

Cadent's Regional Hydrogen Development Programmes

IPLOCA
25th April 2024

Dr Kelly Manders





Cadent Footprint

- The UK's largest gas distribution network.
- Bringing gas to 11 million homes and businesses.
- Operates a network of more than 82,000 miles of pipes.
- Transport gas throughout the North West, West Midlands, East Midlands, South Yorkshire, East of England and North London.

Cadent's Net Zero Priorities

To support the UK Government's net zero ambitions by 2050

Transition the current UK natural gas network over to low carbon hydrogen

Near-term focus on distributing hydrogen for heavy industry, power generation and transport



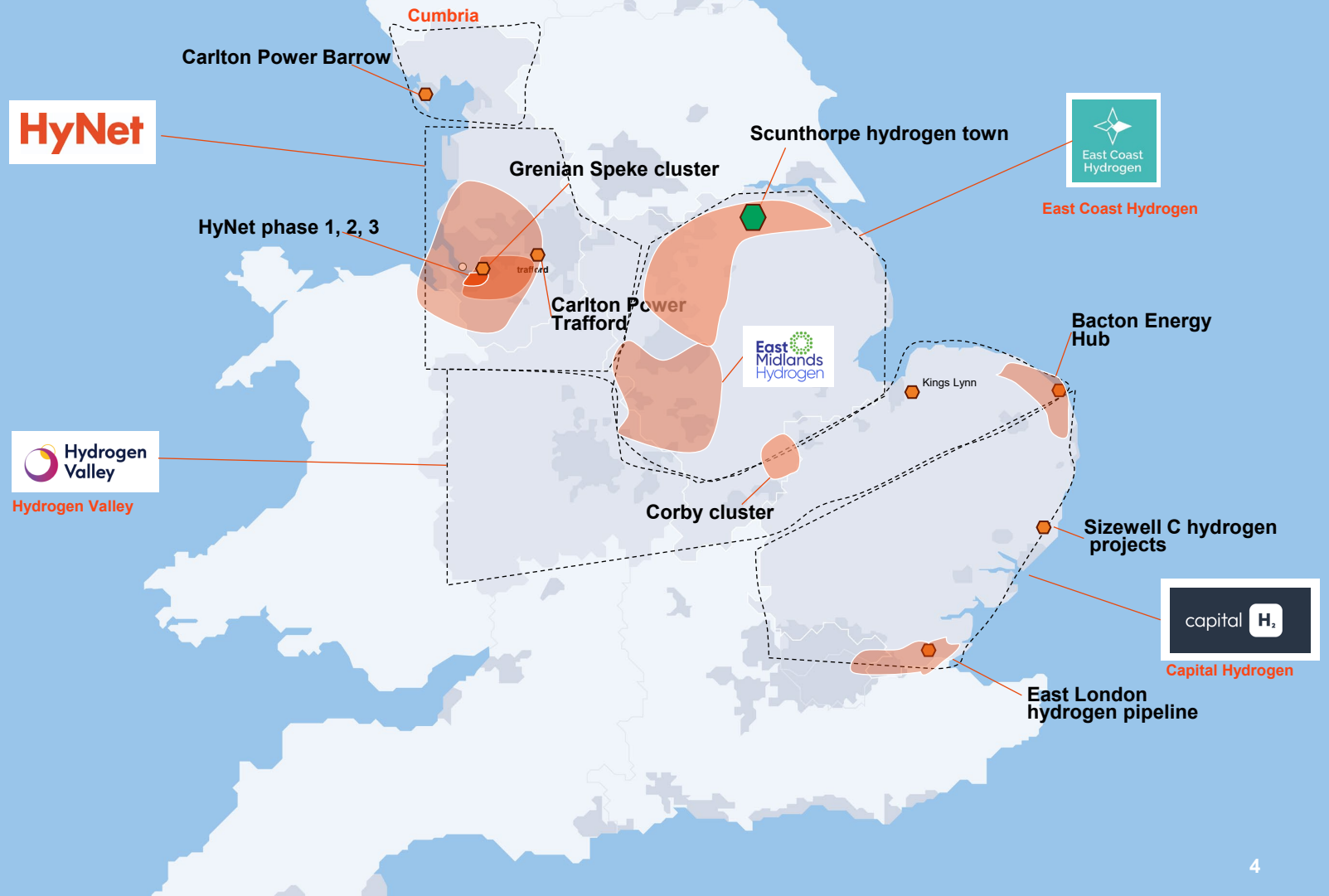
HyNet

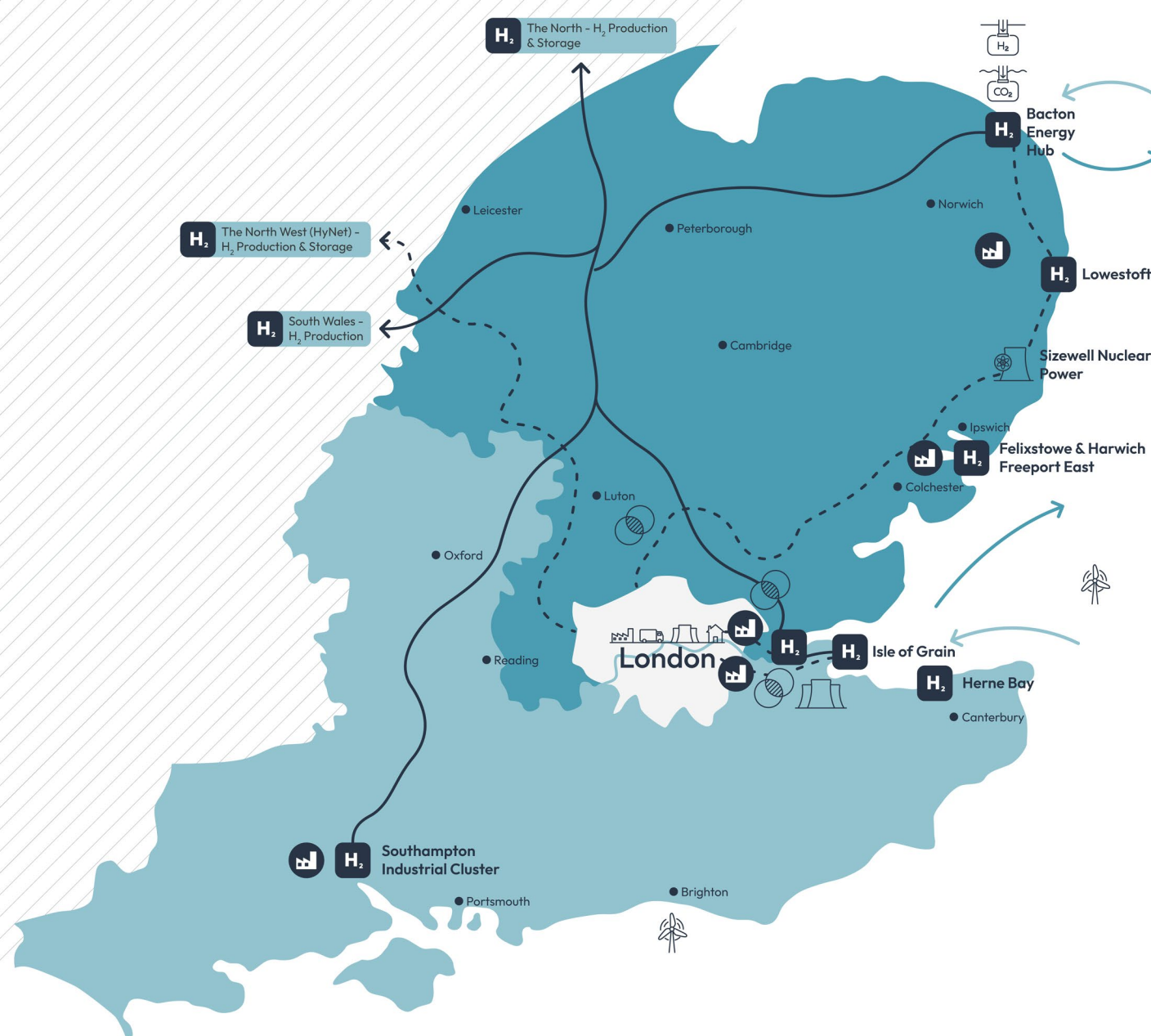


HyNet

Hydrogen Valley

capital H₂





Pipes

- H₂ Transmission Pipes - Repurposed
- - - H₂ transmission pipes - New or Repurposed

Shipping Routes

- CO₂ Exports
- ← H₂ Imports

Services

- Hydrogen Production
- Industrial Hydrogen Use Cluster
- Blending H₂ with natural gas into the gas network
- Underground H₂ Storage
- Potential H₂ Production from Wind Energy
- Potential H₂ Production from Nuclear Power
- Power Station
- Underwater CO₂ Storage

