



UK HFCFA

# The Case for Blue Hydrogen

UK Hydrogen and Fuel Cell  
Association Position Paper



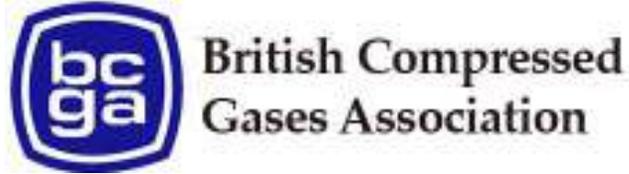
# About us

- The largest pan-UK Hydrogen & Fuel Cell trade group,
- Over 70 organisations, encompassing all aspects of hydrogen and fuel cells.
- A key focal point for national and international engagement on hydrogen and fuel cell activities for UK plc and UK businesses.





# Broad engagement with groups across the sector



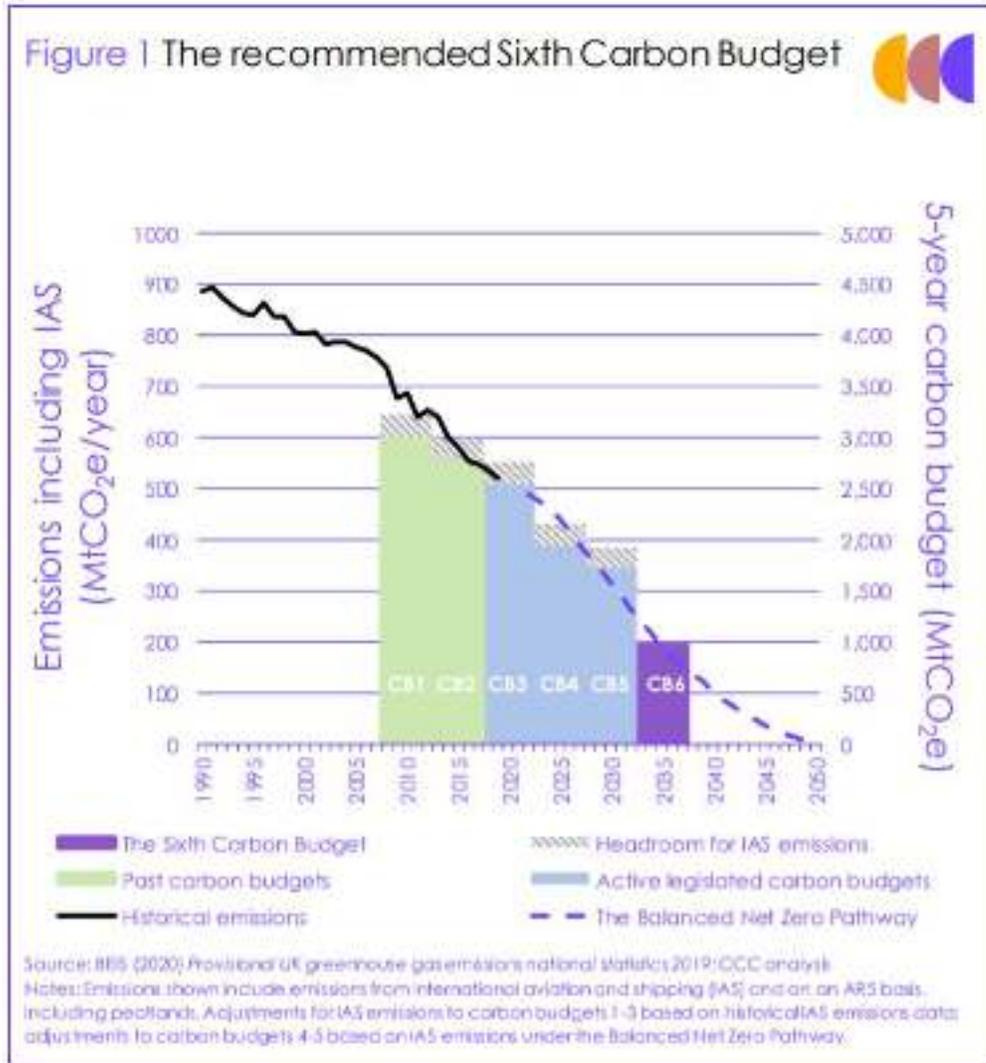


UK HFCA

# The Case for Blue Hydrogen



# The race to zero emissions has already started



The recent announcement by UK Government that it will enshrine the recommendations of the Climate Change Committee for Carbon Budget 6 increases the ambition for emission reductions and the need for low carbon hydrogen technologies:

- UK Government to set in law world's most ambitious climate change target, cutting emissions by 78% by 2035 compared to 1990 levels.
- For the first time, UK's sixth Carbon Budget will incorporate the UK's share of international aviation and shipping emissions.
- This would bring the UK more than three-quarters of the way to net zero by 2050.

