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# The SNS Hydrogen Evolution in the East



## Hydrogen East



# Welcome

Thank you for joining us today

**SNS2023**   
VISION 2030  
Hydrogen East



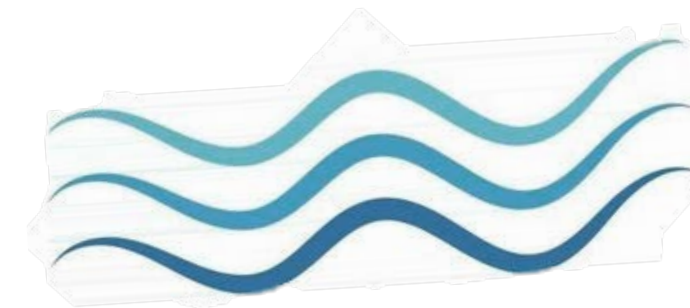
# Andy Holyland

**Managing Director**



**Opergy**  
Net Zero

**The SNS Hydrogen Evolution in the East**



# Who we are?



## Hydrogen East's purpose and ambitions

- Our purpose is to raise awareness of existing and potential H<sub>2</sub> opportunities across the East of England (and beyond), to promote the technology and to support local supply chains and markets
- We work in partnership with regional stakeholders, we will support the development of a viable, implementable route-map that sees the East of England as a leading 'hydrogen region'
- Ambition to develop a broad regional network across all key sectors identifying suitable applications for power, heat, industry and transport

**Hydrogen East**

Supported by



**Opergy**  
Net Zero

# What we have delivered



- A comprehensive study on the potential for an **energy hub at Bacton**
- Feasibility study for **Lowestoft PowerPark**
- Hydrogen **production & blending site assessments**
- Opportunities for **flexible generation assets**
- **Hydrogen Refueling Feasibility Study**
- Hydrogen **Market & Capabilities Assessment**
- Multiple **decarbonisation studies** funded through the CRF
- Inn2Power **Green Hydrogen Supply Chain mapping & State of the Nation Reports**

[https:// mapping.inn2power.eu/ #green-hydrogen-report](https://mapping.inn2power.eu/#green-hydrogen-report)



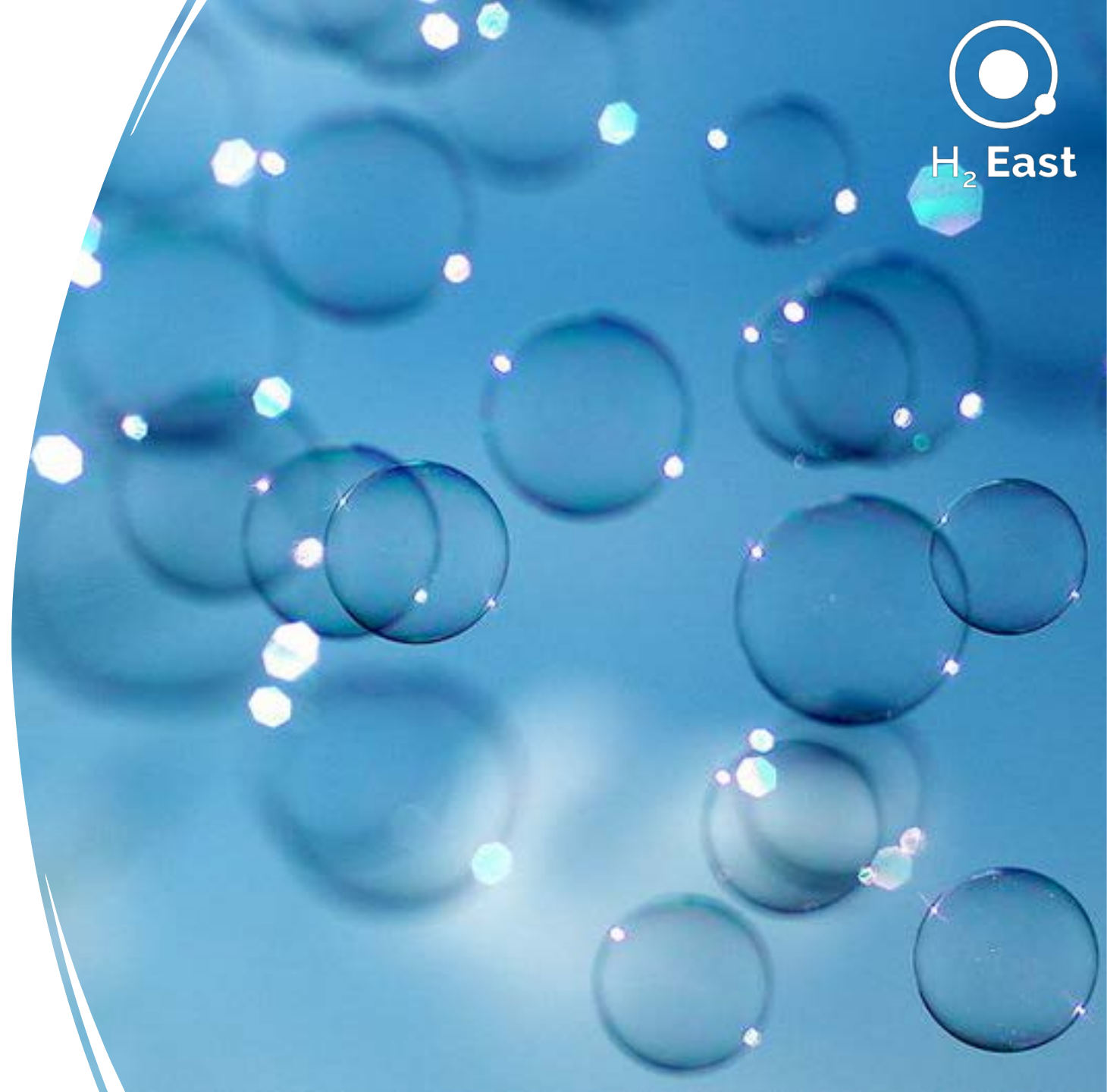
# Hydrogen is a key technology in the energy transition

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- Hydrogen is a **versatile element** that can be deployed across a **variety of sectors**, providing a powerful tool to aid the transition to Net Zero
- It should be considered as a **complimentary to electrification** and increased roll-out of renewable generation
- The government foresees strong growth in hydrogen production and use. Most recently, raising levels of ambition in the Energy Security Strategy to **10GW by 2030**, with at least **half electrolytic (Green) hydrogen**
- UK Hydrogen Strategy Estimates suggest the scale of hydrogen uptake could potentially **reach 460 TWh/y in 2050**, equivalent to 1.8 times total UK electricity consumption in 2020 (260 TWh/ y)



H<sub>2</sub> East



# Who will be speaking?



Ben Fitzsimons

Technical Director



Andrew Summers

Chief Executive



Steve Beel

Chief Executive



Matt Stewart

Policy & Programme  
Manager



Ellie Udomwong

Hydrogen Specialist





Questions  
via **slido.com**



**H<sub>2</sub> East**

[www.hydrogeneast.uk](http://www.hydrogeneast.uk)



# The SNS Hydrogen Evolution in the East

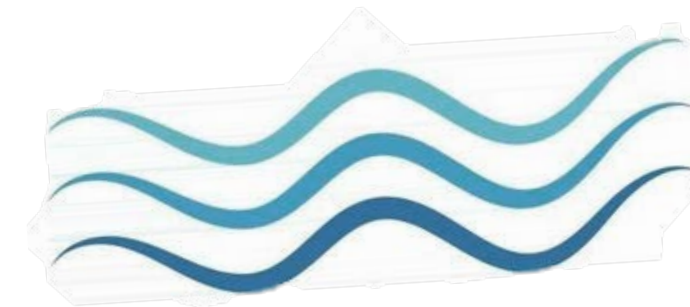
East of England Hydrogen Cluster

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## Ben Fitzsimons

**Technical Director  
Water Resources East**





# Regional Water Resources Planning

24<sup>th</sup> May 2023 – Ben Fitzsimons



[www.wre.org.uk](http://www.wre.org.uk)



[@WaterREast](https://twitter.com/WaterREast)



[Water Resources East](https://www.linkedin.com/company/water-resources-east/)

