

Thank you for joining the Gas Goes Green Advisory Group today

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2. For technical issues please email anthony.wang@navigant.com (until 10:00) and katie.Harrison@energynetworks.org thereafter
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4. You may ask questions or make comments via the chat function throughout the meeting. We will address as many of these as possible during the presentation, and publish a collection of responses shortly after the meeting
5. If you are unable to use chat functionality, try joining the Teams meeting via the Web app using incognito / private browsing (preferably with Chrome or Edge)
6. If you would like to receive information about Gas Goes Green or have any feedback, please get in touch with us at GasGoesGreen@energynetworks.org
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GAS GOES GREEN

Advisory Group

14 May 2020

DELIVERING THE
PATHWAY TO
NET ZERO

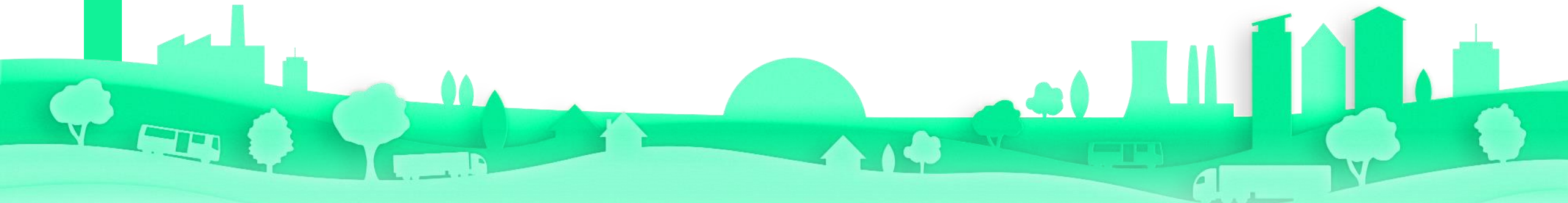
Objectives for today

- Introduce you to the Gas Goes Green programme
- Set out our view of Gas Goes Green and how it will help meet the net zero challenge
- Detail the six programme workstreams
- Receive views from attendees on priorities for the gas networks
- Present and receive feedback on deliverable 1.1



Agenda

Welcome	Matt Hindle, Head of Gas, Energy Networks Association Michiel Stork, Associate Director, Guidehouse
The role of gas in meeting net zero	Chris Train, Green Gas Champion Thom Koller, Gas Goes Green Programme Lead, ENA
Gas Goes Green workstreams and deliverables	Greg Dodd, Head of Strategic Planning, Northern Gas Networks Colin Thomson, Energy Futures Manager, SGN Oliver Lancaster, Future of Energy Manager, Wales & West Utilities Lorna Millington, Future Networks Manager, Cadent Danielle Stewart, Long Term Strategy Manager, National Grid Ed Gill, Gas Goes Green External Affairs, ENA
Programme updates	Thom Koller, Gas Goes Green Programme Lead, ENA
Closing remarks	Michiel Stork, Associate Director, Guidehouse



You and your priorities

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What group of stakeholder do you belong to?

- Trade association
- Government
- Regulator
- Producers
- Supply chain
- Shipper/supplier
- End user
- Consultancy
- Network
- Other

PolLEV instructions:

- We will use PollEverywhere to interact with you
- To join, please go to the following link (mobile or desktop): www.PollEV.com/guidehouse
- Enter your name (if you wish, not required)
- Polls will appear here as long as they are active; keep this tab open for the duration of the session

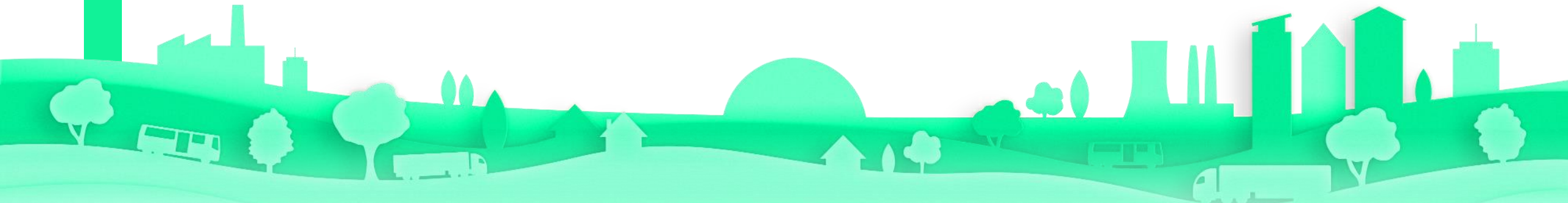
Gas Goes Green and net zero

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Questions?

