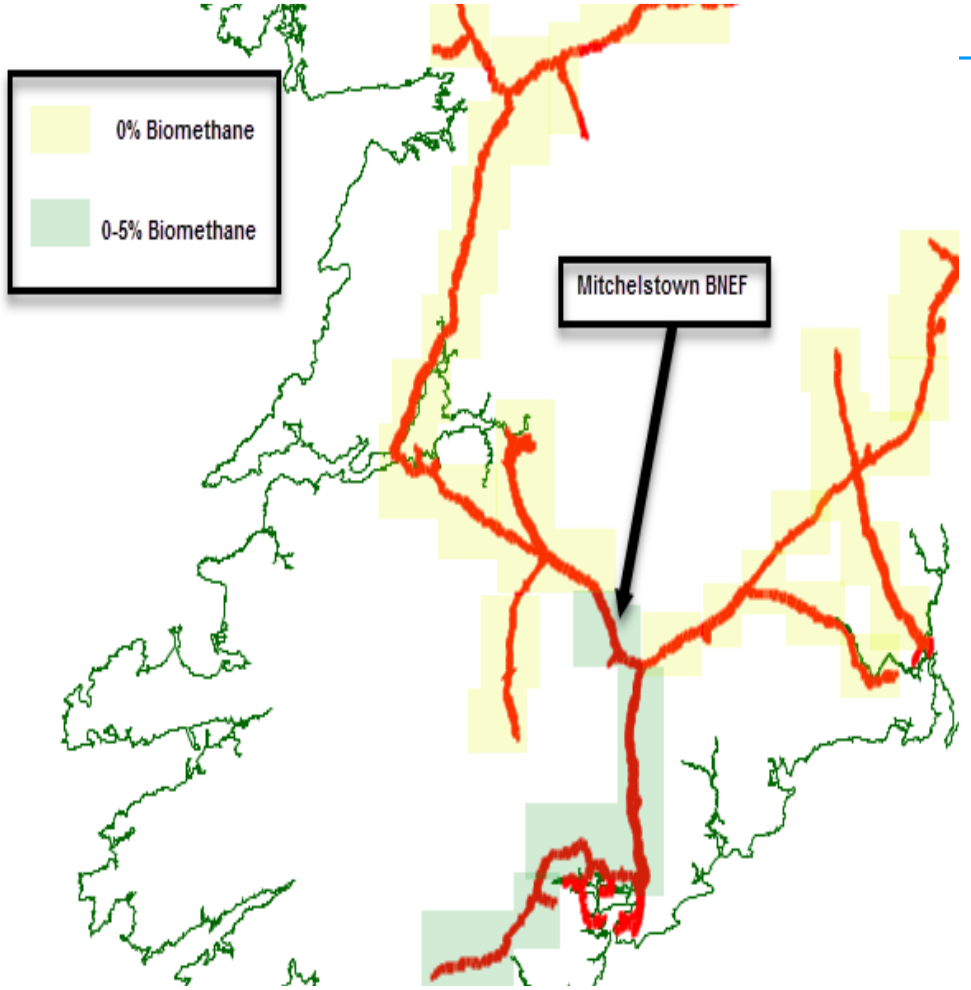
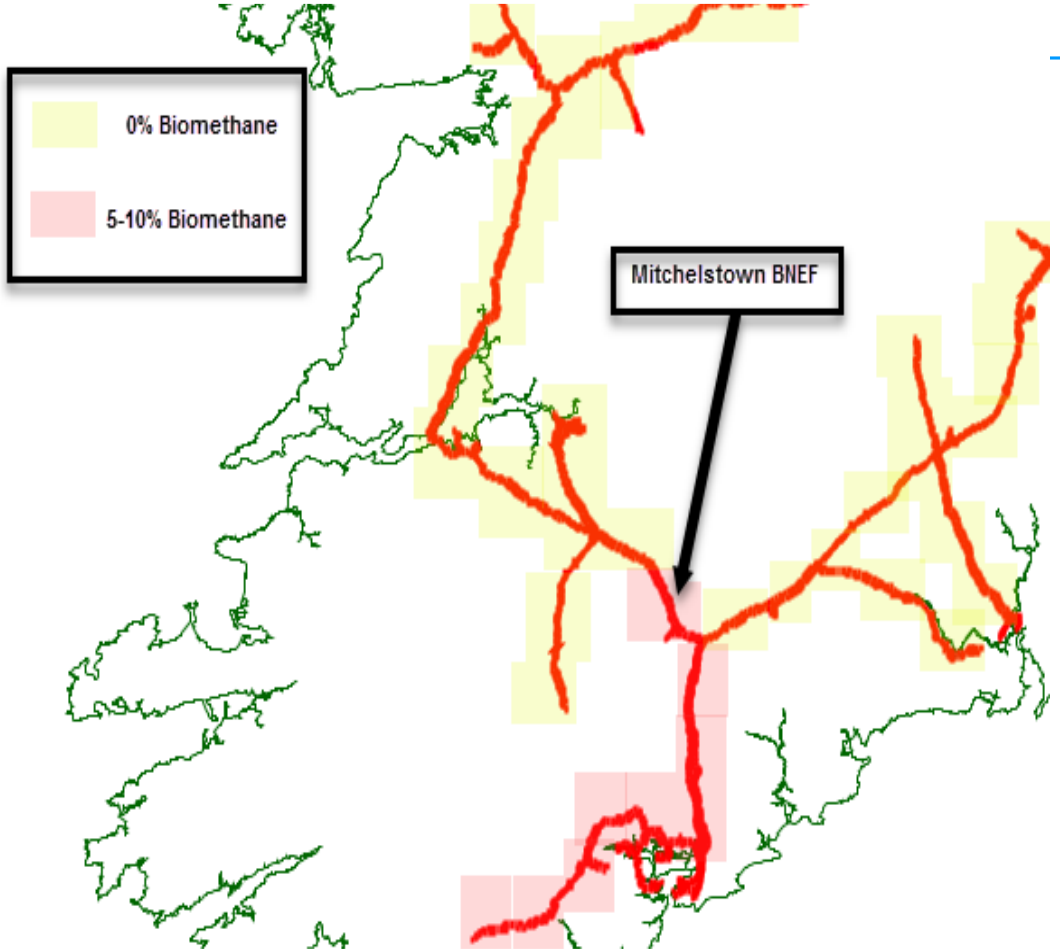
GNI Network Planning "Technical Note: Mitchelstown BNEF Analysis" cont'd



Biomethane penetrations observed in Scenarios 5 & 9 for the **Average Winter Peak** 2022/23 Scenario with Mitchelstown BNEF injecting **5,000 scm/h**



Biomethane penetrations observed in Scenarios 6 & 10 for the **Summer Minimum** Demand Day 2022/23 Scenario with Mitchelstown BNEF injecting **5,000 scm/h**