# WRE's board members and funders

**AffinityWater**



**Norfolk**  
County Council



**Suffolk**  
County Council



**NEWANGLIA**  
Local Enterprise Partnership  
for Norfolk and Suffolk

Combined voting rights

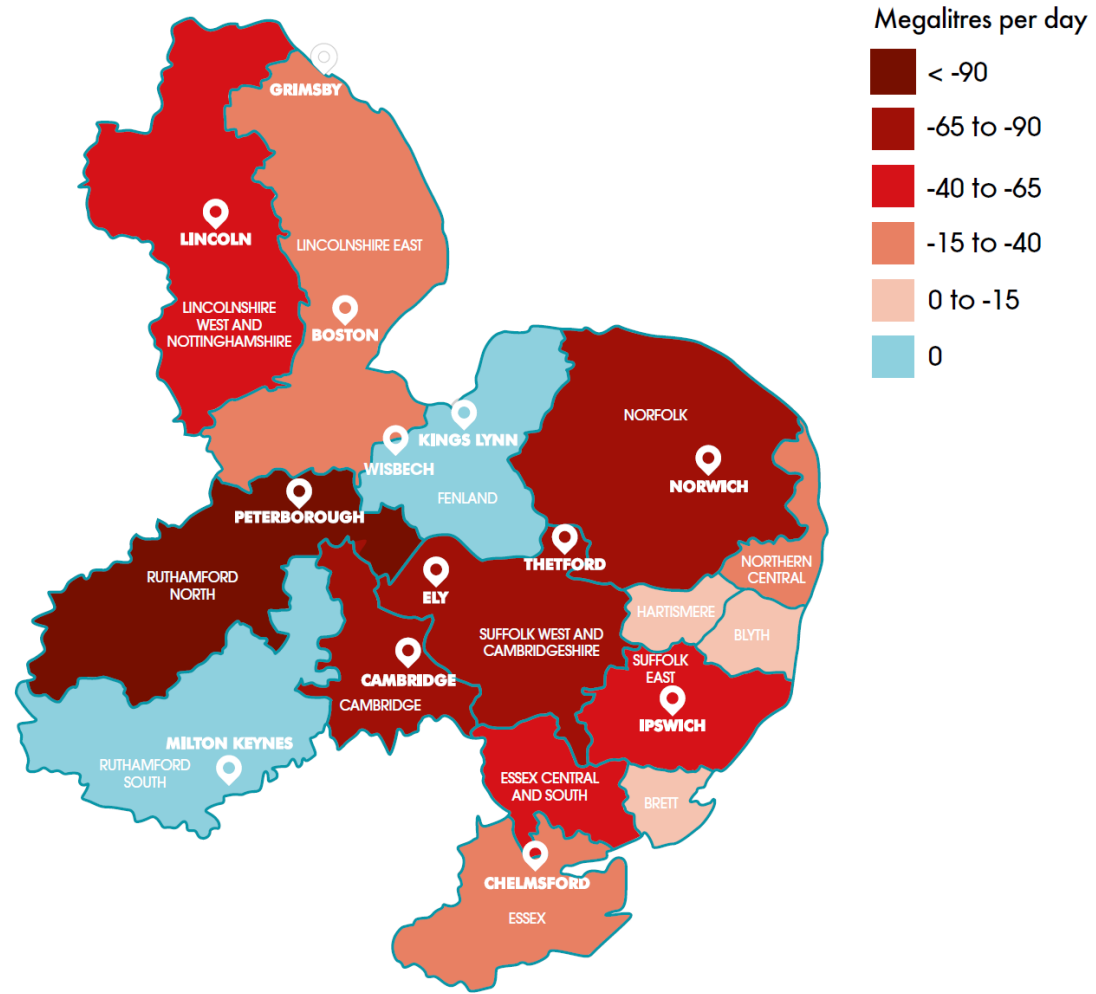
WRE's operating costs are funded by membership fees:  
70% water companies, 30% other organisations

**RWE**

# WRE's members and consultation group



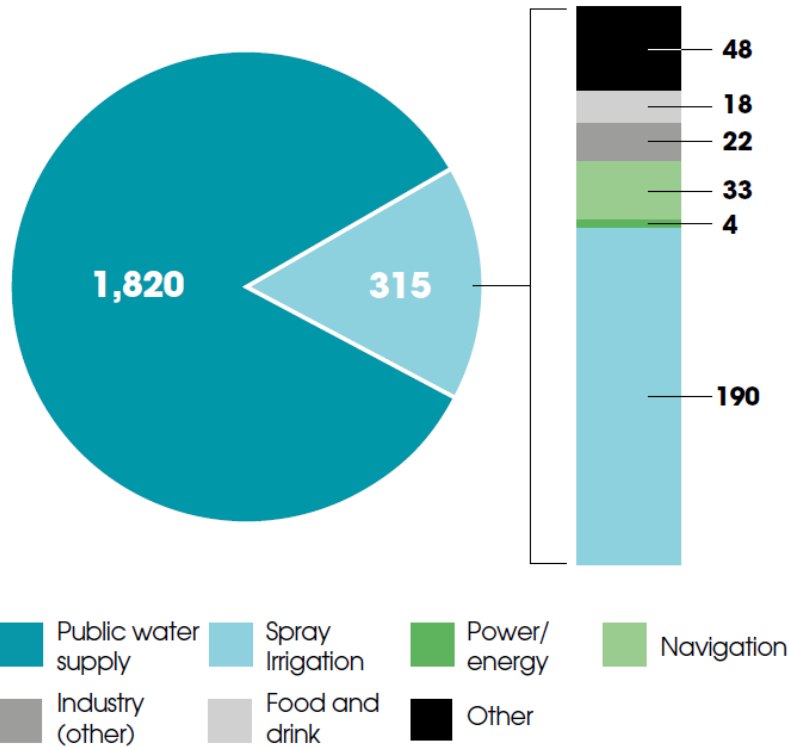
# Urgent action needed by all sectors to manage the region's scarce water resources



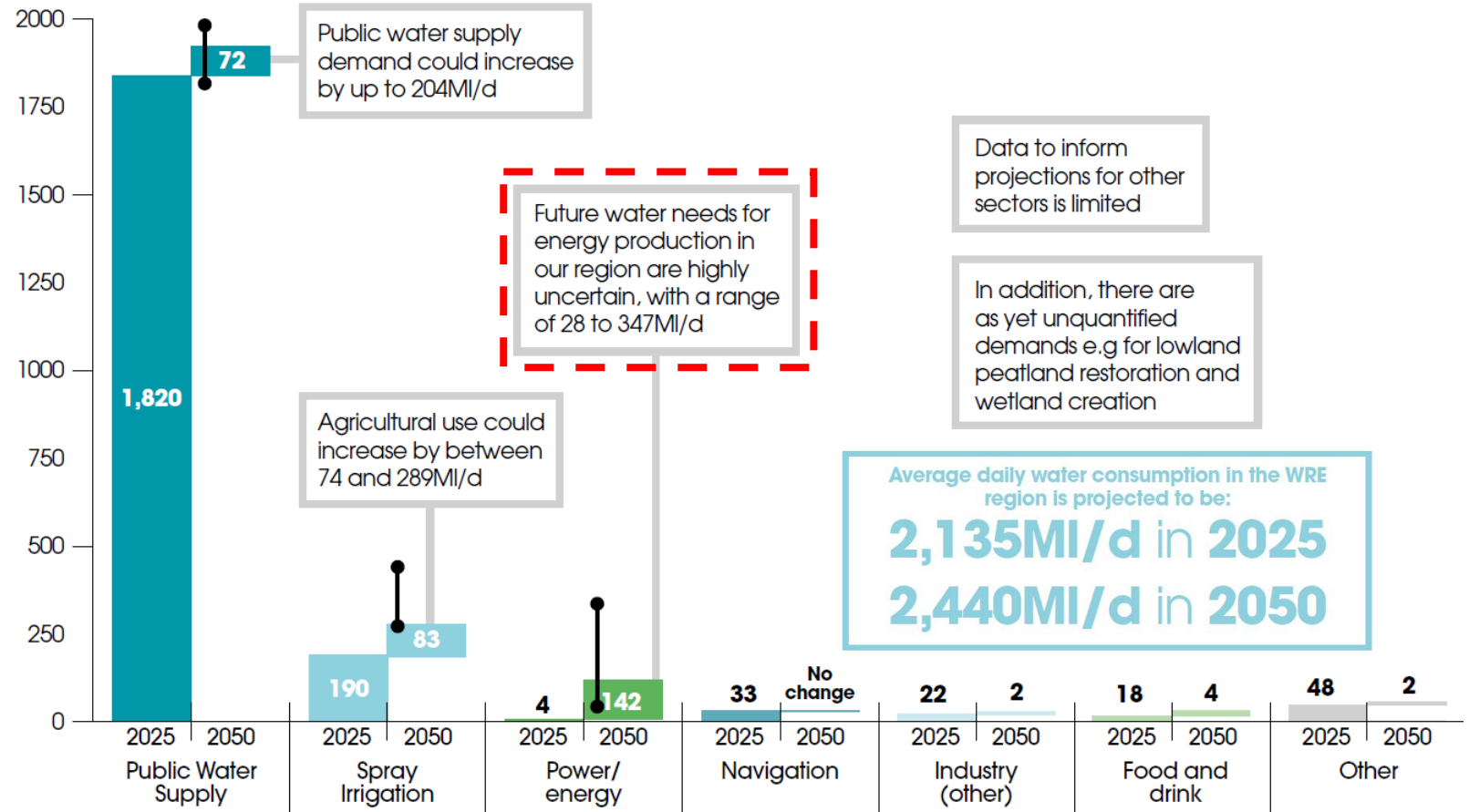
- The whole of Eastern England is already classified as ‘seriously water stressed’ by the Environment Agency
- A shortfall of 640 million litres of water per day (ML/d) projected for 2050
- Unless action is taken, increasing water scarcity will constrain agricultural production and curtail economic and housing development, as well as impacting the region’s future prosperity and contribution to net zero, and endanger the East’s iconic chalk rivers and wetlands

Projected supply-demand deficits in 2050 (Public Water Supply only)

# 300MI/day more water needed by 2050



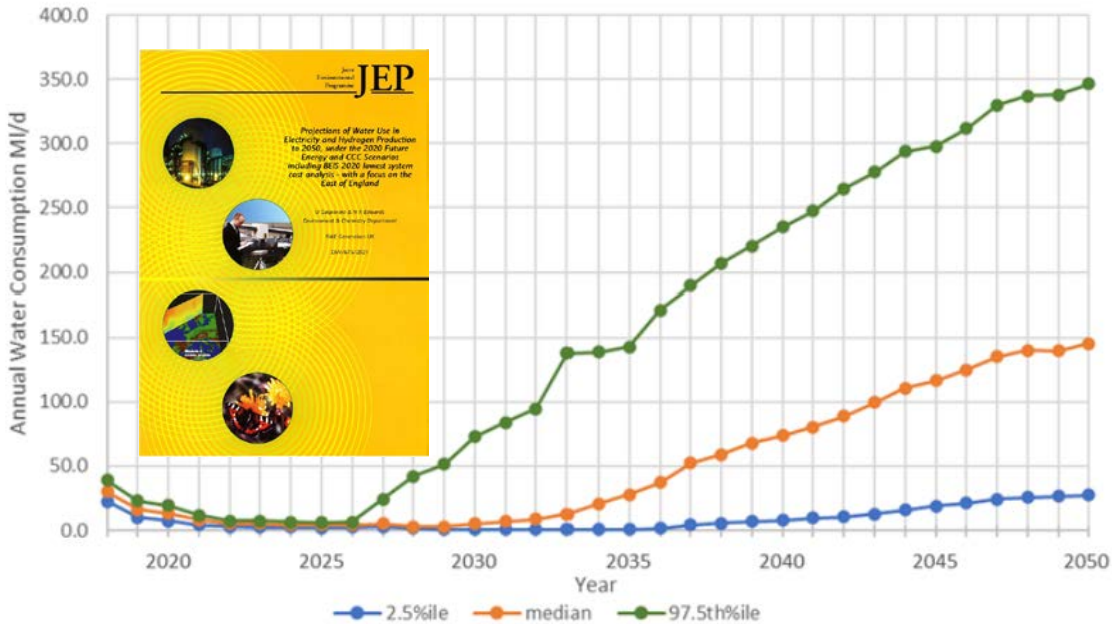
Baseline water demand in 2025



Projections and uncertainties in future water demand

# Uncertain future water needs of the power sector

Maximum of Percentiles from All Four FES21 Scenarios



Each of the four FES21 scenarios represents a credible pathway for the development of energy from today to 2050.