- Please write questions or comments in the Teams chat

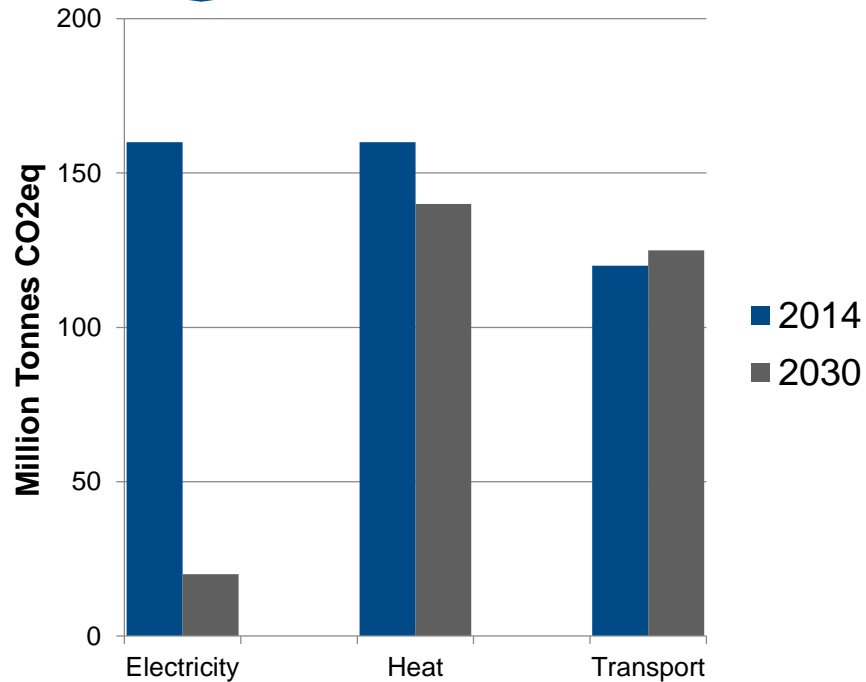




Engineering Net Zero – The Opportunity

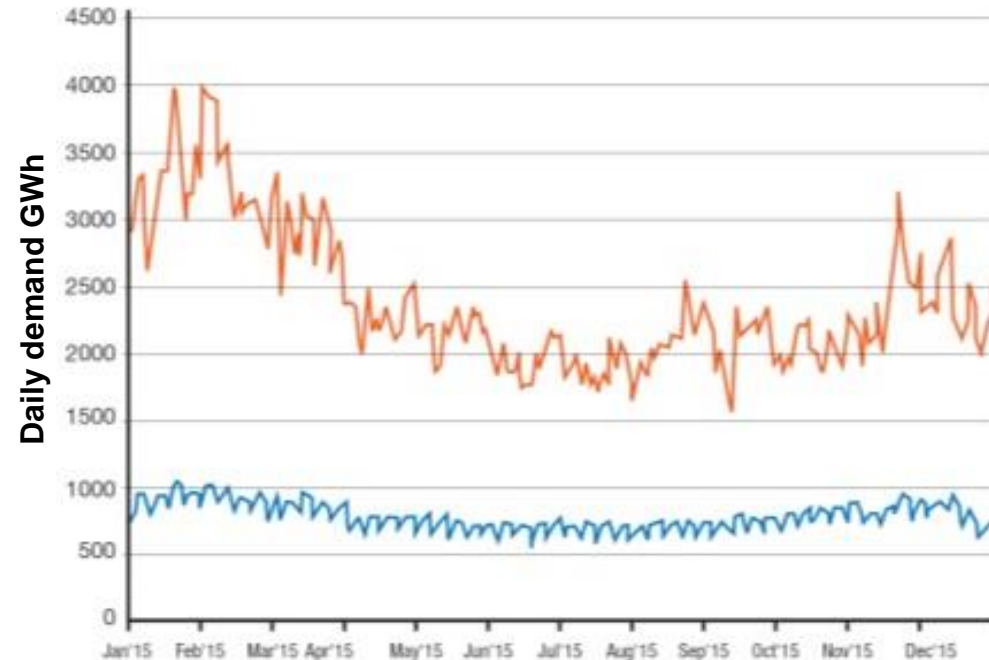
Gas provides 80% of heat at times of peak demand.

UK Carbon Emissions



Good progress decarbonising the power sector, but 'almost no progress in the rest of the economy' (CCC, July 2016)

Daily Electricity & Gas Demand



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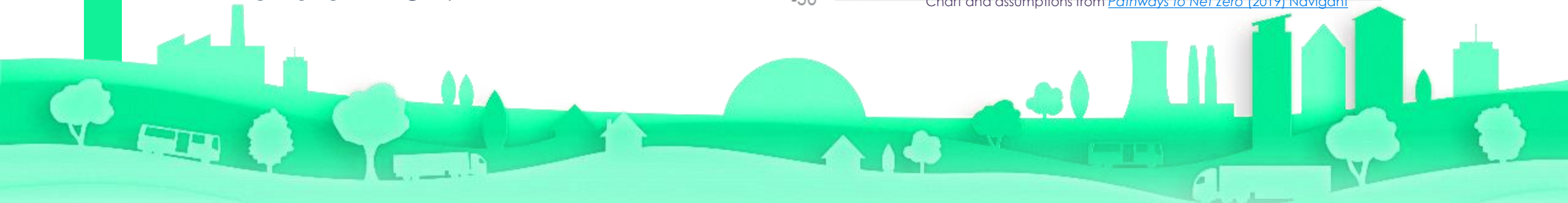
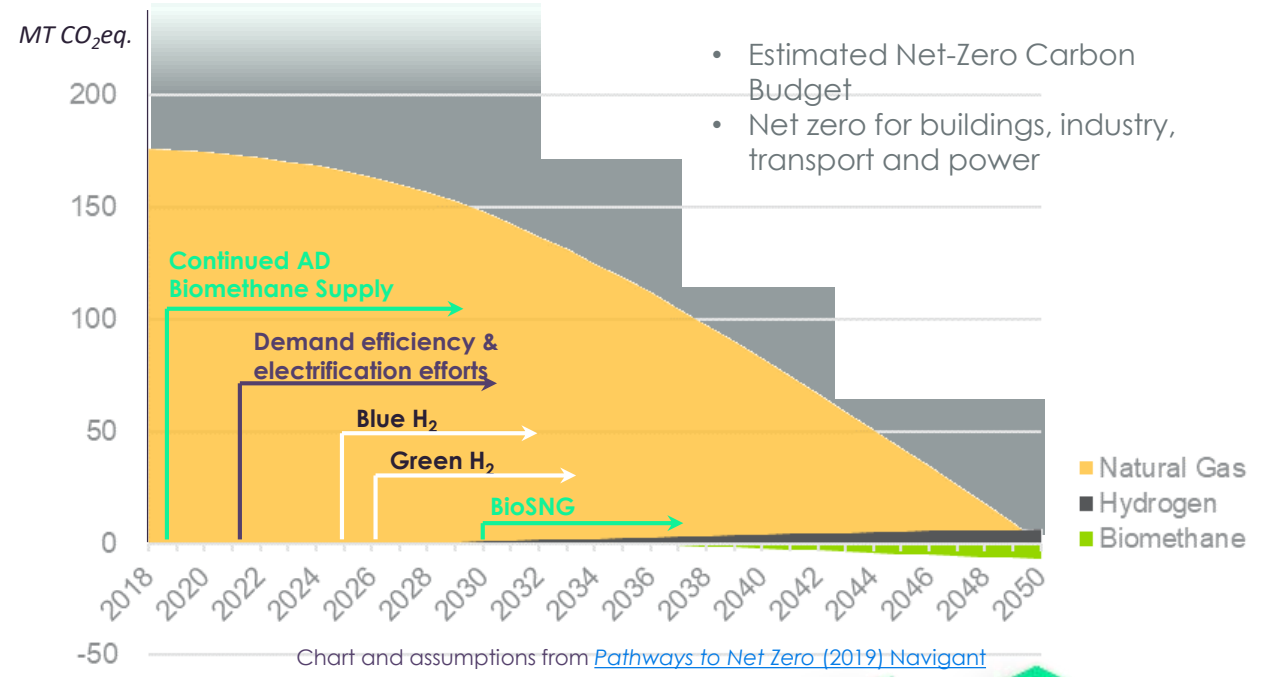


Carbon impact of gas delivered during RII02

Natural gas plays a central role in the UK energy system today, but it is also a significant source of greenhouse gas emissions.

According to the scenario set out in the Pathways to Net Zero report, emissions will reduce by 9 MtCO₂eq by the end of RII02.