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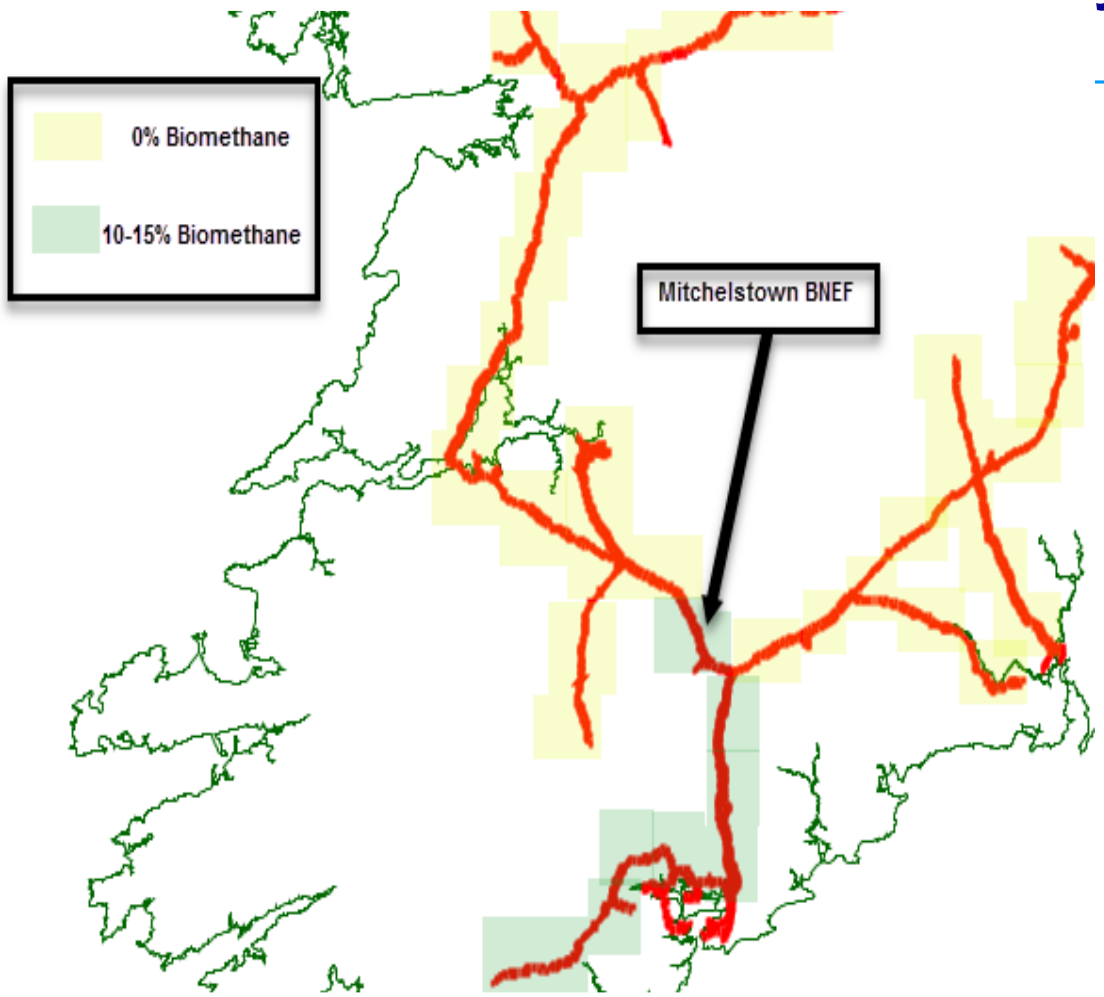
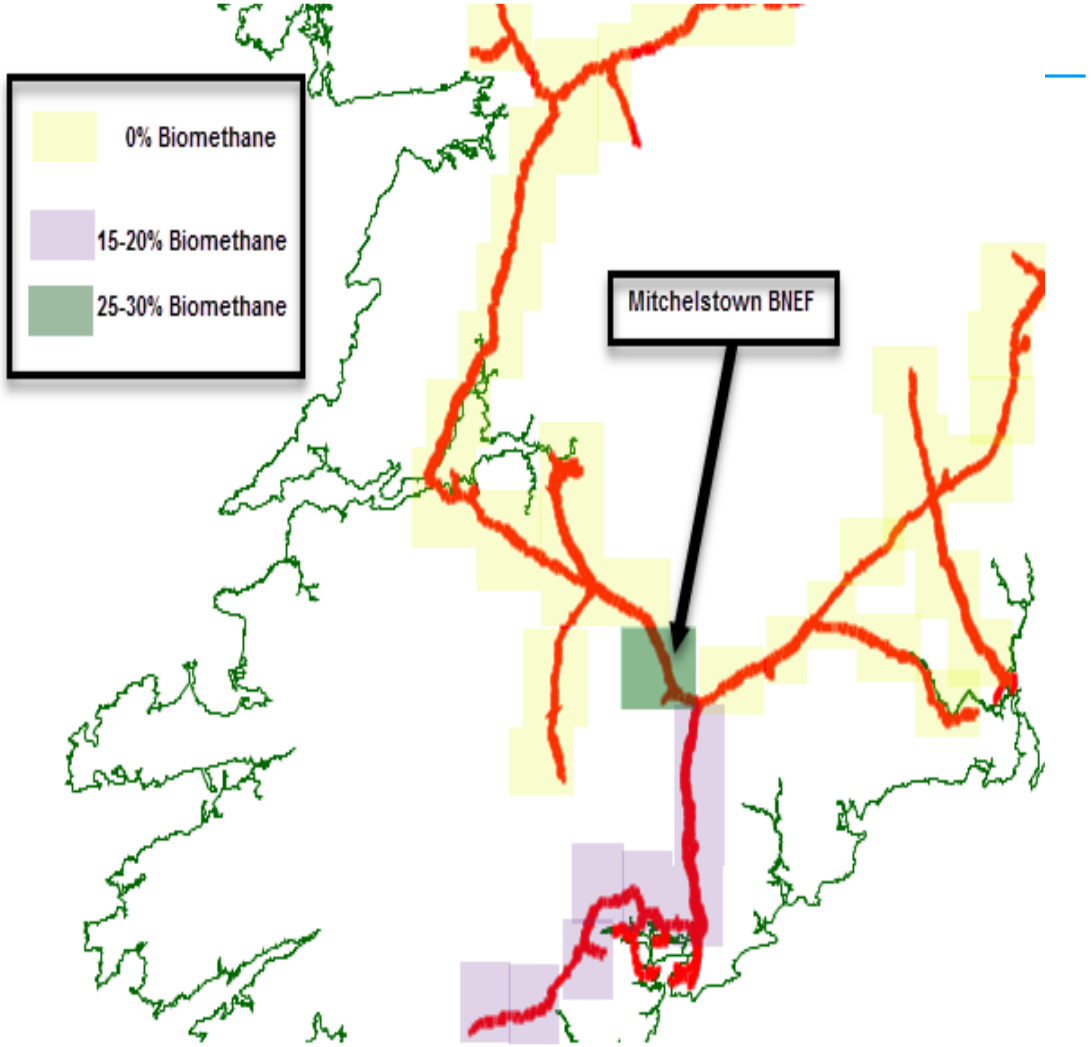
GNI Network Planning "Technical Note: Mitchelstown BNEF Analysis" cont'd



Biomethane penetrations observed in Scenarios 7 & 11 for the **Average Winter Peak** 2024/25 Scenario with Mitchelstown BNEF injecting **20,000 scm/h**



Biomethane penetrations observed in Scenarios 8 & 12 for the **Summer Minimum** Demand Day 2024/25 Scenario with Mitchelstown BNEF injecting **20,000 scm/h**

Dynaflow Analysis Computational Fluid Dynamics (CFD)

Overview:

- Detailed flow analysis study to demonstrate mixing of biomethane and natural gas at **Mitchelstown** injection point - Computational Fluid Dynamics (CFD) methodology used
- Different flow conditions were evaluated on their impact on mixing rate of both gases

Conclusion:

- No slugs of biomethane in natural gas observed
- Over length of modelled pipe, gas was found to mix sufficiently well, even at high concentrations

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Penspen Report “Biomethane - Oxygen Content Assessment”

Report focuses on impacts of oxygen on transmission network

Report currently being finalised

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Uniper Assessment of Impacts on Large End Users

- Scope:
  - Comparison of gas turbine fuel specs with predicted/modelled changes in gas quality to determine whether potential fuel delivered to site will comply with OEM fuel specifications
  - Irrespective of whether potential fuel quality is within OEM specifications, a qualitative assessment of whether combustion problems could be encountered will be made

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Next Steps

- Reports to be finalised
- GNI to summarise findings in one report
- Code Modification Proposal for **oxygen upper limit increase to ≥0.5%** for biomethane injection into transmission network be circulated April 2023

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5. 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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6. 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

- Version 5.04 of code issued.