Hydrogen production and combustion plant fitted with carbon capture and storage are needed to get the country to net zero 2050

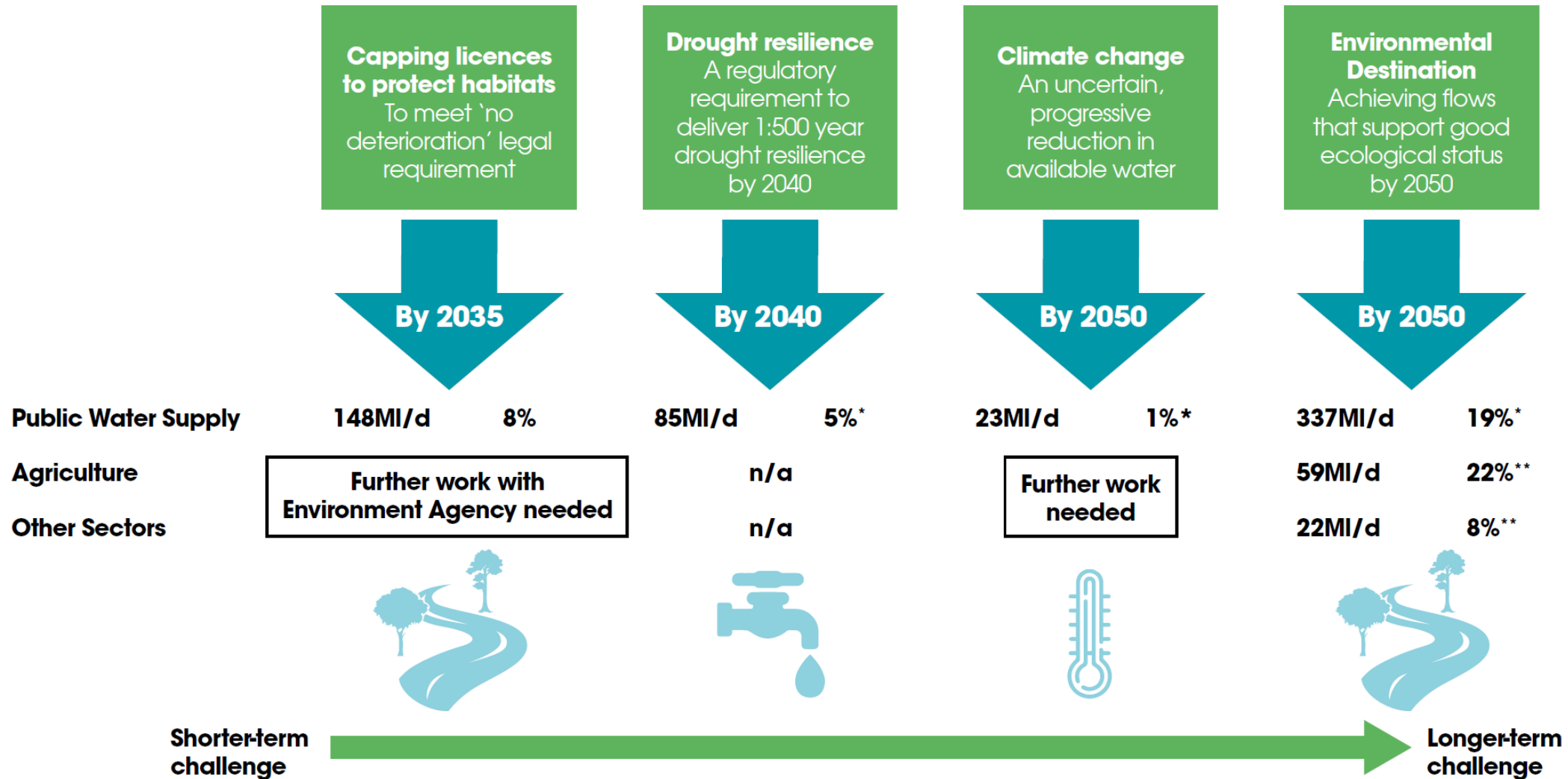
Modelling indicates that water use by power/hydrogen production will:

- continue to decrease until mid-2020s
- begin to increase by the end of the decade
- continue to increase in 2030s and 2040s, with increasing uncertainty

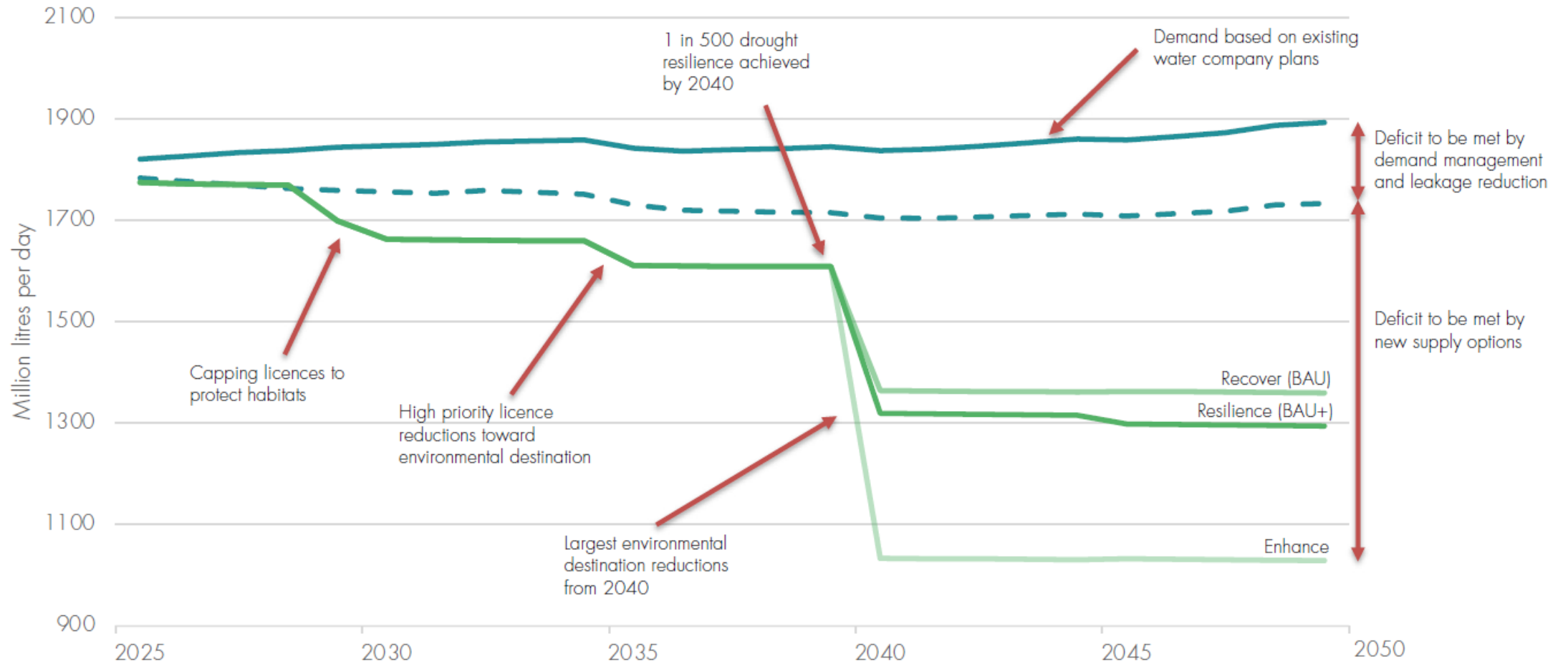
**WRE regional plan recognises that the energy transition to net zero means higher freshwater demands than in recent years from the power/hydrogen sector at some locations**

