



PGES APPG Hydrogen Update

17 November 2020

Transport and Heating towards Net Zero

Establishing the first commercially scaled hydrogen refuelling station network in the UK

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DECARBONISATION - POST-OIL ECONOMICS - NET ZERO - HYDROGEN FOR TRANSPORT



Who are we?

Securing and investing in national hydrogen refuelling infrastructure

- We are a fully-funded venture, creating a network of hydrogen refuelling sites across the UK.
- We address the supply/demand synchronicity dilemma for Hydrogen in the road transport sector. Breaking the chicken and egg paradox for refuelling infrastructure.
- We are targeting the freight and municipal vehicle classes to focus investment in early growth areas.
- We are investing in building around 1,500 hydrogen refuelling pumps by 2030, serving 10% of the UK's heavy goods and municipal fleet.
- We are pushing for close relationships with national and local supply chains, with the Oil & Gas industry, and with Government to ensure our plans are sustainable, impactful and cost effective.
- The UK currently has 12 Hydrogen refuelling sites. Japan has 115 – with 400 more planned to 2025.
- **We must be bolder on action as a nation to enable the energy transition, and decarbonise our road network.**

Vital Statistics

1,500

H2 PUMPS BY 2030

£110m

5 YEAR INVESTMENT PLAN

2,200m

TONNES OF CO2
AVOIDED BY 2025

**N. ENGLAND,
SCOTLAND, IRELAND**

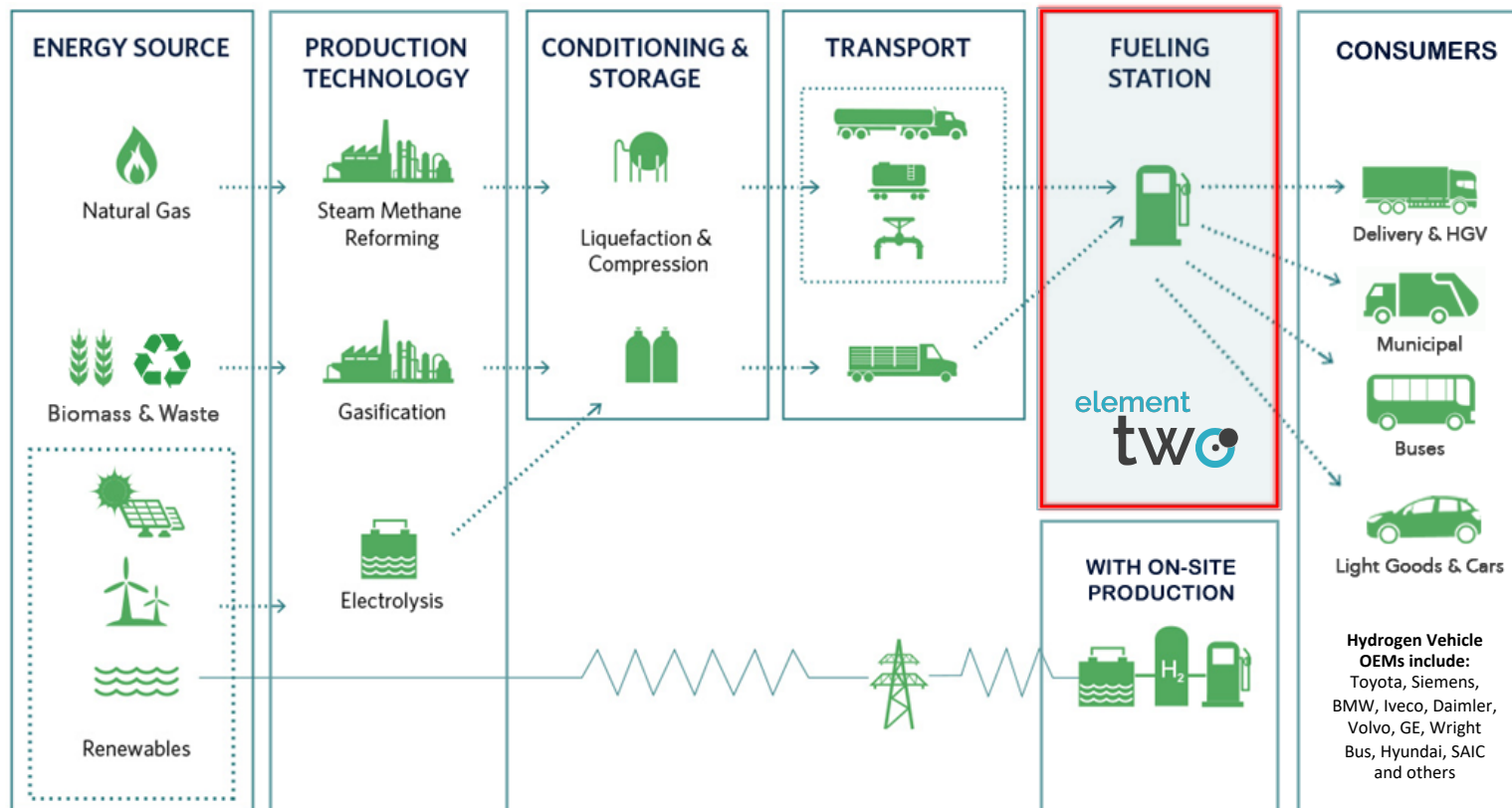
PRIMARY INVESTMENT
REGIONS

element
tw



THE HYDROGEN VALUE CHAIN

Our place in a growing industry with a rich landscape of stakeholders





What does it look like? – Our USP

A Technology Integration – responding to evolving environments

- We are not a technology developer. We integrate best-in-class off-the-shelf hardware from around Europe, and routinely review asset performance.
- We do not use on-site generation as standard. We believe production centres should be encouraged to support skills, investment and supply chains.
- Pumps will serve heavy vehicles, but also passenger cars, as demand grows.
- We will support conversions of current diesel fleets – smoothing the transition

A diversified Hydrogen supply model

- Now - Hydrogen (Green, Blue and Grey) is delivered from suppliers by tanker, direct to the forecourt – as per petrol and diesel.
- Supply routes include industrial production assets, Waste to Hydrogen facilities, electrolysis from excess renewable capacity, and others
- >2025 – The potential for hydrogen to be supplied through the UK gas grid.