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7. 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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8. Gas and Electricity Interaction

9. Security of Supply (SoS) / NGEM Update

- **April 2023**

10. Code Modification Forum Improvements

Code Modification Forum Improvements

- On 9 November the CRU hosted a physical meeting with GNI to consider discussion papers each organisation had prepared and shared regarding proposed improvements to the Code Modification Forum and the Code Modification review process
- A number of initiatives were agreed which should improve Shipper understanding of the complexity of each modification and streamline the review process
- Various initiatives to encourage greater engagement with the Forum are being developed and will communicated to the Forum in due course
- On 11 January, as indicated at the Forum meeting in December GNI circulated to the Forum Mailing List;

    1) Code Modification Forum – Proposed Improvement Document

    2) Code Modification Proposal (format)

    3) Note to CMF of prospective Proposals issued by GNI in 2023

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Code Modification Improvements – Continued

- At the CMF on 15 February 2023 the item together with three Shipper responses was discussed and conclusions agreed and the review period was subsequently extended to the 3 of March 2023.
- One submission was received in this period which resulted in an agreement that at the final CMF meeting in each calendar year the Transporter will furnish a report on each Proposal issued that year and its subsequent progress.
- Outstanding provision is the formulation of an indicative timeline on presentation of proposal and a subsequent progression tracker.

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11. AOB / Next Meeting

Next Meeting

- Next Meeting scheduled for 21 June 2023 – Hybrid Meeting at Clayton Hotel, Cork

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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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Biomethane Update

Suzanne Linehan / Stephen O’Riordan

26th April 2023

Agenda

- Circular Economy Benefits of Biomethane
- EU Perspective
- Ireland and Biomethane
- GNI Biomethane Activities
- Shrinkage Proposal

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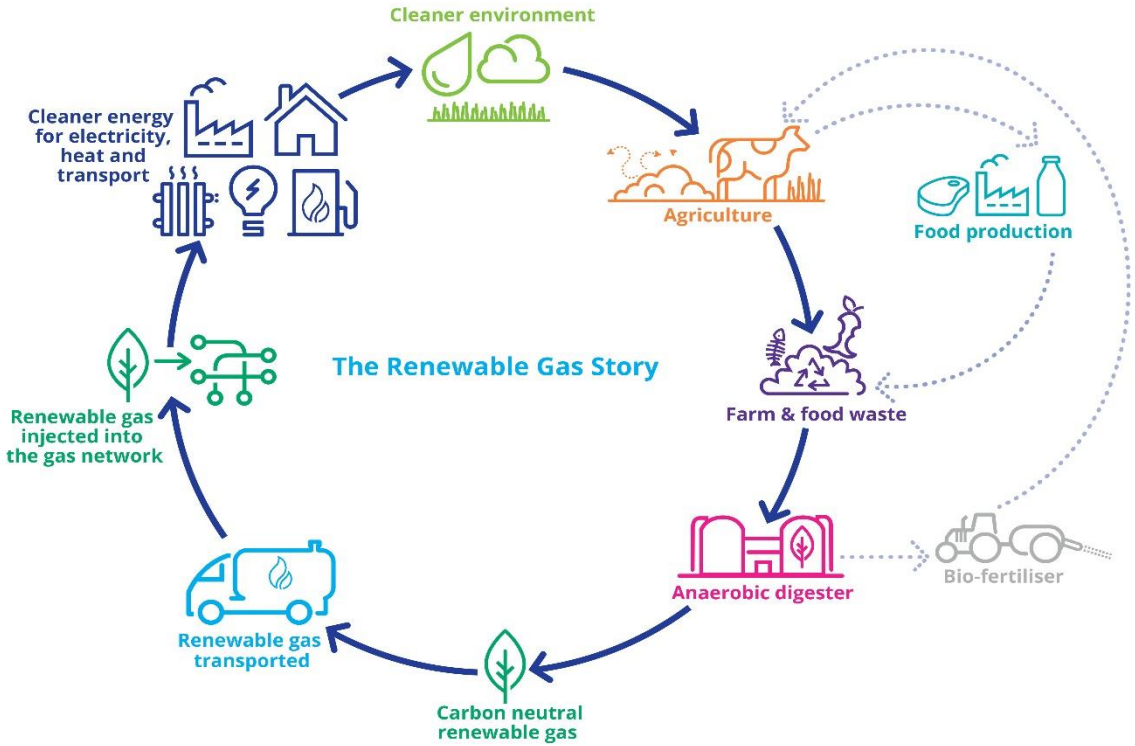
Biomethane – Circular Economy Benefits

Circular Economy Benefits from Biomethane



Biomethane

- Sustainable, carbon neutral fuel made from farm and food waste through anaerobic digestion
- Fully compatible with existing gas network and applications
- Over 710,000 homes and businesses ready to use in heating, cooking, manufacturing and transport without changing any equipment.
- Will decarbonise agriculture and food production by displacing emissions from slurry and other wastes
- Farmers can replace chemical fertilisers with the highly effective organic bio-fertiliser digestate (by-product)
- New employment opportunities throughout supply chain
- Additional income source for farmers and local communities through sale of biomethane, waste/feedstock and fertiliser

Biomethane - EU Perspective

Why is the EU interested in Biomethane?

Security of Supply

- The case for accelerating the clean energy transition has never been stronger and clearer following Russian invasion of Ukraine
- The EU imports 90% of its gas consumption
- Russia providing around 45% of those gas imports

Sustainability

- EU medium-term biomethane target 11% of gas
- Biomethane volumes 35bcm by 2030
- Growth rate of 32% p.a. EU wide required to meet 35bcm
- Most recent inclusion of boilers on renewable gas permissible