..... challenging and stretching targets



# The case for low carbon hydrogen is clear

The UK requires a zero emission fuel that is well understood, has extensive regulations and standards in place, is readily scalable and which can be used across multiple energy vectors. Hydrogen is that fuel.



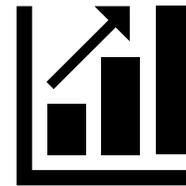
Low Carbon hydrogen **is essential** to the UK government's Net Zero Ambitions



The UK can deploy **10GW of blue hydrogen by 2030** and up to **80GW by 2050** with the right policy support



Investing in low carbon hydrogen today will create **significant long-term economic opportunities** for UK Plc.



Blue hydrogen playing an important role in the **'just transition'** securing and creating hundreds of thousands of jobs



**Short-term thinking must be avoided** to prevent duplicating the errors that encouraged offshoring manufacturing for the wind industry



The UK can become a **significant blue hydrogen producer**; generating revenues and supporting broader decarbonisation.



# Without hydrogen, the UK faces significant challenges

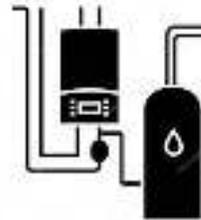
- The country's gas grid supplies 3x more energy than the electricity grid today
- The transport sector accounted for over a third of final energy consumption in 2019
- Electrifying all heating and transport by 2050 is likely to be an insurmountable challenge.

## Sectors with the greatest decarbonisation potential



### *Heavy-Duty Transport*

The single largest source of GHG emissions in the UK, includes trains, heavy duty trucks, busses, maritime shipping, aviation, & non-road vehicles



