

Hydrogen Valley - Bringing hydrogen to the West Midlands and East of England

EXECUTIVE SUMMARY - MARCH 2023

The Hydrogen Valley is being delivered in collaboration by Cadent Gas and National Gas Transmission, two of the UK's largest gas networks

Cadent Gas and National Gas Transmission are working together to **demonstrate how their networks can be repurposed** as rapidly as possible to deliver hydrogen throughout the UK by gathering insight on low-carbon fuel demand in the region to optimise infrastructure planning. **This is key to ensure that industrial decarbonisation is not slowed down and remains affordable for all consumers in the West Midlands and the East of England.** This study has developed a clear and tangible roadmap to develop a hydrogen network across the region by 2032. By planning network investments ahead of investors and consumer needs, Cadent Gas and National Gas Transmission can ensure that the UK can meet its 2050 net-zero target in a fair way, which secures business and growth across the region and country.



Cadent Gas operates and maintains the largest gas distribution network in the UK, serving the North West, West Midlands, East Midlands, South Yorkshire, East of England, and North London. Cadent seeks to connect hydrogen producers and industrial off-takers across the Hydrogen Valley project region.



National Gas Transmission, formerly known as National Grid Gas Transmission, owns and operates the high-pressure gas transmission network in Great Britain and is responsible for safely and efficiently transporting gas throughout the country. National Gas Transmission aims to develop a hydrogen backbone by connecting industrial clusters across the UK through Project Union.



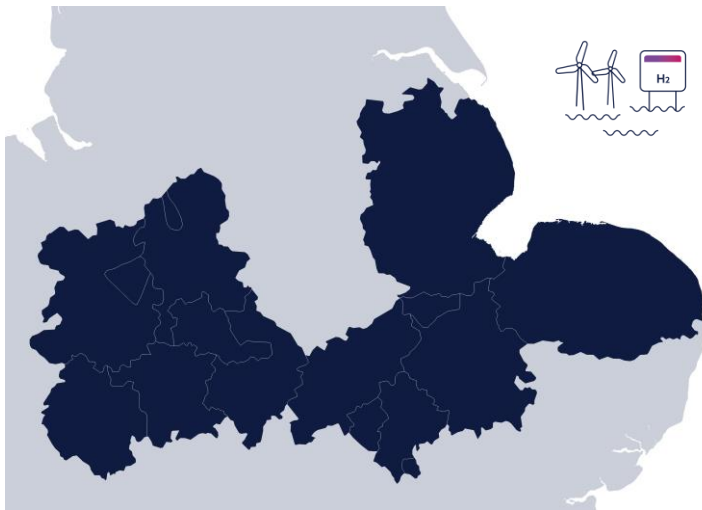
Guidehouse is a leading global provider of consulting services to the public sector and commercial markets, with broad capabilities in management, technology, and risk consulting. Guidehouse's global Energy, Sustainability, and Infrastructure segment is a trusted advisor to utilities and energy companies, large corporations, investors, NGOs, and the public sector. Our team supported Cadent Gas and National Gas Transmission in the development of the Hydrogen Valley.



Premtech are design framework consultants for UK gas transmission and distribution networks. Premzero is a specialist team within Premtech developed with the objective of moving the UK onshore oil and gas transportation industry towards net zero by 2050, with a particular focus on hydrogen, biofuels, and carbon capture. Premzero assessed infrastructure feasibility for the Hydrogen Valley, which included identifying infrastructure requirements and transition pathways.

What are the objectives of the Hydrogen Valley?

Hydrogen Valley is uniquely positioned in the central belt of England, with large potential for a hydrogen economy



The Hydrogen Valley is an east-west corridor that encompasses Norfolk in the east to Shropshire in the west, comprised of the administrative counties of Bedfordshire, Cambridgeshire, Lincolnshire, Milton Keynes, Norfolk, Northamptonshire, Peterborough, Staffordshire, Stoke-on-Trent, Telford and Wrekin, and West Midlands. The Hydrogen Valley is home to major operations in power generation, automotive manufacturing, metal processing, and building materials, and is located at the heart of the UK's strategic road network, at the intersection of the M6, M1, and M40 amongst others.