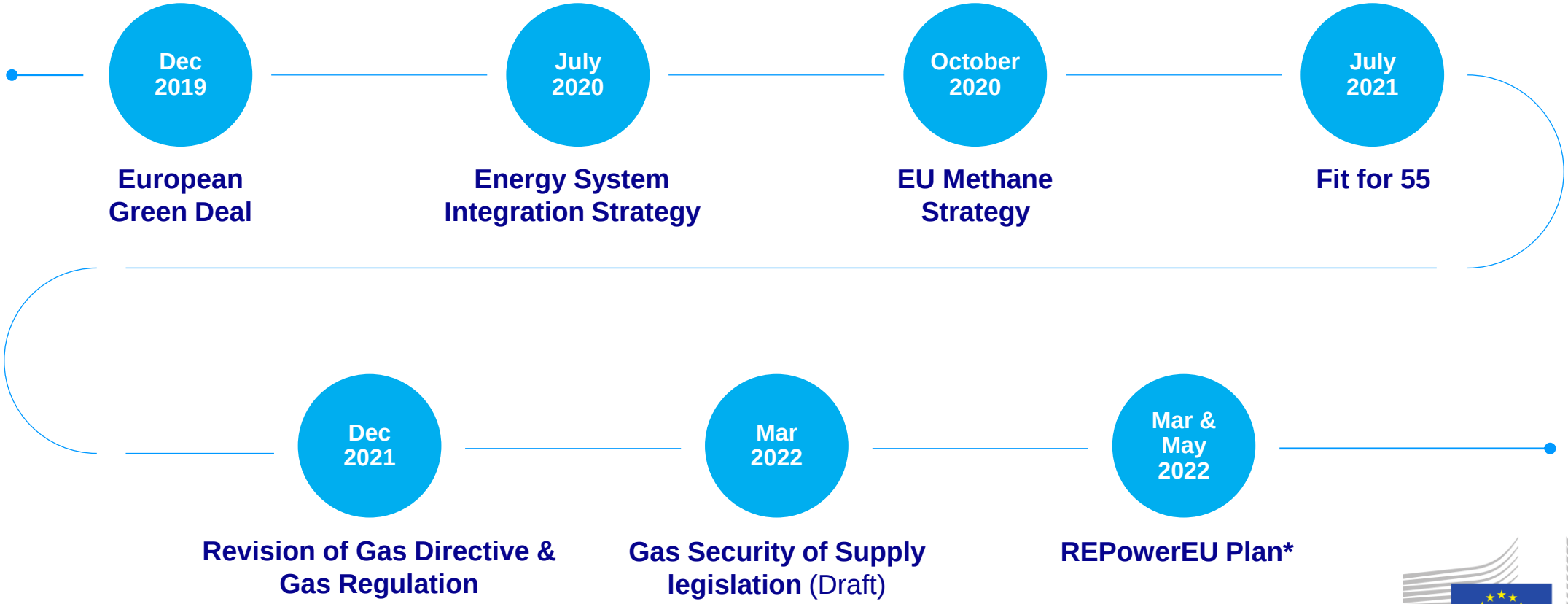
Cost

- From €55/MWh – EU based figures for medium/large plants
- Excluding digestate monetised and non-monetised revenues
- Excluding CO2 revenues
- Excluding Green Certs

Unlike Solar and Wind

- No hidden network costs
- No hidden backup cost

European Policy providing support for biomethane



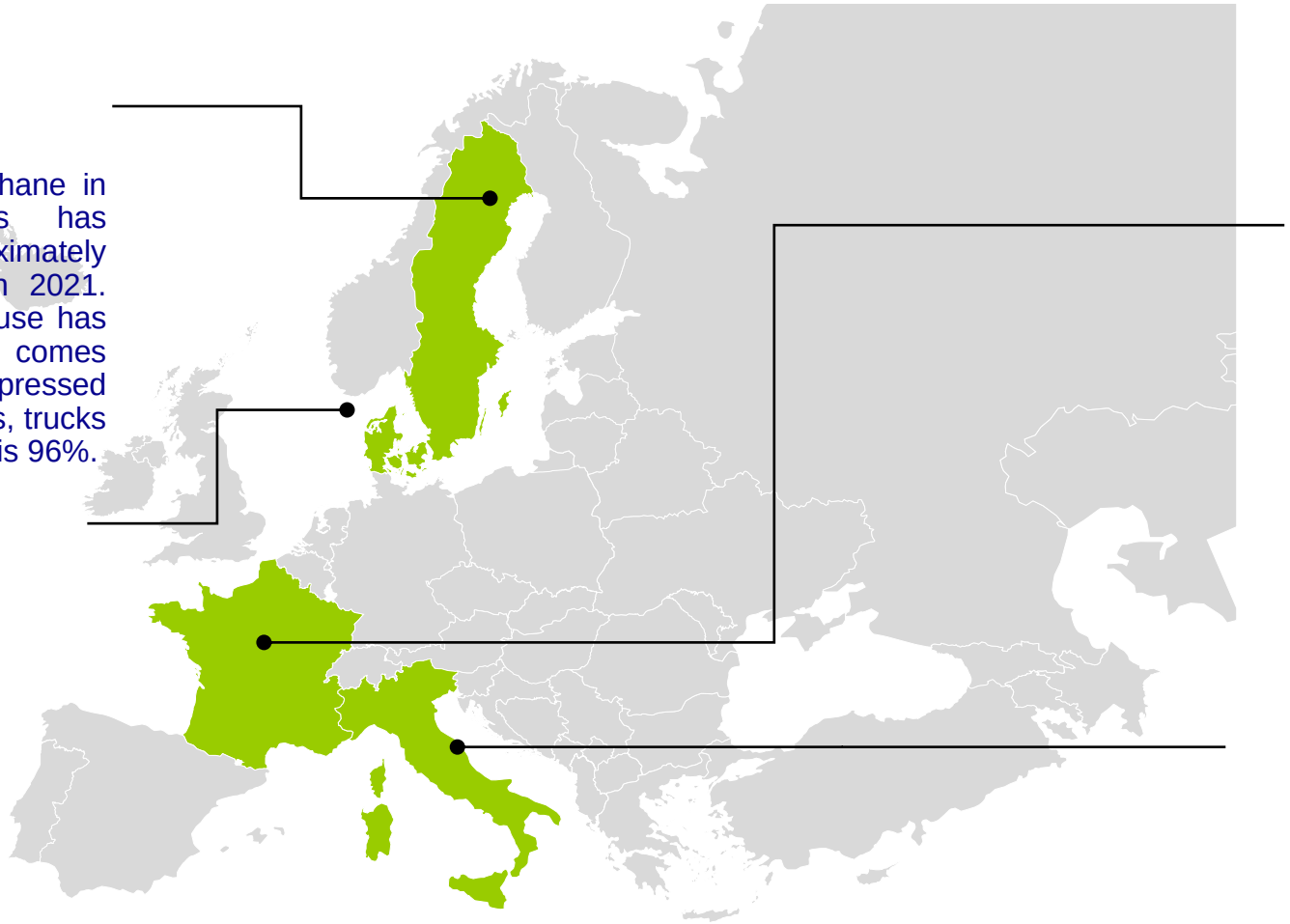
Some EU Member States already have best practice policies to build upon

Sweden

- The proportion of biomethane in liquefied gas vehicles has increased from approximately 50% in 2020 to 65% in 2021. During the same period, use has doubled. When it comes to vehicles using compressed gas, which is used for cars, trucks and buses, the proportion is 96%.

Denmark

- Today, 25% of gas injected in the grid is biomethane



France

- France is home to Europe's fastest growing biomethane sector. The total biogas production amounted to 6,083 GWh and the biomethane production was 2,207 GWh.

Italy

- Italy forecasts that within 2-3 years the entire Italian NGV fleet (approximately 1,050,000 vehicles) will be powered 100% by biomethane.
- "Biogas done right" concept supports development of agroecology with biogas and biomethane.

