

Who are Hydrogen East?



- **Hydrogen East** is a not-for-profit organisation founded in summer 2020 to **research, analyse and promote** pathways for development of a hydrogen economy that connects supply and demand in East Anglia, and which looks to complement and reinforce delivery of other regional clean growth priorities
- While hydrogen is the core focus of the business, the two co-founders have extensive experience in both regional and national gas and electricity markets
- **Hydrogen East** is looking at both potential hydrogen production opportunities as well as local demand-side applications:
 - We will simultaneously take a **place-based** and **whole-system** approach to ensure that we provide locally-tailored solutions that exist symbiotically in the wider energy landscape and provide the maximum local benefit
 - Our analysis will sit upon a **bottom-up analysis** of the assets, infrastructure and consumer types in the region

The Team



Nigel Cornwall
Co-founder



Johnathan Reynolds
Co-founder



Michael Brown
Analyst



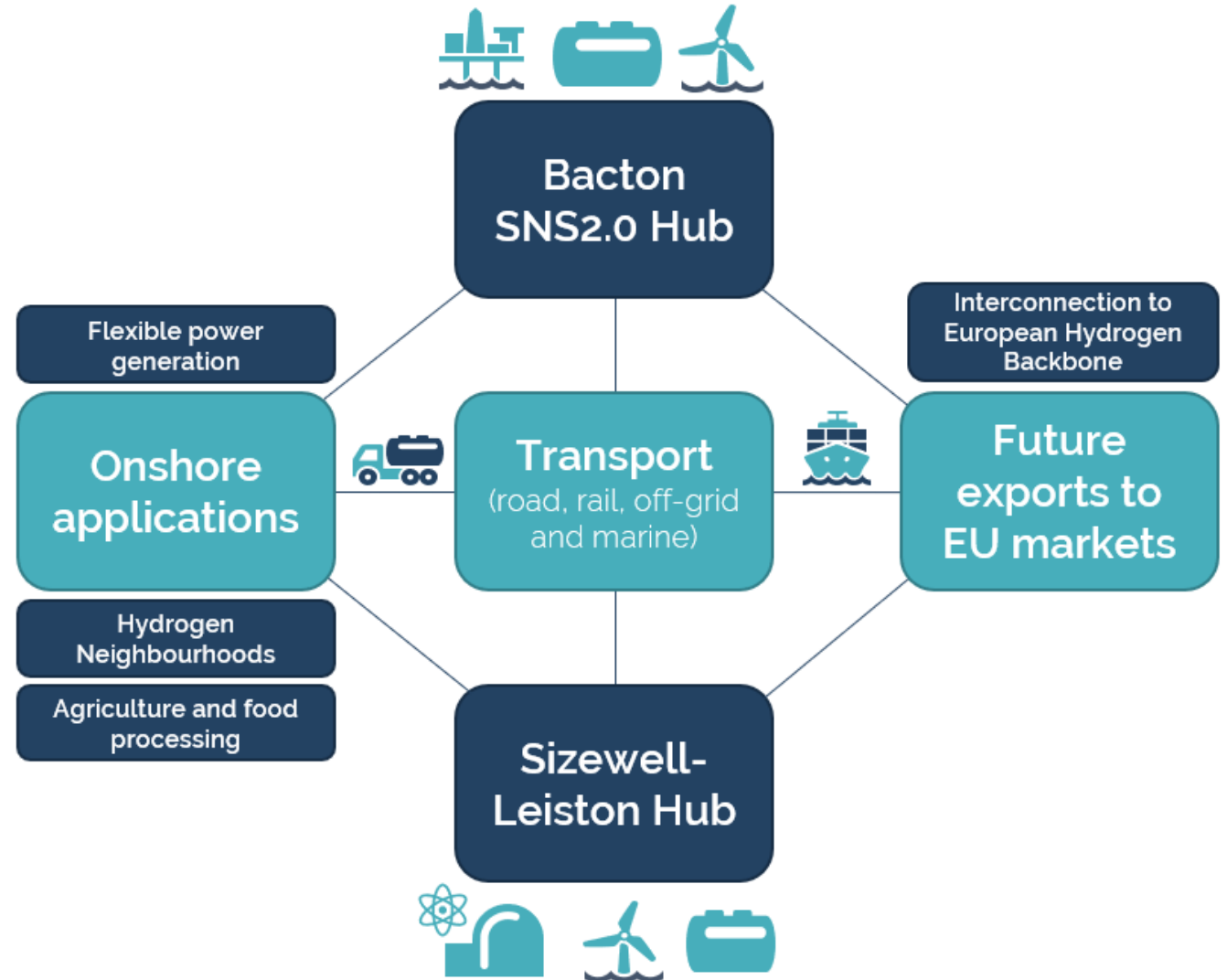
Charlotte Farmer
Analyst

East Anglia – the potential



Initially scoping three “energy hubs” across East Anglia:

- **Bacton gas terminal and the surrounding Southern North Sea**, looking at hydrogen production and storage, as well as CCS
- Opportunities in the **Sizewell-Leiston area** anchored to nuclear generation facility and the existing Net Zero Leiston project
- Exploring a suite of place-based actions in the surrounding regions designed to increase **hydrogen adoption across heavy transport applications** through a demand aggregation model



Transport sub-sectors (1)



Cars and vans

- EVs likely to predominate
- Biomethane and hydrogen would suit some vehicles travelling longer distances
- Two models currently available in the UK from Toyota and Hyundai
- Need to evaluate relative costs



HGVs

- High concentration at ports e.g. Felixstowe
- Ideal for biomethane adoption in near-term
- Convenience of fast refuelling is essential
- Need to consider both back-to-base refuelling and cross-country