**The water challenge is likely to play out across different scales and locations.**

# Water available from existing sources will fall



# A 600MI/d supply-demand deficit by 2050



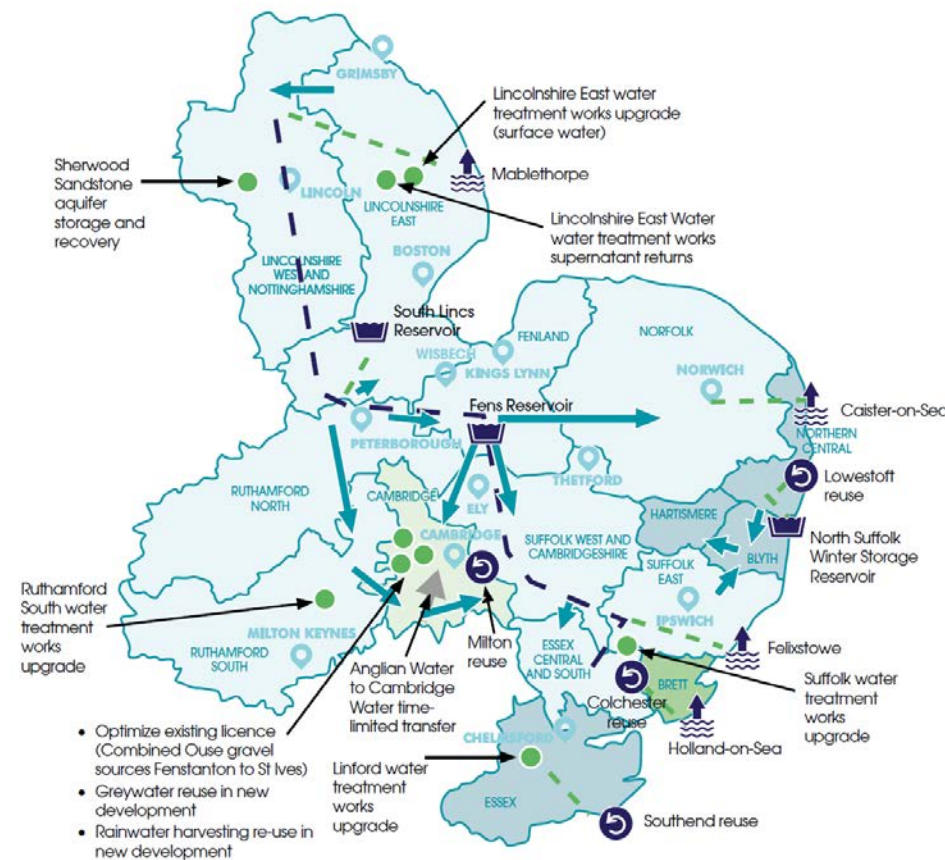
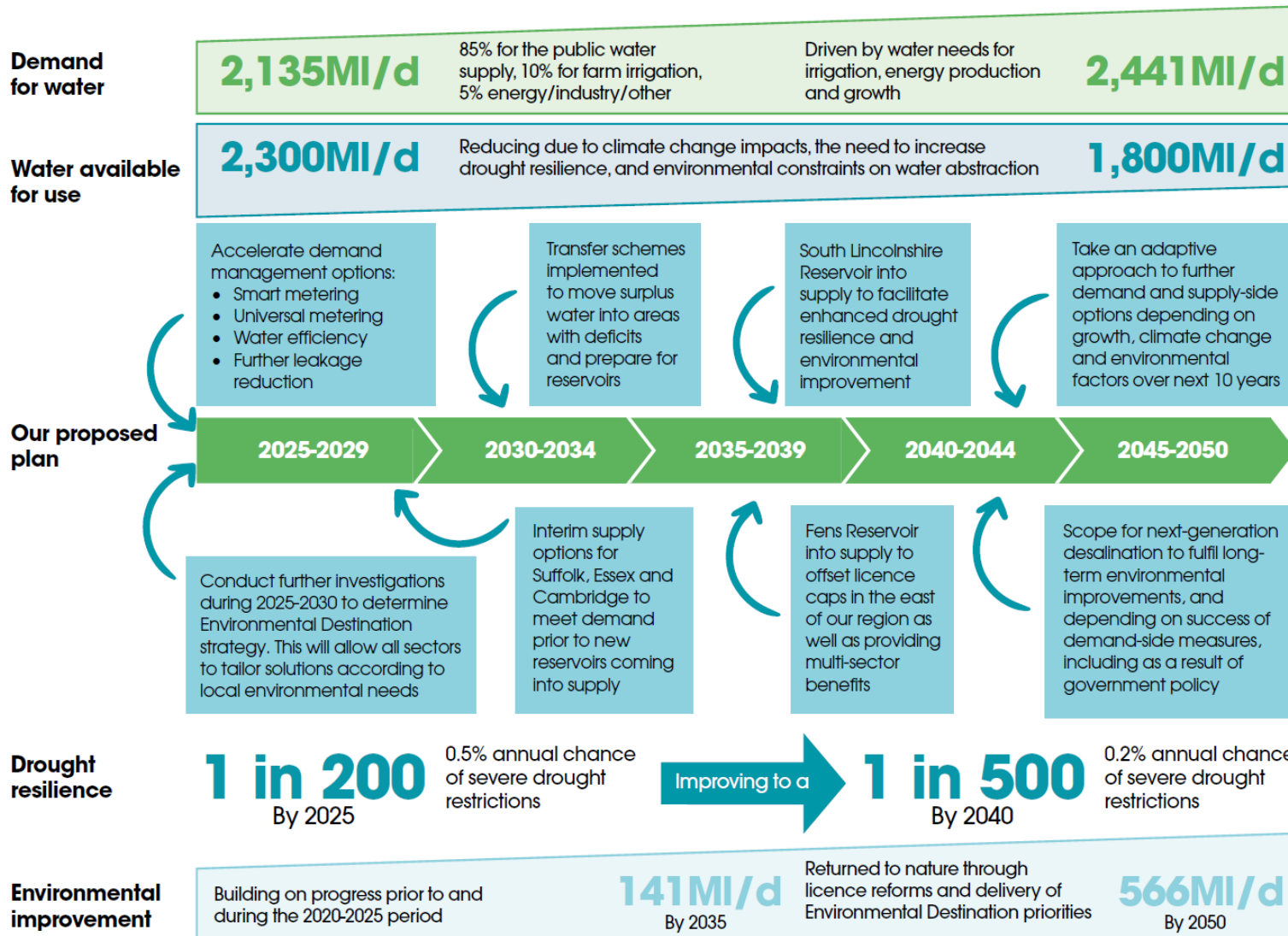
**Emerging gap between demand and water available for supply (Public Water Supply only)**



# A £6bn water security plan for Eastern England



WATER RESOURCES EAST



All figures are in megalitres per day (M/d). A megalitre is a million litres of water.



[www.wre.org.uk](http://www.wre.org.uk)

# Collaboration across sectors

## **If we don't know about it, it's difficult to plan for it:**

Constant engagement and improved understanding of future water needs in the short, medium and long term can allow WRE to factor this into the development of an **adaptive** regional water resources plan.

Unlike public water supply, power is a competitive market – there is no “sector plan”.

**Collaboration will be key to identifying opportunities** to make best use of water. Every situation and catchment is unique.

More research is required on future dynamics between water and power/hydrogen – **funding issues** is needed.

Final Regional Plan due to be published by December 2023  
Draft Plan (November 2022 can be viewed online at:  
[The Draft Regional Plan - Water Resources East \(wre.org.uk\)](https://www.wre.org.uk))



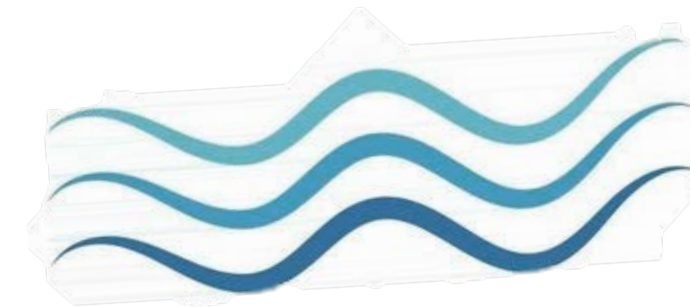
# The SNS Hydrogen Evolution in the East

East of England Hydrogen Cluster



## Andrew Summers

**Chief Executive  
Transport East**



TRANSPORTEAST



Transport Strategy for the East  
Andrew Summers, Chief Executive

# What is Transport East?

- **Transport East:**
  - Norfolk, Suffolk, Essex, Thurrock and Southend
  - **Partnership:** Local Transport Authorities, Planning Authorities, LEPs, Chambers of Commerce, National Highways, Network Rail and DfT
- **Our role:**
  - Speak with **one voice** on transport
  - Create transport **strategy** for regions
  - **Prioritise** strategic investment
  - **Accelerate** and improve delivery
  - Support partners – **capacity** and **capability**

## Sub-national Transport Bodies in England



# Vision and priorities

*“A thriving Eastern region with safe, efficient and net-zero transport networks advancing a future of inclusive and sustainable growth for decades to come”*