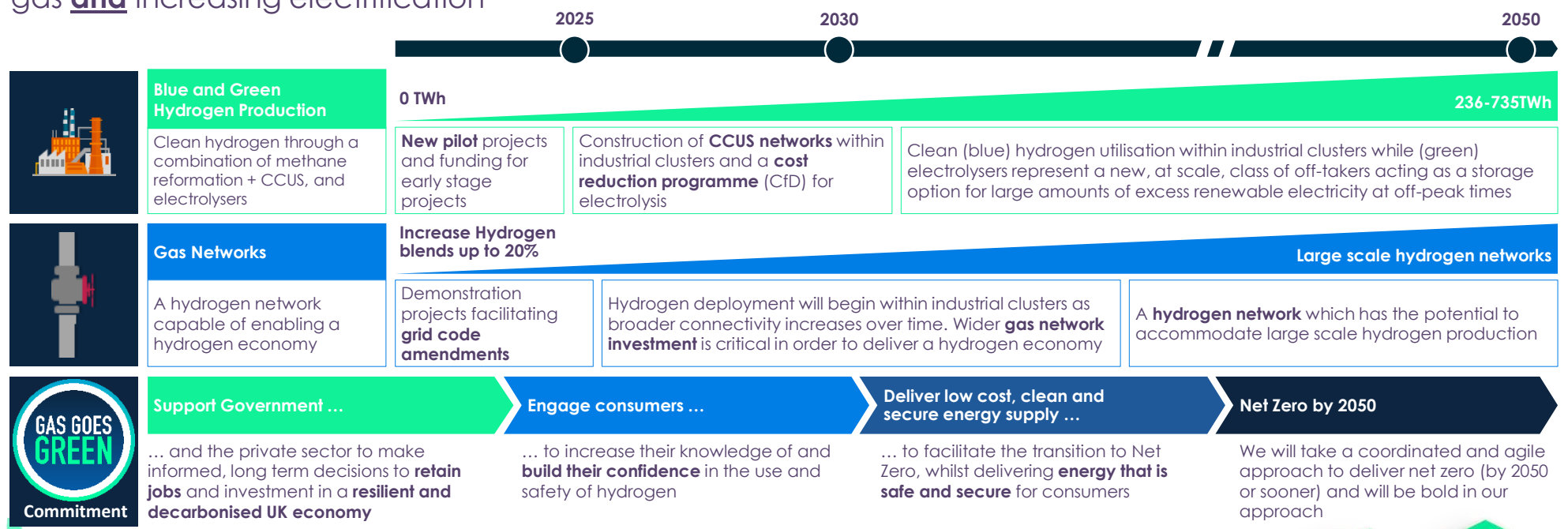
Gas-related emissions along the pathway to net zero





Gas Goes Green is committed to working collaboratively using our extensive experience to support the UK Government in reaching net zero

A whole system approach is key, there is no realistic Net Zero scenario by 2050 which does not involve clean gas **and** increasing electrification



Source: National Grid FES, Element Energy, Navigant,

Working together as an industry



Gas Goes Green



Active members of:

- The Hydrogen Programme Development Group (HPDG, chaired by BEIS)
- Hy4Heat Programme to evaluate the technical viability of distributing hydrogen to decarbonise heat supply

01

Strong support for Net Zero

Among the general public, business, investors and cross-party political will

02

No silver bullet – gas or electric

Delivering Net Zero requires a range of technologies in all scenarios; clean gas or renewable power alone will be insufficient

03

Hydrogen is critical

There's no realistic scenario for delivering Net Zero without a hydrogen economy at its core

04

Huge opportunity for the UK – today

Pilot projects are underway and there's private capital waiting to be deployed

05

Cost of inaction is significant

Further job losses in our industrial heartlands would be inevitable and our ability to hit Net Zero by 2050 in jeopardy

06

New policies are required

We have identified the policy changes needed to unlock private sector investment in the hydrogen economy

07

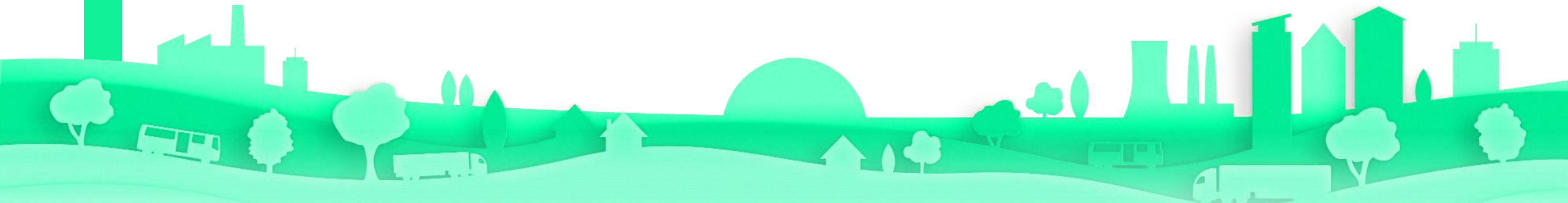
Gas Futures can play a key role

We will work collaboratively with all stakeholders to deliver choice for consumers whilst improving system resilience and minimising cost and disruption



Questions?

- Please write questions or comments in the Teams chat





How we formed the programme

The 2019 'Pathways to Net Zero' report provided:

- An assessment of the role of gas in meeting net zero
- A pathway to reaching net zero using a balanced energy system scenario
- Recommendations on next steps

From this engagement the Gas Goes Green scope of work has been allocated across six workstreams, each of which supports the net zero drive.