Some EU Member States already have best practice policies to build upon

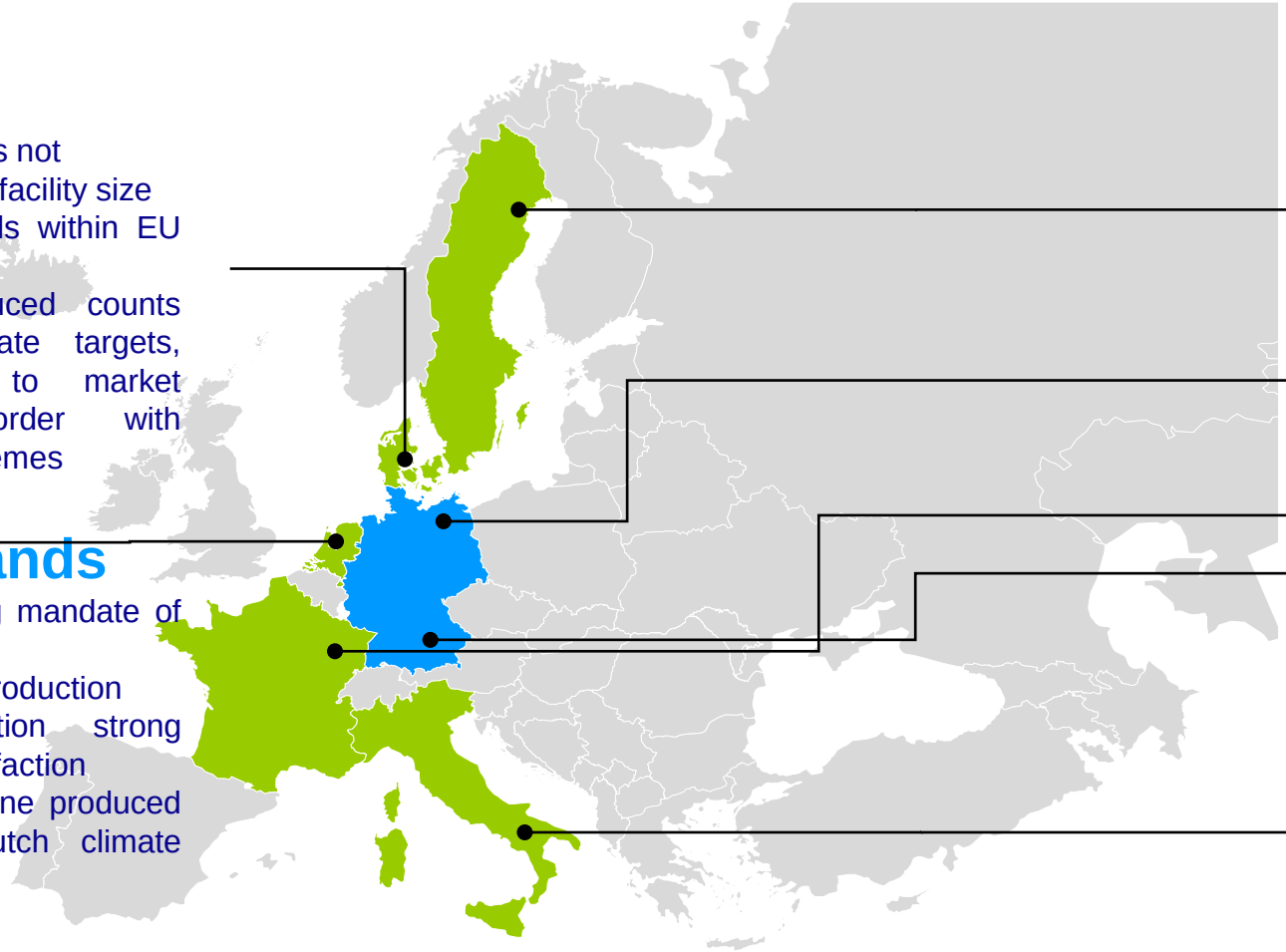
Stimulating the role of biomethane can be achieved via different policy mechanisms i.e. national taxes and subsidies or target setting

Denmark

- Production subsidy does not differentiate on basis of facility size
- Use of biomethane falls within EU ETS
- All biomethane produced counts towards Danish climate targets, making it difficult to market biomethane cross-border with different regulatory schemes

The Netherlands

- Biomethane blending mandate of 20% by 2030
- SDE++ subsidy for production
- REDII implementation strong push for biogas liquefaction
- Subsidised biomethane produced counts towards Dutch climate target



Sweden

- CO2 tax and energy tax exemption for use of biogas and biomethane
- Exemption also available to imported biomethane

Germany

- Many small plants driven by local planning laws

France

- Zoning approach for techno-economic optimization of production facilities

Italy

- High level of financial support for biomethane use in transport
- Recently developed incentive scheme for (new) biomethane plants

Investment Opportunity

Ryanair & Shell Sign Sustainable Fuel Agreement

Ryanair, Europe's largest airline and global energy group, Shell, today (Thurs 1 Dec.) signed a Memo of Understanding (MOU) to advance the supply of sustainable aviation fuel (SAF) at over 200 Ryanair airports across Europe, with particular focus on SAF supply at RYR's largest bases like Dublin and London Stansted.

Sale of green certificates

Shell buys RNG producer Nature Energy for $2bn

+5m
TONNES

5 million tonnes of food waste and manure are converted into 200 million m³ biogas every year

Ireland – Biomethane

How does Ireland compare?

Ireland has greatest potential of all the EU Member States

- 9.5 TWh realisable from agri-sector
- Compares with 9.7 TWh electricity from wind on grid in 2021
- REPowerEU target 11% gas production
- Ireland biomethane production in 2021 <1%

We are a laggard

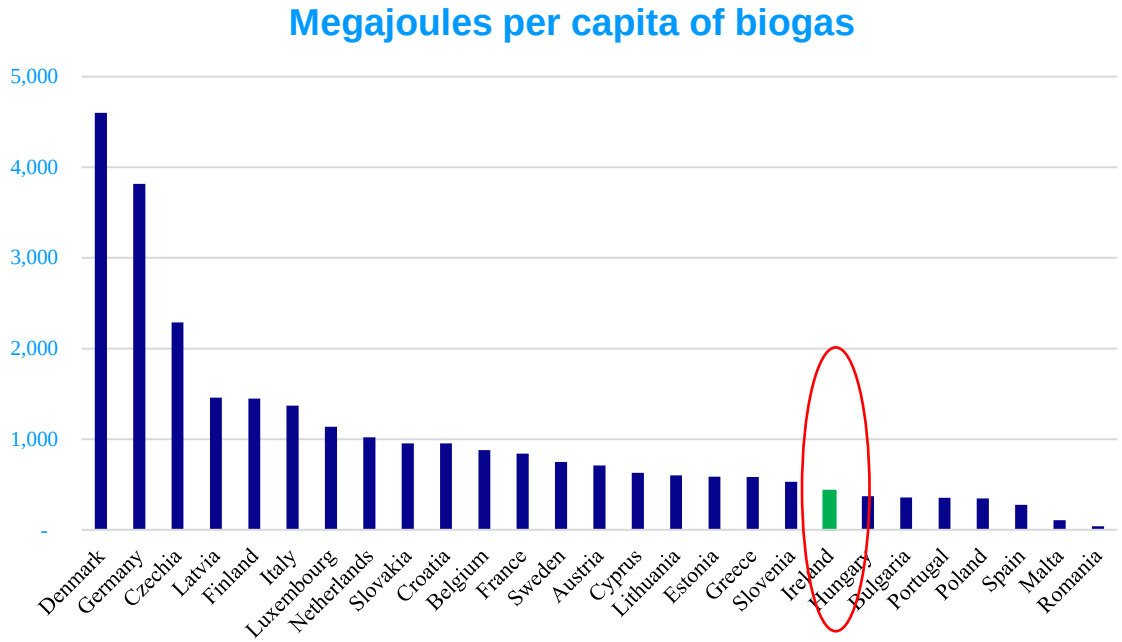
- Ranked 20 out of 27 Member States
- No biomethane-specific policy support

