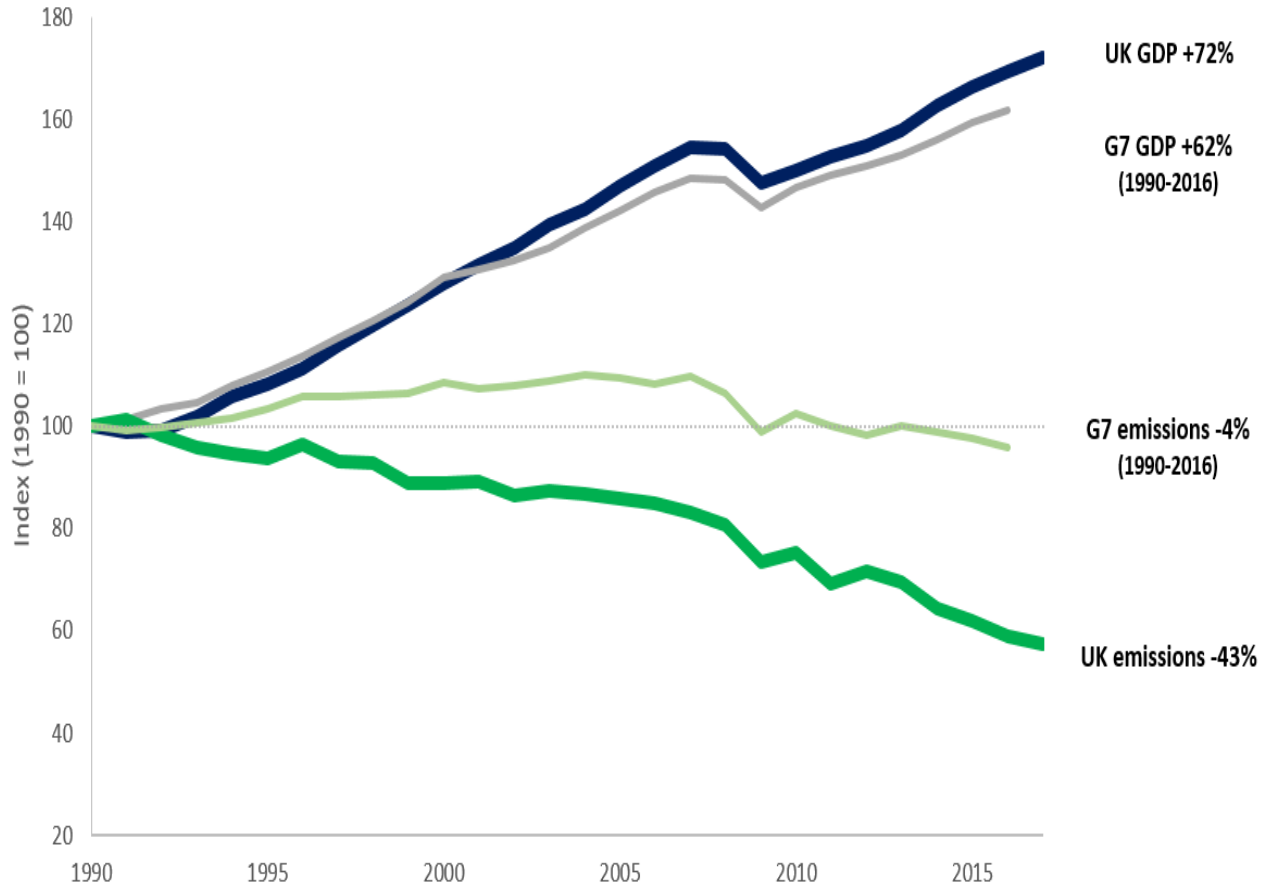
HyNet North West

Delivering Clean Growth

Progressive energy

Department for
Business, Energy
& Industrial Strategy

Context: UK delivering Clean Growth



Source: UNFCCC, World Bank, ONS, BEIS

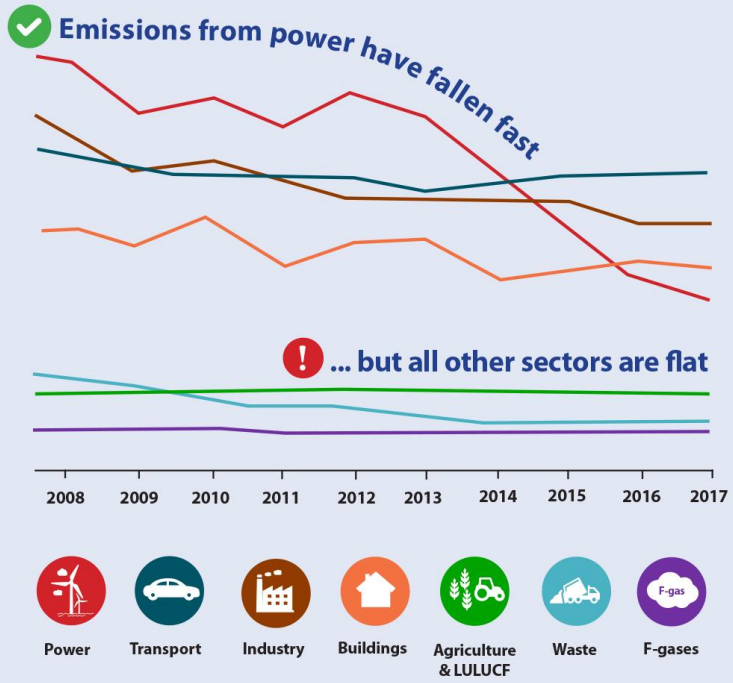
Since 1990:

- UK economy has grown by over 70%
- Energy demand has dropped