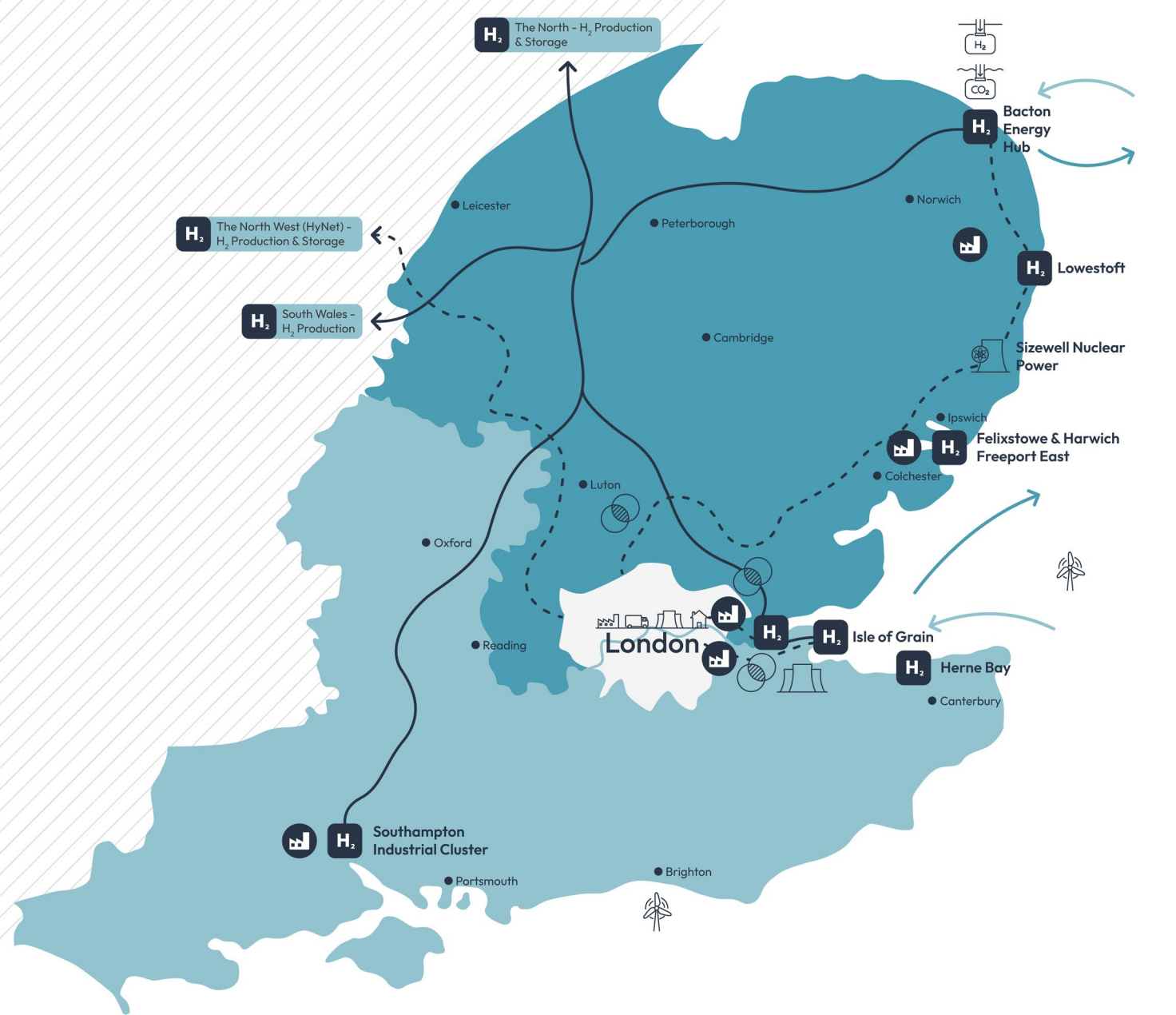
Regions

- Cadent
- SGN
- Rest of the UK

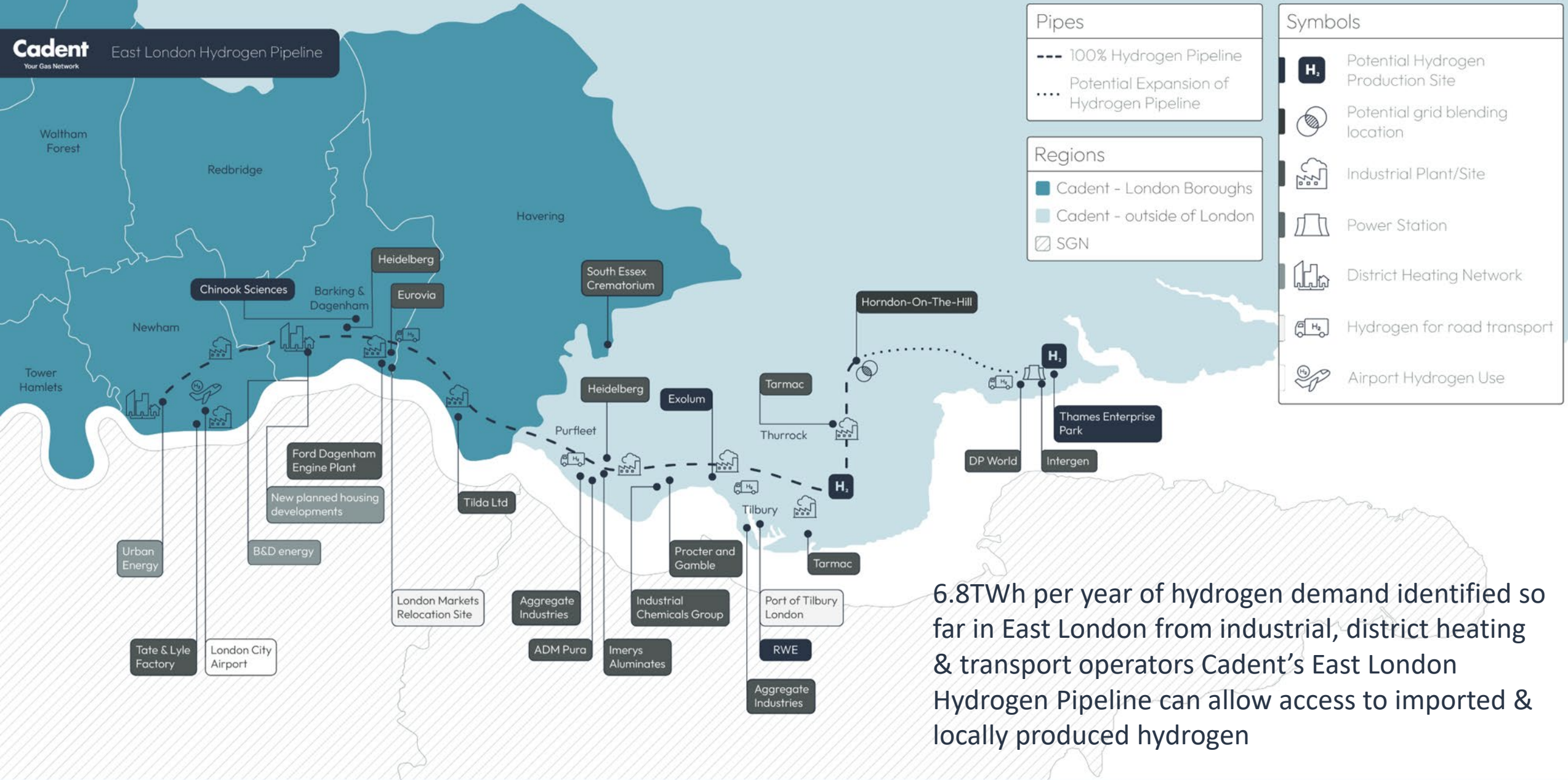
London will be connected to production centres via a National Grid Hydrogen Backbone.