WS1. Investing in net zero

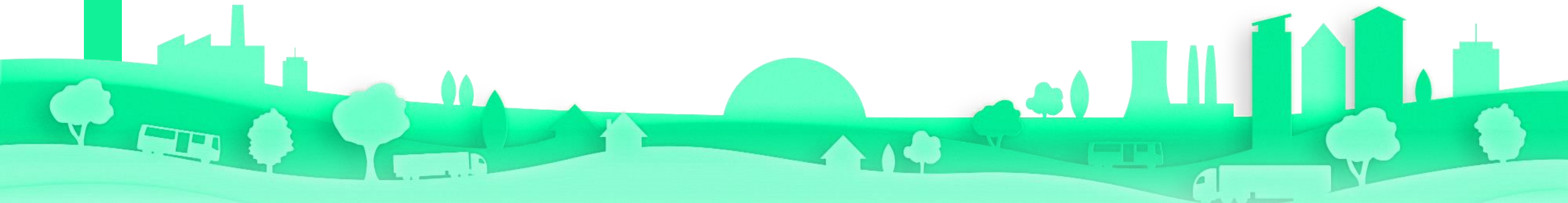
WS2. Gas quality and safety

WS3. Consumer options

WS4. System enhancement

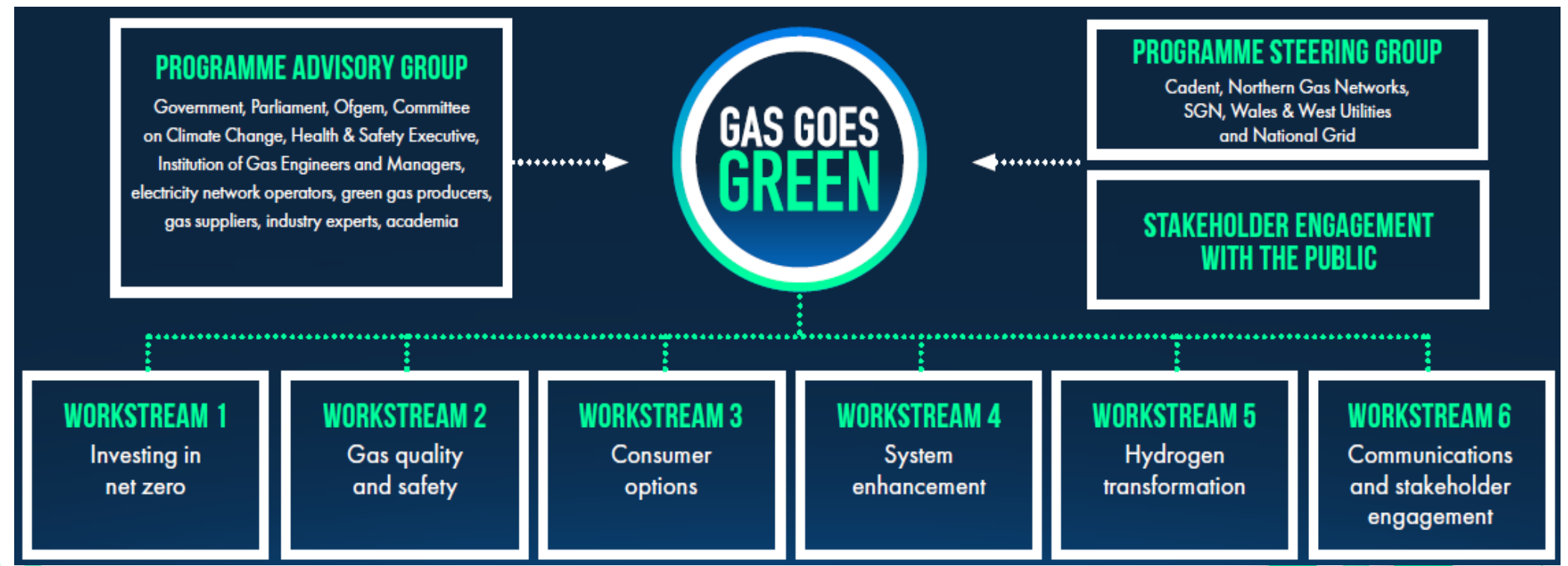
WS5. Hydrogen transformation

WS6. Communications and stakeholder engagement



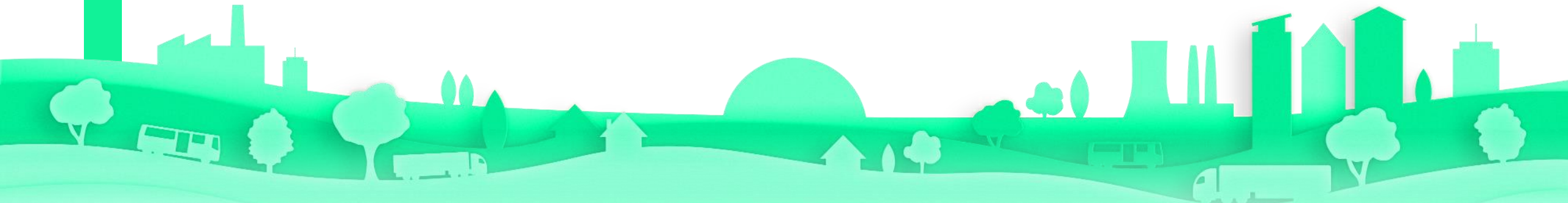
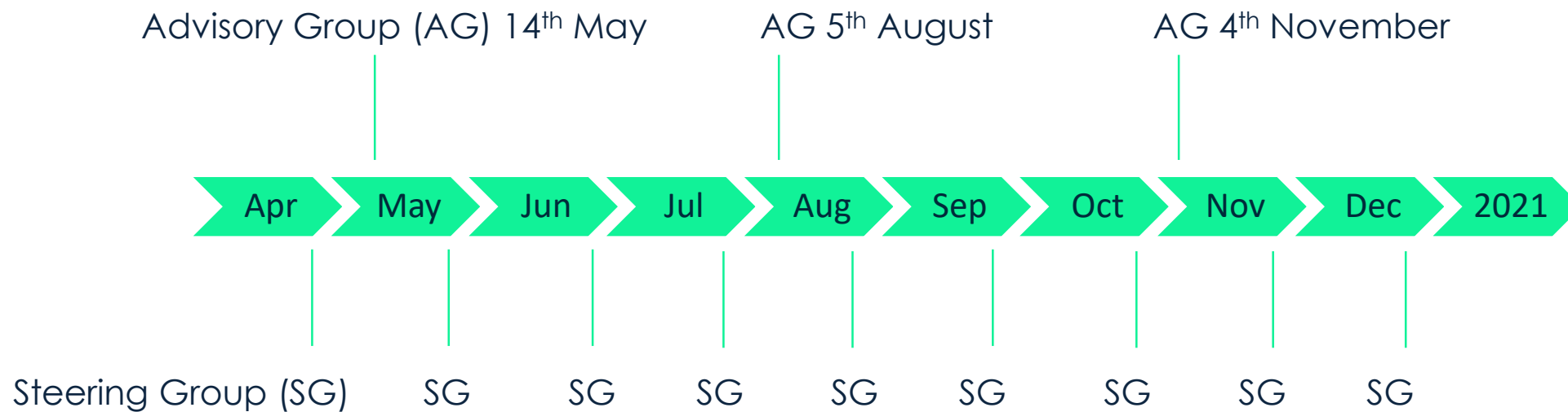


Programme governance





Timeline



Advisory Group - Terms of Reference

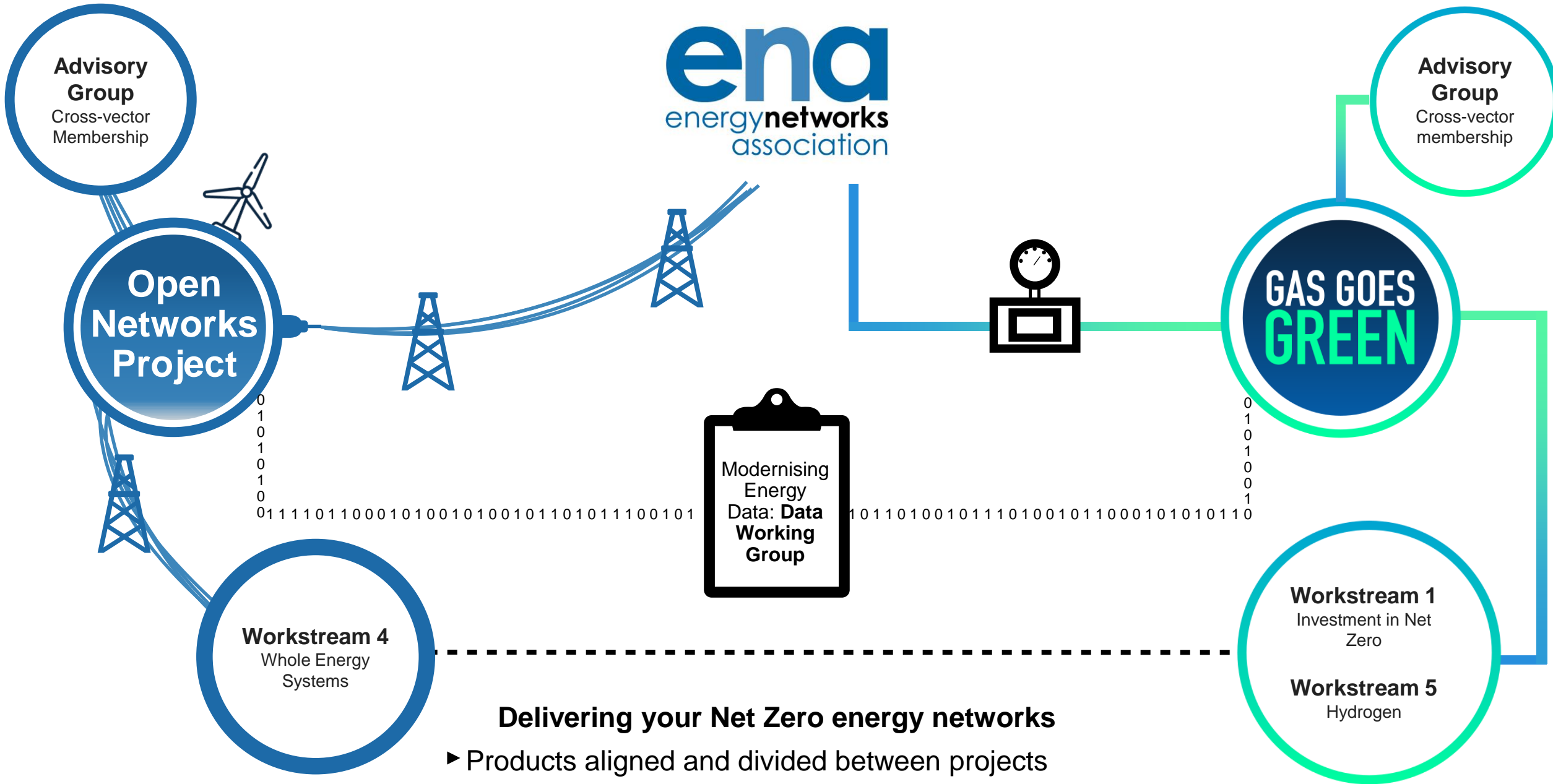
The Advisory Group is essential to our project to:

- Ensure stakeholders are aware and taking Gas Goes Green into account
- Request input from stakeholders to improve the quality of our products
- Increase awareness about programme risks & issues, ask for views on risks & issues and collaboratively resolve where appropriate

The Advisory Group will provide input to:

- Steering Group on programme scope, progress, risks & issues
- Workstreams with deliverable comments/feedback

We will seek to send information in advance of meetings to ensure that views can be sought in advance. Our objective is to encourage open feedback from you all across all of our work.



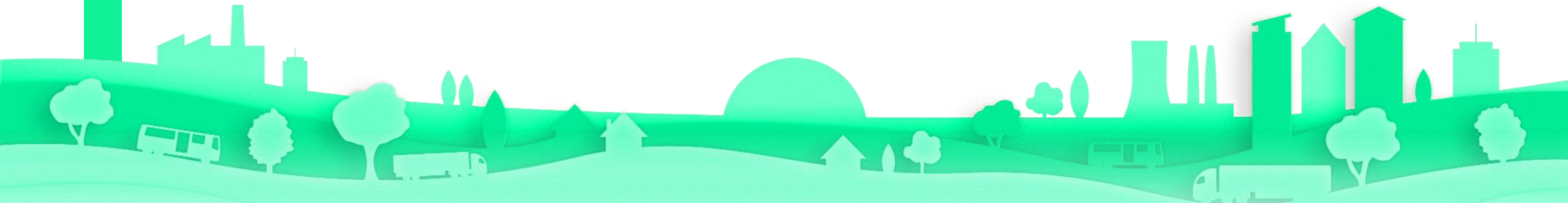
Delivering your Net Zero energy networks

- ▶ Products aligned and divided between projects
- ▶ Cross-over member representation
- ▶ Joint Positions on achieving Net Zero



Questions?

- Please write questions or comments in the Teams chat



Gas Goes Green workstreams and deliverables

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Workstream 1: Investing in net zero

1. Achieving net zero will require the right investment to allow the network to transition
2. UK gas networks have submitted their business plans to Ofgem for the next regulatory period (RIIO2) which details the progress that can be made over the next five years
3. Deliverables will set out the carbon savings that can be achieved through investment in the networks
4. Through the workstream the networks will continue to support delivery of energy efficiency measures to reduce demand and fuel poverty. Greening of the gas grid will also continue, through support for the Renewable Heat Incentive and Industrial Clusters, and in the development of the Green Gas Support Scheme and the green gas levy

Workstream 2: Gas safety and quality

1. Existing gas legislation and regulation will need to change to allow for greater proportions of net zero compliant gases
2. Workstream 2 will support efforts to consider how the Gas Safety (Management) Regulations (GS(M)R) that currently restricts the quantity of hydrogen that can be supplied by the gas system to 0.1% vol., should be changed. Gas Goes Green will hold a workshop in July to support the IGEM consultation on moving quality rules from legislation to a new more flexible industry standard
3. It will also support National Grid's Gas Markets Plan (GMaP) which is considering how gas market frameworks may need to evolve and adapt to support the energy transition and to continue to deliver value for consumers
4. This workstream will also consider gas separation technologies and their potential role in the future energy system through a workshop to be held later in the year

Workstream 3: Consumer options

1. Gas supply and demand are set to change in the net zero world, with green gas transport options and new hydrogen ready domestic appliances
2. This workstream will consider implications of gas and electricity systems becoming increasingly linked and whole systems in their operation. During the transition to net zero emissions, gas vehicles and flexible domestic appliances, like hybrid heating systems, will become commonplace
3. Gas Goes Green will prescribe practical transition pathways for the heavy vehicle sector and for trains and shipping, from fossil based and renewable gas today to a net zero transport future
4. To understand the impacts and opportunities on customers Gas Goes Green will also undertake a review of the long term options for hydrogen storage, production locations and geological suitability and CCUS implications

Workstream 4: System enhancement

1. New connections processes can make it simpler and cheaper to connect to the gas network, and can improve system operation
2. Gas Goes Green will deliver a smarter and more responsive network with changes to gas entry and exit connections, to assets or to services to respond to new network configurations
3. We will evaluate the current standardisation programme and set out proposed next steps to simplify connections and reduce costs. We are creating a new Decentralised Gas Forum to allow members to table items to challenge network practices and to work together to produce policies and procedures
4. Through this workstream we will evaluate network capacity solutions that could increase the gas networks' scope to receive biomethane supplies in areas that have limited local demand and we will assess potential mitigations to fugitive emissions from biomethane transportation and from above ground installations