- Emissions are down by over 40%

Context: Emissions reductions driven by power

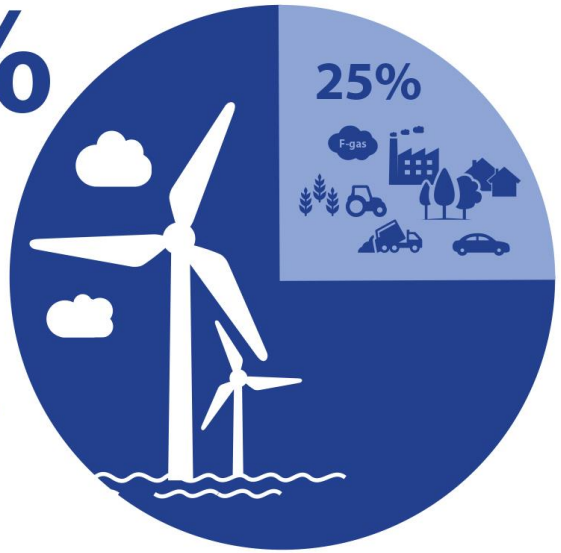
Excellent progress in reducing emissions from electricity generation masks failure in other sectors

The UK's greenhouse gas emissions have reduced by 43% compared to 1990 levels, on the way to a target of at least an 80% reduction by 2050.