## Strategic priorities

Decarbonisation to net zero

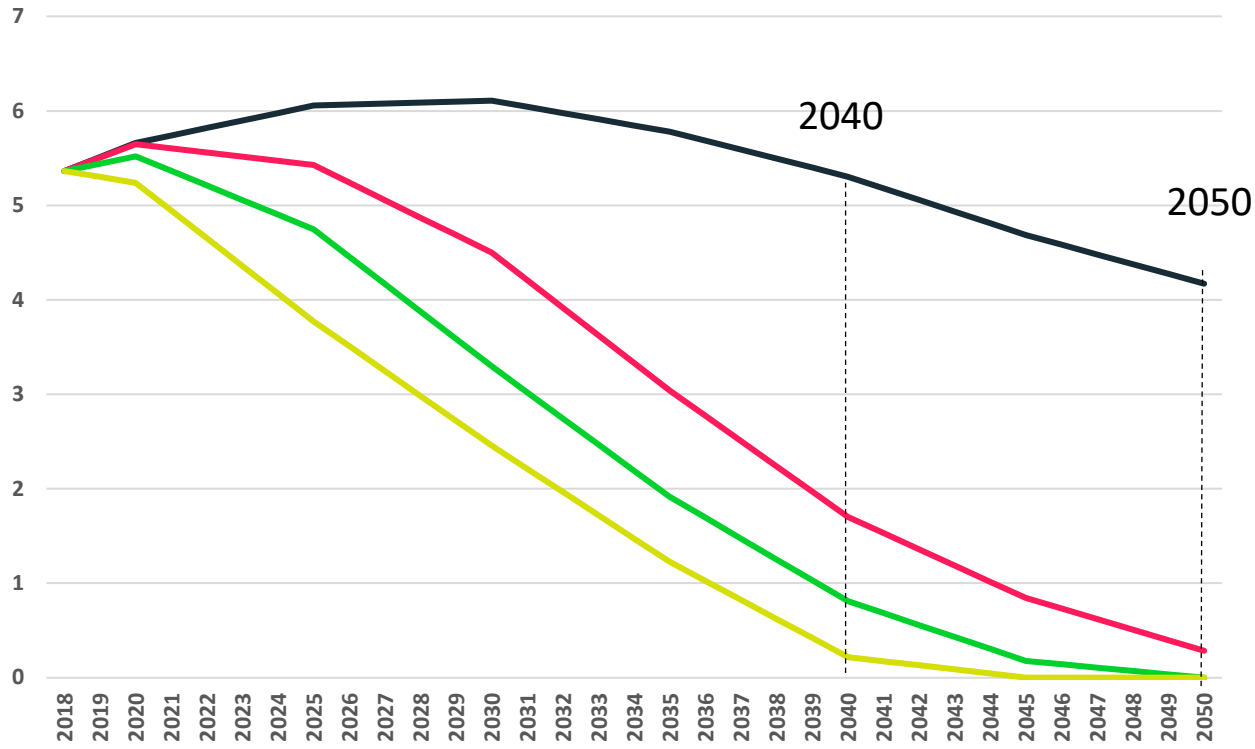
Connecting our growing towns and cities

Energising coastal and rural communities

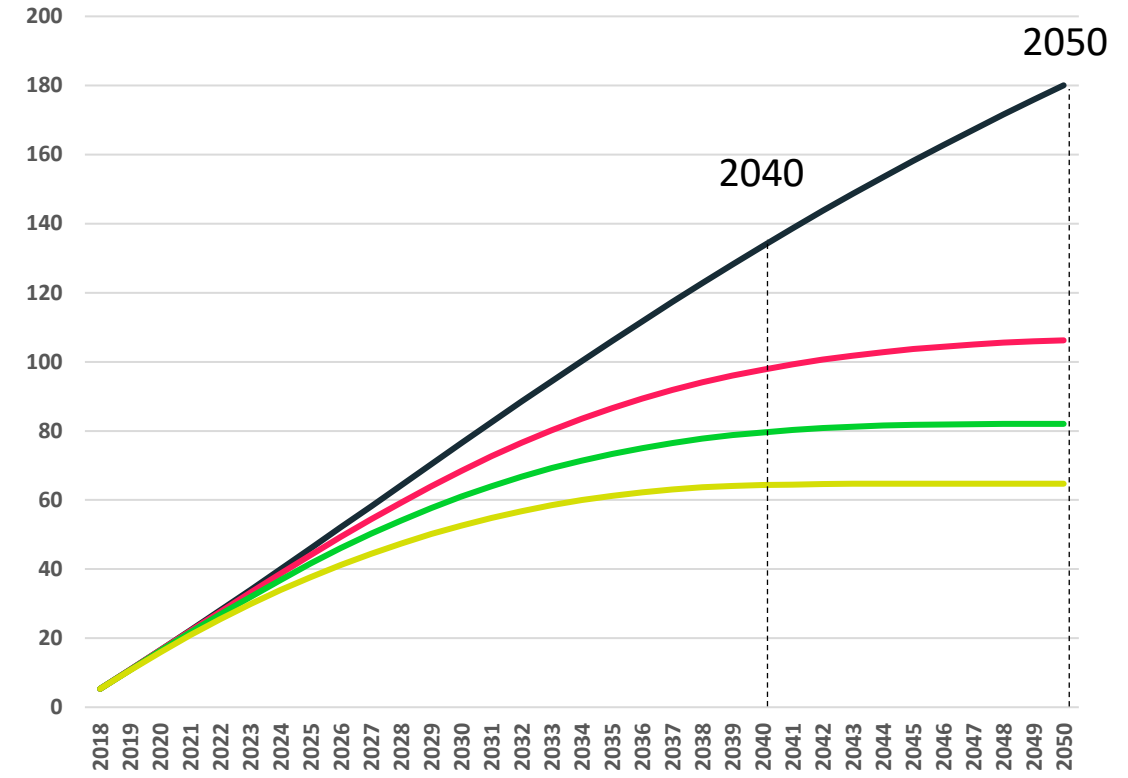
Unlocking our international gateways

# Net Zero Transport – Future trajectories

Mt of CO<sub>2</sub> per year



Cumulative CO<sub>2</sub> (Mt)



BAU – do nothing

Current policy and committed funding

'78% by 2035' (UK 6<sup>th</sup> Carbon Budget)

Net zero by 2040: aggressive shift beyond Paris agreement

# The Challenge

Transport responsible for **42% of emissions** in the region

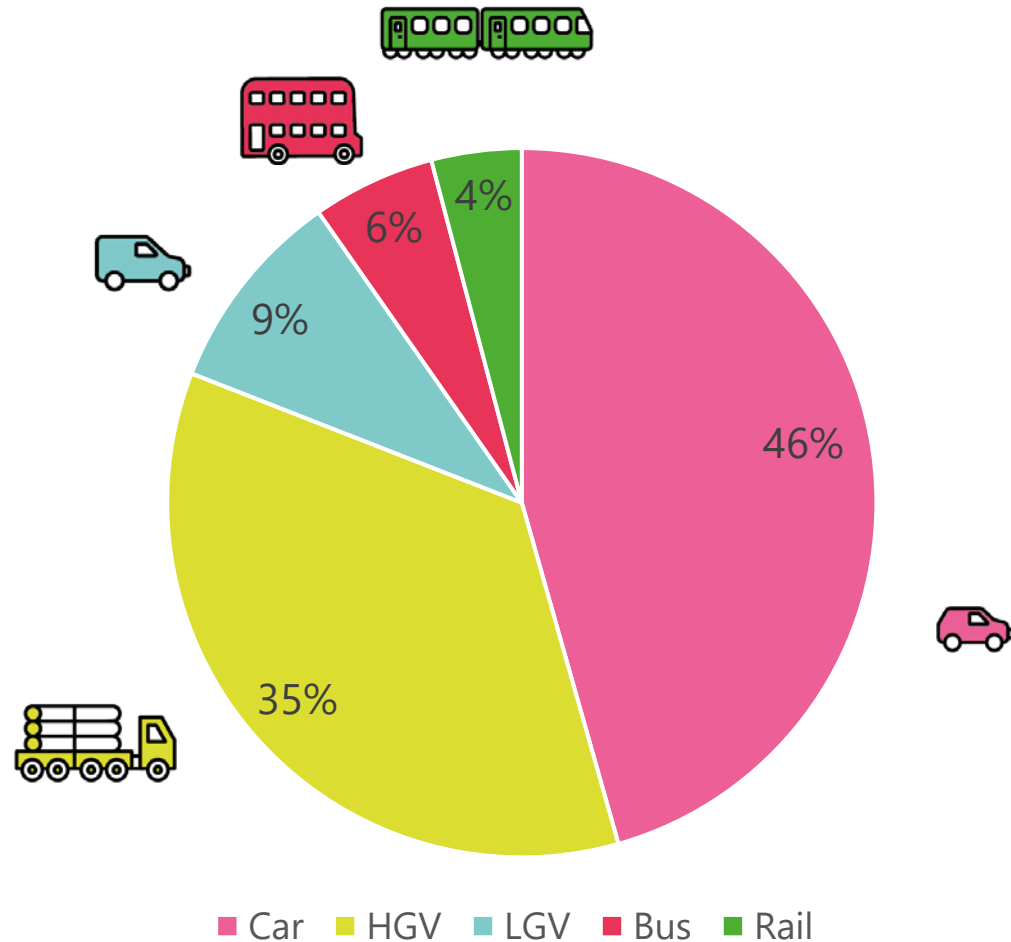
In 2018, vehicle distance travelled = 22,617 million kms

The total emissions were:

**5.35 Mt CO<sub>2</sub>**

Comprised of:

Car - 2.44 Mt CO<sub>2</sub>  
HGV - 1.89 Mt CO<sub>2</sub>  
LGV - 0.50 Mt CO<sub>2</sub>  
Bus - 0.3 Mt CO<sub>2</sub>  
Rail - 0.22 Mt CO<sub>2</sub>





## Decarbonisation Pathway

Achieving net zero emissions from our transport system at the earliest opportunity

### Goal 1 Reduce demand for carbon intensive transport trips

through local living by making it easier for people to access services locally or by digital means

### Goal 2 Shift Modes

by supporting people to switch from private car to active, shared and passenger transport, and goods to more sustainable modes like rail

### Goal 3 Switch Fuels

with all private, passenger transport, fleet and freight vehicles switching to net zero carbon fuels at the earliest opportunity

### Goal 4 Zero Carbon Growth

by supporting authorities and developers to plan, locate and design new development that reduces the need for people to make carbon intensive transport trips in the future