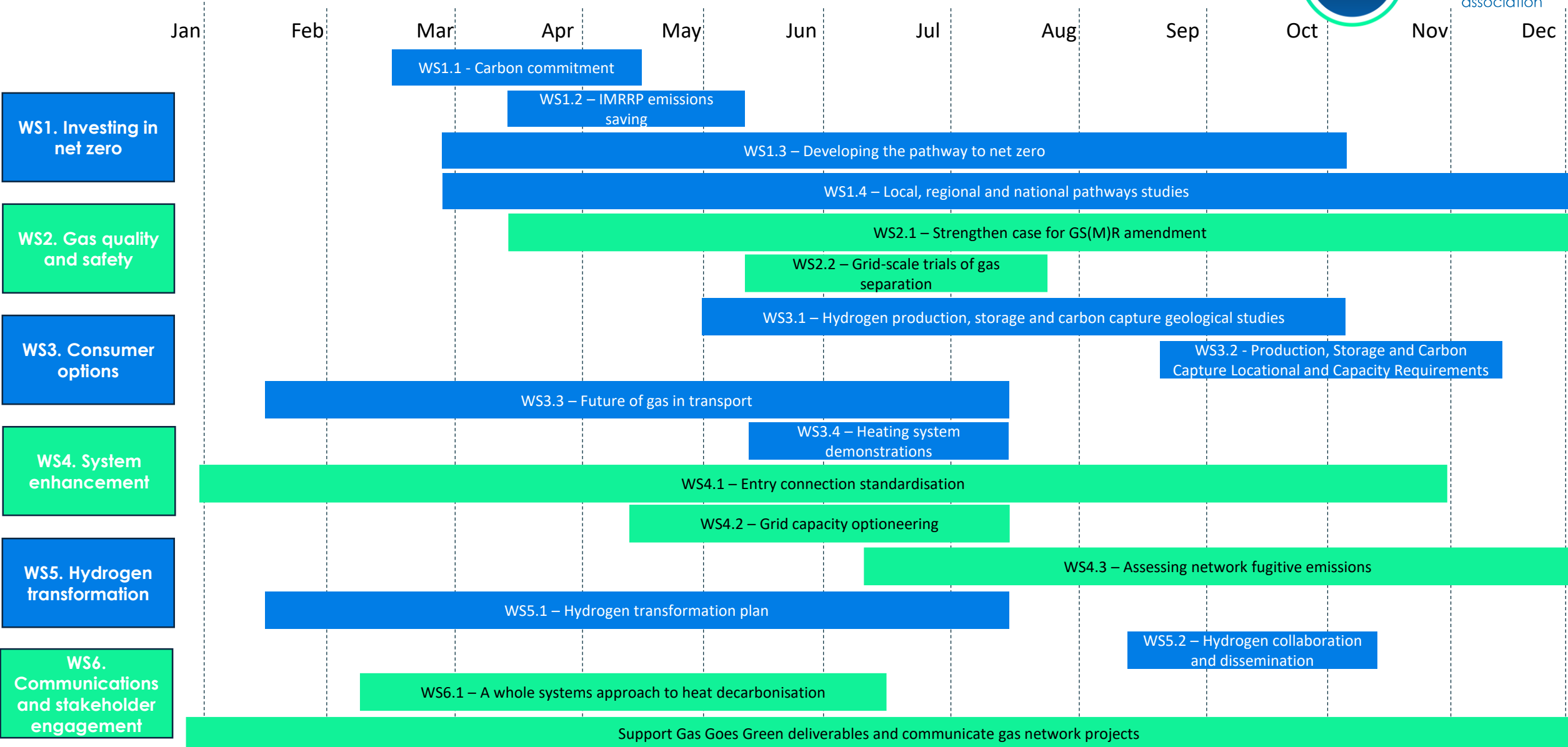
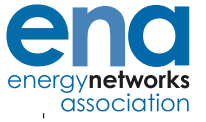
Workstream 5: Hydrogen transformation

1. Hydrogen is critical for delivering net zero, with all major new studies expecting it to have a significant role
2. The gas networks continue to collaborate on major projects to address essential questions relating to the building and operation of new hydrogen and repurposed networks
3. Gas Goes Green will integrate the technical, safety, quality and financial evidence to demonstrate the viability of using the gas networks to transport and distribute 100% hydrogen through existing and new networks
4. We will produce a plan in July that reviews the current technical evidence relating to safety and impacts, assesses transformation and transition options, and charts a course for the trials and pilots that are required

Workstream 6: Communication and stakeholder engagement

1. Stakeholder engagement a key component of Gas Goes Green
2. Quarterly Advisory Group meetings, subject specific events
3. GGG's level of ambition requires technical and operational input from experts and organisations from wider industry
4. Engagement must be worthwhile for participations – i.e. serve individual stakeholder needs (goals, objectives)
5. Regular Programme updates via e-mail
6. Feedback surveys to shape engagement activity

2020 deliverables



Questions?

Where should the network innovation focus be during the next regulatory price control (RIIO2, 2021-2026)?

Multiple choice

- Evidence work around network and asset safety
- Trials of hydrogen in homes
- Developing options for domestic end user appliances
- Supporting industrial decarbonisation
- Supporting policy makers in developing options for the energy system transition
- All of the above
- Other

Update on Deliverable 1.1: Carbon Commitment

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Our R102 carbon commitment

Regulatory and funding mechanisms need to evolve to reflect the pace of delivery required. This includes ensuring that key strategic projects, for example around hydrogen deployment and conversion, can be delivered.

Emissions savings will be delivered as the composition of gas transported and distributed changes, with increased biomethane and hydrogen. Increased efficiencies and renewable alternatives will continue to proliferate.

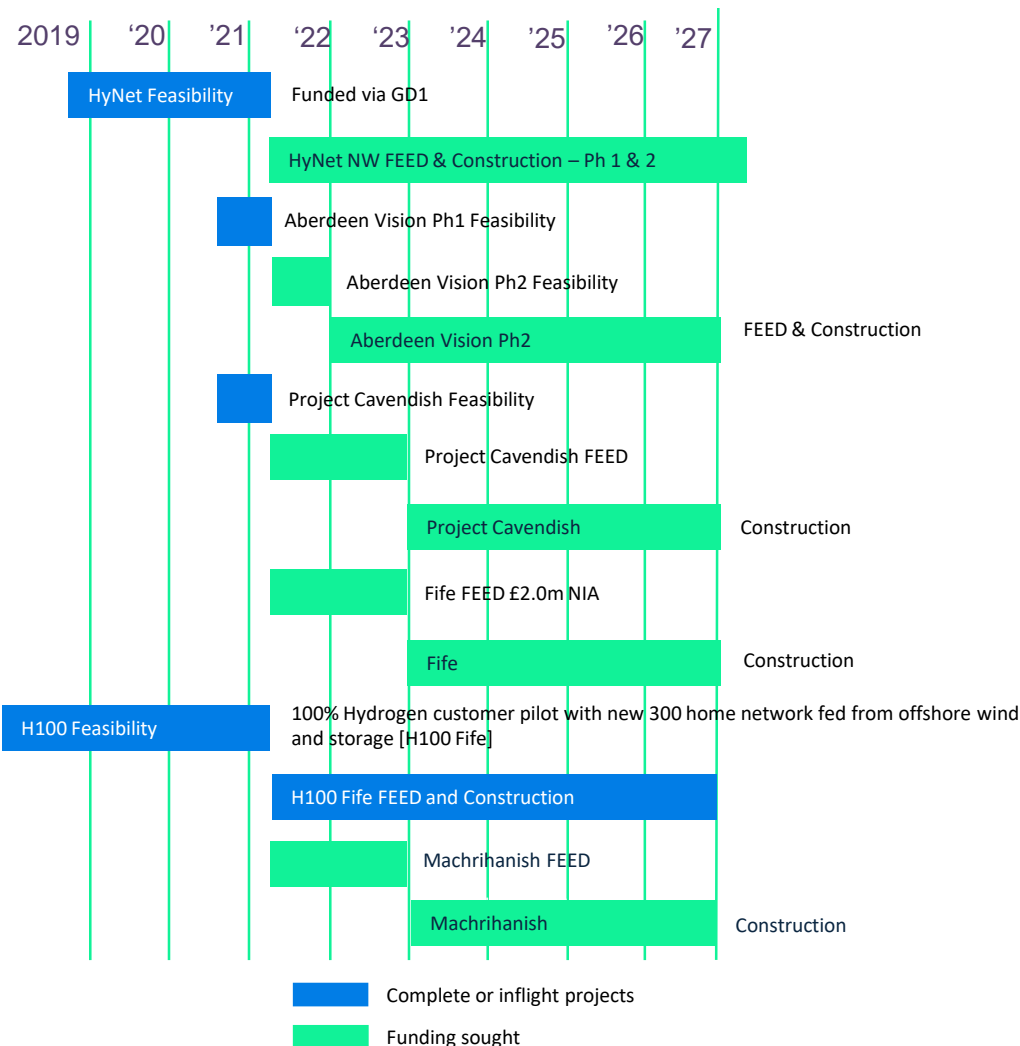
Gas Goes Green sets out the business carbon footprints of the gas network companies that will reduce during the next regulatory period.

