Grid Guide to the **Future of Gas**

nationalgrid

January 2021

Cautionary Statement

This presentation contains certain statements that are neither reported financial results nor other historical information. These statements are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. These statements include information with respect to National Grid's (the Company) financial condition, its results of operations and businesses, strategy, plans and objectives. Words such as 'aims', 'anticipates', 'expects', 'should', 'intends', 'plans', 'believes', 'outlook', 'seeks', 'estimates', 'targets', 'may', 'will', 'continue', 'project' and similar expressions, as well as statements in the future tense, identify forward-looking statements. These forward-looking statements are not guarantees of National Grid's future performance and are subject to assumptions, risks and uncertainties that could cause actual future results to differ materially from those expressed in or implied by such forward-looking statements. Many of these assumptions, risks and uncertainties relate to factors that are beyond National Grid's ability to control, predict or estimate precisely, such as the impact of COVID-19 on its operations, employees, counterparties, funding and legal and regulatory obligations, but also more widely in terms of changes in laws or regulations, including any arising as a result of the United Kingdom's exit from the European Union; announcements from and decisions by governmental bodies or regulators, including those relating to the RIIO-T2 price control, as well as increased political and economic uncertainty resulting from COVID-19; the timing of construction and delivery by third parties of new generation projects requiring connection; breaches of, or changes in, environmental, climate change and health and safety laws or regulations, including breaches or other incidents arising from the potentially harmful nature of its activities; network failure or interruption, the inability to carry out critical non-network operations and damage to infrastructure, due to adverse weather conditions including the impact of major storms as well as the results of climate change, due to counterparties being unable to deliver physical commodities, or due to the failure of or unauthorised access to or deliberate breaches of National Grid's IT systems and supporting technology; failure to adequately forecast and respond to disruptions in energy supply; performance against regulatory targets and standards and against National Grid's peers with the aim of delivering stakeholder expectations regarding costs and efficiency savings; and customers and counterparties (including financial institutions) failing to perform their obligations to the Company. Other factors that could cause actual results to differ materially from those described in this presentation include fluctuations in exchange rates, interest rates and commodity price indices; restrictions and conditions (including filing requirements) in National Grid's borrowing and debt arrangements, funding costs and access to financing; regulatory requirements for the Company to maintain financial resources in certain parts of its business and restrictions on some subsidiaries' transactions such as paying dividends, lending or levying charges; the delayed timing of recoveries and payments in National Grid's regulated businesses and whether aspects of its activities are contestable; the funding requirements and performance of National Grid's pension schemes and other post-retirement benefit schemes; the failure to attract, develop and retain employees with the necessary competencies, including leadership and business capabilities, and any significant disputes arising with National Grid's employees or the breach of laws or regulations by its employees; the failure to respond to market developments, including competition for onshore transmission, the threats and opportunities presented by emerging technology; the failure by the Company to respond to or meet its own commitments as a leader in relation to climate change development activities relating to energy transition, including the integration of distributed energy resources; and the need to grow the Company's business to deliver its strategy, as well as incorrect or unforeseen assumptions or conclusions (including unanticipated costs and liabilities) relating to business development activity. For further details regarding these and other assumptions, risks and uncertainties that may impact National Grid, please read the Strategic Report section and the 'Risk factors' on pages 227 to 230 of National Grid's most recent Annual Report and Accounts, as updated by National Grid's unaudited half-year financial information for the six months ended 30 September 2020, published on 12 November 2020. In addition, new factors emerge from time to time and National Grid cannot assess the potential impact of any such factor on its activities or the extent to which any factor, or combination of factors, may cause actual future results to differ materially from those contained in any forward-looking statement. Except as may be required by law or regulation, the Company undertakes no obligation to update any of its forward-looking statements, which speak only as of the date of this presentation.

Grid Guide to the **Future of Gas**

Nick Ashworth

Director of Investor Relations

nationalgrid

To ask a question

Ask our speakers a question live by joining the

conference call

United Kingdom: 0800 640 6441

United States: 1 646 664 1960

All other locations: +44 20 3936 2999

Participant access code

560619

You will be greeted by an operator to register

Alternatively, you can type your question by using the 'Ask a question' box in your

Webcast window

You can submit as many questions as you like

Grid Guide to the **Future of Gas**

John Pettigrew
Chief Executive

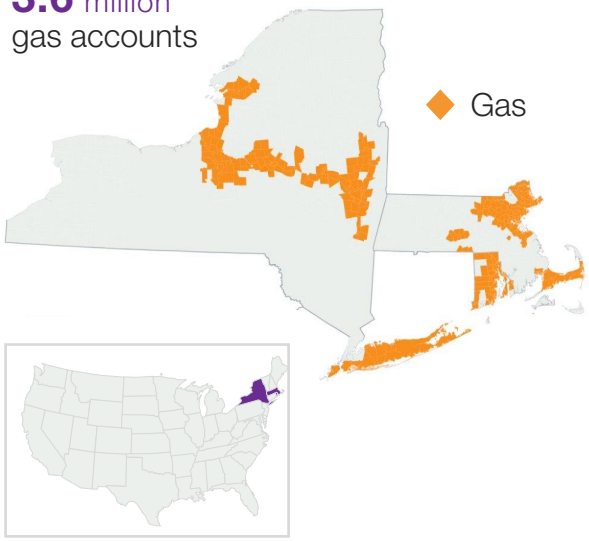
nationalgrid

Our gas infrastructure assets

Gas distribution
North Eastern United States

36,000 miles
of natural gas pipeline in
New York, Massachusetts, Rhode Island

3.6 million
gas accounts



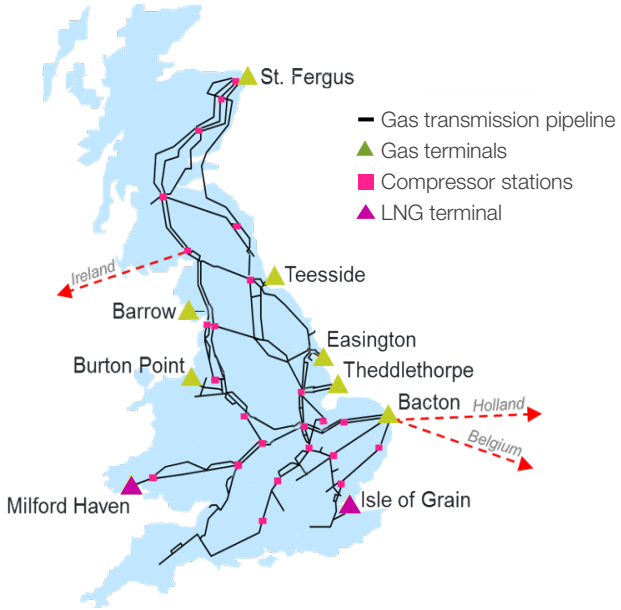
Gas transmission
Great Britain

7,630km
high-pressure pipe

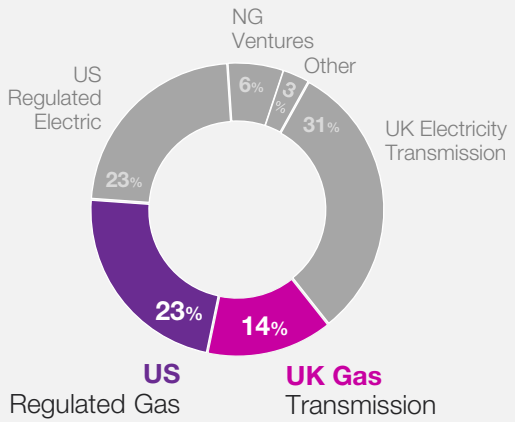
24
compressor stations

504
above-ground
installations

8
connected
distribution networks



Assets by segment[1]
as at 31 March 2020



1 Net assets excluding debt / funding balances

Why gas matters

annual
gas demand

3 times

annual
electricity demand

Gas has a role in decarbonising industry, heavy goods vehicles and shipping

UK

22 million
homes using gas

implies conversion of
c.20,000 homes
every week from
2025 to 2050 to decarbonise

US

3.6 million
gas accounts

implies conversion of
c.2,300 homes
every week

Research backs a balanced approach

- Future energy scenarios
- Committee on Climate Change

Working with US policy makers

Collaborating with NYC Mayor's Office and Con Edison

- Analytical assessment
- Portfolio of solutions to be carbon neutral
- Gas networks can be reimagined
- Existing infrastructure key to reaching net zero

Balancing long term and near term focus

- Need to invest for safety and reliability
- Continue to work with Regulators
  - Multi year settlements
  - Protection against cost pressures
  - Incentives to create value for customers

Working with UK policy makers

Recent policy announcements

- Highlighted wider role gas needs to play
- Collaboration led to fast pace of development
- Recognise gas has a critical role
  - Energy security
  - Economic contribution
- Scaling up of hydrogen by 2030
- Faster development of CCS

Clear focus on

- Balance of technologies being needed
- Decarbonised gas and electricity complementing each other
- Addressing the challenges of all our gas assets

Summary

- Gas has a key role accelerating progress to net zero
- Working collaboratively with all key stakeholders
- Investment levels becoming evident
- Proud of the achievements to date

nationalgrid

Grid Guide to the **Future of Gas**

Cordi O'Hara
Chief Operating Officer, US Gas Business

nationalgrid

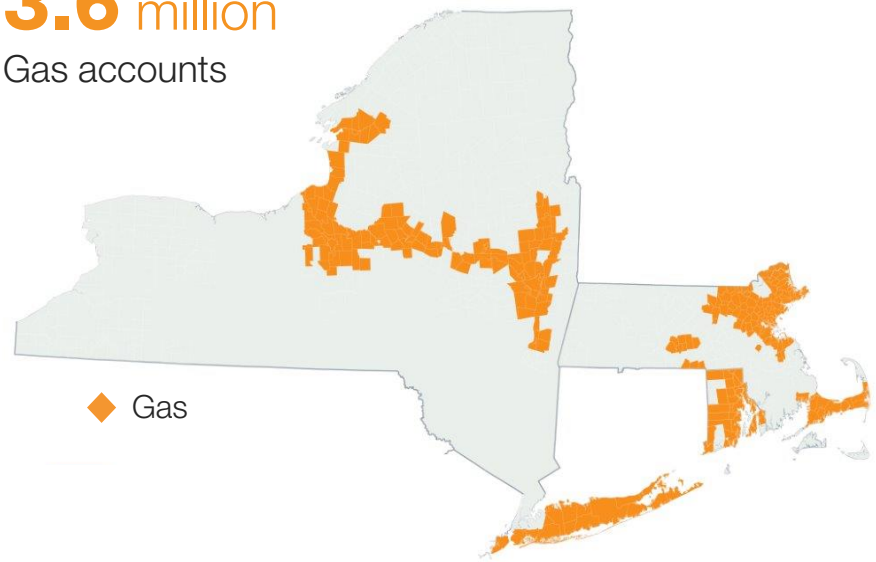
US Gas Business overview

36,000

Miles of natural gas pipeline in
New York, Massachusetts, Rhode Island

3.6 million

Gas accounts



Gas demand and growth

Design-Day Peak Gas Demand (Bbtu)