75%

of emissions reductions since 2012 have come from the power sector

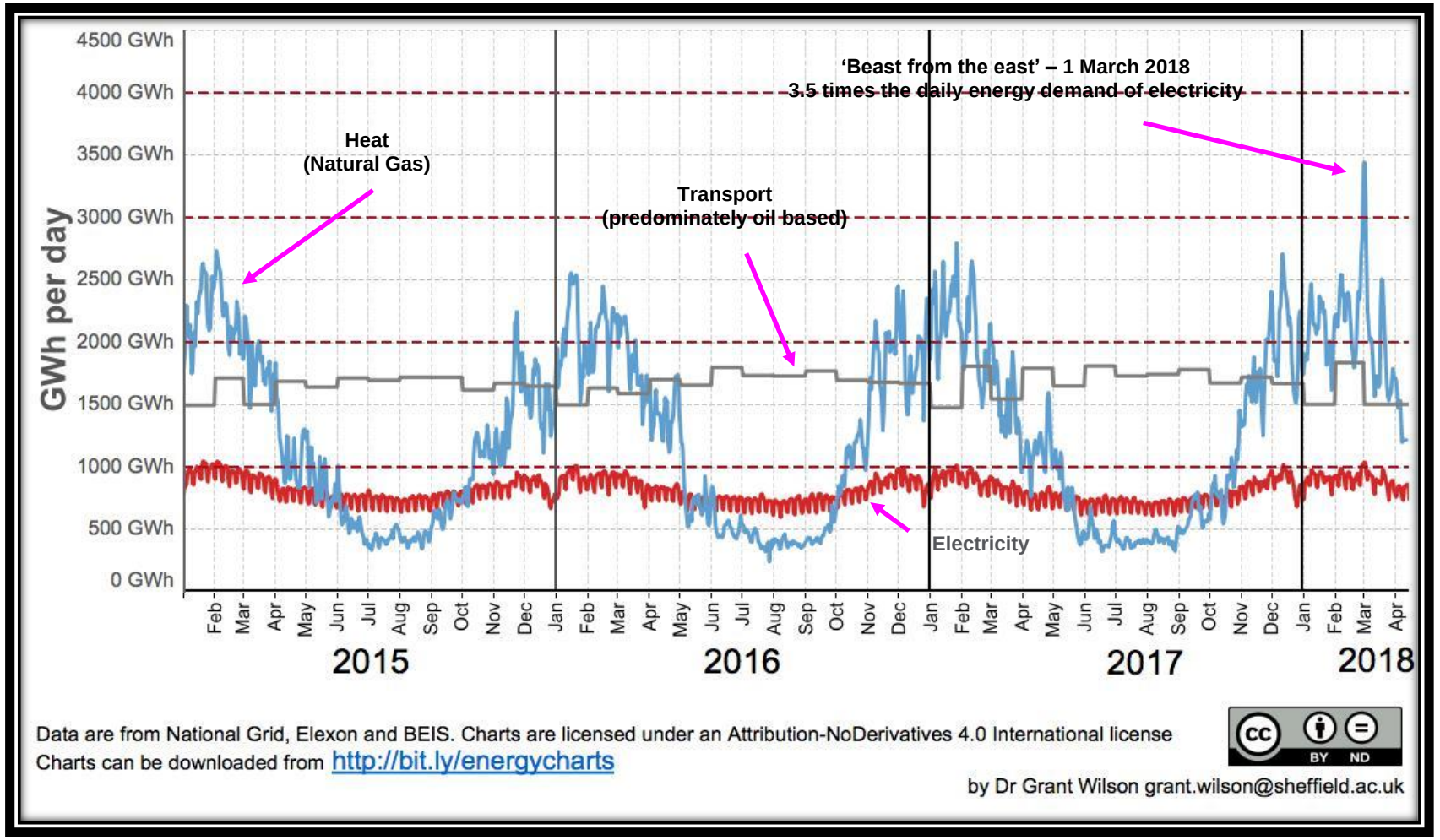


Clear goals, ambitious strategy and well-designed policies have been effective. These lessons must now be applied to other sectors

UK not on track to deliver 4th and 5th Carbon Budgets (2023-32)

'Urgent new policies are required'

Context: Seasonal variability of UK energy demand



'Beast from the East': 1st March 2018:

- Peak Electricity Demand = **53GW**
- Peak Heat Demand = **214GW**

Context: A TWh scale challenge

UK Annual Energy Consumption

• Electricity	300 TWh
• Gas	500 TWh[1]
• Petroleum	650 TWh
Total	**1450 TWh**
• Low Carbon	205 TWh
– Electricity (renewables)	60 TWh
– Electricity (nuclear)	70 TWh
– Gas (renewables - biomethane)	3 TWh
– Transport (renewables - biofuels)	12 TWh
– Other (biofuels directly used)	60 TWh

Challenge for UK energy system:

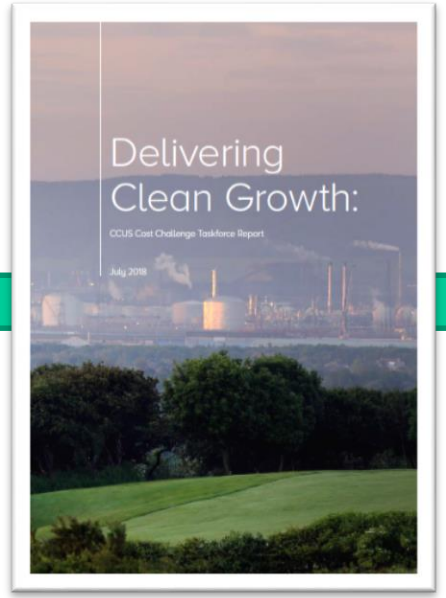
- Delivering a low carbon, affordable system, while;
- Ensuring flexibility to meet peak demand

Hydrogen presents an opportunity to address this equation

Notes:
1) Excludes 285 TWh for Power Station Fuel
2) Excludes network losses

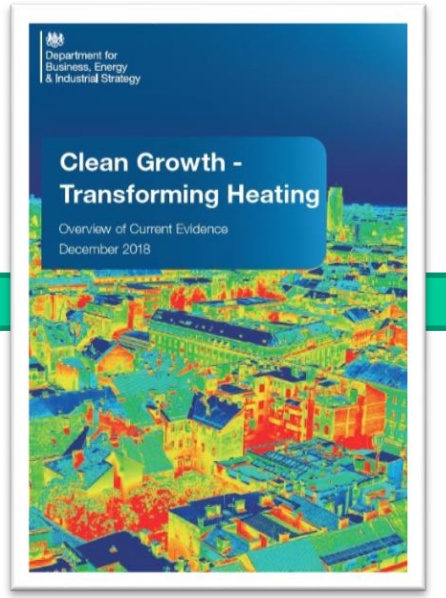
Policy Landscape: Clean Growth / CCS / Hydrogen

Clean Growth Strategy
Oct 17



CCUS Cost Reduction Task Force
Jul 18

CCUS Deployment Pathway
Nov 18



Transforming Heating
Dec 18

Commitment to CCUS Policy Framework in 2019

Policy Landscape: Industrial Clusters Mission

"We will establish the world's first net-zero carbon industrial cluster by 2040 and at least one low-carbon cluster by 2030"

To achieve this, in at least one cluster, by 2030:

- The low-carbon infrastructure needed to support industrial decarbonisation will be in place and operational.

- Multiple industrial facilities will already have reduced their emissions to the greatest possible extent.

HyNet: A TWh scale solution

- HyNet North West is a Hydrogen and Carbon Capture, Usage and Storage (CCUS) project.

- The goal of HyNet is to reduce Carbon Dioxide (CO_2) emissions from industry, homes and transport and support economic growth in the North West.

- Launch project in numbers:
  - 6TWh / Year Hydrogen – 2/3 Industry Fuel Switching, 1/3 Distribution Network Blending
  - 0.8 $MtCO_2$ / Year Emissions Capture from Hydrogen Production
  - 1.2 $MtCO_2$ / Year Emissions Capture from industry (refinery / fertiliser production)
  - £900m CapEx
  - 2024/5 Operational Date

Why the North West?