### *Industrial Heating and process feedstock*

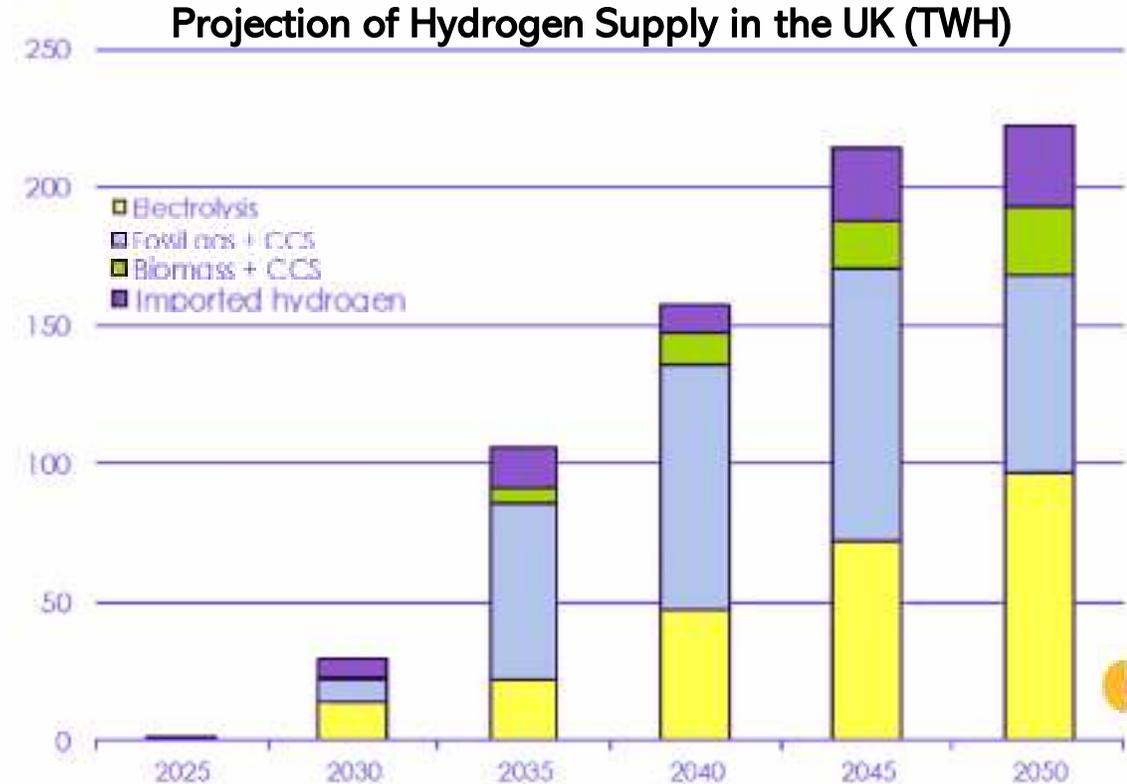
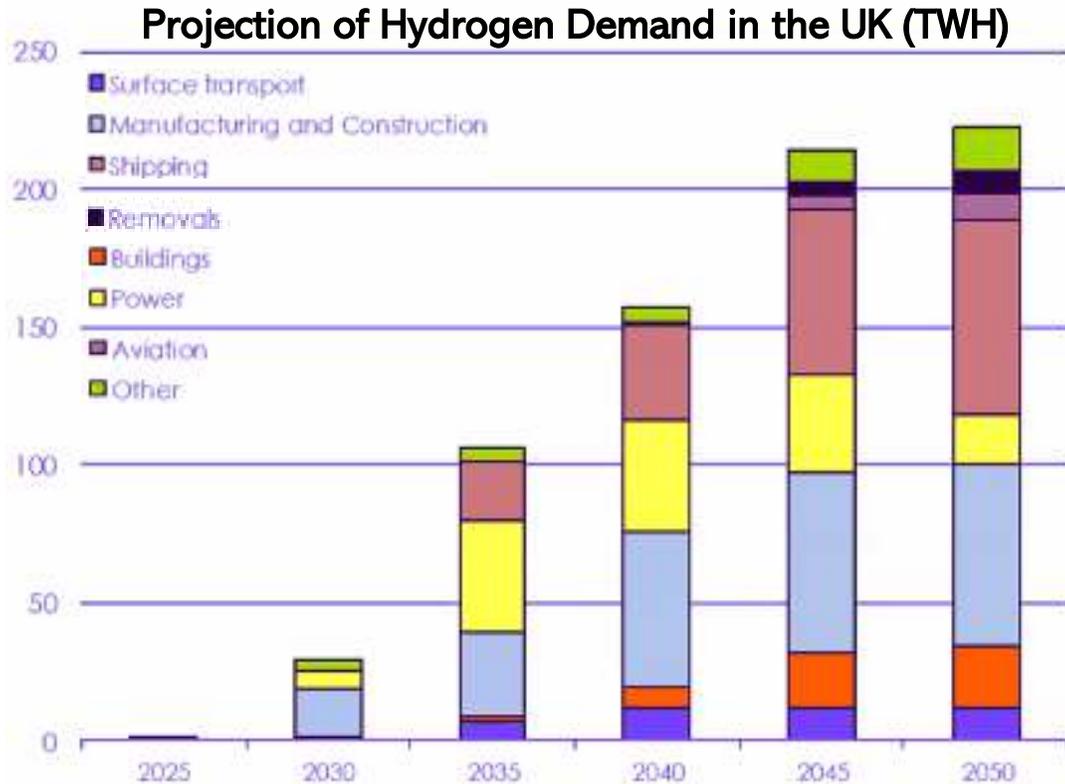
This includes fuel switching for boilers, burners and other high temperature processes and replacement of 'grey' hydrogen



### *Domestic heating*

Heating our homes accounts for ~20% of all UK GHG emissions.

# Hydrogen is widely recognised as an essential component of a future low carbon economy in the UK



Source:  
Climate Change Committee

The economic and climate case for hydrogen offers tremendous opportunity to 'build back green' after the COVID-19 pandemic.