Service Territory	Winter '20/'21	Projected '20-'25 CAGR
Downstate NY	2,774	2.3%
Upstate NY	898	0.9%
Massachusetts	1,404	2.1%
Rhode Island	383	2.0%
Total	**5,458**	**2.0%**

Demand growth driven primarily by customer conversions to gas, new households, and increases in business and economic activity (e.g. construction of new commercial space)

US Northeast decarbonization goals

Massachusetts:

- **Global Warming Solutions Act of 2008:** Calls for 80% reduction in GHG emissions below statewide 1990 levels by 2050
- Executive action has committed MA to net-zero by 2050

New York:

- **Climate Leadership and Community Protection Act (CLCPA) of 2019:** Calls for an 85% reduction in GHG emissions by 2050

Rhode Island:

- Non-binding goals for GHG emissions reductions of 10% below 1990 levels by 2020; 45% by 2035; and 80% by 2050

Our plans: net zero by 2050

Responsible Business Charter (UK/US)

- **Commitment:** Reduce Scope 3 GHG emissions for the electricity and gas we sell to our customers by 20% by 2030 from a 2016 baseline
- **Ambition:** Further reduce our Scope 3 emissions from selling gas to our customers beyond 2030 to be consistent with the targets set by the markets in which we operate (e.g. net zero by 2050)

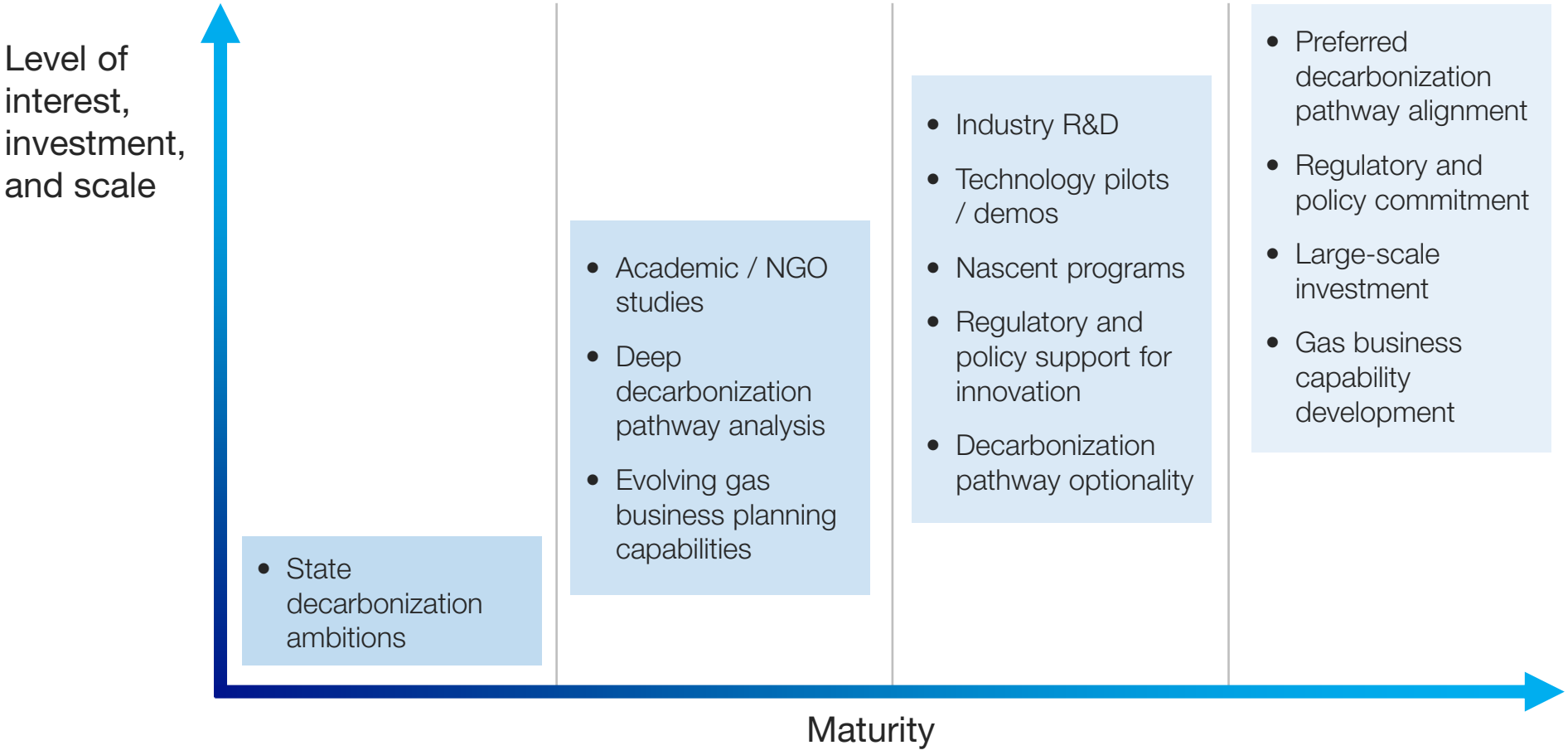
NGUSA Net Zero by 2050 Ambition

(5 of 10 Pillars include the Future of Gas)

- Decarbonizing the gas network with renewable natural gas and hydrogen
- Integrating innovative technologies to decarbonize heat, incl. heat pumps and geothermal networks
- Reducing demand through energy efficiency and demand response
- Reducing methane emissions from our own gas network while working with the industry to reduce emissions through the entire value chain, and
- Investing in large scale carbon management technologies (e.g., CCS, offsets)

Evolving US landscape

Gas network decarbonization



Grid Guide to the **Future of Gas**

Sheri Givens

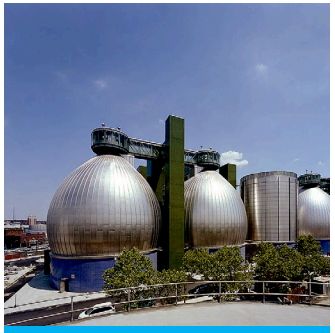
Vice President, US Regulatory
& Customer Strategy

nationalgrid

Today's gas network as an energy network in transformation

Networks deliver molecules, and those molecules will look different in 2050 as we:

- **Scale RNG from sustainable biomass feedstocks**
  - Newtown Creek Wastewater Treatment Plan (Q2 2021)
  - NY RNG Interconnection Guidelines (in use)
- **Lay the foundation for hydrogen use**
  - NYSERDA/Stony Brook University Hydrogen Blending Demonstration Project (2019-2021)
  - Research Partnerships
- **Create policy frameworks to support RNG and hydrogen**



RNG/Biomass

Hydrogen

Power-to-Gas

Advancing the energy network of tomorrow

Aligning Internal Capabilities and Support

- Adoption of RNG interconnection standards
- Dedicated “Future of Heat” engineering group

Proposals:

- **Massachusetts:** Two Phase Project: (1) Hydrogen Blending Campus Study and (2) Network Hydrogen Blending Study (up to 1,000 customers)
- **New York:** Interconnection incentives for two projects annually and for central digester interconnection.
  - Multi-Use Hydrogen Facility, in partnership with Standard Hydrogen Corporation and located at an industrial site
- **Rhode Island:** Proposing amendment to the Advanced Gas Technology program to allow program to support decarbonization projects, including hydrogen

Next Steps:

- **All NG States:** RNG Procurement Program (1 to 5% of annual supply within 5 years)
- Building Policy Frameworks to Scale Supply, Demand, End-Use
- U.S. Department of Energy Research Project: HyBlend

Advancing the energy network of tomorrow: HyBlend

US DOE HyBlend Project (2020-2022)

- NG playing a leadership role in this research effort which includes six national laboratories and twenty industry partners, including major utilities
  - Builds upon NG partnership with Stony Brook University founding the Institute of Gas Innovation and Technology
- $12.5 million hydrogen blending research project focused on eliminating technical barriers to blending hydrogen in natural gas pipelines
- Main research areas include:
  - **Hydrogen compatibility evaluation** of piping and pipelines, including metal and polymer materials;
  - **Life-cycle emissions analysis** of technologies using hydrogen and blends; and
  - **Techno-economic analysis** quantifying the costs and opportunities for hydrogen production and blending in the energy network

Grid Guide to the **Future of Gas**

Antony Green
Project Director – Hydrogen

nationalgrid

Repurposing UK gas transmission assets

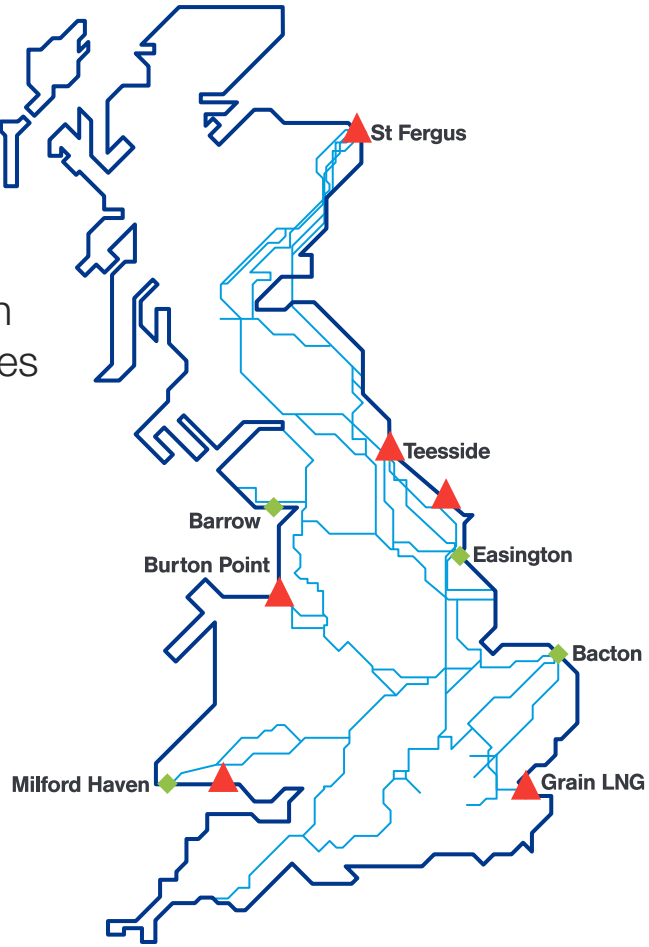
HyNTS > **Hy**drogen into the **N**ational **T**ransmission **S**ystem is our programme of hydrogen research

Network Capacity

First results from a model of the NTS converted to hydrogen demonstrate that the current infrastructure can carry the required volumes of hydrogen in 2050.

