The Voice of the Networks

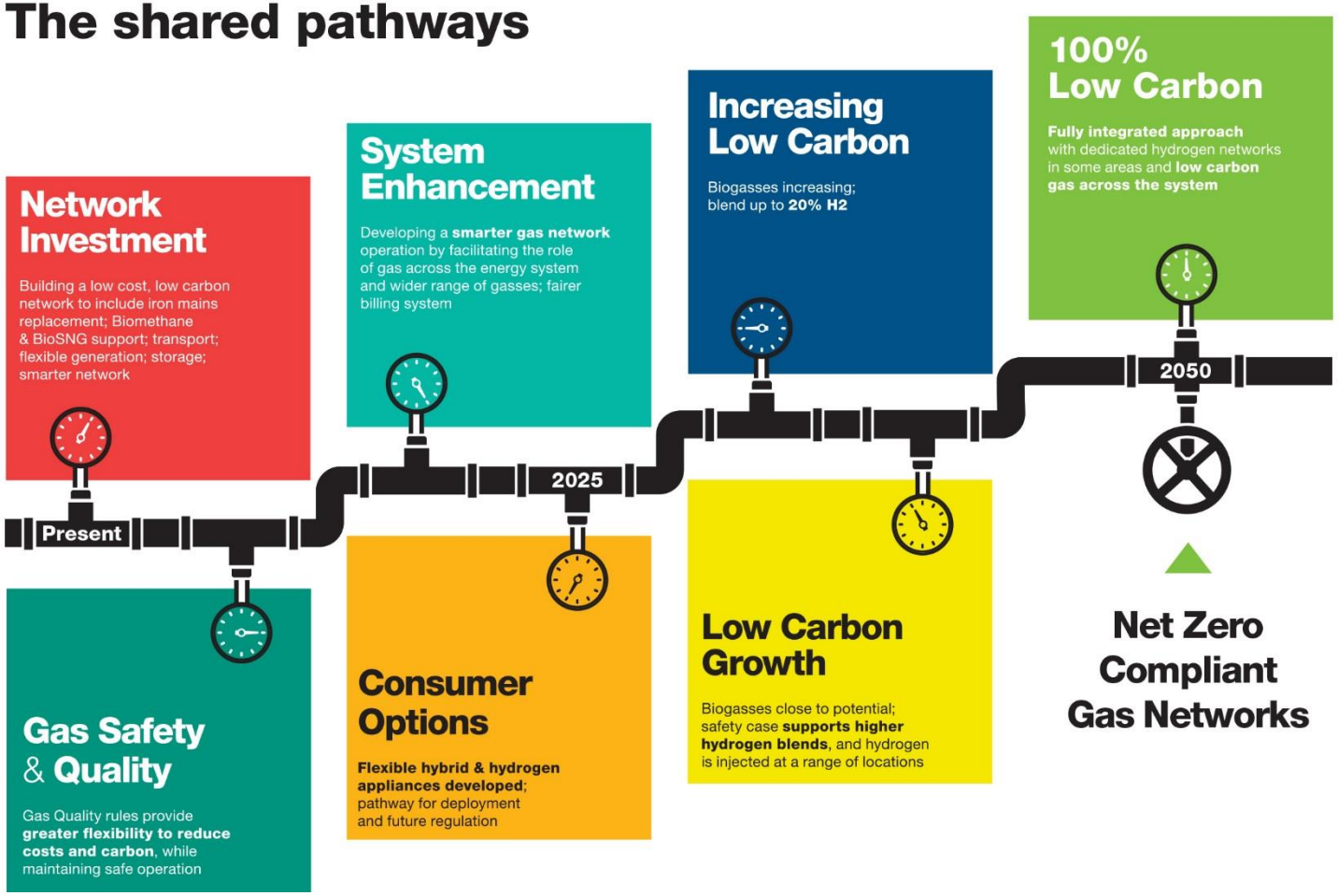
Energy Networks Association

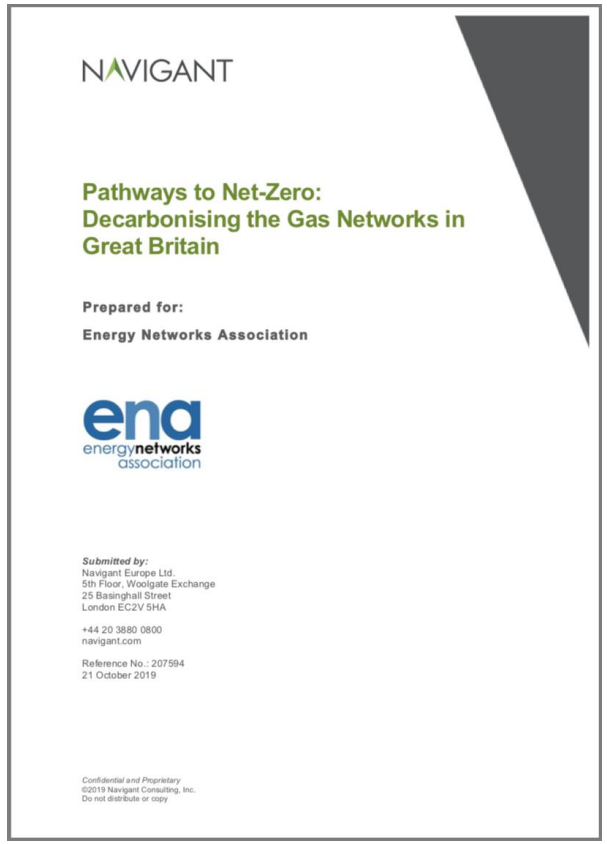
Gas Decarbonisation Pathways Programme

25 March 2020

ENA's Pathways Programme

The shared pathways

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Pathways to Net-Zero: Decarbonising the Gas Networks in Great Britain

