

# Hydrogen and Carbon Capture In Scotland

Call for evidence

Submission by the Hydrogen Science Coalition (HSC)

## Introduction to the HSC

The HSC are a group of independent academics, scientists and engineers who are specialists in hydrogen from production to potential end use sectors. We want to ensure that policy decisions on hydrogen reflect the most effective path forward in Scotland/UK's journey towards net zero emissions by 2045/50.

## Our Position

It is abundantly clear that the Scottish Government understands that, done well, decarbonisation can create jobs, future-proof Scottish industries, improve air quality and cut consumer bills.

Delivering net zero is about deploying all the solutions we have within the right sectors, ensuring that we tap into all expertise available to guide decisions. A well thought through, evidence supported, strategy on hydrogen is a key part of that plan.

The terms of reference provided by the SAC presupposes that there is an extensive societal, environmental and commercial benefit for hydrogen production in Scotland.

The HSC's key concern is that Scotland is moving at pace with a hydrogen strategy that has not been fully evidenced tested against other Scottish net zero pathways, notably electrification.

## Our concerns

We make reference to the Scottish Government's two key reports –

Hydrogen Assessment, December 2020 [Scottish hydrogen: assessment report - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/scottish-hydrogen-assessment-report-2020/pages/1.aspx)

Scottish Draft Hydrogen Action Plan [Hydrogen action plan: draft - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/scottish-draft-hydrogen-action-plan/pages/1.aspx)

On analysis of these reports we have many concerns.

The following are some examples of where the HSC is concerned that the hydrogen reports are making assertions and conclusions that are not evidence supported. In doing so, conclusions made relating hydrogen are flawed, missing opportunities and technologies that can deliver net zero more effectively.

### **Blue Hydrogen**

We have major concerns that blue hydrogen is not a sustainable solution.

CCS is always partial, fugitive methane emissions during production and transportation are significant, and the risk of lock-in to expensive fossil fuels are very real.

A variety of emerging studies are highlighting the lack of understanding of the climate impacts of blue hydrogen, suggesting that its emissions can be as bad or even worse than simply burning fossil fuels, and at best is a very expensive way to mitigate GHG emissions from necessary hydrogen production. Indeed the German Government has withdrawn support for blue hydrogen.

Blue hydrogen is not a net zero stepping stone to green. Once invested blue hydrogen facilities will be operational for 20 -30 years.

### **Hydrogen Blending**

Blending is frequently suggested in both reports. Blending is a poor use of low carbon hydrogen. This has been highlighted in a recent Fraunhofer IEE report where it is concluded 'Blending is shown to be a sub-optimal pathway for the deployment of hydrogen and should be avoided in favour of policy instruments, which can deliver hydrogen to specific sectors.'

### **Building Heating**

Heating buildings with boilers using green hydrogen takes about six times more electricity than using electric heat pumps. That means six times the number of wind turbines or solar panels and a significantly higher cost for consumers pushing more households into fuel poverty.

Numerous independent studies have shown that electrification is a far superior option to hydrogen.

### **Transport Sector**

Use of hydrogen in buses, trains, shipping, aviation and road freight is promoted in both reports

For urban buses, hydrogen is a more expensive option than battery electric and we therefore see no rationale for the deployment of hydrogen buses. Indeed Montpellier City has recently cancelled an order for 51 hydrogen buses on operating cost grounds.

According to Transport Scotland trains are responsible for around 0.5% of Scotland's CO2e emissions and are therefore of little significance.

Hydrogen is promoted for heavy haulage. The HSC disagrees with this position and believes electrification is the more appropriate option. A view supported Scania, Europe's largest truck manufacturer.

## **Conclusion**

The Scottish Hydrogen Strategy is leading to many initiatives that are wrong-headed and a poor use of taxpayers' money. It is also leading to supply chain over-blown expectations of providing services for hydrogen.

Strategies that consider energy vectors, such as hydrogen, in isolation will not provide a balanced view of the benefits of that vector.

The HSC recommends that the Scottish Government undertake a fully holistic energy integration study that addresses net zero pathways on a comparative basis.