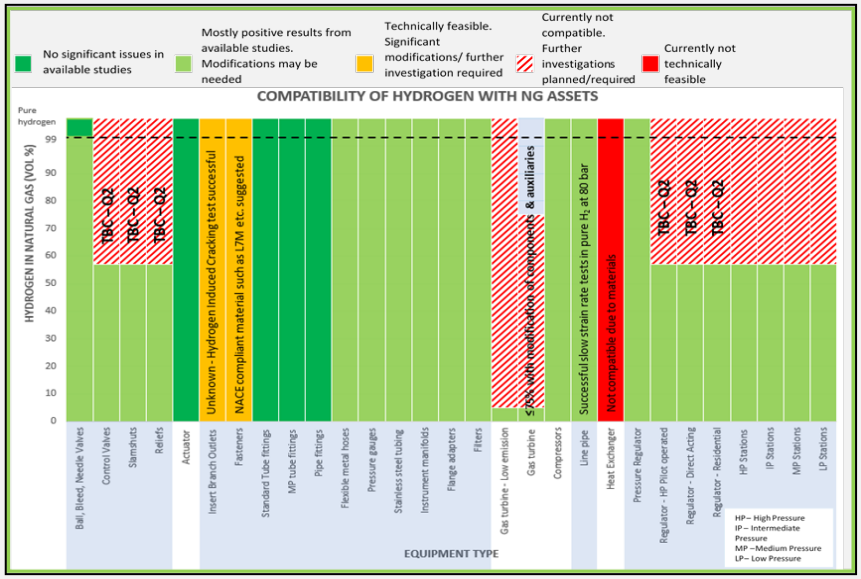
Reinforcement will be required as hydrogen demand estimates grow

Requirements will depend where hydrogen production is located

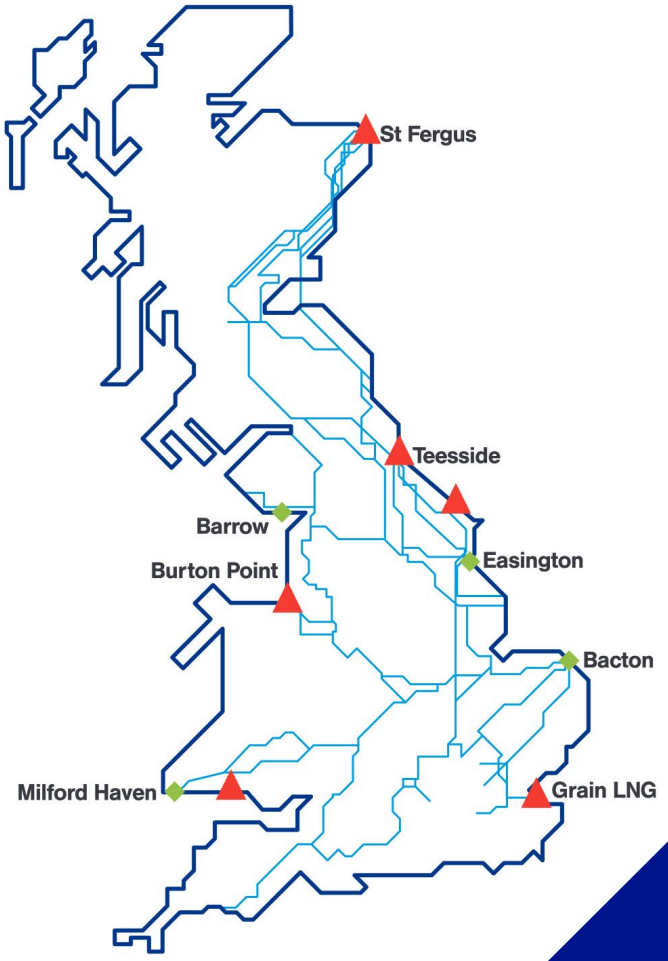


Asset Readiness

Results from a first data request from our suppliers infer a high degree of readiness for hydrogen – full asset risk model required



HyNTS FutureGrid



HyNTS FutureGrid

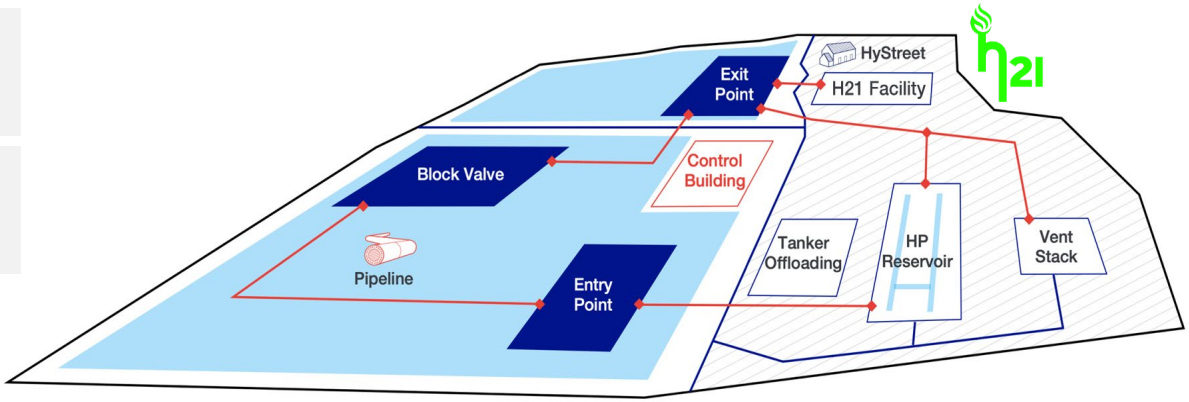
Future Grid – Phase 1 overview

This ambitious programme is to build a hydrogen test facility from decommissioned assets at DNV GL Spadeadam to demonstrate the National Transmission System (NTS) can transport hydrogen.

The project will be delivered in three phases:

Phase 1a	**Offline Facility Build**	May 2021 until Jan 2022
Phase 1b	**NTS Asset Testing**	Jan 2022 until Sep 2022
Phase 1c	**Safety & Risk Impact**	Feb 2022 until Mar 2023

The FutureGrid test facility will connect to the existing H21 distribution facility creating a representative UK Hydrogen Testing and Training Facility:



FutureGrid Project Partners: DNV·GL, HSE, Northern Gas Networks, fluxys, Durham University, The University of Edinburgh