Hydrogen Valley region

This region is unique for the UK as it is largely landlocked, with limited access to renewable energy for green hydrogen production. Despite this challenge, there are multiple regional initiatives in development, which highlights an opportunity for collaboration and further growth to facilitate the transition to hydrogen and unlock socio-economic benefits for local people and businesses. The region's location in the middle of England makes the Hydrogen Valley a key piece of the puzzle to develop a mature hydrogen economy in the UK by helping connecting the East with the West as well as North and South of the country.



Objectives of the Hydrogen Valley

1

Establish the hydrogen economy in the region to accelerate industrial decarbonisation

2

Attract hydrogen investments in the region to enhance socio-economic benefits associated with the energy transition

3

Explore infrastructure opportunities to secure long-term, low cost hydrogen in the region

Pipelines will be needed to transport the large volumes of hydrogen produced in Bacton to demand across the region

Hydrogen demand in the Hydrogen Valley

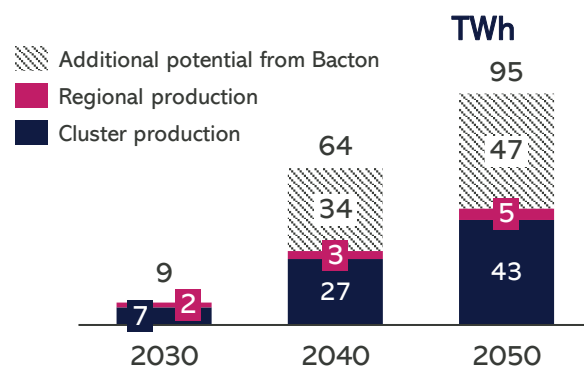
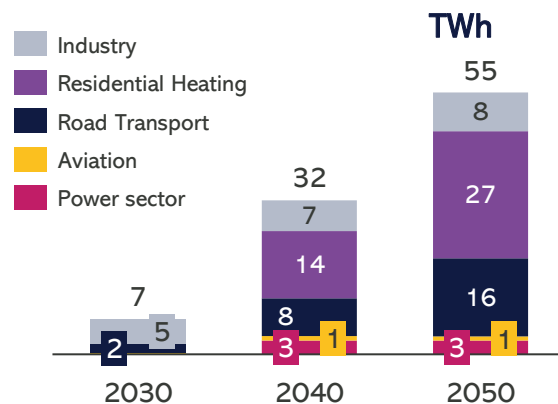
The Hydrogen Valley hydrogen demand is driven primarily by the industrial decarbonisation in the West of the region, and large industrial and power generation loads in the East.

- Up to 2030 most demand for hydrogen will come from the imperative for industry to decarbonise.
- Between 2035-2050 further acceleration of industrial decarbonisation, along with the potential for hydrogen to heat homes results in a sharp increase in demand.

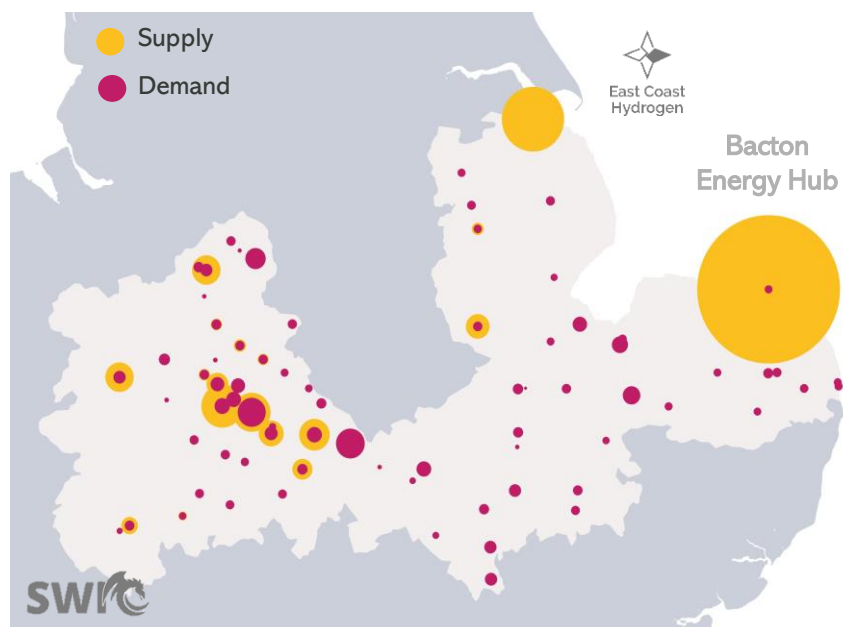
Hydrogen supply in the Hydrogen Valley

This study identified significant planned production initiatives across the national hydrogen production clusters. Bridging the gap between hydrogen production and demand across this region will require hydrogen pipelines.