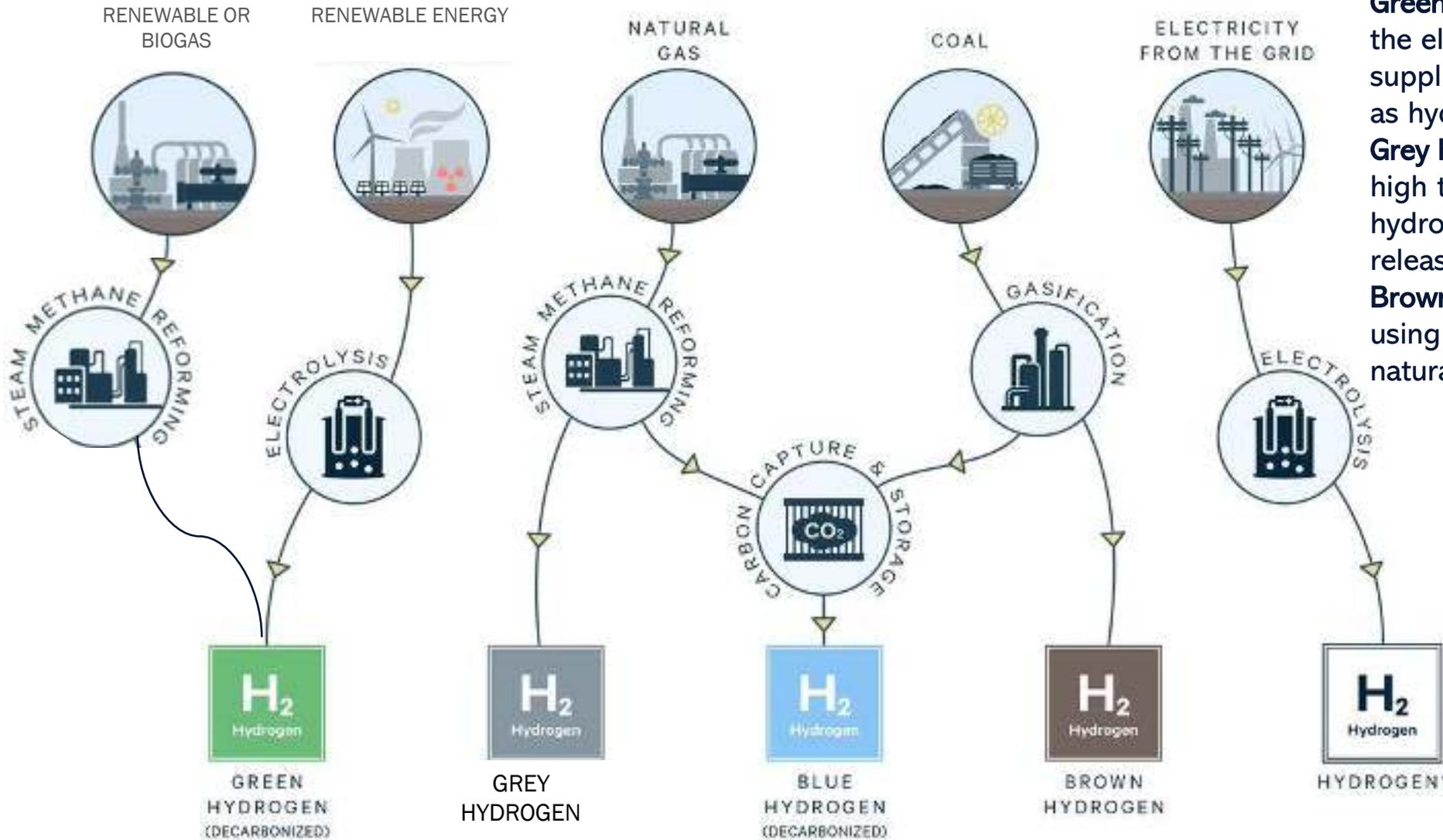
## 74,000

Jobs could be created from government-supported measures to develop the hydrogen economy  
- Hydrogen Taskforce

## £320bn

Value that could be generated for the UK economy by the hydrogen industry  
- Offshore Renewable Energy Catapult

# Hydrogen production options



**Green H2:** Hydrogen produced from the electrolysis of water with energy supplied via renewable energy such as hydro, solar or wind

**Grey H2:** Turning CH<sub>4</sub> into H<sub>2</sub> using high temperatures to split apart hydrocarbon chains with CO<sub>2</sub> released as by-product

**Brown H2:** Similar to grey H<sub>2</sub> but using coal as a feedstock instead of natural gas

➤ **Blue H2:** Grey or brown hydrogen but where the CO<sub>2</sub> is captured and stored / sequestered

➤ **Other Colours:** Hydrogen produced from electrolysis using grid electricity or nuclear power