Hy Street

Hy Street

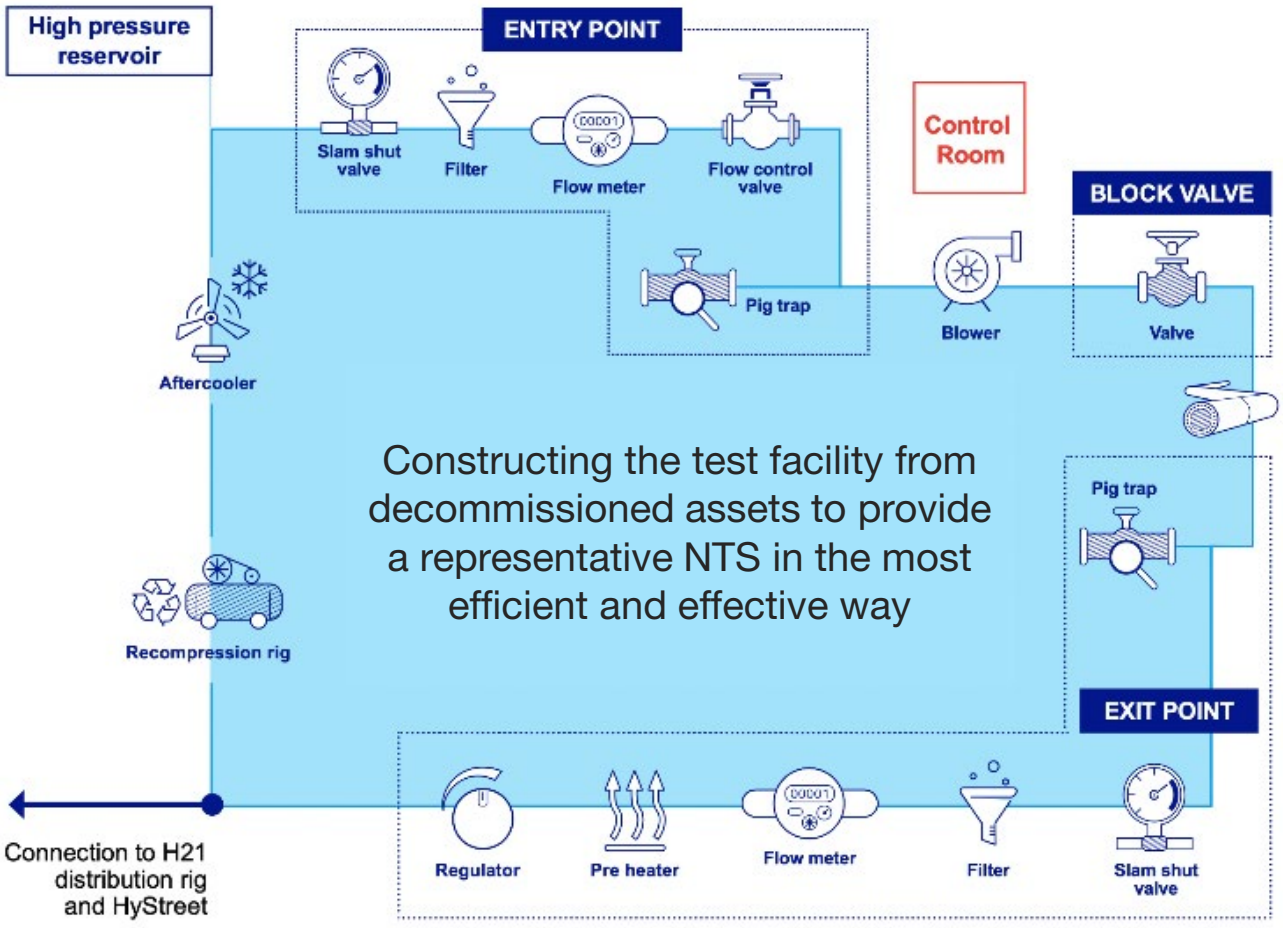
FutureGrid aerial view

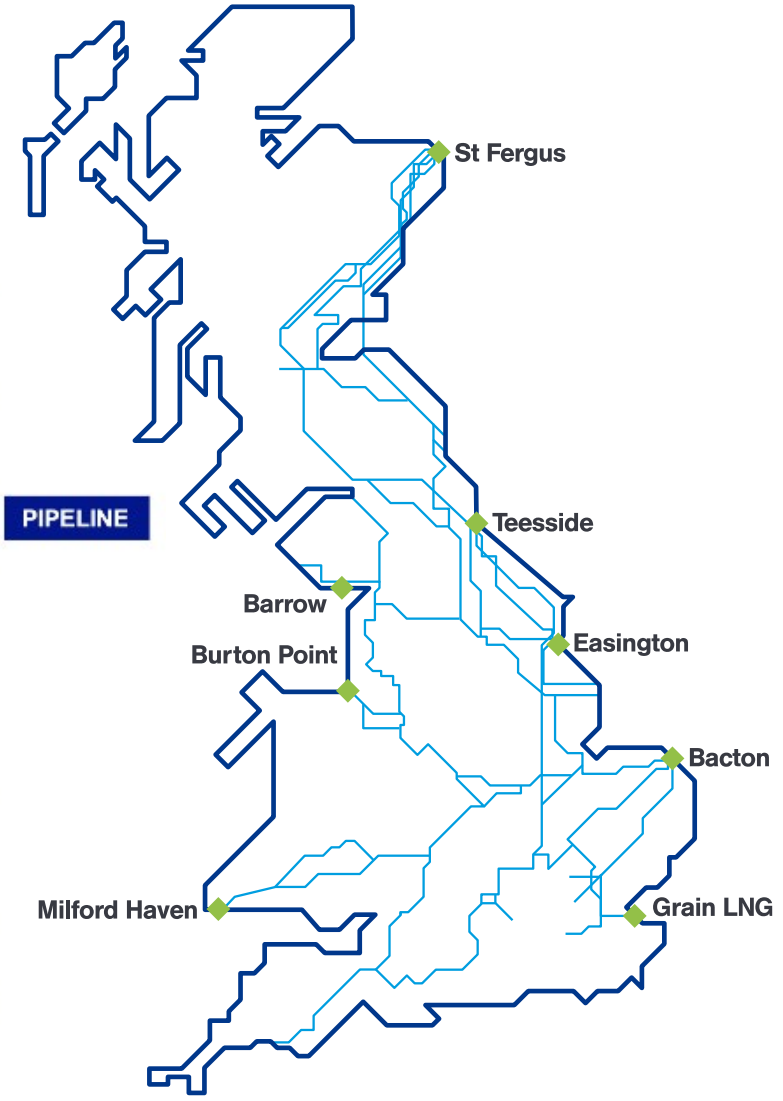
FutureGrid aerial view

HyNTS FutureGrid

Offline facility build

Phase 1a	Phase 1b	Phase 1c

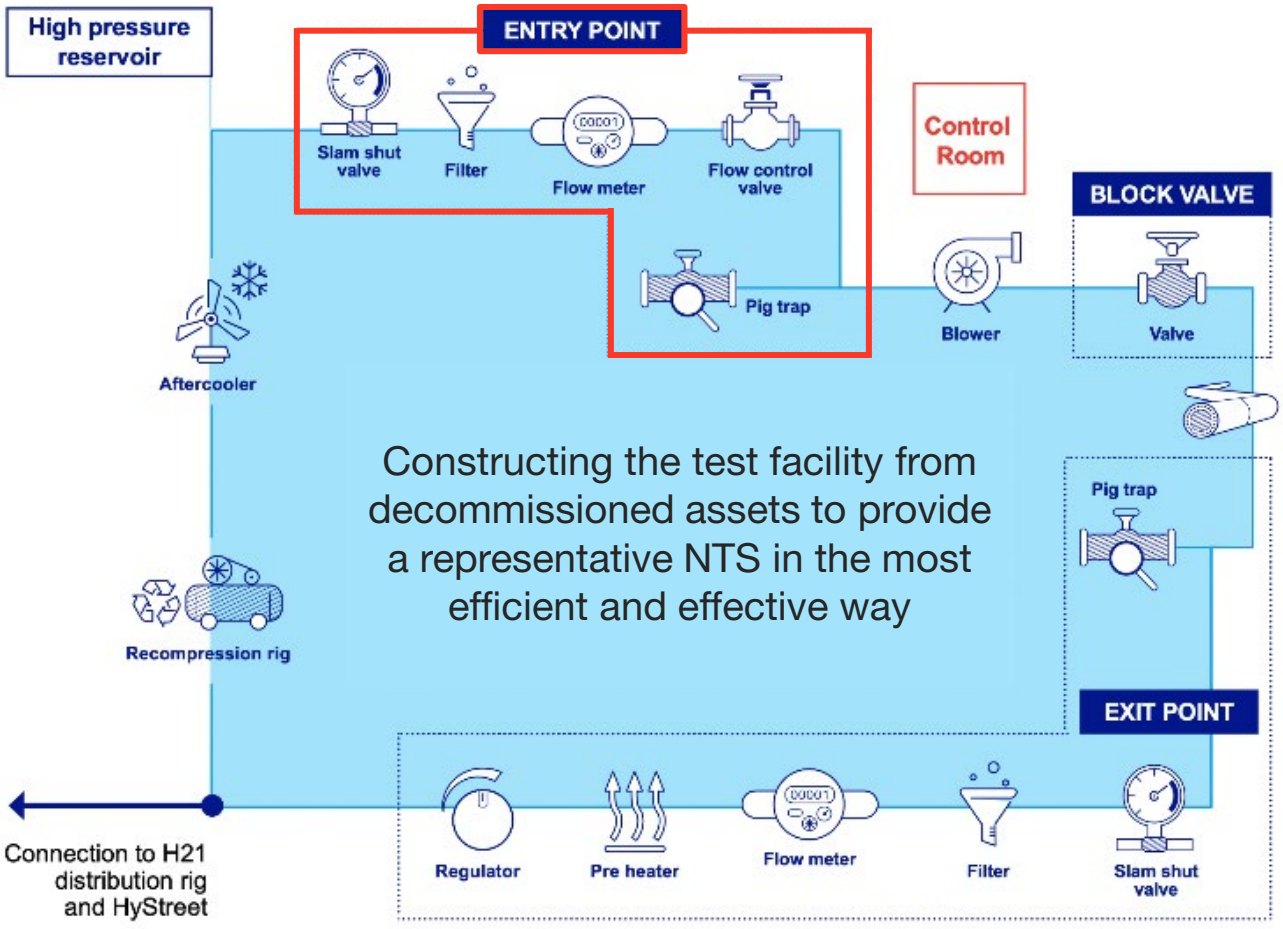




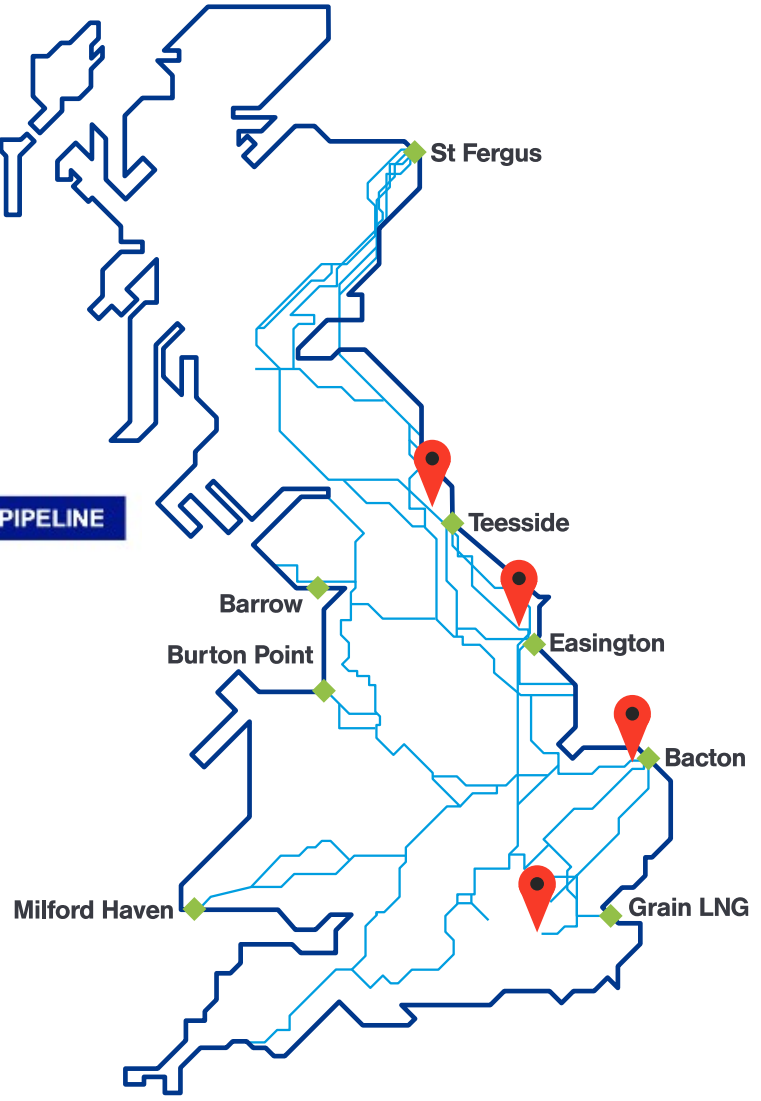
nationalgrid

Offline facility build

Phase 1a	Phase 1b	Phase 1c



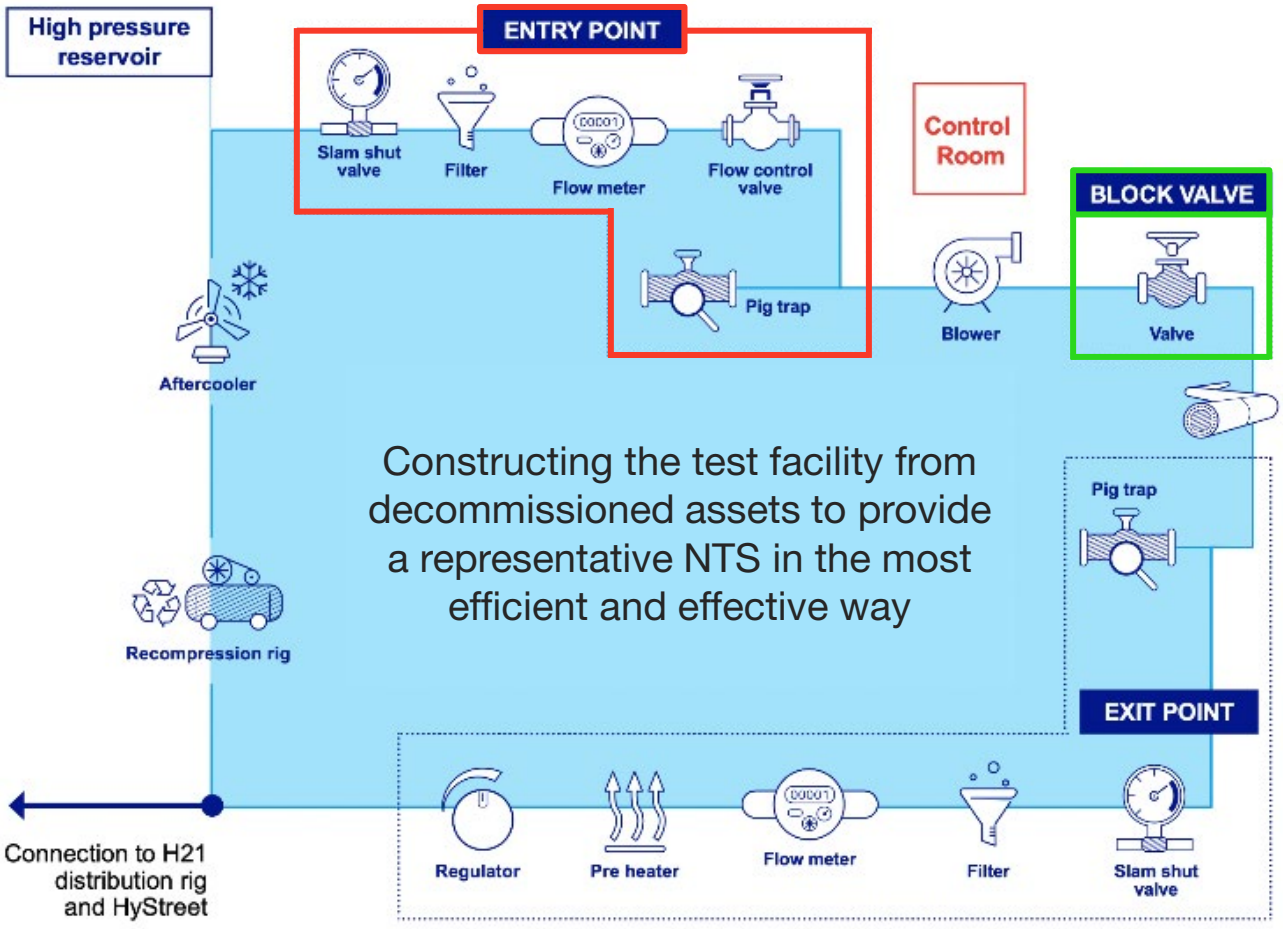
Constructing the test facility from decommissioned assets to provide a representative NTS in the most efficient and effective way