Prepared for:

Energy Networks Association

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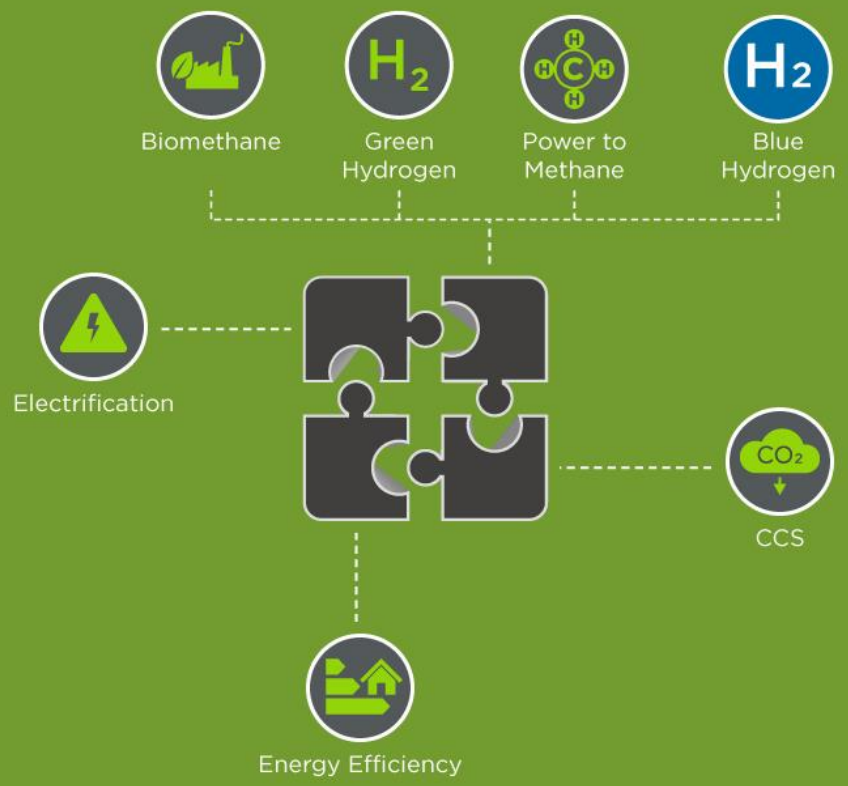
Biomethane and hydrogen can provide a substantive portion of our energy supply in a decarbonised energy system, complementing electrification and energy efficiency measures