Denmark

- Produced 30% of its gas from biomethane by end-22
- Almost 100% in some summer days

France

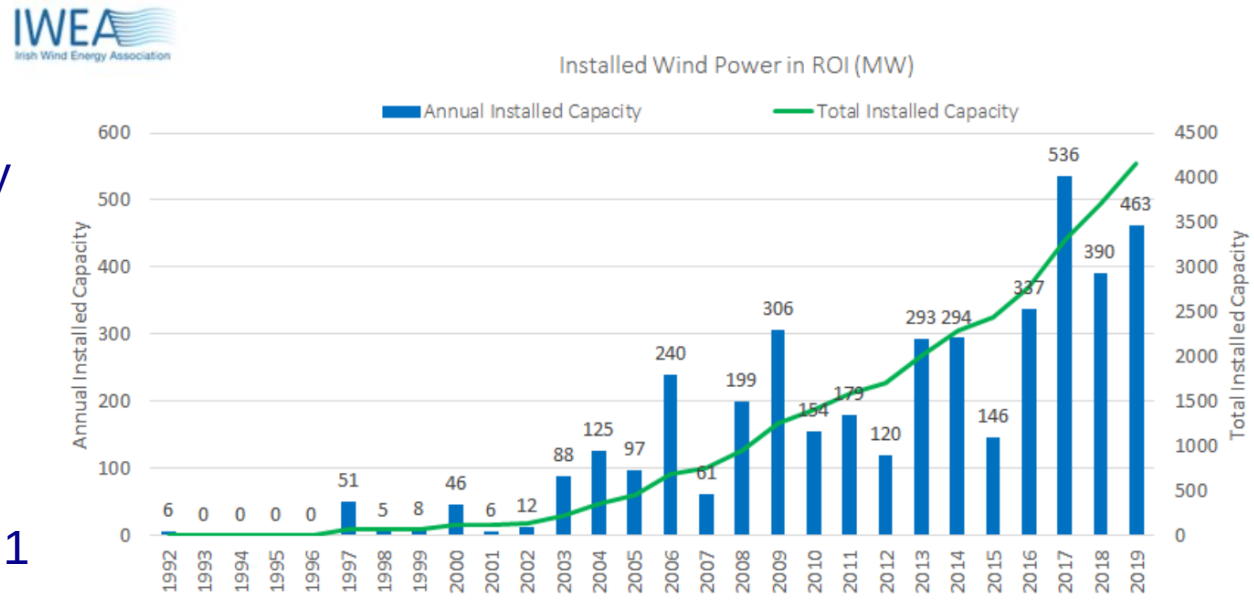
- Built circa. 3 plants per week
- By 2021, 200 plants built producing 4TWh
- By 2030, 1,200 plants planned producing 40TWh



National Biomethane Strategy & Renewable Heat Obligation

- **Biomethane Strategy Q3-23**
- **Renewable Heat Obligation (RHO)**
  - Consultation closed Aug-21
  - Proposed 5.7 TWh/p.a. by 2030
  - Obligation on suppliers to procure renewable heating fuels, renewable fuel certificates or pay penalty
  - Next step is to publish detailed technical consultation Apr-23
- **Renewable Transport Fuel Obligation (formerly BOS)**
  - 1st April, biomethane in transport 3 RTFOs per 1 MJ
  - Buyout price 54c per KWh
  - Market price 4c – 8c per KWh

Similar to other renewable industries?



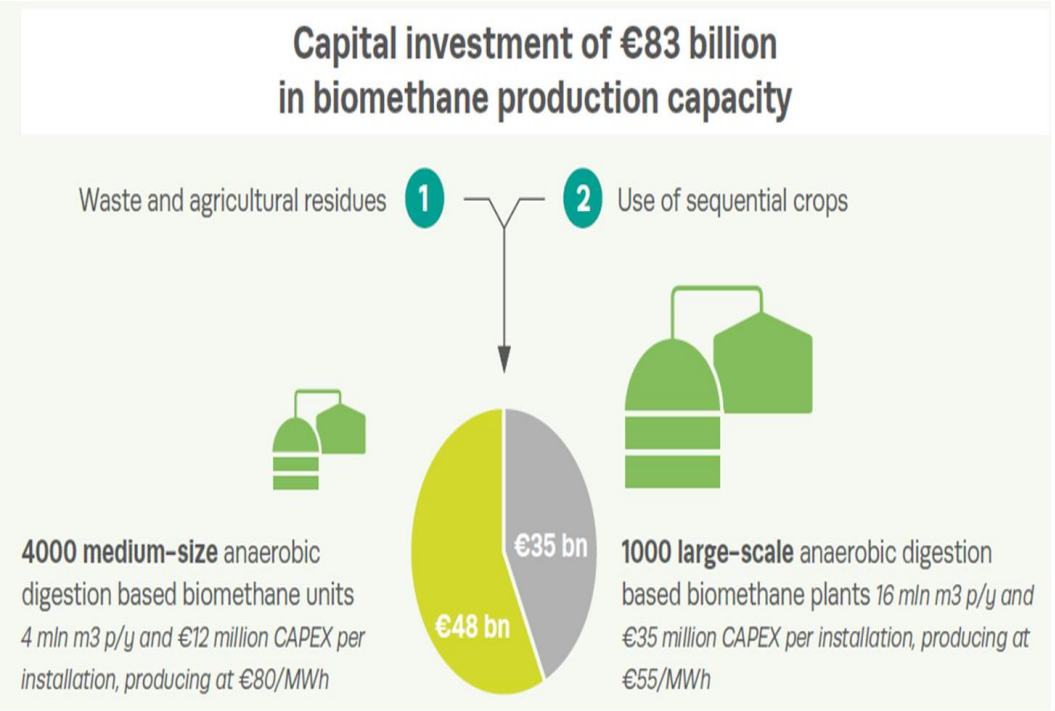
Ireland's Biomethane Landscape

Government Ambition 5.7 TWh by 2030 ≈ 10% Demand,

- 68 medium and 17 large plants require (per EBA data)
- Figures of 150 plant and above have been made public based on smaller plant size.
- Scaleable business

Based on EBA data 2022	Medium	Large
No.	68	17
Million m^3 production p.a.	4	16
GWh p.a.	42	168
€m Capex each	12	35

Achieving current national target of 5.7TWh by 2030 would deliver CO2 savings of c. 1,140,000 tonnes.