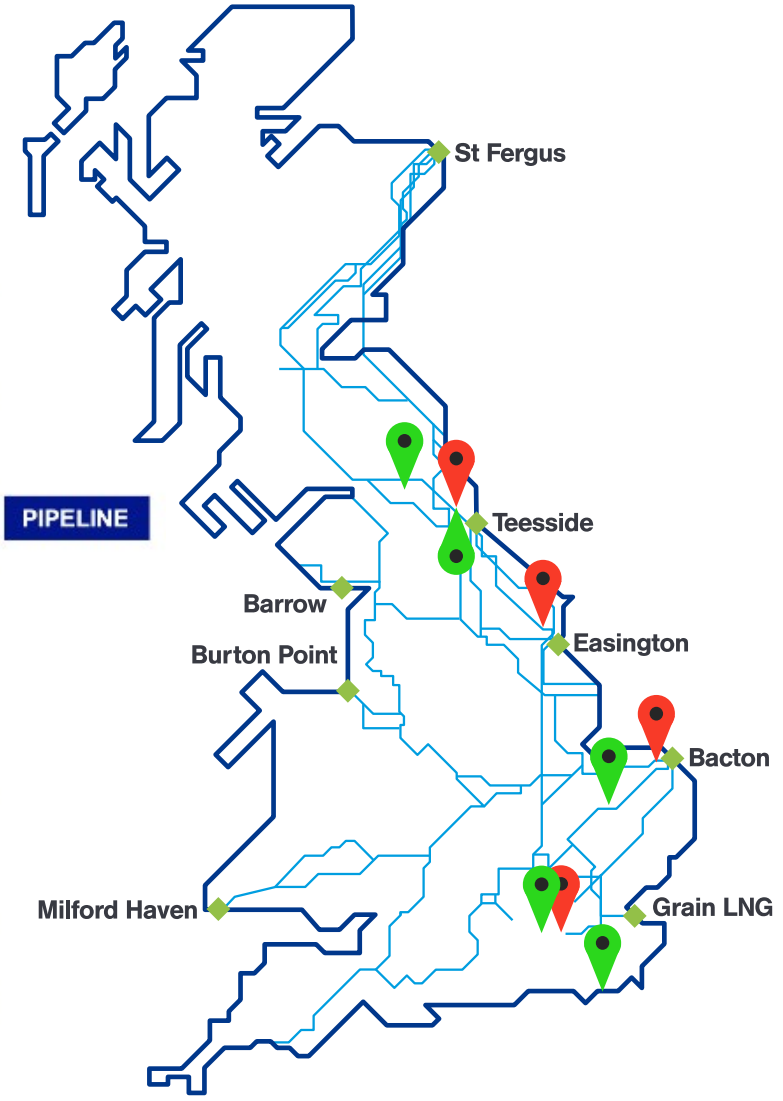


HyNTS FutureGrid

Offline facility build

Phase 1a	Phase 1b	Phase 1c



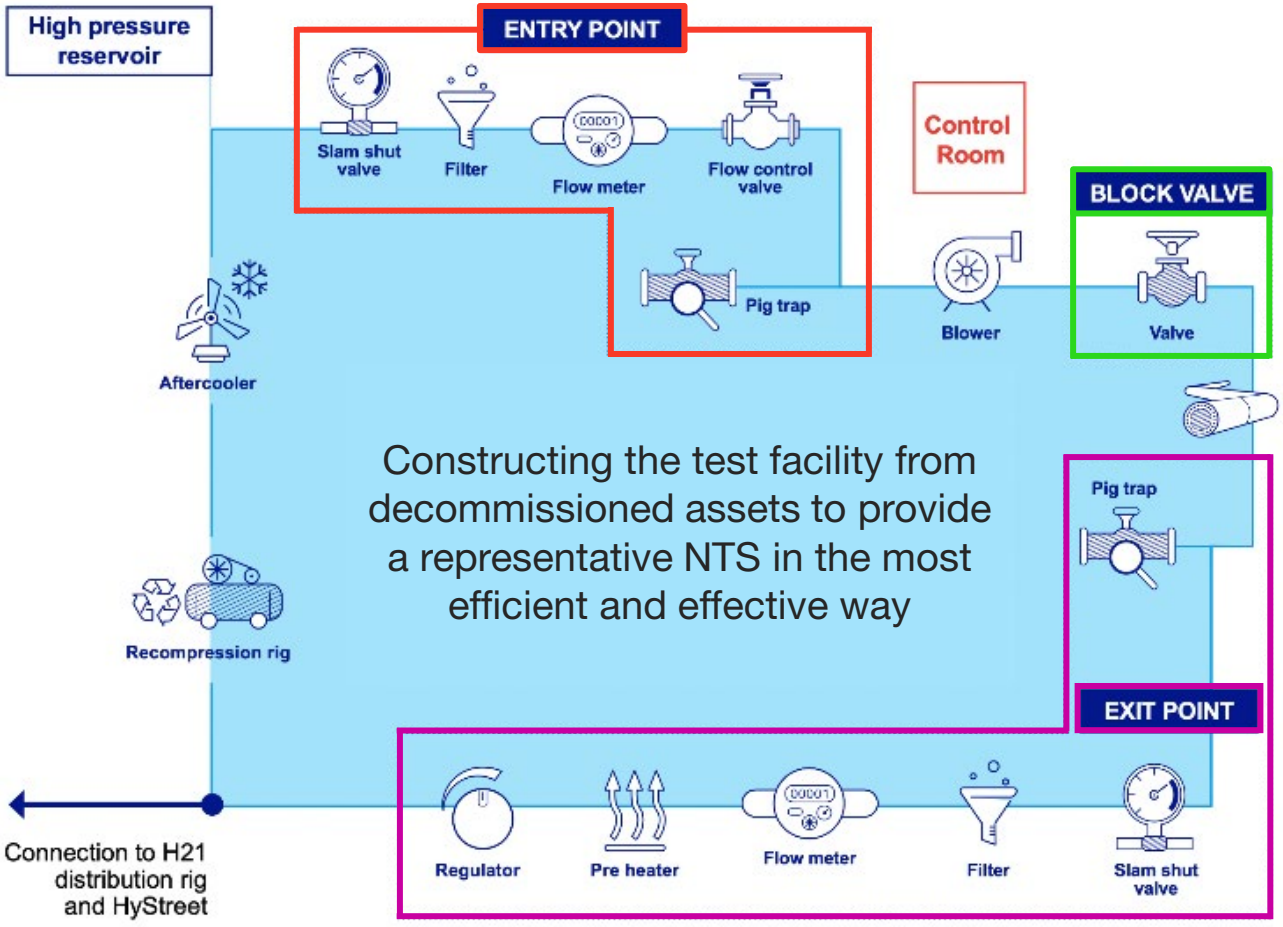


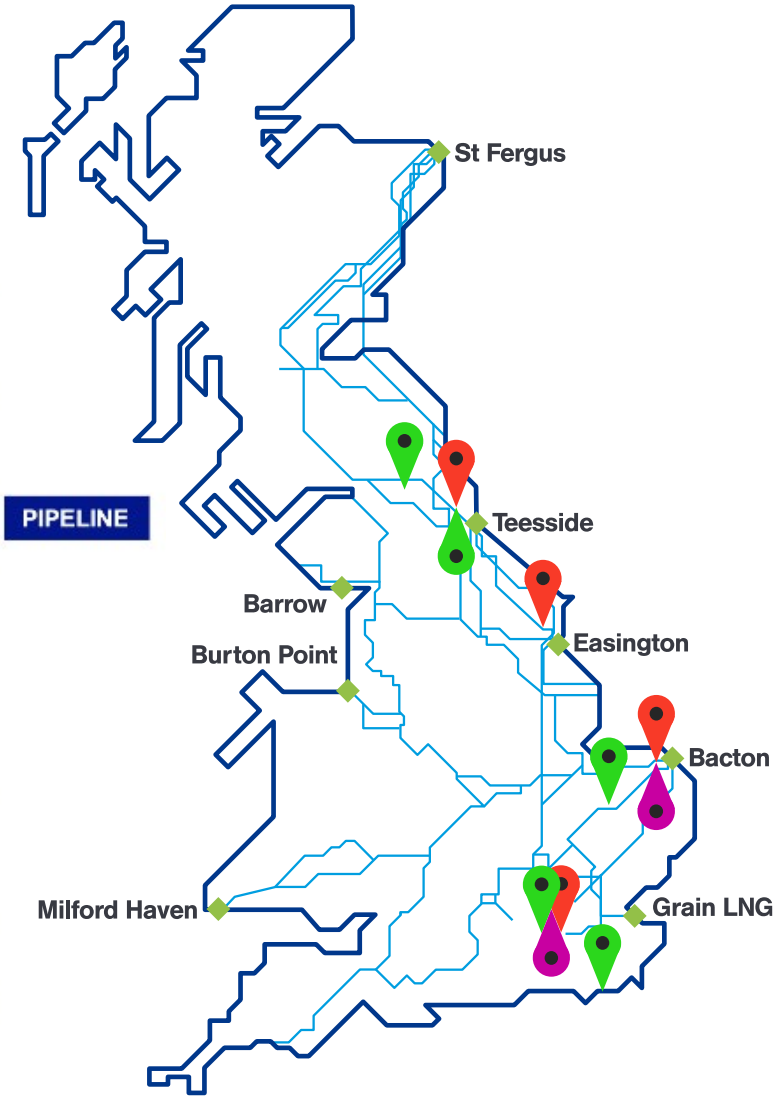
nationalgrid

HyNTS FutureGrid

Offline facility build

Phase 1a	Phase 1b	Phase 1c





nationalgrid

HyNTS FutureGrid

Roadmap to live trials

HyNTS FutureGrid

Phase 1
NTS Hydrogen Test Facility

Build an offline hydrogen test facility using decommissioned assets to assess the impact that blends of hydrogen up to 100% will have, to facilitate the gas network transition to hydrogen

Duration: Apr 2021 – Apr 2023
NIC 2020 Bid

- Links to H21 distribution test facility
- Hydrogen ready transmission asset strategy - replace / reuse / update
- Hydrogen storage
- Hydrogen Asset Maintenance & Repair
- Hydrogen training
- Academic research & links

Phase 2
Deblending & Compression

Validate deblending technologies to separate hydrogen from natural gas and demonstrate its impact on operating compressors, to enable a flexible system transition to hydrogen.