# A convergence of factors are leading to rapid development and deployment of hydrogen technologies



## Climate Change Targets

75 countries representing over half of the world's GDP have net zero carbon ambitions



## National H2 Strategies

30 countries have hydrogen-specific strategies (EU has a target for 40GW of electrolyser capacity by 2030)



## ICE Vehicle Bans

20 countries have announced sales bans on internal combustion engine vehicles by 2035



## Private Sector Reductions

More than 1300 companies have set Science Based GHG-reduction targets, 3X increase from 2019 in 2020

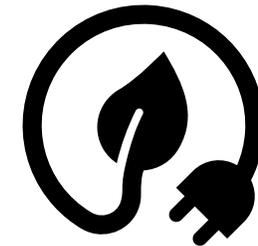
Global project investment could exceed \$300B by 2030



## A reliable energy system

- Our extensive gas network:
  - can deal with extremes of demand covering the entire UK
  - supplies energy to domestic and industrial customers
  - can store energy for long time periods
- Blue hydrogen can help to:
  - decarbonise the gas network
  - prolong the economic life of existing gas infrastructure
  - ensure that we continue to derive the benefits that it offers
  - avoid costs associated with expansion of our electricity infrastructure

**28,000km**  
of pipeline



connecting over **85%**  
of UK dwellings





# Cluster map

## Acorn

North Sea natural gas reformed into clean hydrogen, for use in transport applications, and in the gas grid to decarbonise heating in homes and industries.

## HyNet

HyNet North West is based on the production of hydrogen from natural gas. A HyNet North West consortium has just received significant Government funding to enable the plant to become 'investment-ready'.



## Teesside

The Teesside project would be the largest in the UK, producing up to 1GW of blue hydrogen (20% of the UK Government's hydrogen target) by 2030 and supporting the development of the region as the UK's first hydrogen transport hub.

## Humber – H2H Saltend

Hydrogen will be produced at scale from natural gas and delivered to the nearby chemical plants and power station, reducing their emissions. The CO<sub>2</sub> by-product will be captured and stored safely and permanently offshore. The Humber is the closest industrial hub to the Endurance storage site in the Southern North Sea.

Other locations also under consideration



# Stringent standards should be set for blue hydrogen



- Standards should be set to maximize CO2 capture from blue hydrogen processes.
  - Reducing upstream emissions is equally important.
  - Factor such as:
    - the field from which gas is extracted;
    - the method of production;
    - the natural gas composition;
    - the type and distance of transportation; and
    - the capturing and processing of any by-products
- ....all contribute to the life cycle emissions of the hydrogen

**We can achieve the lowest emission levels by using:**

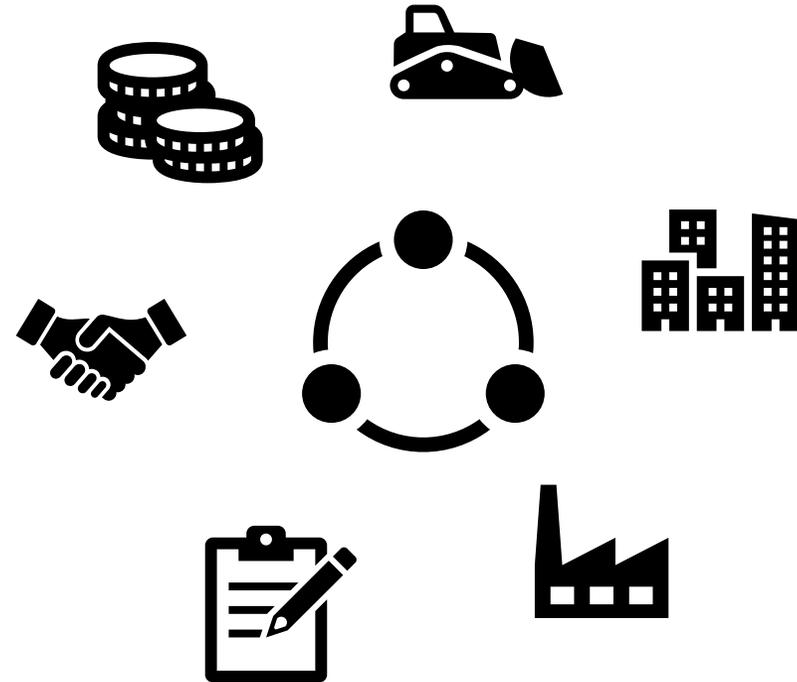
- **the highest efficiency and lowest carbon footprint technologies, which consume the least natural gas per unit of hydrogen produced; and**
- **sources of natural gas with lower emissions profiles.**



# Policy and regulatory challenges and uncertainties

Project developers need clarity on:

- the Government support that will be available for blue hydrogen projects
- How cross-value chain or “project-on-project” risk will be allocated / minimised
- How project finance will be structured.