Biomethane Opportunity for Consumers

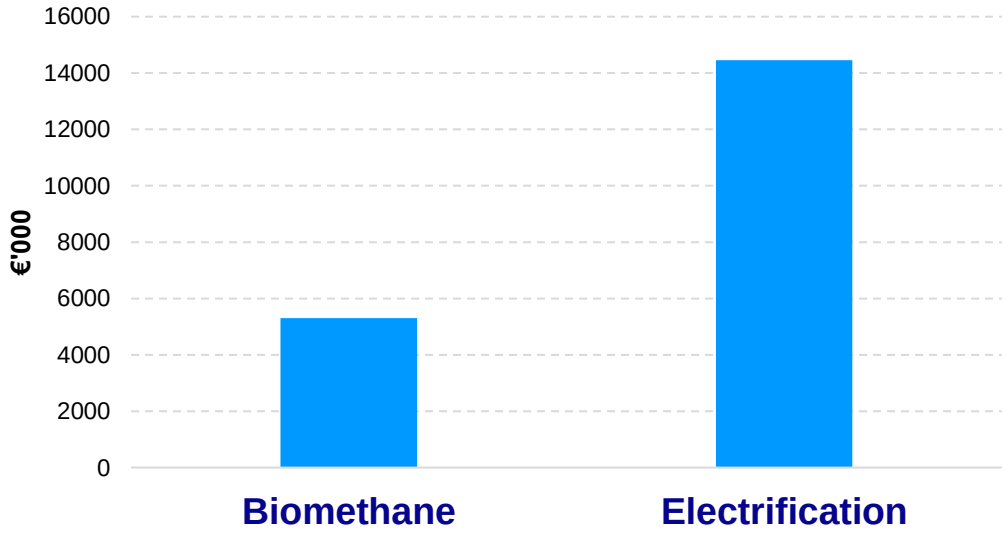
Least Disruptive - Currently 670,000 homes on the gas network

3,000+ rural jobs

Cleaner Air

Cleaner Water

Requires no changes to consumer behaviour



Source: RGFI, The business case for Irish renewable gas

Biomethane – GNI Activities

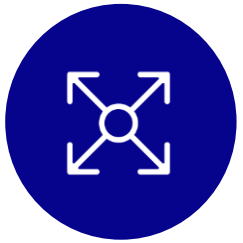
GNI Biomethane Activities

Connection Policy Approved by CRU

Developer pays 30% of connection cost subject to economic test.

Renewable Gas Certs

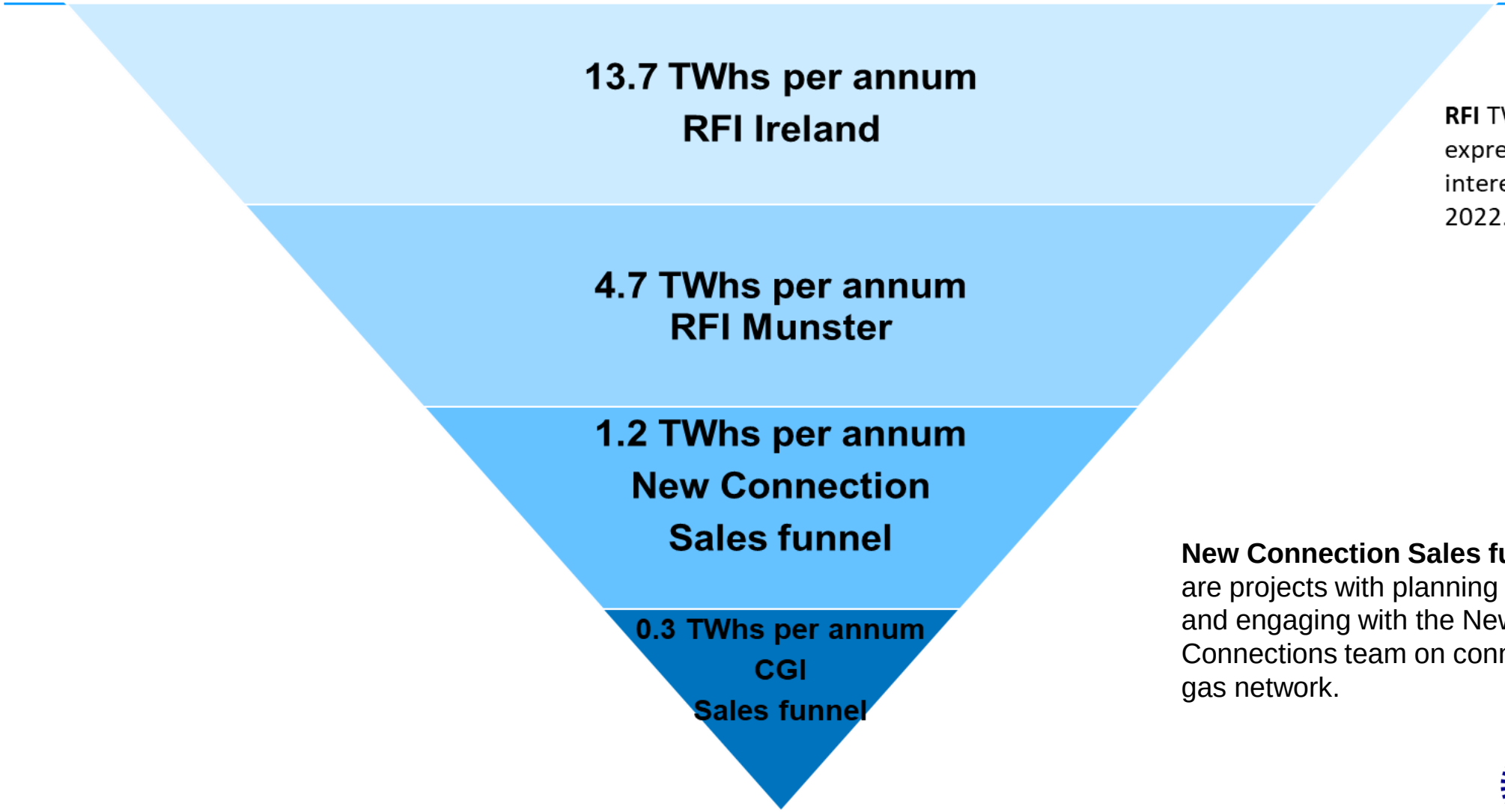
Put on statutory basis in July 2022, awaiting CRU scheme approval



National Biomethane Study

Due to be completed in Q3 2023. Initial response to request for information 170+ response amounting to 13.7TWh