Challenge and opportunity

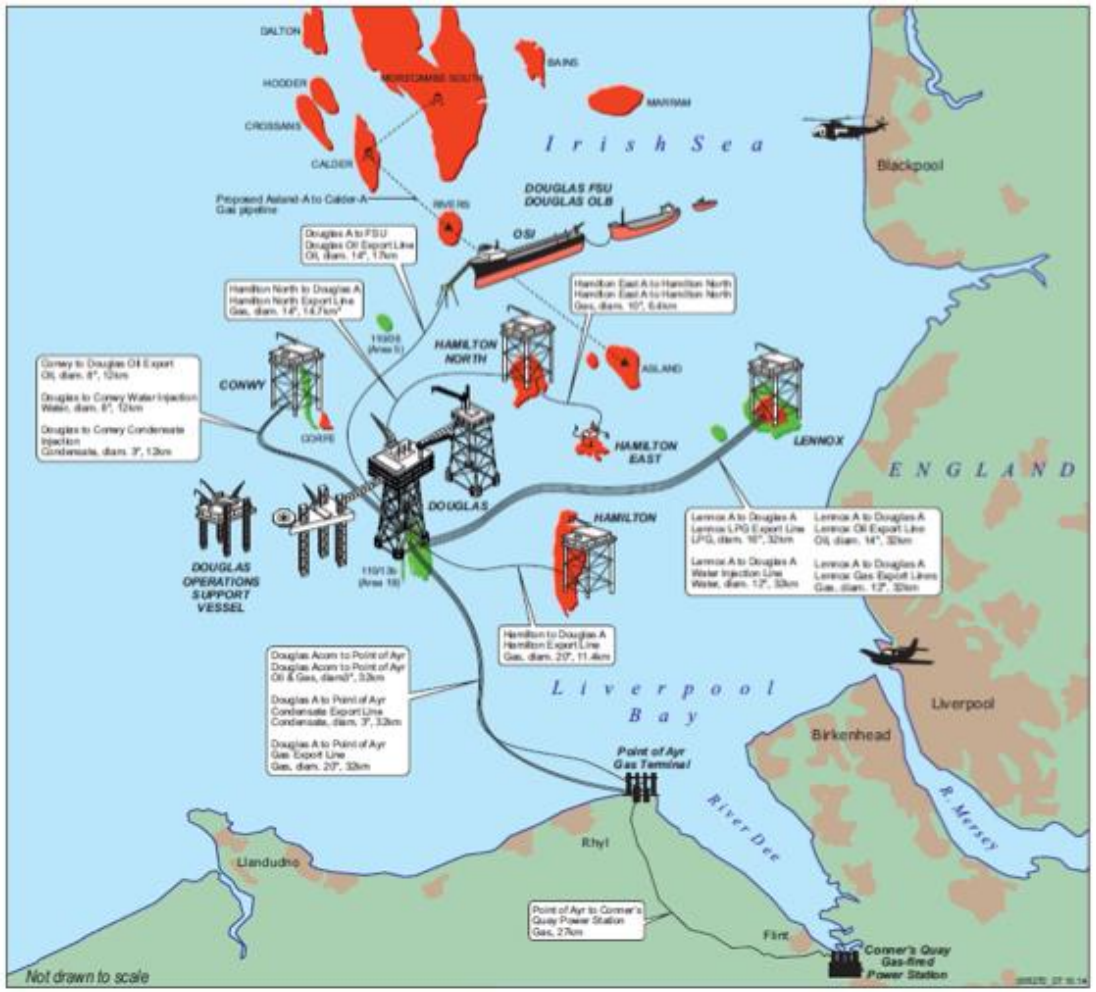
85% of homes connected to gas network

25%
emissions from industry
Vital for northern economy

A need to reduce transport impacts on **air quality** in Liverpool and Manchester

Why the North West?