Buses

- Hydrogen buses are most technologically mature
- Suit long-distance journeys
- Ideal opportunity to reduce inner-city air pollution
- Major demonstrator examples from around the UK which we could emulate



Municipal

- Varied vehicles in municipal fleets including gritters, bin lorries etc.
- Mixture of ownership, leasing and third-party service provision
- Activity spread across multiple local authority stakeholders
- Funding of council initiatives elsewhere



Agricultural

- Large agricultural sector in Norfolk and Suffolk
- Opportunities for new vehicles and retrofitted dual-fuel
- Fuel delivery aspects need to be carefully considered
- Explore opportunities for on-site production of biomethane or hydrogen



Transport sub-sectors (2)



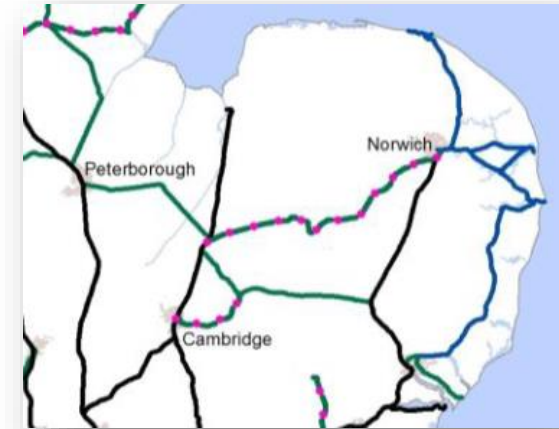
Rail

- Rail network sees heavy usage, primarily the routes between East Anglia and London
 - In 2018-19, just under 194mn passenger journeys took place between the East of England and other regions (or within the region itself)
- Local geography and infrastructure mean the Norfolk and Suffolk branch lines aren't necessarily suitable for electrification
- Middle-distance trains moving at under 100mph ideal for conversion to hydrogen
- [Traction Decarbonisation Network Strategy](#) by Network Rail flags Norfolk and Suffolk Coast line as prime for hydrogen

Ports and shipping

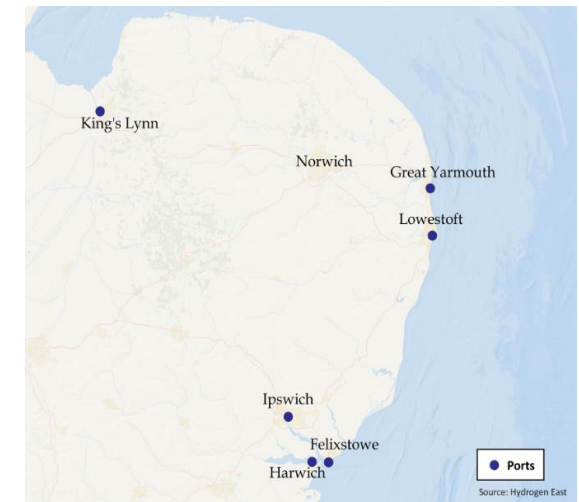
- As flagged in FES 2020 - major opportunities to decarbonise shipping through hydrogen-based fuels (e.g. ammonia)
- Freeport East bid included a proposal to establish a hydrogen hub
- Confluence of road, rail and shipping at the ports. For example at Felixstowe:
 - The 2019 cargo stats show that over 246,000 road goods vehicles passed through the port (inbound and outbound)
 - 72 trains service the port daily and up to 29% of its UK domestic throughput goes via rail
- Good opportunities to decarbonise O&M vessels and port-side machinery

Network Rail view for track conversion



(blue = hydrogen, green/pink = multiple options could apply but electrification preferred)

Six principal ports in East Anglia

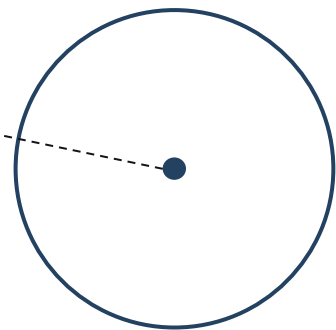


Hydrogen refuelling models



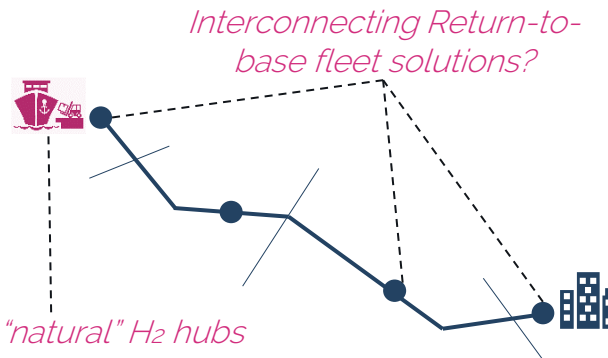
Source: ARUP

Back-to-base

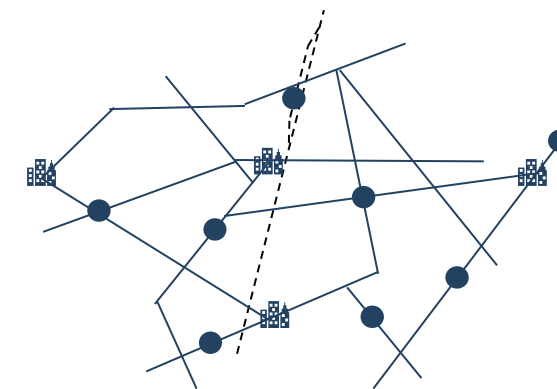


Integrated / neighbouring transport hubs, rather than individual operators/fleet owners?

Corridors



Full network



- = Hydrogen refuelling station
- = Initial roll out
- = Commercial roll out



Initial road network for consideration



Map of the proposed New Anglia Clean Transport Hub network