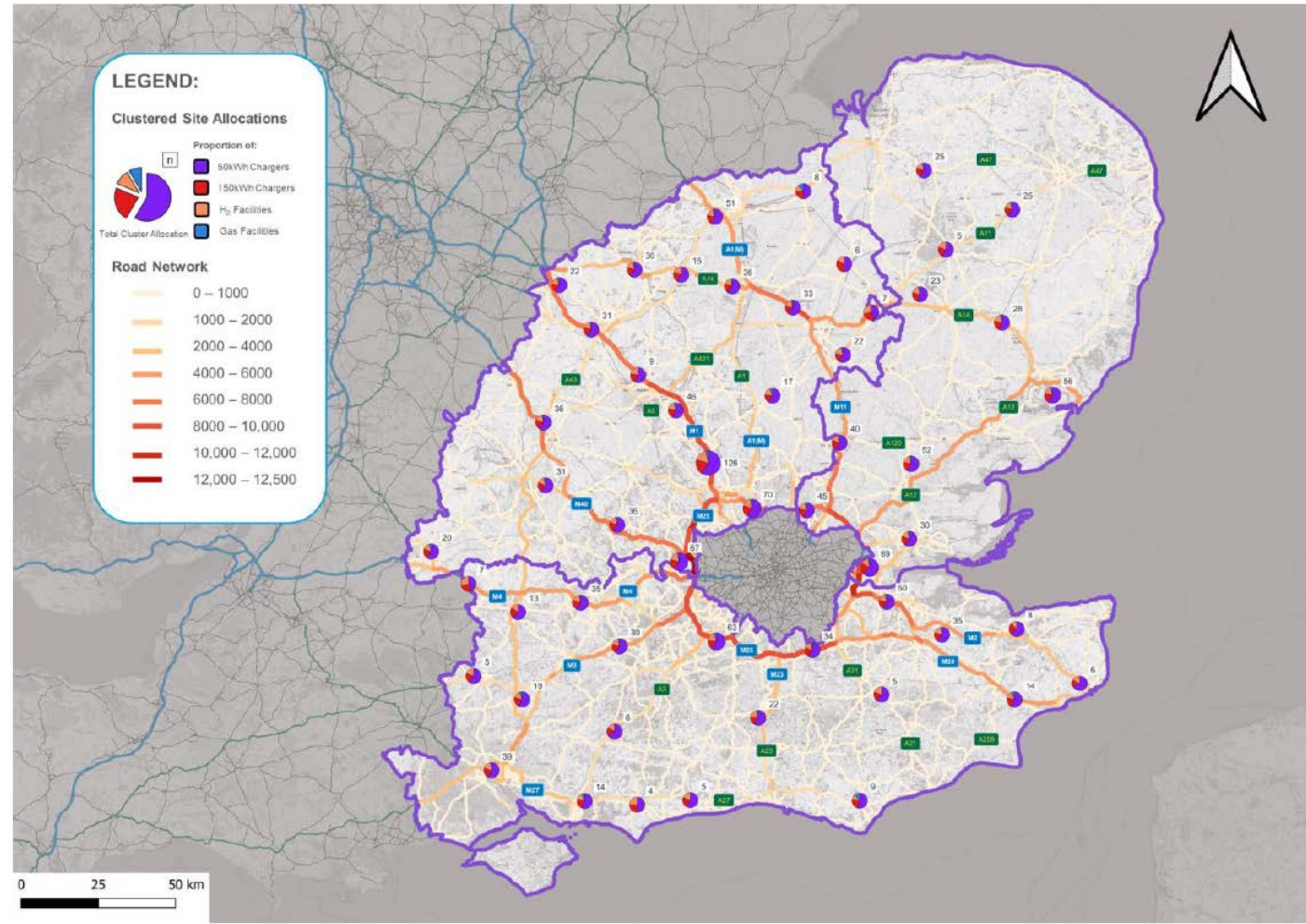
**Net Zero**  
emissions from the  
region's surface transport  
system by 2040

# Next Steps

1) Work with partners (including other regions) to develop **evidence base** and **case** for alternative fuels infrastructure, including:

- a) **Alternative fuel future infrastructure mapping** with the other six England Sub-national transport bodies
- b) **Corridor connectivity studies** for East region
- c) **Rail Plan for the East**
- d) **Supporting Local Transport Plans**

2) Review and update the Transport East **Strategic Investment Plan** to advise **Secretary of State for Transport** on future investment priorities for the East.





# The SNS Hydrogen Evolution in the East

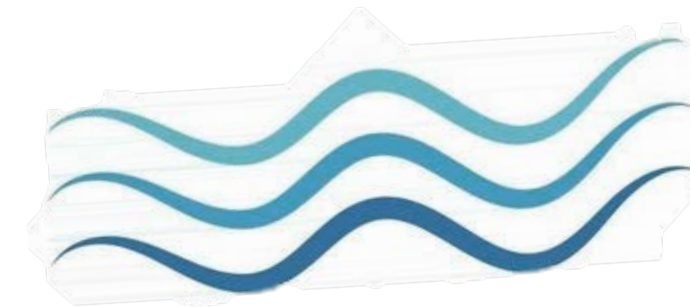
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Steve Beel

Chief Executive  
Freeport East

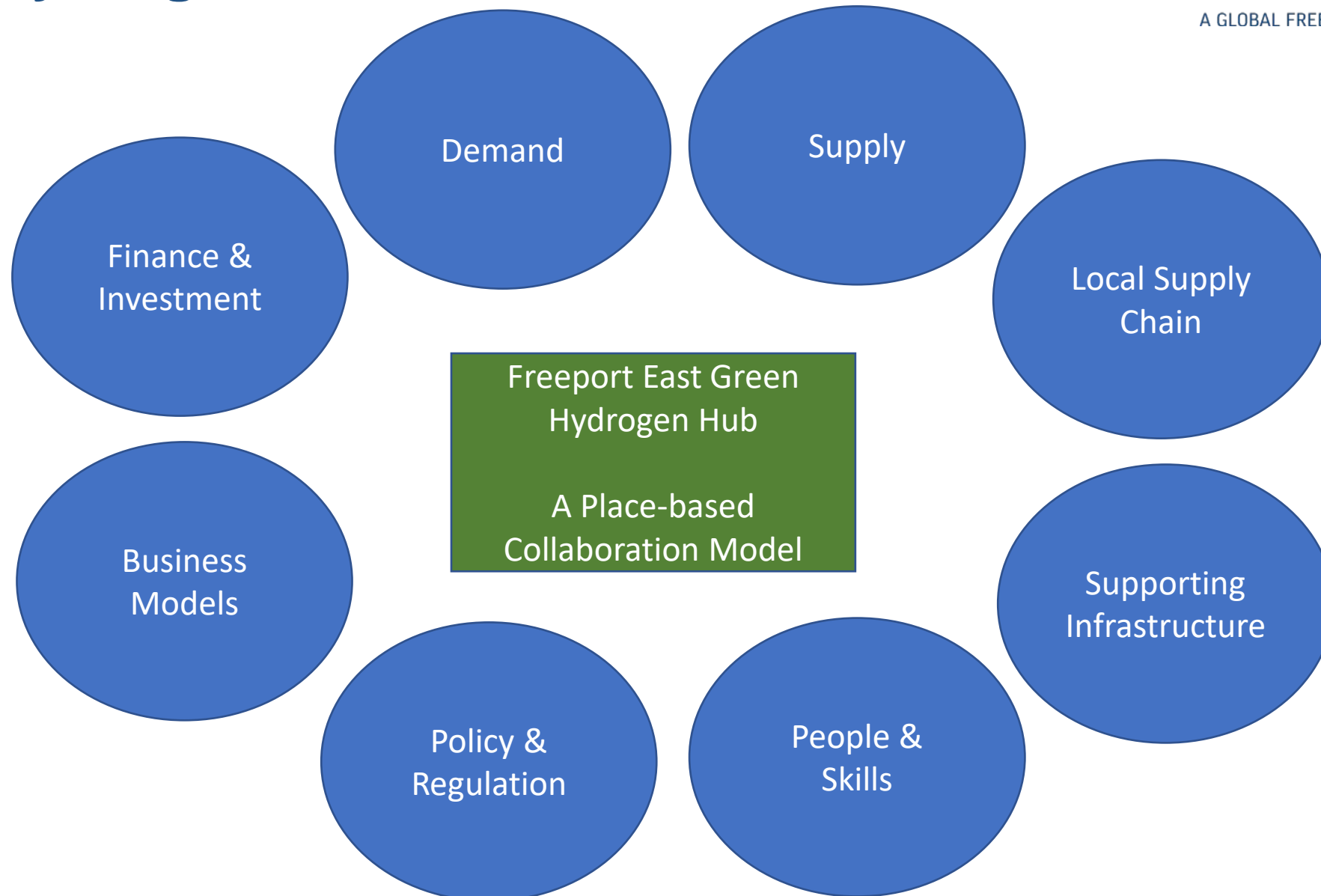


**Steve Beel**  
**Freepport East CEO**

**Aspiring to be the UK's leading centre for global trade, green energy, innovation and technology.**

**Freeport East offers unique opportunities for investment, business-led growth and levelling up that will deliver benefits at the local and national level.**

# What do we mean by a Green Hydrogen Hub?



# ....but also

## 5. ZERO EMISSION VEHICLES:

A cluster-based approach to hydrogen supply and demand will allow for a quick rollout of hydrogen buses, trucks, emergency vehicles, trains, construction and agriculture vehicles across the region, in London and beyond.

## 1. HYDROGEN:

At its peak 1GW of hydrogen could be produced - achieving 20% of the PM's 5GW target.

Equivalent size of a small shipping container

## 3. WIND:

Hydrogen will also be produced via renewable energy from nearby offshore windfarms, with the extra demand bolstering investment and accelerating progress to the 40GW target.