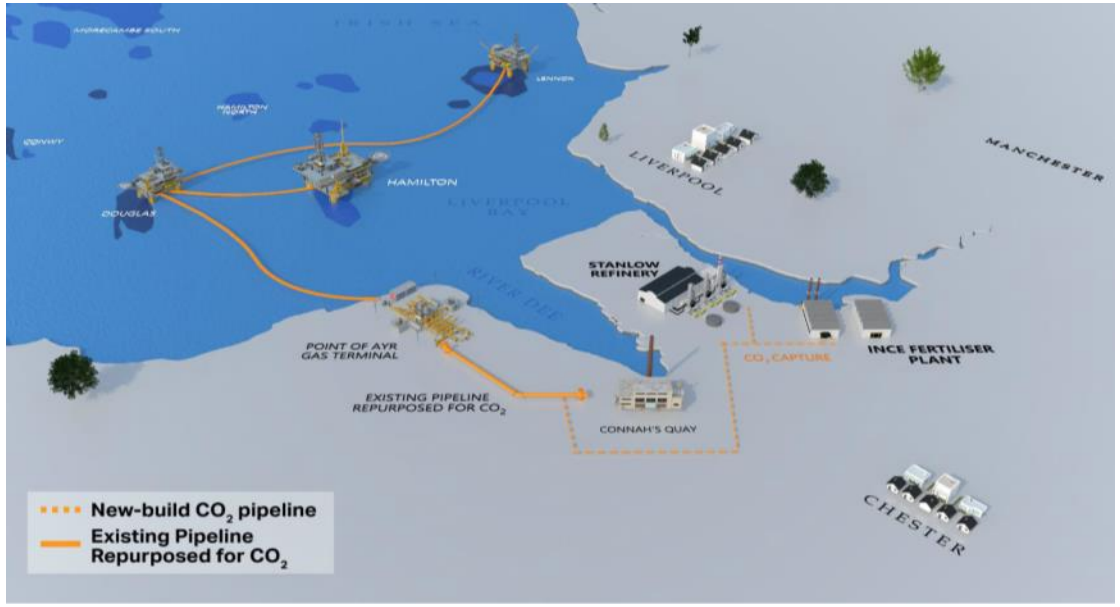
Challenge and opportunity



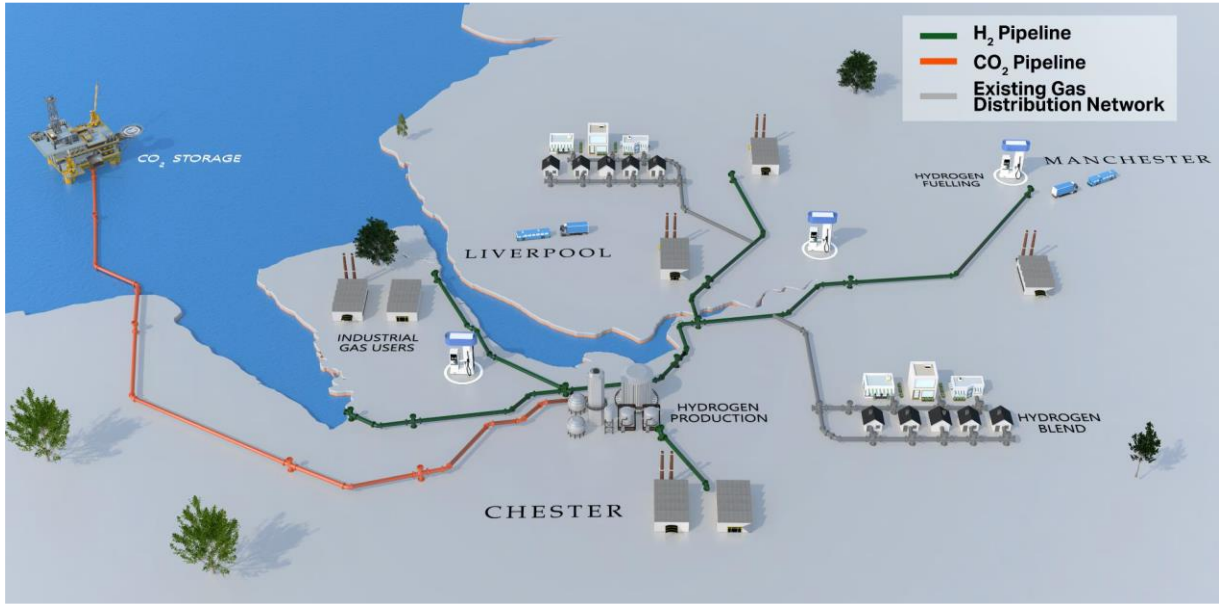

Cadent
H_2 Pipeline
CO_2 Pipeline
Future Hydrogen Sources
Future CO_2 Shipping
CO_2 Storage
Hydrogen Trains
Hydrogen Fuelling
Manchester
Liverpool
Industrial Gas Users
Hydrogen Production
Hydrogen Blend
Future Power Generation
Future Hydrogen Storage
Chester
Jobs and Skills
Inward Investment

HyNet Delivery: Partnerships

CCS infrastructure



H_2 supply & distribution infrastructure



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& Other Industrial users

HyNet North West

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