This will allow conversion of regional distribution networks to hydrogen in the 2030s and 2040s

Hotspots - Progress



- Bacton
 - Working with Bacton Hydrogen Project – bH2
 - Project moving into Select (pre-FEED) Phase for Phase 1 Blue Hydrogen Synthesis
 - Looking at local high demand offtake hotspots including Kings Lynn
 - Reviewing feasibility for Regional Green Hydrogen Synthesis
- Felixstowe and Harwich
 - Potential green hydrogen production at both Felixstowe and Harwich ports
 - Cadent considering pipeline distribution options
- Import of H₂ – Thames Estuary
 - National Gas leading SIF project: HyNTS Maritime - supporting UK maritime ports to link to large scale hydrogen infrastructure across the UK
 - South Africa-UK PACT programme funds an innovative feasibility study to explore the viability of Green Hydrogen Production and Export Infrastructure from South Africa's Eastern Cape region



6.8TWh per year of hydrogen demand identified so far in East London from industrial, district heating & transport operators Cadent's East London Hydrogen Pipeline can allow access to imported & locally produced hydrogen

East London Hydrogen Pipeline

Pre-FEED preparations



Hydrogen Forecasts	Target	Received	Points to note
Customer Forecasts	10	18 customers, 23 sites including 2 district heat networks	
Producer Forecasts	2	2	1 Producer withdrawn from region
Storage Forecasts	1	0	

Key sectors represented:

- Food and drink
- Chemicals processing
- Construction materials
- Power generation
- District heat networks
- Logistics
- Aviation



East London Hydrogen Pipeline:

Pre FEED prep - 84% of critical data received

capital

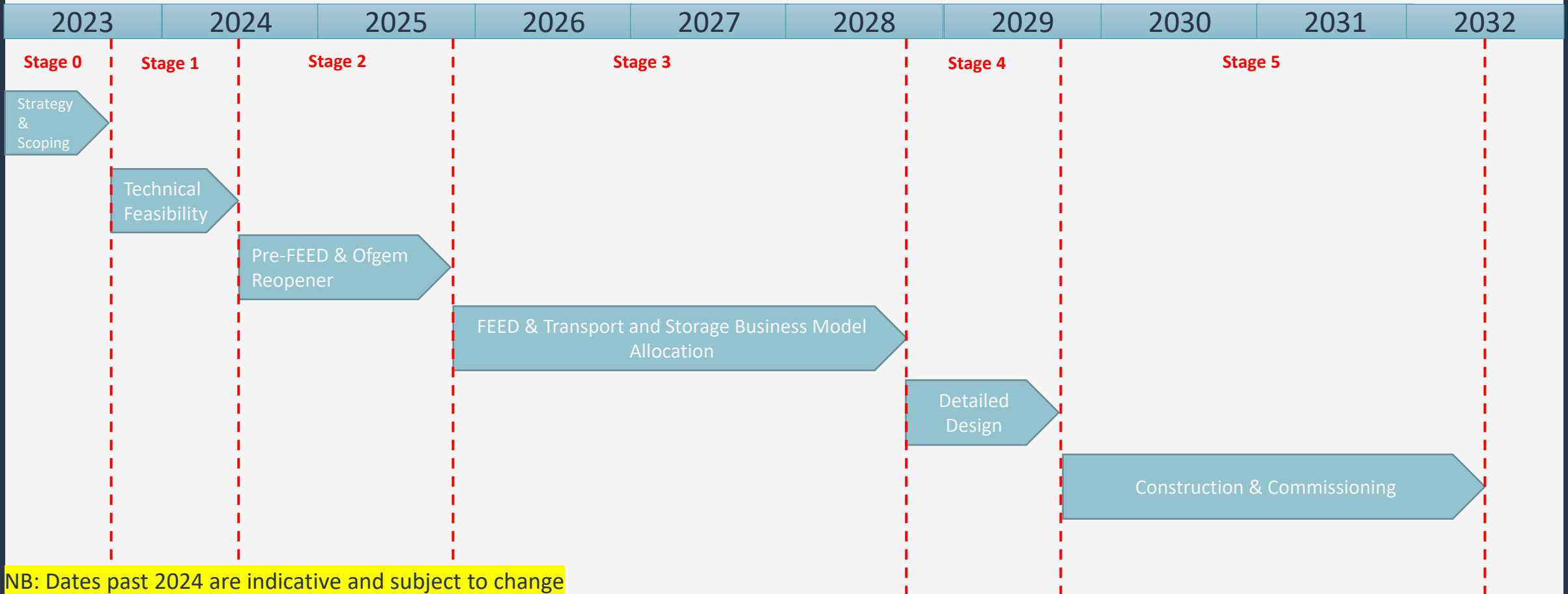


- Customer engagement has grown from 15 to 19 customers, with updated forecasts received from 18 customers to date.
- Customers provided us with information about their plans to blend on site, ability to switch back to NG, ability to take less/more hydrogen in order to facilitate the system balancing etc.
- 2 Producers have confirmed production over 3 sites in the region and provided forecasts
- Producers have provided greater detail on hydrogen production volumes, purity and direct off taker plans
- 1 storage operator undertaking an independent feasibility study on their site in East London
- Importance of hydrogen import at this location