FOCUS: SAFETY

All equipment is fully tested and assured to EU and UK standards.





Road Transport Decarbonisation

Rapid and scalable NetZero progress possible.

Local Plans

- Local Government and Enterprise Partnerships are early adopters
- Traction with these councils and LEPs will support confidence for fleet conversions with private operators
- Hydrogen MUST be supplied at parity with diesel fuel
- Stimulates local hydrogen economies and brings together supply chain participants
- Creates a commercial route to market for regional and national production centres – stimulating investment and growth in capability

National Plans

Despite no national strategy....

- Addresses decarbonisation of transport objectives
- Provides rich and rapid evidence of progress towards Net zero



Increasing demand stimulates supply-side infrastructure investment

We bring the infrastructure, but economic barriers must be lowered

- **E2 is acting now** to provide the infrastructure the UK needs for a vibrant world-leading Hydrogen economy.
- Availability of refuelling network will accelerate uptake and stimulate investment in vehicles and production assets, as well as supply chains and technology research.
- **We believe dual fuel vehicles** (H2 / diesel) have a major role to play in the transition.
- We must **transition rapidly from Blue to Green**, but it is a transition. We cannot wait for Green to reach economic parity with diesel.
- Our infrastructure will supply both – economic blue and green hydrogen, to suit demand – evolving over time as our national assets mature. **We are agnostic on source of supply...**



GAS / SMR



ELECTROLYSIS



GREEN ENERGY



BIOGAS



PLASTICS AND WASTE

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Policy recommendations

Subsidise vehicle conversions, not fuel, to establish the foundations of the Hydrogen economy for transport

While we wait for green hydrogen, and FCEV market prices to be fully competitive, we recommend that a subsidy framework for the conversion of heavy diesel vehicles will catalyse industry and fleet owners into action, and make the transition economic.

Providing an incentive for fleet conversions rather than wholesale replacement will...

- Tap into an opportunity to save 2.2 billion tonnes of CO₂ emissions by 2025
- Make a shift to H₂ more financially attractive to operators
- Create jobs and expertise in the UK, and stimulate local H₂ economies
- Move the UK along the H₂ economy pathway more quickly, while other economies wait for H₂ prices to fall, or for FCEVs to establish themselves
- **We will invest now, but we can only succeed if policy is clear, and signals are not crossed. Should we wait for the future, or make it happen now?**

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Addendum

Frequently Asked Questions

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Why Hydrogen?

NetZero ambitions accelerating a rapid move from fossil fuels

Hydrogen...

- Is being positioned as the successor to fossil fuels by governments and industry across the world
- Has broad application - transport, energy storage, home heating and industrial processes
- Has 3 times the energy density of petrol / diesel
- Can be used in a combustion engine as well as with Fuel Cells
- Produces no CO₂ or particulates
- Is converted directly into electricity via fuel cells
- Is already produced at scale and at low cost for other industrial uses
- Can refuel vehicles in 5 minutes with a >350km range
- Is highly suited to heavy duty-cycle vehicles, such as buses, HGVs and other industrial vehicles.
- Has been identified by the UK Government as a cornerstone of the UK's national energy strategy

TAKEAWAYS

“Hydrogen is today enjoying unprecedented momentum. The world should not miss this unique chance to make hydrogen an important part of our clean and secure energy future.”

Dr Fatih Birol – Executive Director – International Energy Agency



FAQ

Understanding the challenge



We are caught in a Catch-22 scenario. We require infrastructure to be in place to service our expectations for growth and investment in Hydrogen, but early demand will be low, which deters investment in HRS sites. Why are you doing it?

We believe that it is important to provide early access to refuelling sites. This will in turn provide confidence to investors, manufacturers and vehicle buyers to commit to a vision that has Hydrogen at the centre of transport.

Whilst conversions certainly help our financial model, our business plan is focused on creating the network. We believe demand is inevitable, but we do want to work with you to make informed judgements on demand needs for the short and mid-term, to stay ahead of the curve.



FAQ

Understanding the challenge



We have an evolving ecosystem of hydrogen supply chain organisations and consultants supporting our programme. How will you interact with this existing pool of resource and capability?

Our mission is to be a valued part of the hydrogen economy, which includes working with technology developers, suppliers, consultants and vehicle manufacturers to provide a service to our customers.

Our operations will provide jobs, technology commercialisation opportunities and routes to market for regional businesses and research pathways.



FAQ

Understanding the challenge



We are pursuing a Zero Emissions, Green Hydrogen strategy. Conversions are not zero emissions. Investment in this area may take money away from the focus on full clean lifecycle hydrogen. Why are conversions important?

We believe strongly in the Green Hydrogen vision, and aim to supply all our sites with clean lifecycle H₂. However, UK production is still immature, and needs demand to grow. We will work with you to select the right supply grade for your fleet, balancing economics with security of supply, and setting out a plan that describes our approach to going 'fully green' by a fixed date.

Conversions are a transition technology, that allows you to make strategic FCEV procurements, and allows us to commercialise our plan. Without it, short-term demand volumes may not support us. Our sites serve both FCEV and dual-fuel.