Duration: 2022 - 2024

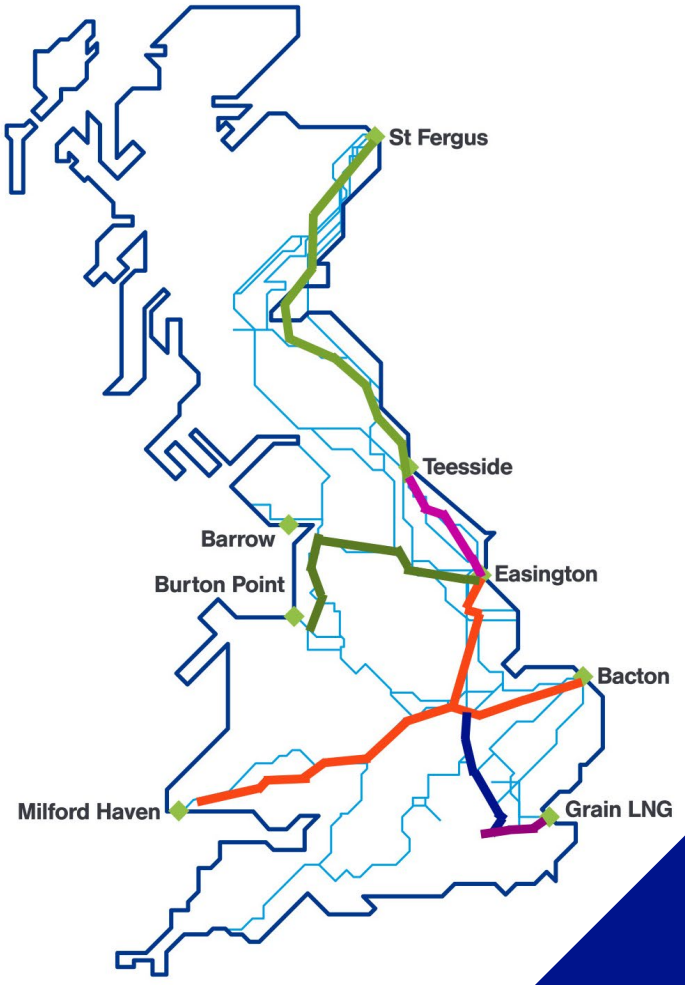
- Compressor technologies
  - Use of hydrogen to drive the turbines and gearing to meet the same compression rates as natural gas
- Deblending technologies
  - In collaboration with customer requirements such as transport, industry etc…

Phase 3
Third Party Testing & Collaboration

Duration: 2023 Onwards

- New technology integration
- Production solutions & integration
- Implementation focussed testing
- Links to Customers and use cases

HyNTS Live Trials 2% → 100%



HyNTS ProjectUnion

HyNTS ProjectUnion

European hydrogen backbone

Guidehouse Study

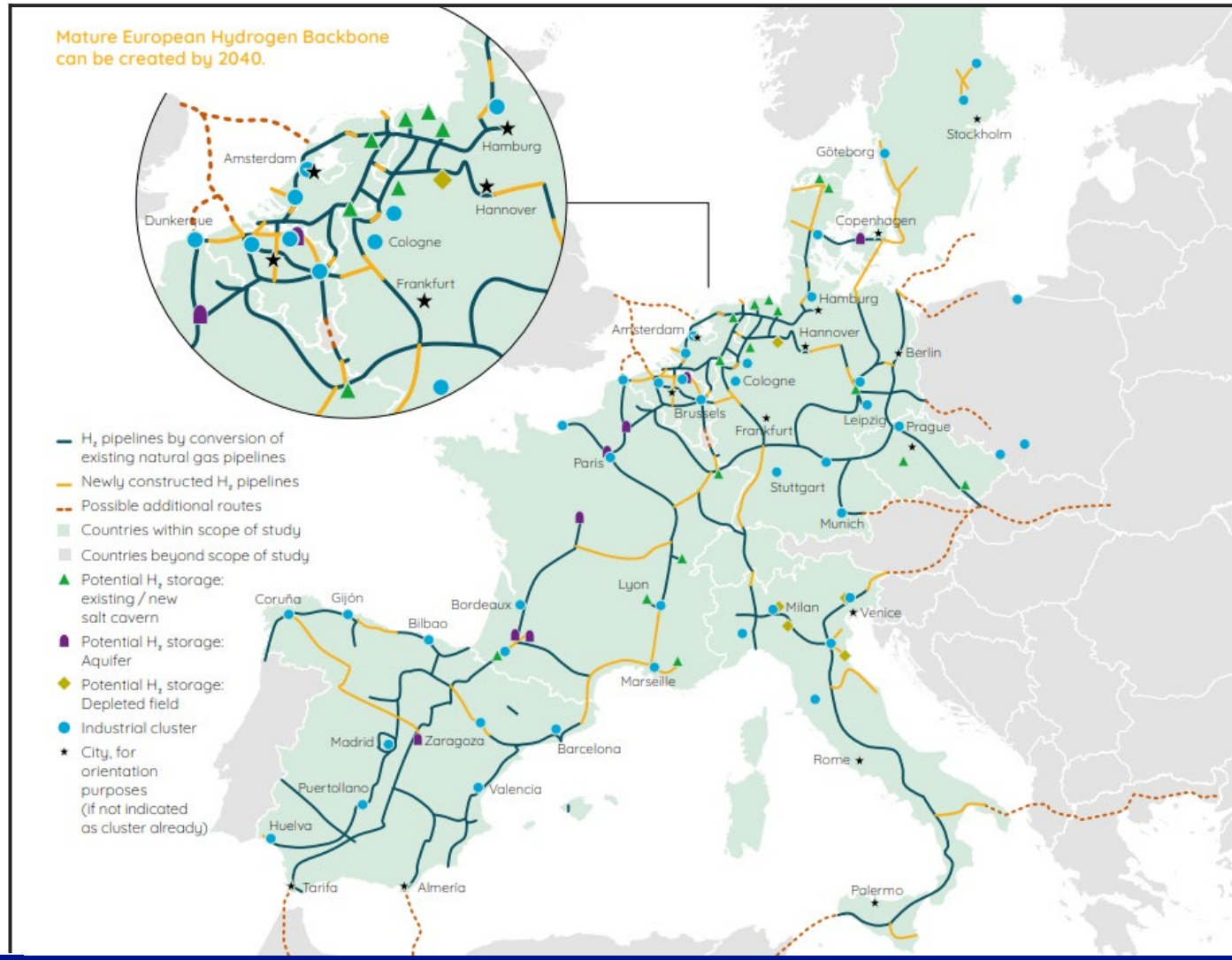
11
National Transmission Operators

23,000km by 2040

75%
conversion

25%
new pipelines

€27-64bn
build cost



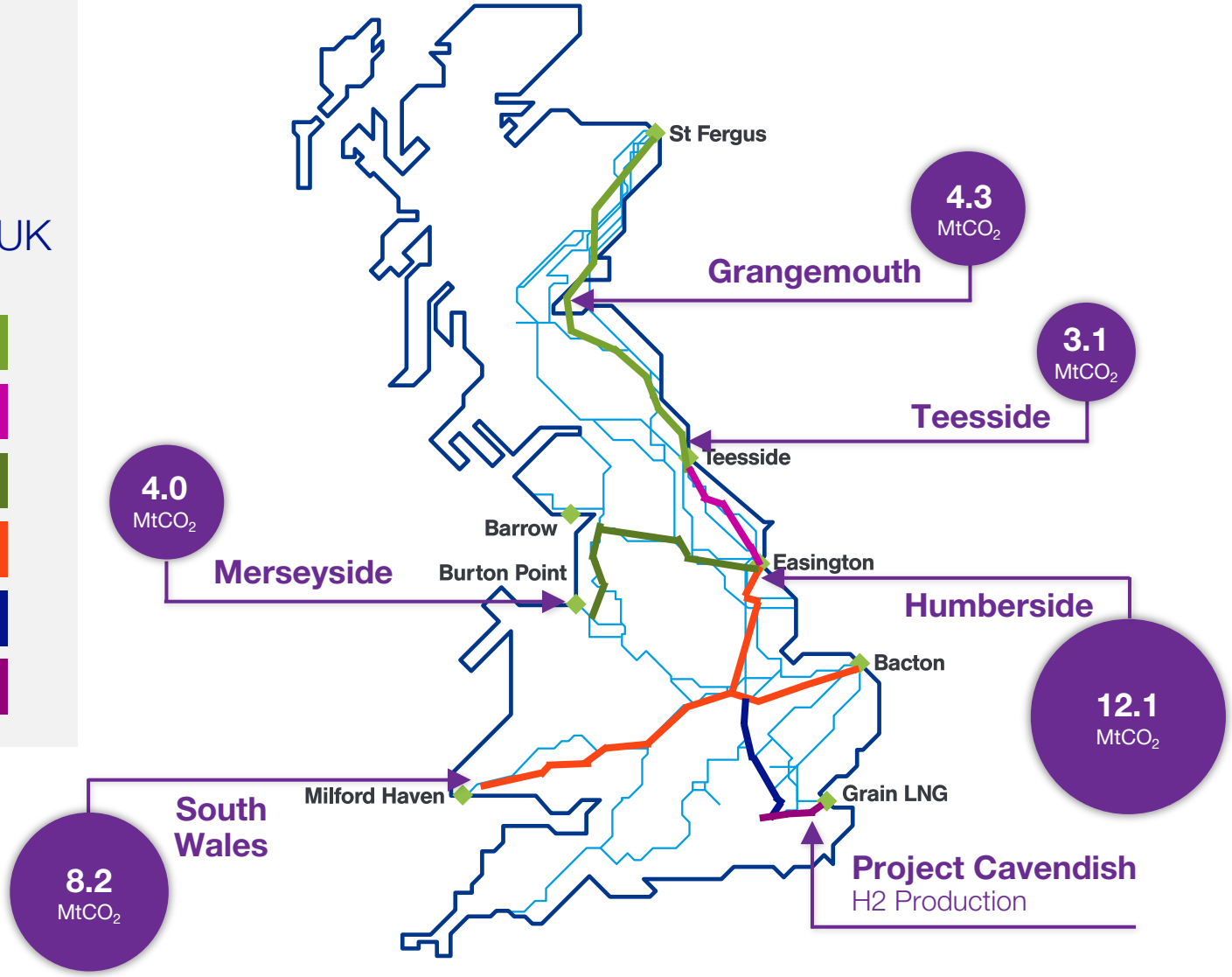
nationalgrid

HyNTS ProjectUnion

Developing a UK hydrogen backbone

Project Union will review the potential phased repurposing of NTS pipelines to carry hydrogen and provide a hydrogen transmission 'backbone' for the UK