To get the hydrogen economy moving in the 2020s, a number of regional production initiatives are needed. Some projects have already started across the region.



Potential hydrogen supply and demand in 2050



Bubble sizes represent relative energy volume











The west, notably West Midlands, Warwickshire, and Staffordshire, could dominate hydrogen demand in the region by 2050, accounting for around 50% of the total hydrogen consumption in the Hydrogen Valley.

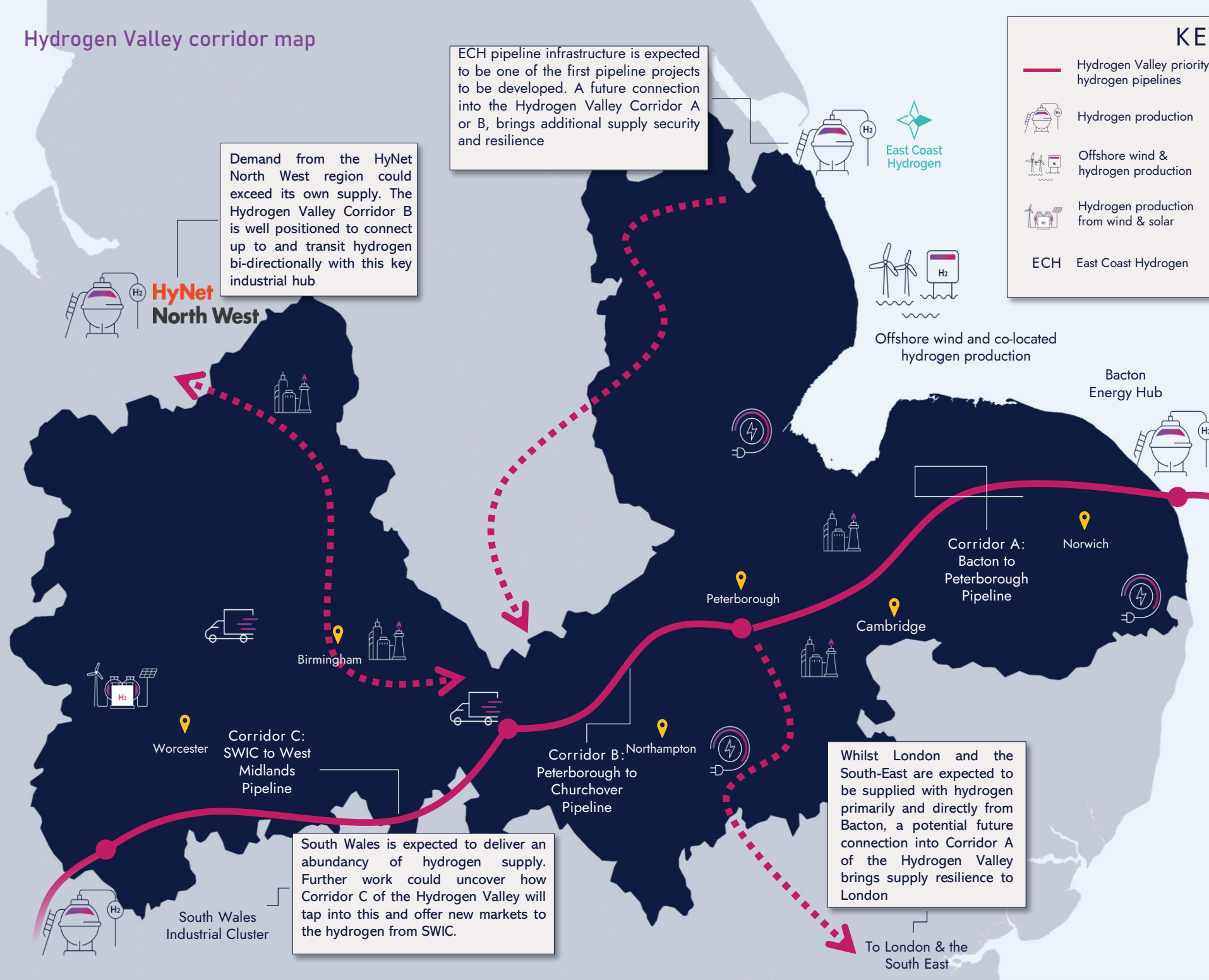
Supply from Bacton, East Coast Hydrogen (ECH), and South Wales Industrial Cluster (SWIC) will underpin a secure, lower levelized cost of hydrogen for consumers.