- Our published feasibility report estimated a total industrial demand for hydrogen by 2050 of **2TWh** for London and the Thames Estuary
- Demand data submitted from our customers has identified over **6.8TWh** of industrial demand by 2035+

	2030	2035	2035+
Hydrogen Demand across 19 sites	2.0TWh	3.6TWh	6.8TWh
Planned Hydrogen Supply:	2.0TWh	2.7TWh	3.5TWh

ELHP Timeline





East Coast
Hydrogen

East Coast Hydrogen

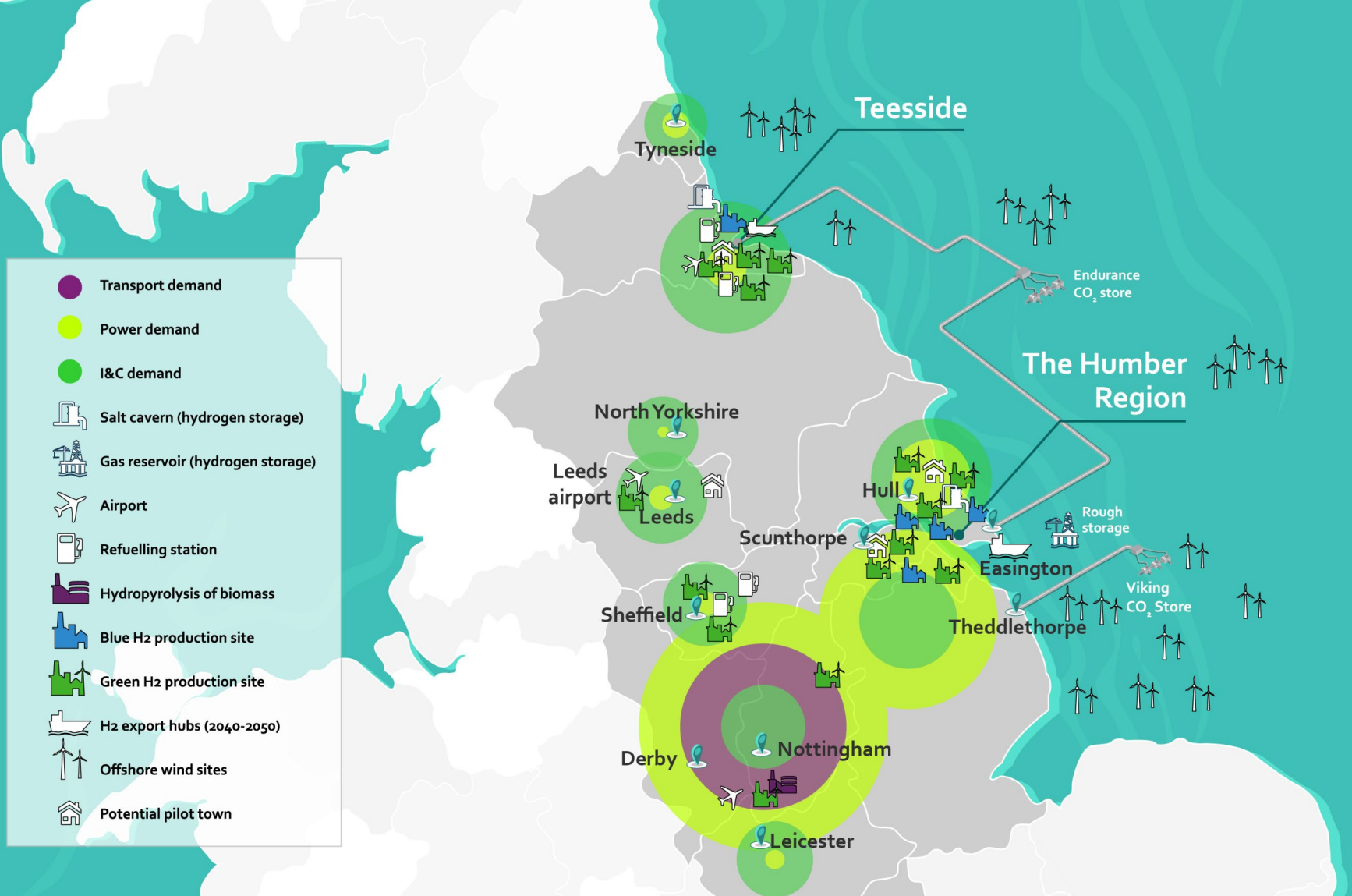
Northern
Gas Networks 

Cadent
Your Gas Network

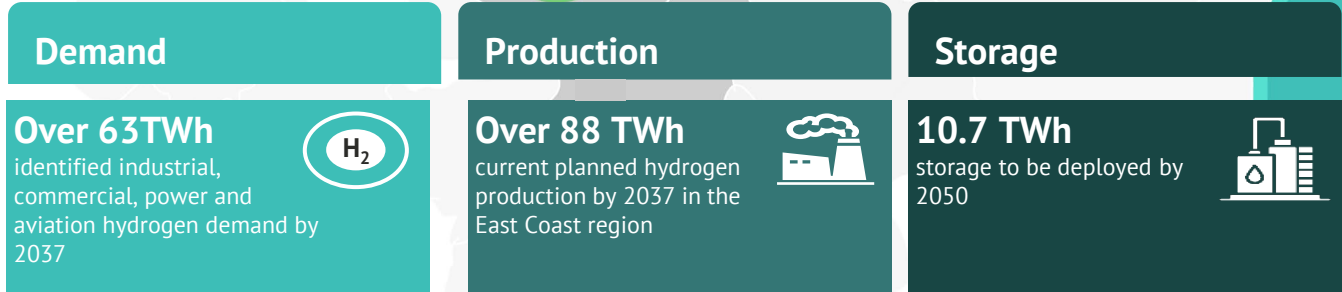
 **national
gas**



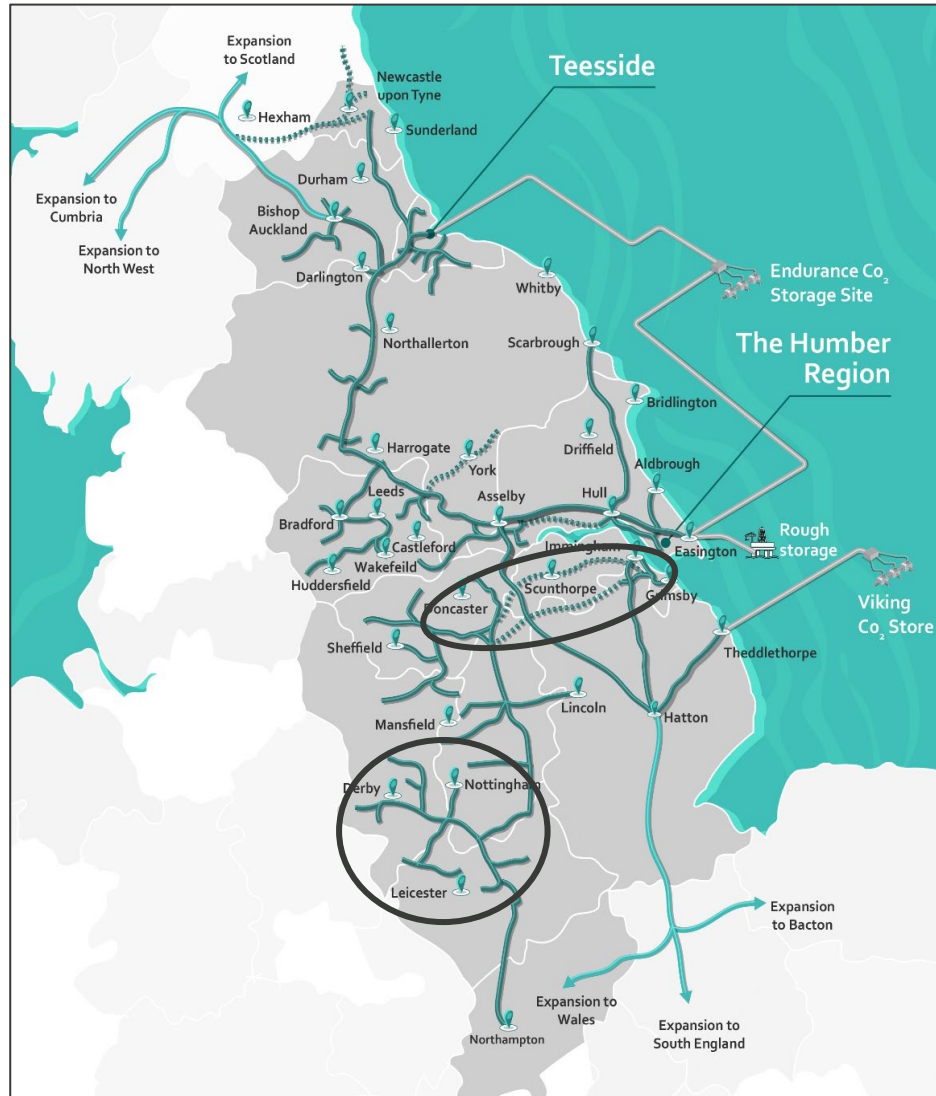
The East Coast Hydrogen region has the key ingredients for a thriving hydrogen economy...