- Teesside – St Fergus
- Humber –Teesside
- Humber – Merseyside
- South Wales – Bacton – Humber
- East Midlands – Cavendish
- Cavendish – London



nationalgrid

HyNTS ProjectUnion

Our hydrogen outlook

We want to be ready to begin a hydrogen conversion by 2026

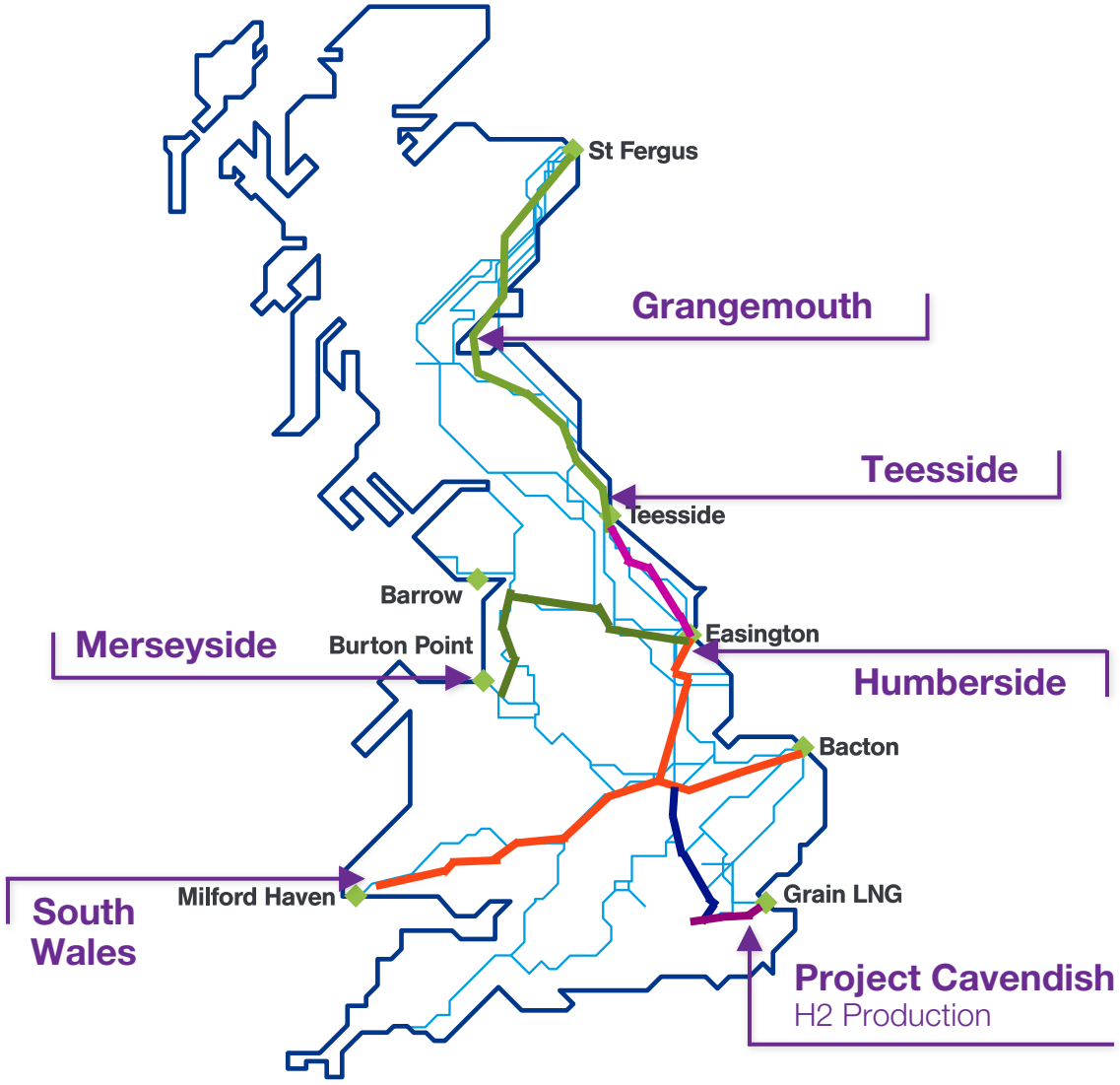
We're to build a full scale offline test facility
FutureGrid will demonstrate up to 100% H2 in NTS assets

We're collaborating to develop our future plans
Through H2GAR with colleagues in Europe

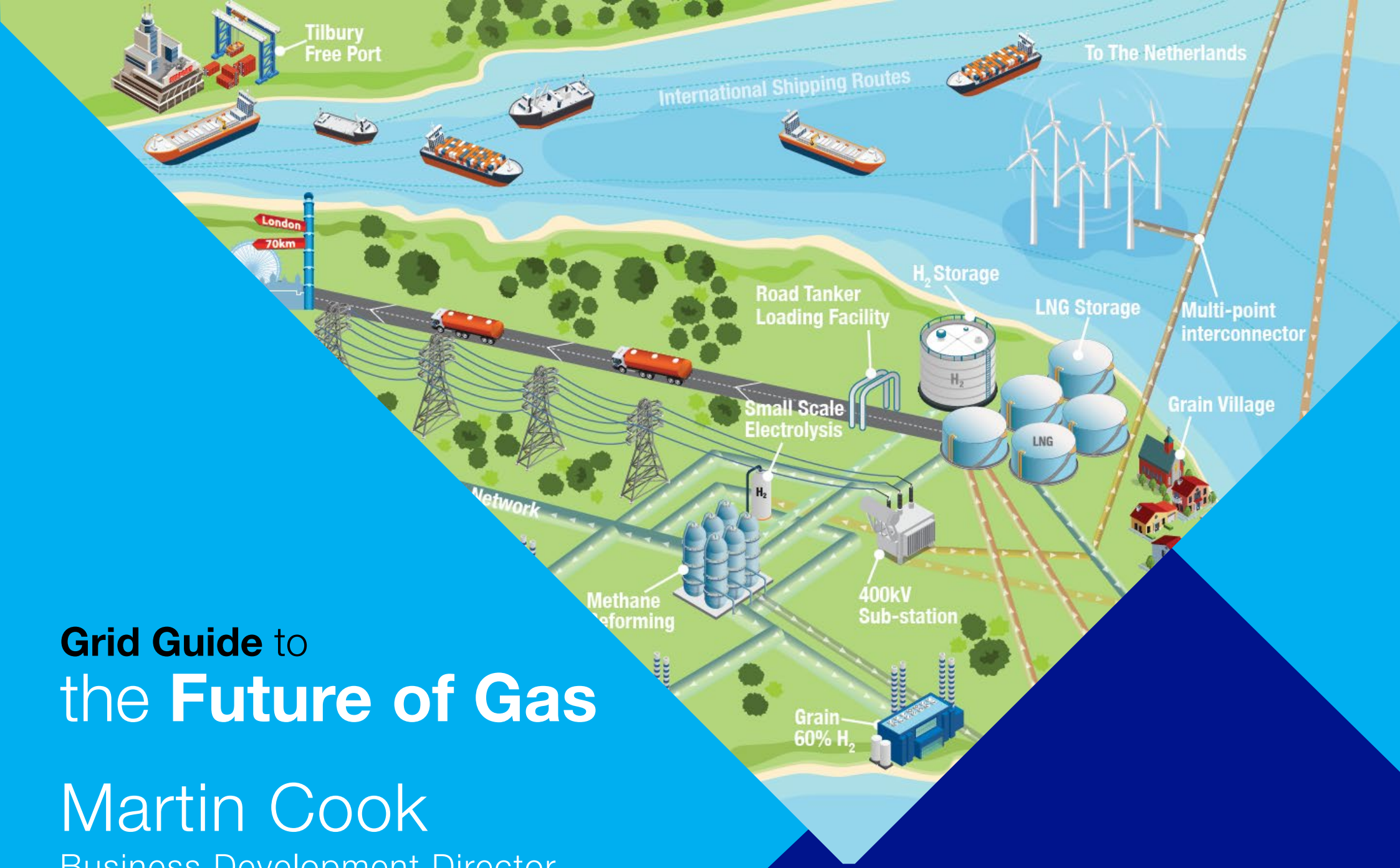
NTS broadly has the capacity for 2050 hydrogen demand
We're now modelling a wider range of scenarios

Conversion of the NTS to hydrogen is being evaluated
We're evaluating our asset readiness

Conversion likely to begin with a hydrogen backbone
Project Union links the industrial clusters



nationalgrid

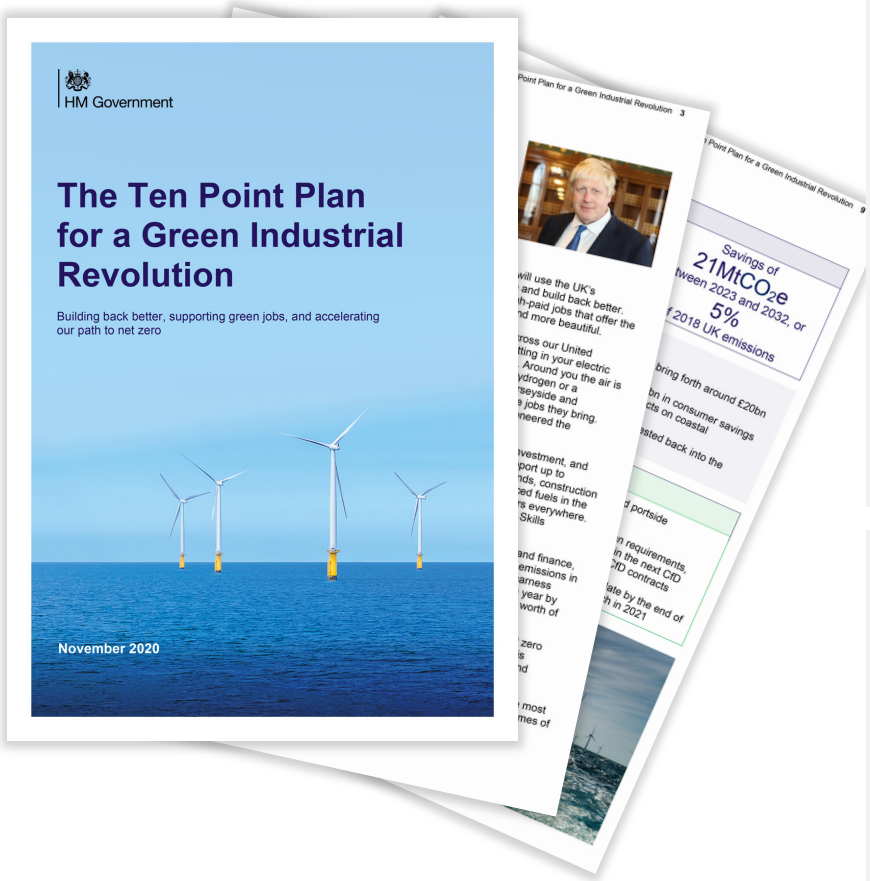


Grid Guide to the **Future of Gas**

Martin Cook

Business Development Director

Hydrogen and CCUS in the Ten Point Plan



Hydrogen

- 5 GW of low carbon H2 capacity by 2030
- Hydrogen for power, transport, industry and homes.
- £240m for Net Zero Hydrogen
- A hydrogen ‘town’ before the end of the decade.
- H2 business models and revenue developed in 2021
- Finalise H2 business models in 2022

CCUS

- 10 $MtCO_2$/yr by 2030
- CCUS in 4 Industrial clusters, with 2 by mid-2020s
- £1bn investment through the CCS Infrastructure Fund by 2025
- Revenue mechanism for industrial carbon capture developed in 2021
- Finalise CCUS business models in 2022