A Balanced Combination of Low Carbon Gases and Electricity



End State Highlights:

- **Hydrogen Clusters** developed around
  - Anchor industrial consumers
  - Blue hydrogen and CCS projects
- **Biomethane** production incentivised for injection into the gas networks
  - Anerobic Digestion
  - Bio-SNG (thermal gasification)
- **Regionalised** gas deployment
- Widespread deployment of **hybrid heat systems**
  - Electric heat pump; plus
  - Low carbon/renewable gas boiler
- Improvements in **energy efficiency** through building renovation
- **Negative emissions** to offset hard to decarbonise sources

A balanced combination of low carbon gases and electricity

The optimal way to decarbonise Great Britain's energy system and reach net-zero emissions

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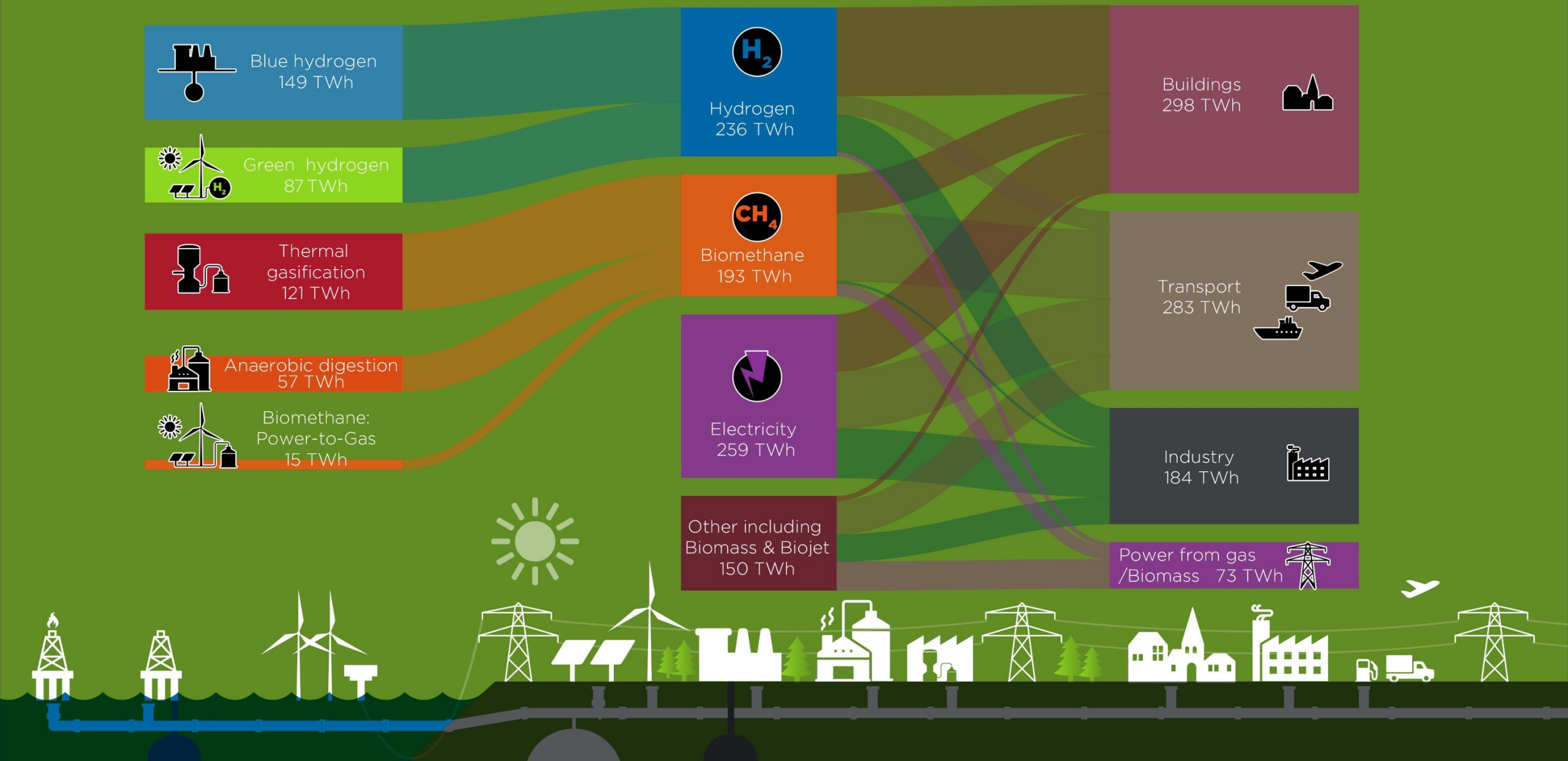