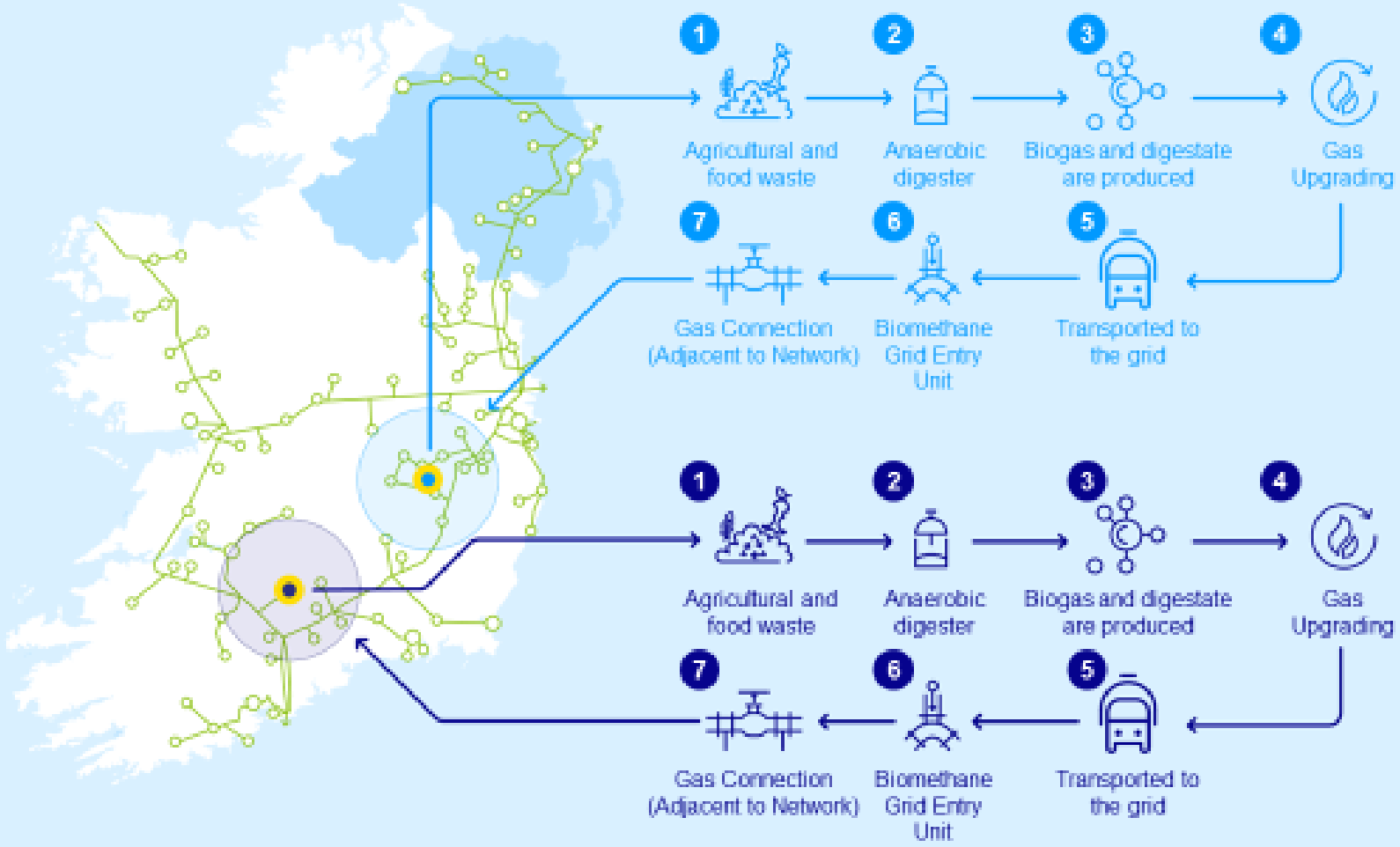
Biomethane Project Funnel (TWhs)



RFI TWh's are expressions of interest in Q4 2022.

New Connection Sales funnel TWh's are projects with planning permission and engaging with the New Connections team on connecting to the gas network.

Mitchelstown Central Grid Injection to join Cush Direct Grid Injection



Cush

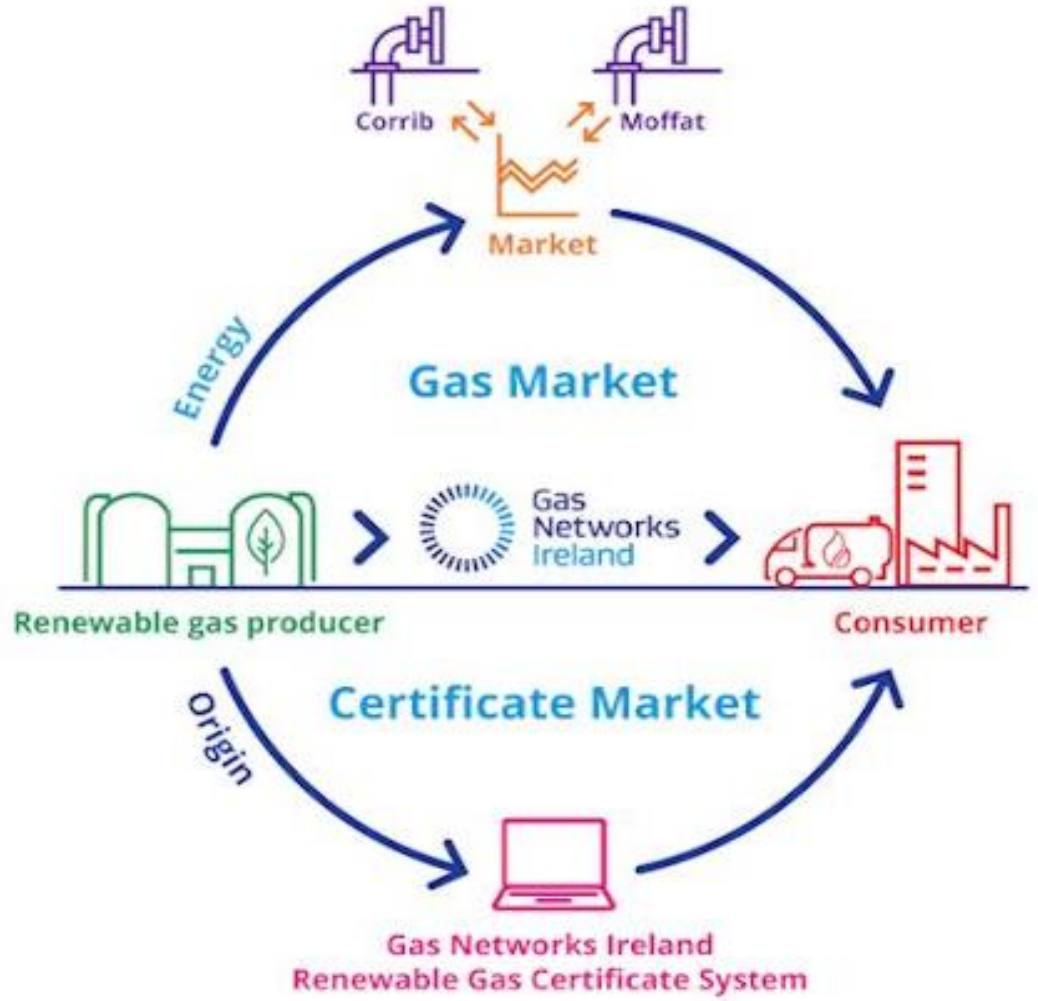
- Biomethane first flowed onto the Irish gas network in 2019 in Cush Co. Kildare
- Annual injection of up to 40 GWh

Mitchelstown

- Funding secured of €8.4m from DECC's Climate Action Fund
- Planning permission secured
- Detailed design in progress
- Designed to be able to inject biomethane from 20+ AD facilities
- Annual injection of up to 700 GWh of biomethane

GNI operate Renewable Gas Registry and Certification

- Legislation underway to establish the certification of origin scheme
- Gas Networks Ireland registers renewable gas volumes and issues certificates to producers injecting into the network
- Each certificate = guarantee that equivalent amount of renewable gas injected
- Guarantee of origin = energy mix declaration for end-consumers
- Proof of origin = title tracking of renewable gas for biofuels and ETS



PC5

- CGI
- Reverse Compression
- Biomethane Capex/Opex
- Max/Min connection option

Biomethane for Shrinkage Proposal

Gas Networks Ireland

Thank you for your participation