## 2. NUCLEAR:

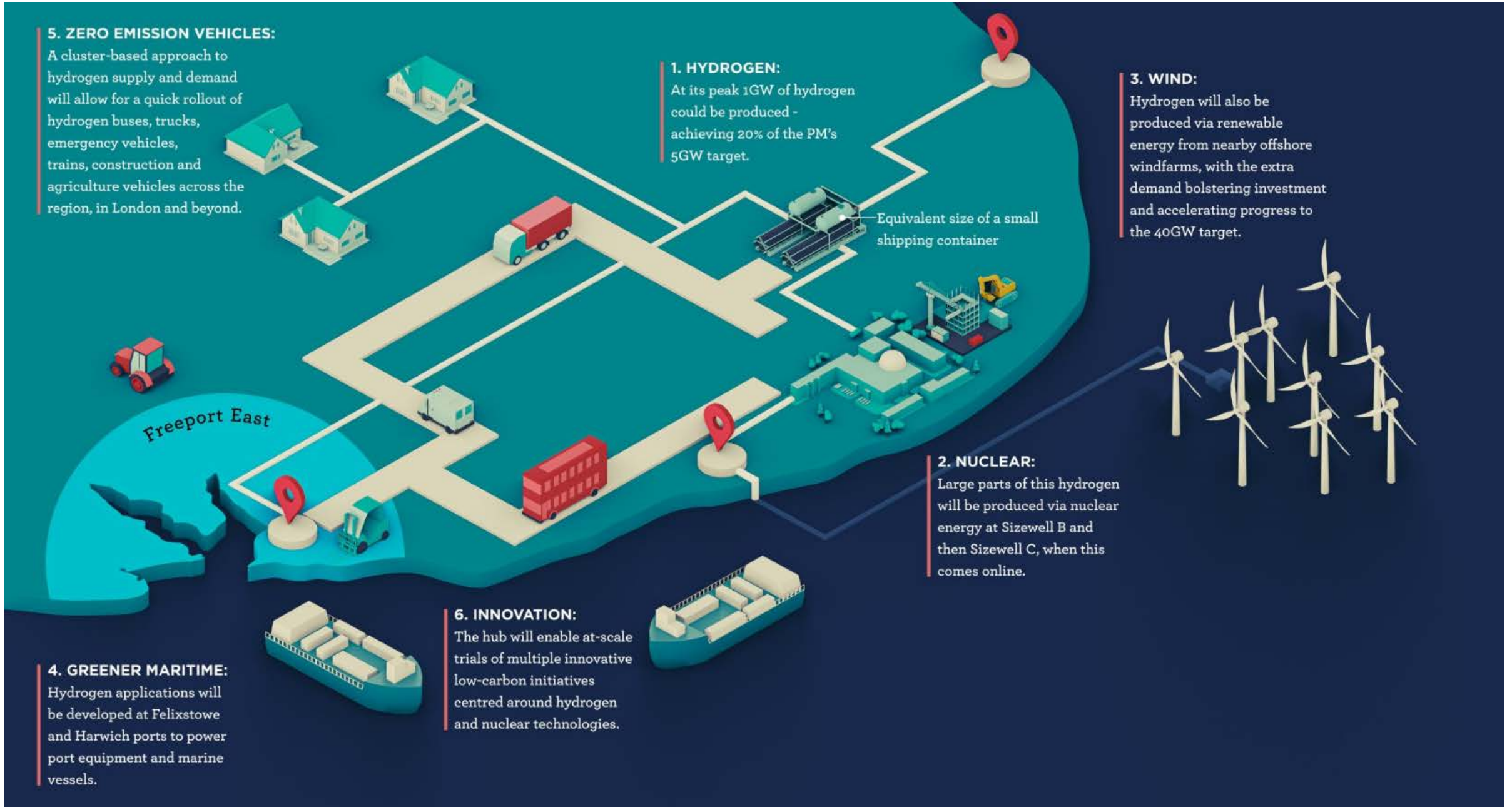
Large parts of this hydrogen will be produced via nuclear energy at Sizewell B and then Sizewell C, when this comes online.

## 4. GREENER MARITIME:

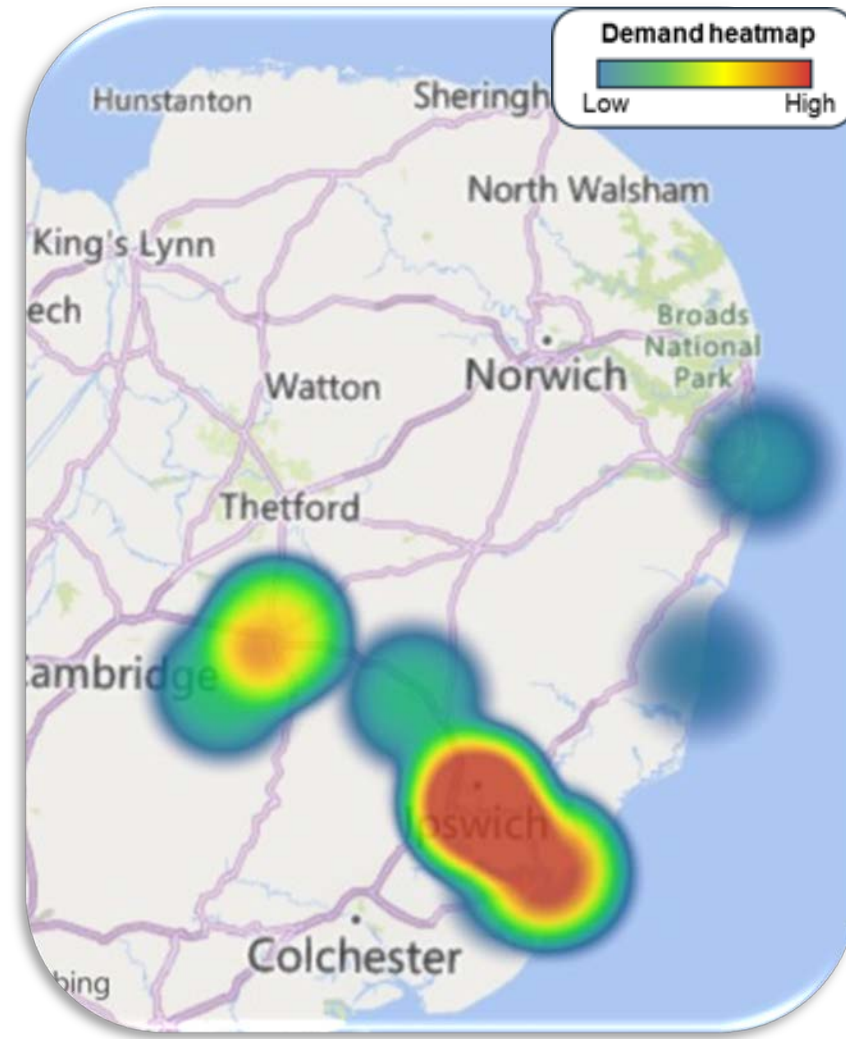
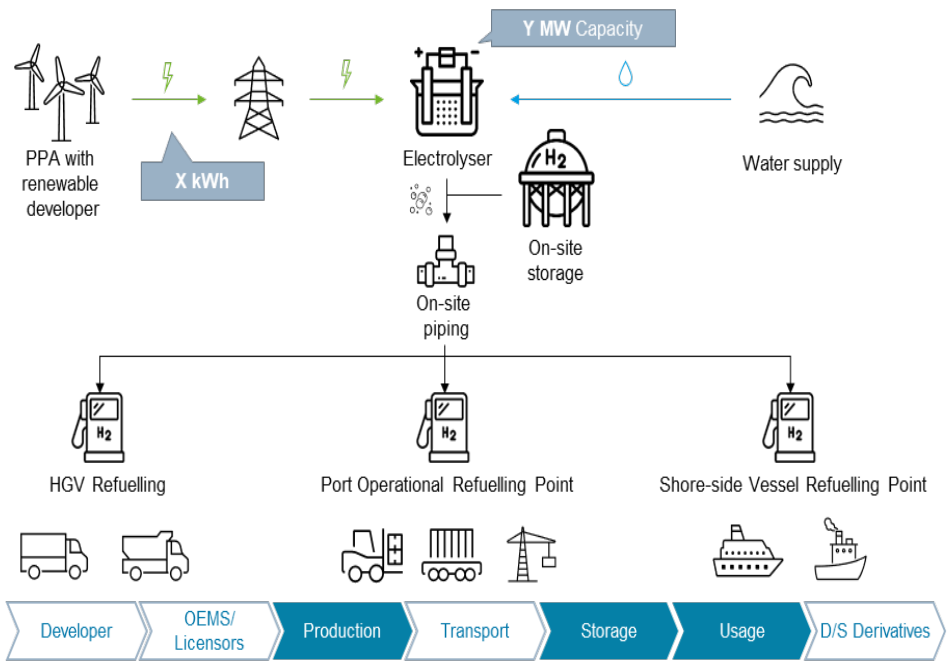
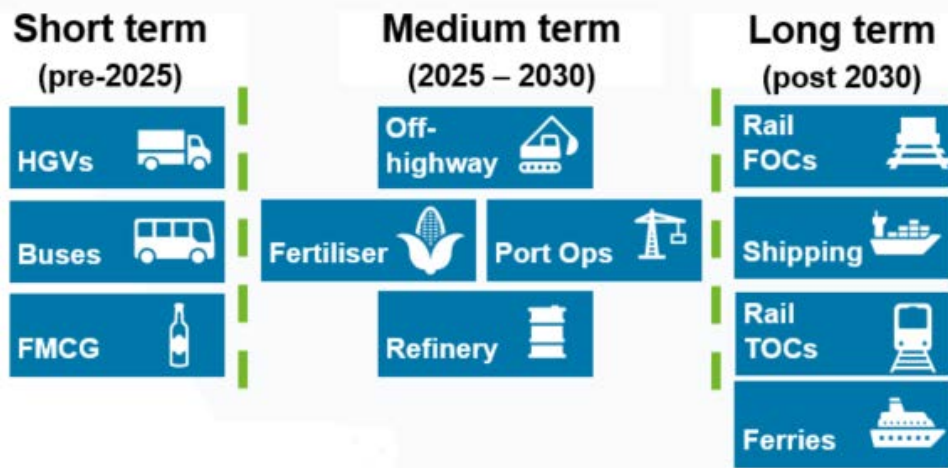
Hydrogen applications will be developed at Felixstowe and Harwich ports to power port equipment and marine vessels.

## 6. INNOVATION:

The hub will enable at-scale trials of multiple innovative low-carbon initiatives centred around hydrogen and nuclear technologies.



Minimum of c. 140 tonnes per day or 550MW of forecastable Green Hydrogen demand through to 2030.....excluding maritime, wider network demand, etc.







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East of England Hydrogen Cluster

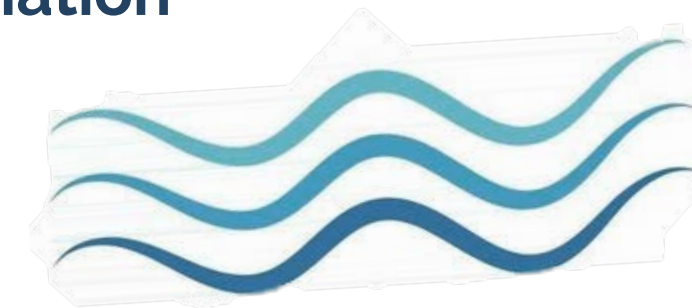
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Hydrogen **East**



## Matt Stewart

**Policy & Programme  
Manager**

**East of England Local  
Government Association**





**East of England**  
Local Government Association

# If we're setting the scene...

Matthew Stewart - Policy and Programmes  
Manager

[Matt.stewart@eelga.gov.uk](mailto:Matt.stewart@eelga.gov.uk)

East of England Local Government Association

...Local  
Government  
is the Stage



# Opportunities

- ▶ Inward investment
- ▶ Eager to build a “Skills Legacy”
- ▶ A green future!