Project Cavendish

Project Cavendish is a hydrogen project located at the Isle of Grain

- Strong consortium - key components of a hydrogen supply chain
- Aim to support creation of a new hydrogen economy that supports jobs and clean growth in SE England
- Demand initially from CCGT power stations and blending of H2 into existing gas networks
- Anchoring hydrogen in the region enables the build out of 100% hydrogen pipelines towards London

nationalgrid ventures

uniper

ARUP

SGN

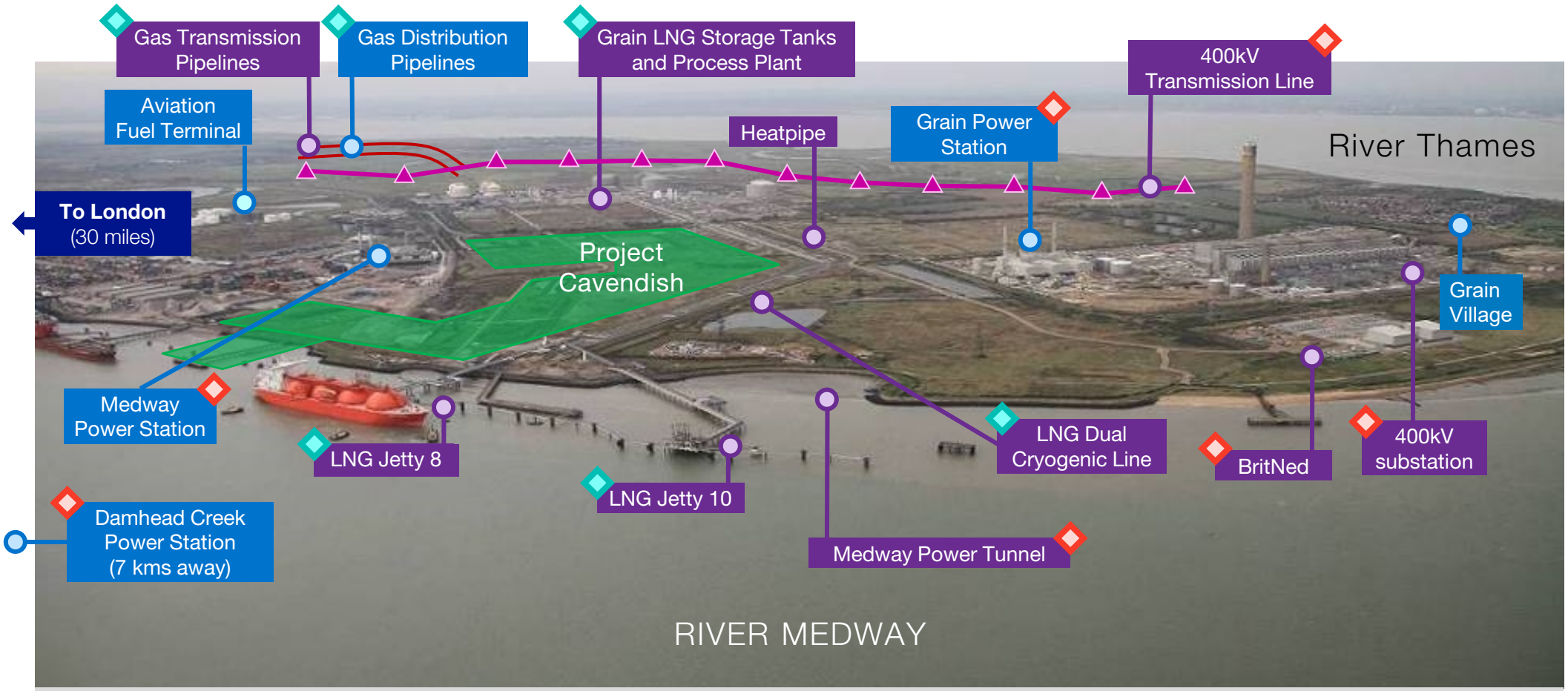
drax

SSE

Project Cavendish

Isle of Grain

Offers unique advantages and provides key elements for a successful hydrogen project



nationalgrid

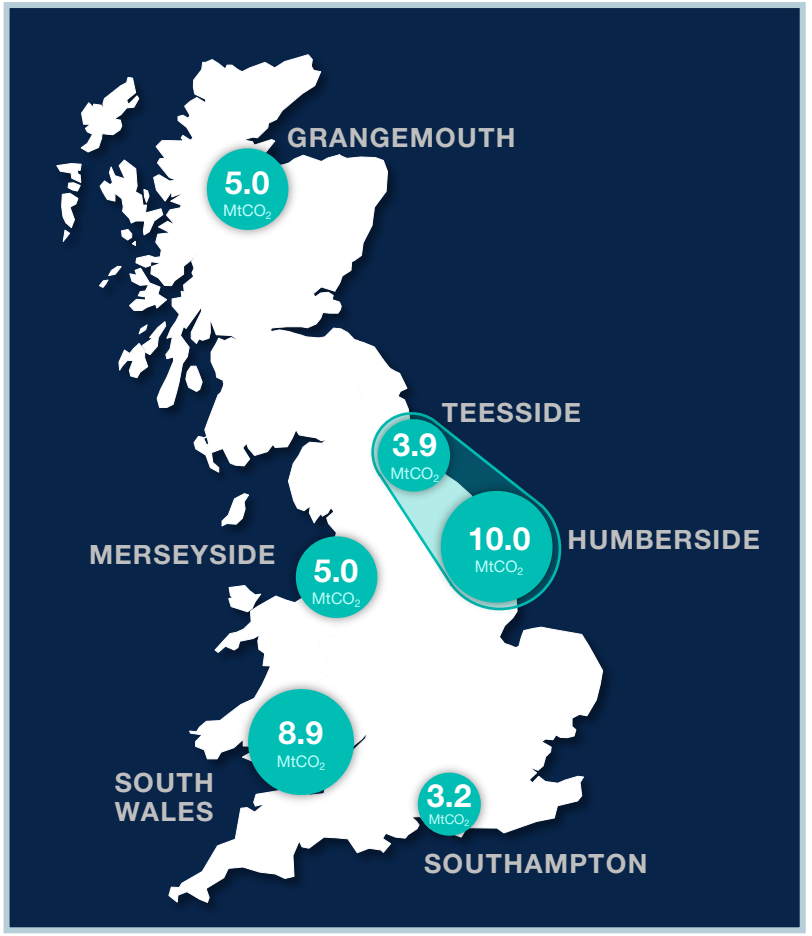
nationalgrid

ZEROCARBON HUMBER

CCUS network

NG is leading a project to develop and build a CCUS network in the Humber and Teesside regions of the UK

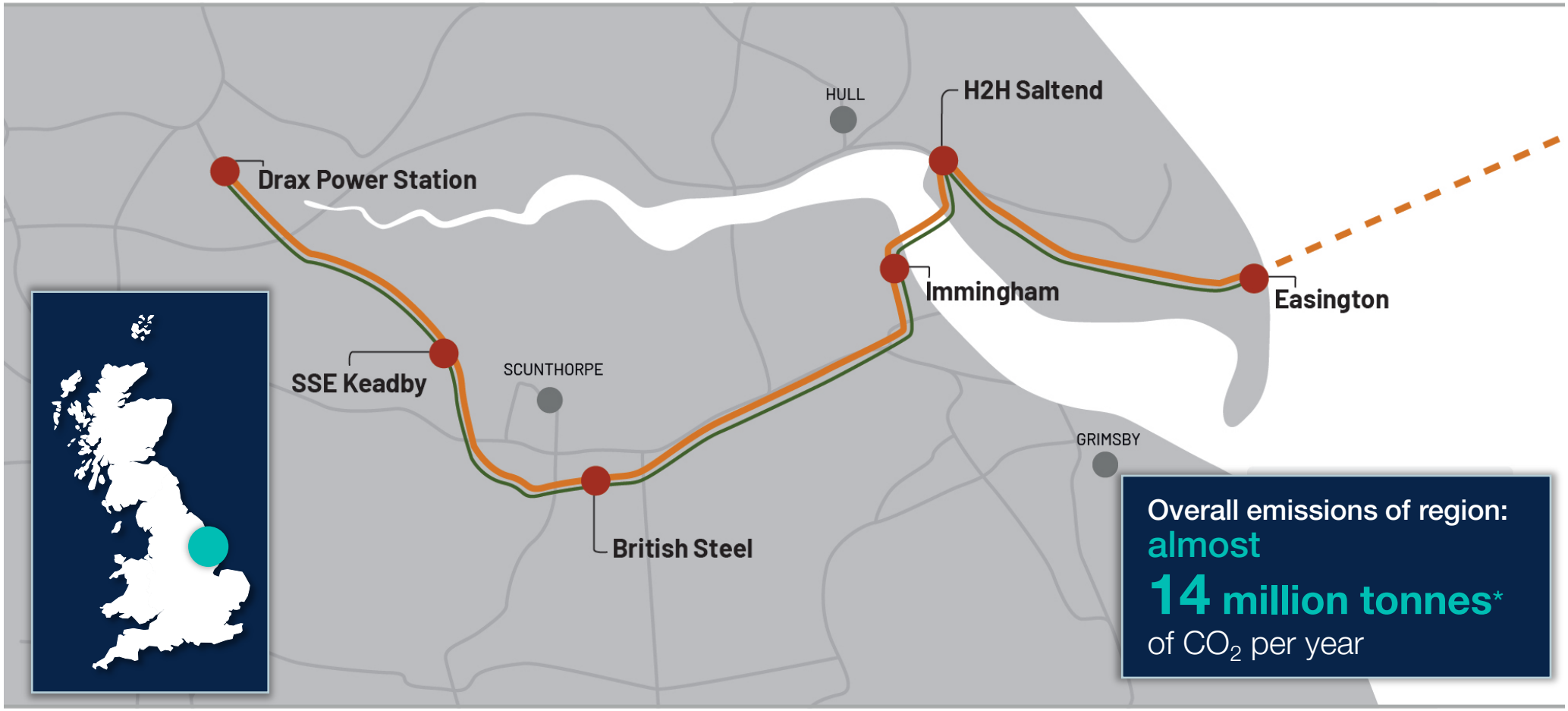
- The government is supporting the development of solutions around the UK using a £130m fund
- The Humber is the UK's largest industrial cluster – with hard to decarbonise industries
- It contributes £18bn to the UK economy, supports 55,000 manufacturing jobs, 25% of the country's refinery production and >100 chemical and refinery companies
- Decarbonising Teesside & the Humber would remove more than a third of UK's industrial emissions
- 2021 is a key year for continued development in particular developing business models to support this new industry



nationalgrid

ZEROCARBON HUMBER

Humberside site map



* Combined industry and power emissions for the Humber and Teesside, excluding Drax Power Station

Northern Endurance Partnership

Subsea CO_2 Store

Grid Guide to the **Future of Gas**

Nick Ashworth

Director of Investor Relations

nationalgrid

To ask a question

Ask our speakers a question live by joining the **conference call**

United Kingdom: 0800 640 6441

United States: 1 646 664 1960

All other locations: +44 20 3936 2999

Participant access code

560619

You will be greeted by an operator to register

Alternatively, you can type your question by using the 'Ask a question' box in your **Webcast window**

You can submit as many questions as you like

Coming up…

Watch out for our next live event in the

Grid Guide to
series, which will focus on the
Decarbonisation of Transport
in Quarter 2, 2021

nationalgrid

Grid Guide to the **Future of Gas**

nationalgrid

January 2021