Pathway to 2050

How the gas sector can contribute step-by-step to the decarbonisation of Great Britain's energy system

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1 Preparing for Transition

Strategic, technical and policy planning to enable low carbon gases to play a significant role in GB's transition to net-zero, while maintaining safe and reliable operation

2 Facilitating Connections

More anaerobic digestion (AD) biomethane plants connected to the gas grid

Preparations accelerate for first hydrogen projects

Ramp up energy efficiency improvements throughout GB

3 Expanding Supply

First hydrogen projects integrated with carbon capture, utilisation & storage (CCUS) and anchored by baseload consumers, likely from industry and transport.

Continuing scale-up of biomethane supply

4 Expanding the Demand Base

Hydrogen use extends to commercial and residential consumers near the first hydrogen projects, initially via low blends (up to 20%) but developing into 100% hydrogen clusters

Consumers in other regions continue to receive natural gas, with rising blends of biomethane

5 Increasing Low Carbon Gases

Hydrogen clusters spread and connect to become extensive hydrogen zones, enabled by an evolving, carefully managed National Transmission System (NTS)

Greater volumes and diversification of low carbon gas supply as more production methods mature technically and economically

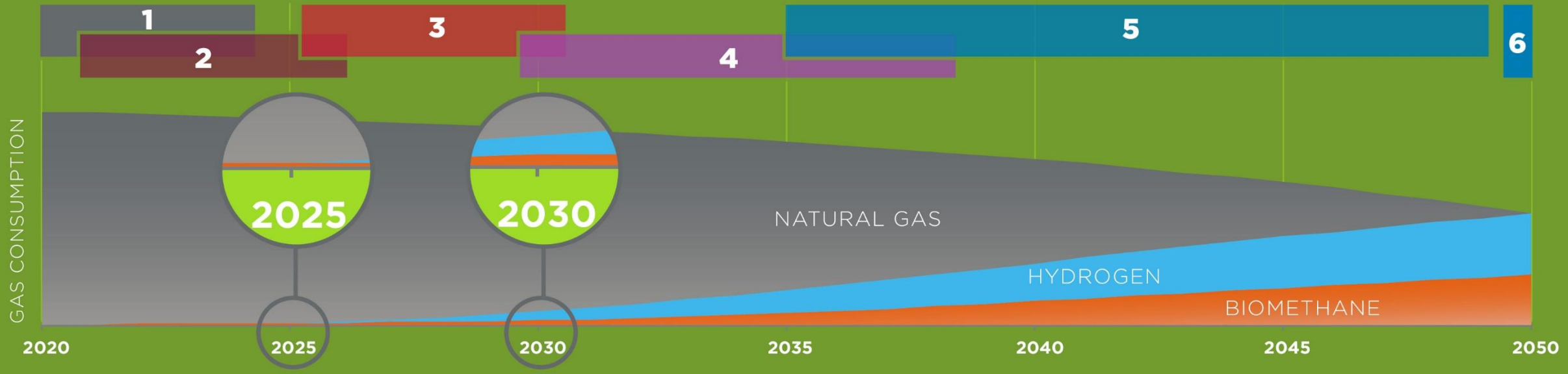
6 100% Low Carbon Gases

Low carbon gases fully integrated across the GB energy system, with distinct regional solutions