Also summarised are the planned and proposed network innovation projects that will provide the evidence and learning required to deliver emissions reductions and an accelerated decarbonisation to a net zero network. The four areas discussed are all necessary to deliver a net zero network, these are:

- New network for 100% hydrogen
- Hydrogen blends
- Repurposing network for 100% hydrogen
- Cross cutting innovation projects



New network for 100% hydrogen



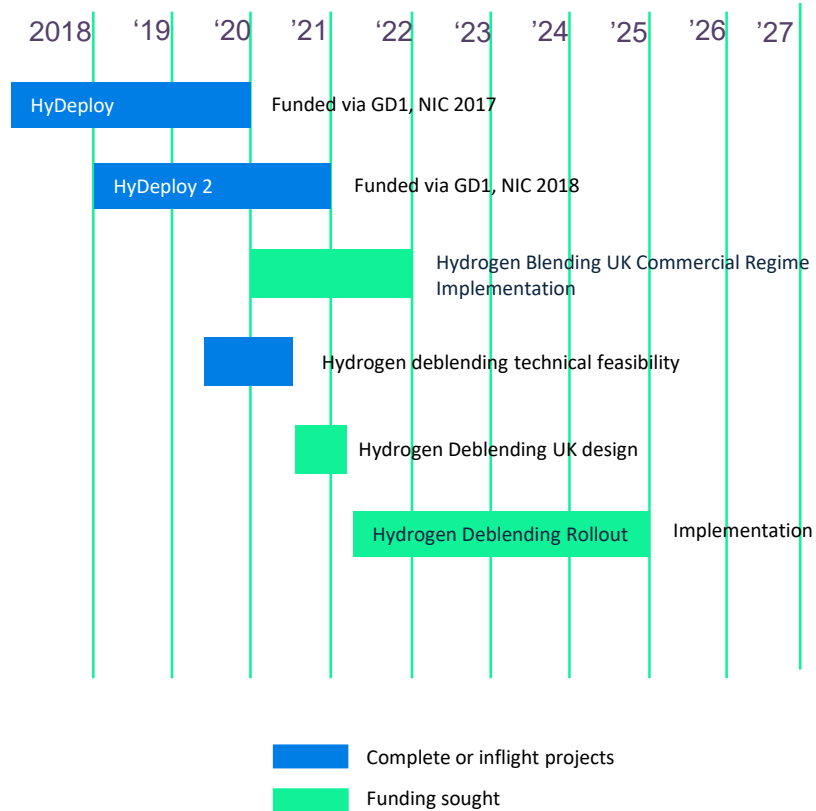
New hydrogen infrastructure associated with industrial clusters

- RII02 investment is driven by regional industrial and CCUS clusters
- BEIS funding has supported pre FEED and FEED for production and storage
- Funding required for the design and construction of new bulk hydrogen pipelines
- Investment to connect production and sources of demand
- Providing hydrogen to industry, power, transport and into the existing network
- Initially as a blend and then allowing transitioning to 100% hydrogen.
- BEIS IDC match funding leveraged for FEED reducing gas consumer contribution.
- GNO's have proposed to fund remaining FEED costs via NIA c £8m.
- Construction costs are subject to be a 'reopener' contingent on a regional cluster passing FID (Final Investment Decision).

First 100% hydrogen domestic consumer pilot

- New purpose built 100% hydrogen distribution network to 300 consumers
- Utilising appliances developed by the BEIS Hy4Heat programme
- Also integrates green hydrogen and storage
- Scottish Government funding obtained £2.5m
- Remainder will be funded via the 2020 GD1 NIC allowance [if successful].

Hydrogen blends



Roll Out of Hydrogen Blending Commercial Regime

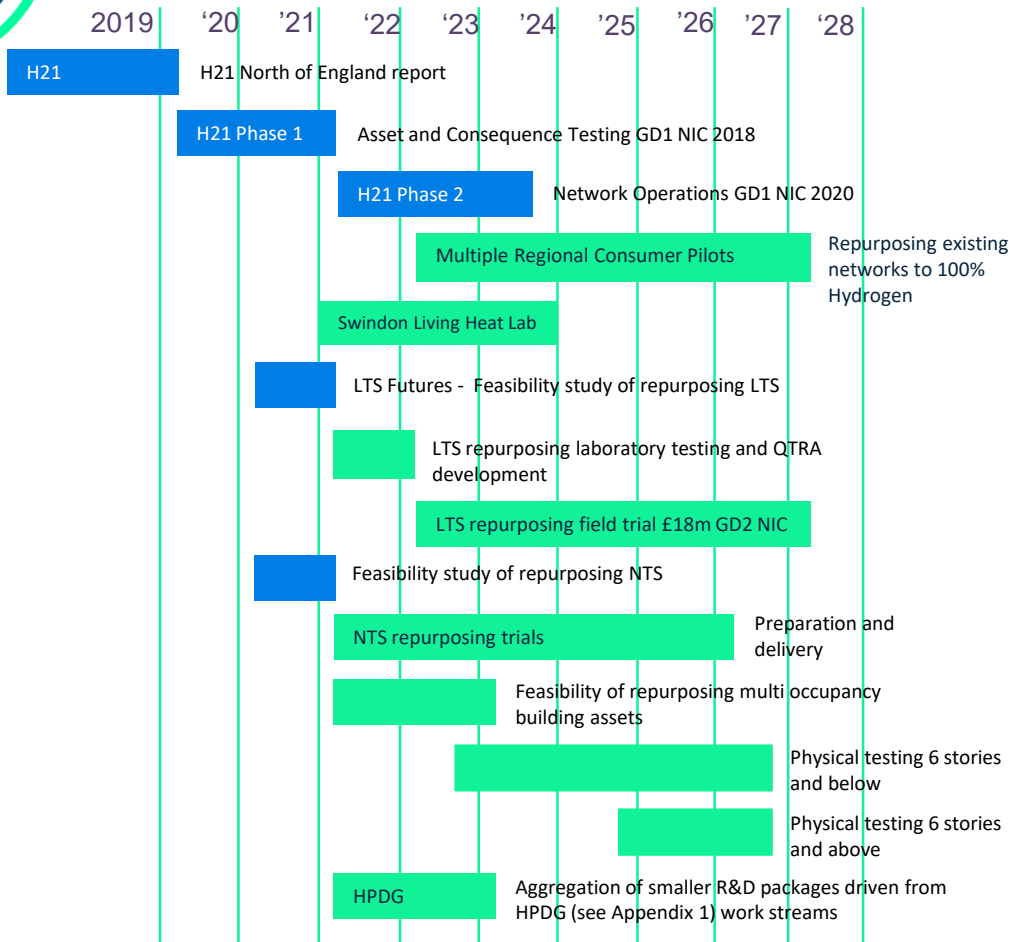
- OFGEM funding during GD1 has delivered the technical evidence to enable blending across the UK.
- Either into the Distribution or Transmission networks.
- GD2 funding required to develop and implement a commercial regime for roll out.
- Market for blending in the network stimulates and scales Hydrogen production market.
- Regime is the first step in the necessary reforms to the gas market.
- Implementation costs are contingent on the timing of HMG policy decisions and the type of revenue support mechanism underpinning this and therefore have been included as a reopener in GD2 submissions.