# Certification of blue hydrogen

## Why?

- Certification will provide confidence for purchasers and end consumers that the hydrogen they have purchased or indirectly consumed is low carbon.
- This will be increasingly relevant as hydrogen use moves beyond geographically defined industrial clusters to other applications.
- The great benefit of such a scheme is that it can decouple the low-carbon attribute from the physical flow of the product and make blue hydrogen available independently from its production sites.
- This will be key to expanding the market for blue hydrogen.

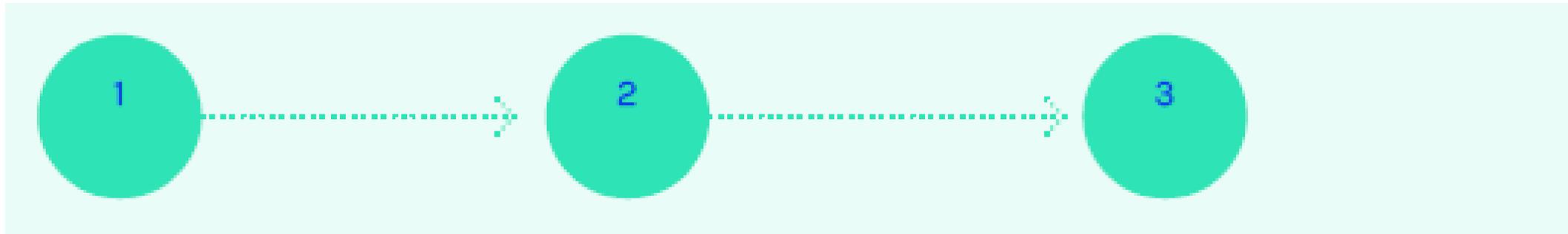
## How?

- Given that the EU has already made good progress on its CertifHy scheme, the UK Government should consider adopting a similar scheme.
- An approach involving ‘book and claim’ or similar to the UK’s Renewable Energy Guarantees of Origin (REGO) scheme will work well.
- Any UK a scheme must be such that it enables certificates to be recognised in the EU.



# Actions to unlock blue hydrogen (1)

Alongside business models for hydrogen we need:



Blending of hydrogen into the gas network

Proof points for fuel switching in industries such as glass, steel and cement via industrial trials

Building the infrastructure required for hydrogen-powered vehicle (and wider transport) refuelling.



# Actions to unlock blue hydrogen (2)

## GAS NETWORK LIMITS

- Revise current maximum limit of 0.1% hydrogen by volume in the gas grid.
- Build on results of Hy-Deploy project.

## BOOSTING HYDROGEN EXPORTS & IMPORTS

- There is huge scope for exporting skills and services, providing a further boost to the UK economy.
- Government should also develop an industry wide plan to boost this.

## GROWTH IN PRODUCTION

- We believe that the UK can deploy
- 10GW of blue hydrogen by 2030
  - up to 80GW by 2050 with the right policy support.

## GAS NETWORK PRACTICALITIES

- Define hydrogen measurement standards
- Confirm the ability of various types of pipework to safely handle hydrogen needs.
- Introduce measures to ensure that the hydrogen blending stay within the permitted levels

## SUPPORTING THE 'JUST TRANSITION'

- Blue hydrogen can enable the transition away from traditional roles in oil and gas, which currently support 147,000 jobs.
- The North Sea Transition Deal expects to support up to 40,000 hydrogen and CCS jobs.
- Many of the current skillsets are key to the roll-out of hydrogen.

# Next steps

- The next critical step is to deploy technology at scale and ensure that demand grows in tandem.
- The level of investment needed from industry and Government far exceeds that already committed.
- Business models are key and required now.
- There is the potential to develop a robust UK supply chain.
- Having the policy landscape and Government signals will attract investment into the UK in a sector in which many countries will compete.





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# Panel discussion



Q&A

# Closing remarks