# Challenges

- ▶ Sharing expertise
- ▶ Minimising disruption
- ▶ Joining up the dots



**East of England**  
Local Government Association

Thankyou  
for your  
time!

Matthew Stewart - Policy and Programmes  
Manager

[Matt.stewart@eelga.gov.uk](mailto:Matt.stewart@eelga.gov.uk)

East of England Local Government Association



Questions  
via **slido.com**



**H<sub>2</sub> East**

[www.hydrogeneast.uk](http://www.hydrogeneast.uk)



# The SNS Hydrogen Evolution in the East

East of England Hydrogen Cluster

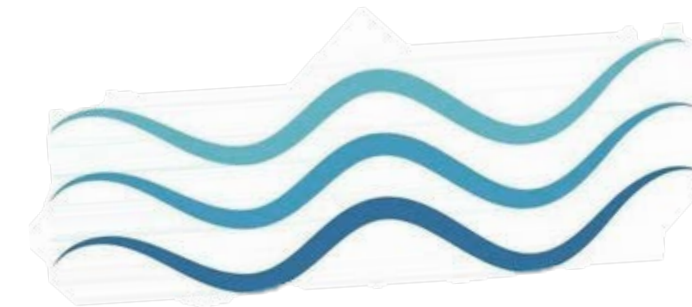
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Hydrogen East



## Ellie Udomwong

**Hydrogen Specialist  
Hydrogen East**

[ellie.udomwong@netzeroeast.uk](mailto:ellie.udomwong@netzeroeast.uk)





# Why the East of England?

The **East of England** can contribute to the **UK's Hydrogen Strategy** and **Net Zero target**.



The East of England including the UK's Clean Growth Region has a **strong presence in offshore wind and nuclear**.



Many **Industrial and Economic Strategies** reaffirms the region's commitment to hydrogen development.



The government needs to support early deployment of electrolytic hydrogen, not just blue hydrogen, to achieve the **10GW target for low-carbon hydrogen by 2030**.



Active **National Assets & Infrastructure**. Initiatives such as, Project Union, Capital Hydrogen, Hydrogen Valley, CCS Licensing and Interconnectors.



Bacton Gas terminal, a strategic national infrastructure asset for production and distribution of **both green and blue hydrogen linked with CCS** and positioned within the Project Union and European Hydrogen Backbone plans.



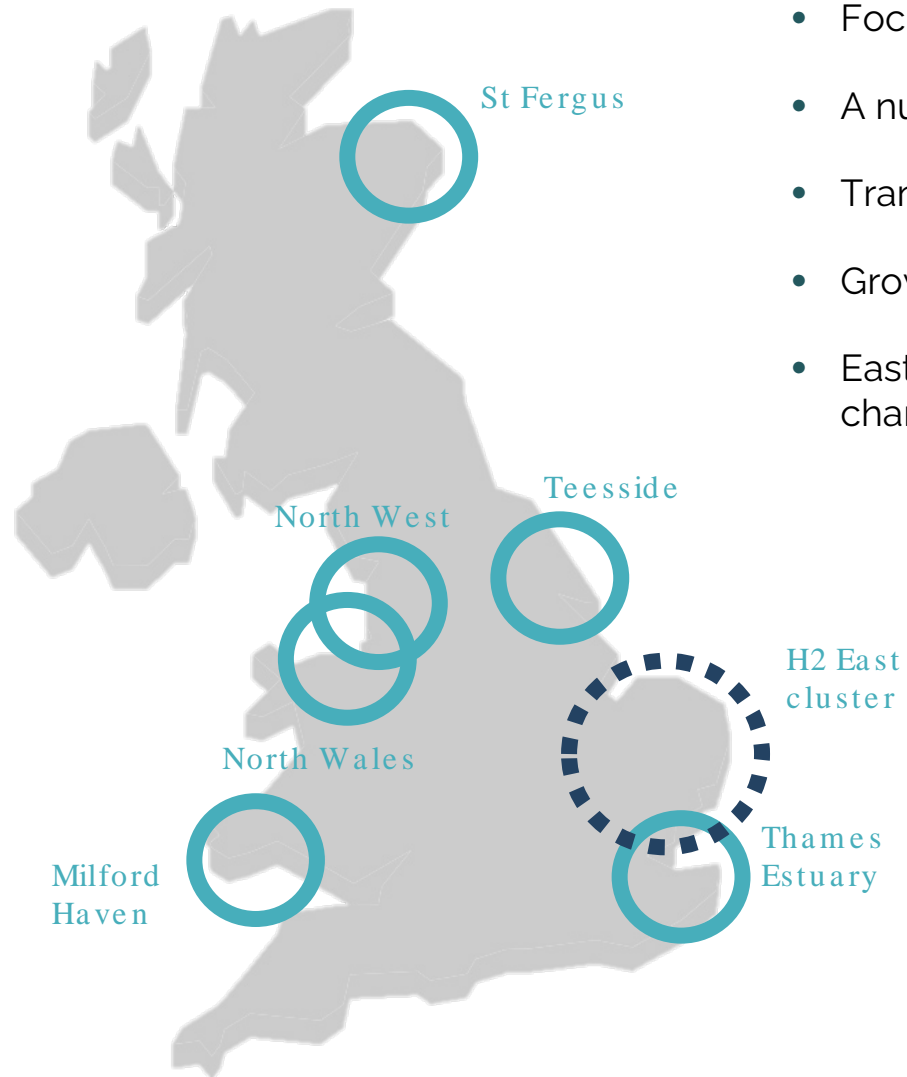
Deployment of electrolyzers can provide local flexibility to the electricity system and support **storage initiatives & decarbonisation of transport**.



Collaborative cross sector opportunities. Energy, water, food, agriculture, industry **Multi-use & shared infrastructure**



# What's already happening?



- Focus is presently centred around blue hydrogen (CCS) in industrial cluster zones
- A number of demonstrator projects ongoing to test various hydrogen applications
- Transport hubs emerging in regions such as Aberdeen and Teesside
- Growing interest from developers and utility companies across the UK
- East of England needs to establish its hydrogen pathway which aligns with its distinct characteristics

**Coordination** across hydrogen value chain stakeholders to exploit and develop the secondary H<sub>2</sub> use cases (heavy freight, marine, medium scale industrial) in which the region has clear strengths and opportunities **is not happening.**

The East of England represents dispersed industrial emissions sites and presents a huge opportunity to deliver cross sector decarbonisation alongside local place based solutions

**Hydrogen East will accelerate and deliver the Hydrogen economy across the East of England.**

# Launching East of England Hydrogen Cluster



A cluster provides the opportunity to rapidly build consortia with the correct products, services, resources, capabilities and experiences to maximise funding opportunities.

## Industrial Advisory Group benefits



Opportunity to become a **global leader** in production, storage and distribution of hydrogen and its derivatives



Access **partnership opportunities** and supporting functions available for local collaborative projects.



Gain exclusive **first access to outputs, outcomes and opportunities** generated from the Cluster.



benefit from a pool of **asset suppliers and skilled workforce** from the regions



**Maximise funding and grant calls** and drive effective development.



Further stimulation of **inward investment**



Stimulate **cross-sector demand** to align with national and regional initiatives



**Export of services** and technologies to emerging hydrogen economies

# East of England Hydrogen Cluster

## Industry Advisory Group



## Cluster supporters



Connected Innovation Programme





H<sub>2</sub> East

# Cluster vision

- The UK Government views **hydrogen as a key part of its Net Zero by 2050 policy**.
- The Government is “**reflecting the priorities**” with reorganised departments:

**Department for Science, Innovation and Technology**, tasked with driving innovation that will create new and better paid jobs

**Department for Energy Security and Net Zero**, which will focus on securing long-term energy supplies and reducing bills

**Department for Business and Trade**, which will champion free trade and promote investment

- Blue hydrogen is a policy focus and several projects are under development with CCS.
- **Project Union, Capital Hydrogen, Hydrogen Valley & the European Hydrogen Backbone** all include **Bacton** in their thinking.
- **Green and Pink hydrogen** are poised and ready to play a part in the integration challenge.
- **Power, transport, food, agriculture, construction, water, comms and industry** are all aware of the challenges and opportunities and looking for a collective vision.
- The **East of England needs a Hydrogen Strategy** developed and driven by a forward thinking, collaborative and proactive Cluster



H<sub>2</sub> East



The East of England, despite having many advantages for a developing hydrogen economy is at risk of being left behind.

42%

UK offshore wind installed in the East of England

40%

UK container freight passes through the region

18bn

Knowledge economy focused around the Cambridge Tech cluster

Presentation title  
H2 Aviation

# Next Steps



## Hydrogen East Cluster will

- **Recruit** a **Cluster / Programme Manager** responsible for strategy, governance, facilitation, programme delivery, stakeholder management.
  - **Position is live via** - [Careers - Opergy Group](#)
- **Lead** the development and implementation of strategic plans for Hydrogen East, driving growth and innovation through the hydrogen cluster.
  - A Regional Hydrogen Economic Roadmap
- **Coordinate** the development and delivery of a core work programme, identifying bespoke projects to drive development activities.
- **Identify** and secure funding opportunities, including grants, investments, and partnerships, to support the ongoing growth of Hydrogen East and its projects.
- **Collaborate** with key stakeholders, industry partners and clusters, investors, government agencies and research institutions to promote knowledge exchange.
- **Deliver** marketing and communication strategies to raise awareness of Hydrogen East's initiatives, achievements, and potential benefits to the region.



Panel Session

via **slido.com**



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[www.hydrogeneast.uk](http://www.hydrogeneast.uk)