Pipeline infrastructure will be needed to ensure hydrogen can be transported in time to meet the emerging demand in the mid 2030s onwards.

Hydrogen Valley corridor map

KEY

	Hydrogen Valley priority hydrogen pipelines		Longer term Pipeline Connections
	Hydrogen production		Industrial demand
	Offshore wind & hydrogen production		Hydrogen refuelling
	Hydrogen production from wind & solar		Power generation from hydrogen
	ECH East Coast Hydrogen		SWIC South Wales Industrial Cluster



Demand from the HyNet North West region could exceed its own supply. The Hydrogen Valley Corridor B is well positioned to connect up to and transit hydrogen bi-directionally with this key industrial hub

ECH pipeline infrastructure is expected to be one of the first pipeline projects to be developed. A future connection into the Hydrogen Valley Corridor A or B, brings additional supply security and resilience

HyNet North West

Offshore wind and co-located hydrogen production

Bacton Energy Hub

Corridor A: Bacton to Peterborough Pipeline

Corridor C: SWIC to West Midlands Pipeline

Corridor B: Peterborough to Churchover Pipeline

Whilst London and the South-East are expected to be supplied with hydrogen primarily and directly from Bacton, a potential future connection into Corridor A of the Hydrogen Valley brings supply resilience to London

South Wales is expected to deliver an abundance of hydrogen supply. Further work could uncover how Corridor C of the Hydrogen Valley will tap into this and offer new markets to the hydrogen from SWIC.

South Wales Industrial Cluster

To offshore storage (Deborah)

Interconnector to Europe

To London & the South East

The Hydrogen Valley will unlock benefits for the UK energy system, the region, and consumers



25,000 jobs to be supported and a further 9,000 created through new opportunities



Throughout the net-zero transition journey, **34,000 jobs could be safeguarded or created** in the region, creating real, tangible benefits to constituents of the Hydrogen Valley.



25% of the emission reductions needed to reach net-zero



12.9 million tonnes of CO₂ reduction directly attributable to a hydrogen transition in the Hydrogen Valley region, 25% of what is needed for the region to achieve net-zero



Up to **£28 billion** of private capital investment



Developing the green economy in the Hydrogen Valley **could attract up to £28 billion in private capital investments** in hydrogen production



Reduce reliance on fossil fuels - **48TWh of clean hydrogen** produced



Local resources are used for local hydrogen production and consumption, which **protects consumers** from volatile prices and **reinforces UK energy security**

The Hydrogen Valley is supported by a wide and diverse set of regional stakeholders, from hydrogen production to demand and including the public sector

Upstream: Hydrogen production



Midstream: Transportation



Downstream: Hydrogen Demand



Public Sector: Local Authorities and Higher Education



The Hydrogen Valley is a **central part of the national energy transition story**, connecting coastal hydrogen hubs with mainland England.

Key industrials across the region have highlighted the challenges they face when planning their decarbonisation strategies, including the need for certainty regarding the timings of hydrogen supply. To ensure that industry have access to affordable low-carbon fuels in time to meet emissions reduction targets, hydrogen network investment need to be planned ahead.

This study has developed a clear and tangible roadmap to develop a hydrogen network across the region by 2032, connecting the large hydrogen production hub in Bacton and South Wales to the West Midlands being built by 2032 to deliver hydrogen at scale across the region.

This plan can support UK energy security and net-zero ambitions while securing business growth and jobs creation in the region.

**For more information on the programme, to become a supporting member of our Consortium Group and to get in contact with our team, please visit:
www.hydrogenvalley.co.uk**