Deblending technical development and implementation

- Having hydrogen blended into the existing gas networks offers the opportunity via deblending to provide 100% hydrogen for various applications.
- The technical feasibility has successfully been investigated during GD1.
- The GNO's have included funding via NIA and NIC to first design a UK roll out and then construct a subsequent pilot project.



Repurposing network for 100% hydrogen



■ Complete or inflight projects
■ Funding sought

Consumer pilots with repurposed networks

- Ofgem funding during GD1 has delivered the technical evidence to enable repurposing of the below 7 bar network via the H21 projects.
- In parallel the BEIS Hy4Heat programme has established the safety case for the conveyance of hydrogen in domestic dwellings and developed 100% hydrogen appliances.
- During GD2 BEIS has requested that the networks undertake a number of large scale customer pilots with 100% hydrogen. The first would be a new purpose built network [included in new network for 100%] with new hydrogen appliances followed by three further pilots all involving repurposing existing networks. The GNO's have proposed reopeners to fund these pilots.

Repurposing transmission assets

- The GNO's have moved on in the last years of GD1 to examine the feasibility and opportunity of repurposing the UK's LTS & NTS assets. They have proposed funding by NIA and NIC in GD2 to progress this from desk top studies into lab testing and field trials.

Hydrogen use in multi occupancy buildings

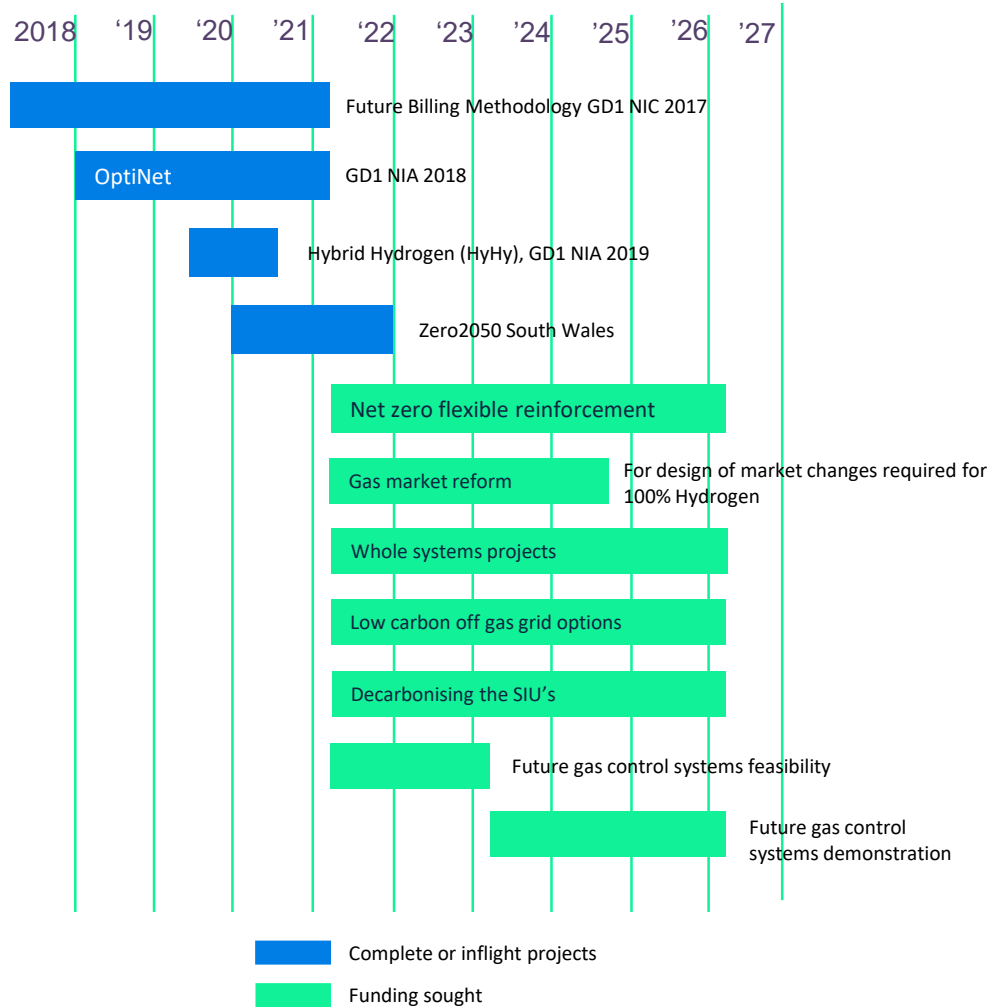
- The re-use of gas assets in high rise buildings has not yet been investigated. The GNO's have included funding first to assess the feasibility (via NIA) and if proven to be of value to consumers, further physical testing and assessment on real world assets.

BEIS hydrogen grid R&D programme

- The HPDG workstreams have identified a portfolio of smaller packages of R&D which the GNO have made NIA funding provision in their submissions.



Cross cutting innovation projects



Net zero flexible reinforcement

- Capacity investment required in the networks to support cross sector decarbonisation, including flexible power generation and Bio CNG fuelling station connections for heavy duty vehicles. In particular there is currently no mechanism that supports capacity investment to enable more green gas connections both for Biomethane now and hydrogen in the future. GNO's propose a reopener or new 'mechanism' to support this.

Gas market reform

- Reform of the current market operation arrangements are required if the UK is to transition to 100% hydrogen. Consideration is also required along the transition with regard to the role of blended hydrogen [covered in the Blending commercial regime] and the implications any regional roll out. The GNO's have requested NIA funding to design and develop this pathway identifying changes to UNC.

Future gas network control systems

- The future gas networks will need to be more actively controlled with the further expansion of distributed gas injection and the proliferation of peaking power generation supporting the decarbonisation of the electricity networks. The GNO's have proposed first to carry out a feasibility study (funded by NIA) of how gas and electricity network data and comms can be utilised for whole system optimisation. Subsequent demonstration projects would be funded via NIC.

Closing remarks

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Next steps

- ENA will share updates on Gas Goes Green via our newsletter
- Minutes from this meeting and the results of the questions we asked will be available via our website



Contacts

If you have any feedback or would like to register your interest in joining the Advisory Group please email

GasGoesGreen@energynetworks.org