... but will need a pipeline network to realise the opportunity














East Coast Hydrogen: Next stage is FEED



<p>Cross-value chain Participants</p> <p>VPI</p> <p>STATERA</p> <p>sse Thermal</p> <p>EQUANS</p> <p>centrica storage</p> <p>SIEMENS energy</p> <p>EAST COAST CLUSTER</p> <p>kellas MIDSTREAM</p> <p>equinor</p> <p>bp</p>	<p>Hydrogen Production</p>	<p>BOC A Member of The Linde Group</p> <p>ITM POWER Energy Storage Clean Fuel</p> <p>CHINOOK</p> <p>CPH</p> <p>RWE</p> <p>Carlton POWER</p> <p>ECO ENERGY WORLD</p> <p>uni per</p> <p>HyMarnham Pure</p> <p>PHILIPS 66</p> <p>HY</p> <p>ecoEnergy</p>
<p>Demand</p>	<p>Demand</p>	<p>Navigator</p> <p>LIBERTY</p> <p>semcorp</p> <p>Samworth Brothers</p> <p>AGGREGATE INDUSTRIES</p> <p>GUARDIAN GLASS</p> <p>TRITON POWER</p> <p>FORTERRA</p> <p>VELOCYS</p> <p>INVIVO</p> <p>SAFFLET</p> <p>Vaillant</p> <p>NHS England</p> <p>N8800</p> <p>KNAUF</p> <p>TOYOTA</p> <p>ENERGY</p> <p>PEPSICO</p> <p>Ardagh Glass Packaging</p> <p>BEATSON CLARK</p> <p>PREMIER FOODS</p> <p>University of Sheffield</p> <p>Lenzing</p> <p>CRANSWICK</p> <p>SOFIDEL</p> <p>University of Nottingham</p> <p>BritishSugar</p> <p>SOLENIS</p> <p>Boots</p> <p>ROLLS ROYCE</p> <p>ALSTOM</p> <p>MERCIA</p> <p>Singleton Birch</p> <p>SAINT-GORAIN</p> <p>Loughborough University</p> <p>EnerTek International</p> <p>NAYLOR</p> <p>MID East Midlands Airport</p> <p>syngenta</p> <p>Hanson</p> <p>H+H</p> <p>MOLSON COORS</p>
<p>Local Stakeholders</p>	<p>TEES VALLEY</p> <p>MIDLANDS ENGINE</p>	<p>West Yorkshire Combined Authority</p> <p>Tracy Brabin Mayor of West Yorkshire</p> <p>CATCH</p> <p>D2N2</p> <p>EAST MIDLANDS DEVELOPMENT COMPANY</p> <p>Greater Lincolnshire</p>

East Midlands Hydrogen Footprint

KEY

-  **PROSPECTIVE INDUSTRIAL HYDROGEN USER - FORECASTS RECEIVED**
-  **PROPOSED HYDROGEN PRODUCTION**
-  **100% HYDROGEN PIPELINE ROUTING OPTION - CADENT**
-  **EAST MIDLANDS FREEPORT SITES**
-  **EAST MIDLANDS FREEPORT FUTURE ENERGY SKILLS HUB**
-  **HYDROGEN TECHNOLOGIES MANUFACTURERS**
-  **SOUTH DERBYSHIRE HYDROGEN REFUSE TRUCKS TRIAL**
-  **MULTIPLE LOCATIONS**
-  **M1 MOTORWAY**
-  **A42 AND A50 MAIN ROADS**
-  **EAST MIDLANDS AIRPORT**