All gas end-users are supplied with hydrogen and/or biomethane, the principal type varying by region

Natural gas no longer used, unless abated with CCUS for blue hydrogen production

Net-zero energy system achieved in 2050



Action is required during the RIIO-2 period to support the Pathways to Net Zero

Facilitate biomethane injection

Trial and implement solutions to facilitate increased biomethane injection

LEAD: **GAS NETWORKS**

SUPPORT: **OFGEM, BEIS, GAS PRODUCERS**

Standardise gas network connection requirements

Develop a common connection regime to simplify the connection process and lower project costs

LEAD: **GAS NETWORKS**

SUPPORT: **OFGEM, BEIS, GAS PRODUCERS**

Mandate hydrogen ready boilers

New appliance installations to be "Hydrogen Ready" once commercially available to make part of regular appliance replacement and upgrades

LEAD: **NATIONAL GOVERNMENT**

SUPPORT: **LOCAL GOVERNMENT, DOWNSTREAM GAS INDUSTRY**

Gas safety, metering and billing regulations

Modify regulations to enable hydrogen injection, remove the need to add propane to biomethane and accurately bill customers for their actual energy use

LEAD: **NATIONAL GOVERNMENT**

SUPPORT: **LOCAL GOVERNMENT, DOWNSTREAM GAS INDUSTRY**

Incentivising and financing the energy transition

Introduce an energy efficiency policy frame-work and funding mechanism

Support for emerging low carbon and renewable gas production technologies

Compensation for any potential adverse impacts of the low carbon transition (fuel poverty, industrial competitiveness)

LEAD: **NATIONAL GOVERNMENT**

SUPPORT: **OFGEM**

CCUS implementation

A number of aspects need to be considered for successful implementation, including the policy framework and funding mechanisms

LEAD: **NATIONAL GOVERNMENT**

SUPPORT: **UPSTREAM GAS INDUSTRY**

Repurposing high pressure networks for hydrogen

Conduct trials to demonstrate hydrogen compatibility of gas networks and explore gas separation technology at hydrogen cluster(s)

LEAD: **GAS NETWORKS**

SUPPORT: **HSE, IGEM, UPSTREAM GAS INDUSTRY**

Hydrogen storage needs

Examine the potential future storage requirements for hydrogen and funding means

LEAD: **GAS NETWORKS**

SUPPORT: **BEIS, OFGEM**

Low carbon trials including dedicated hydrogen production and hybrid heat systems

Scale up demonstration – including using hydrogen fuelled hybrids – in order to improve evidence base and prepare for mass market roll-out

LEAD: **DOWNSTREAM GAS INDUSTRY**

SUPPORT: **GAS NETWORKS, NATIONAL OR LOCAL GOVERNMENT**

Raising awareness

Communicate the need and mechanisms for end users to switch to low carbon and renewable gas heating technologies

LEAD: **NATIONAL GOVERNMENT**

SUPPORT: **LOCAL GOVERNMENT, GAS NETWORKS, DOWNSTREAM GAS INDUSTRY**

Developing UK skills and labour capacity

Develop skills and labour capacity to deliver the transition to a decarbonised energy system

LEAD: **NATIONAL GOVERNMENT**

SUPPORT: **LOCAL GOVERNMENT, GAS NETWORKS, UPSTREAM & DOWNSTREAM GAS INDUSTRY**

Increasing Green Gas Volumes

Legislation

Developing Policy Frameworks

Feasibility and Demonstration

Skills and Communication