



Position Statement – Solent Cluster and Hydrogen Production

About Southampton Climate Commission

Informed by the work of the UK Committee on Climate Change, and other leading organisations in the sector, the Southampton Climate Commission seeks to be an **independent** voice in the city, providing authoritative information on steps towards a zero carbon, climate resilient future to inform policies and shape the actions of local stakeholders and decision makers. It will monitor progress towards meeting the city's carbon reduction and nature-based targets and recommend actions to keep the city on track and advise on the assessment of the climate-related risks and adaptation opportunities in the city.

Our Vision

Working with partners, stakeholders and the community, the Southampton Climate Commission provides an inclusive, collective approach, in ensuring a just transition towards a zero carbon and climate resilient future for everyone in the city.

Our Members

The Commission is comprised of over 20 core members representing key stakeholders across the city, including the hospital, universities, businesses, and community representatives.

The Solent Cluster

[The Solent Cluster](#) is a collaboration between organisations in the Solent region with a focus on industrial decarbonisation. The Cluster's published key aims are to:

- To create new opportunities in low carbon hydrogen production and carbon capture and storage (CCS).
- Capture, transport and store 20-30 million tonnes of CO₂ by 2030 with up to 10 million tonnes annually
- 90% reduction in industrial emissions based on 2018 levels by 2050.

Southampton Climate Commission Response

The Southampton Climate Commission acknowledges the need for regional collaboration to deliver Net Zero, especially for high carbon pollution sectors such as industry, commerce and energy. However, due to their high emissions, the Commission can only support collaborations which are aligned with a rapid transition away from a fossil-fuel economy and carbon capture and storage used as a last resort, in order to keep the planet within 1.5 degrees of warming, with [no overshoot period](#)ⁱ.

We support the global consensus that the burning of coal, oil and gas must be halted, that fossil fuels must be replaced with renewable energy sources as a priority and that there should be no new oil and gas projectsⁱⁱ.

Given the latest warnings from climate scientistsⁱⁱⁱ, it is clear that a combination of rapid decarbonisation combined with an on-going programme of carbon removal will be required to mitigate damaging climate change.

The Commission has reviewed a research paper on hydrogen produced by the Southampton Climate Action Network and a presentation by a representative of the Solent Cluster on low carbon hydrogen production in the Solent region.

Currently hydrogen production produces the same amount of carbon emissions, if not more, emissions than fossil fuel production so is reliant on CCS to be low carbon. Zero carbon hydrogen means that renewable fuel sources have been used for production.^{iv}

The Commission considers that the following points highlight the current limitations of CCS and the risks associated with delivering a successful scheme at the scale required to be net zero:

Hydrogen production – Low carbon

- Hydrogen is currently produced using fossil fuels and CCS attempts to reduce the carbon emissions from this process. The Clean Hydrogen Definition^v produced by the independent Hydrogen Science Coalition requires hydrogen manufacturers to meet a rigorous standard for net zero. Currently the only known method of producing zero carbon hydrogen is through electrolysis and this is not yet available at scale.
- The technology for CCS is not yet deployed at a large enough scale required to make a significant contribution to reducing emissions so cannot be relied on in the short term^{vi}.
- The National Infrastructure Commission recommends that the government should not support the rollout of hydrogen for domestic heating^{vii}, which is one of the objectives of the Solent Cluster^{viii}.

Hydrogen production – Viability

- Hydrogen production in the Solent is not likely to commence until 2032 at the earliest^{ix}, so any emissions reductions will not be achieved for another 9 years. That is time and money that could be used to increase renewable energy production.

- The amount of carbon projected to be captured and stored by the Solent Cluster is 3-10million tonnes per year. However, a [2021 feasibility study](#) by ExxonMobil showed that only 2m tonnes could be captured per year. The Chevron's Gorgon project in Australia has seen a decline in carbon stored and only managed to store 1.6m tonnes in 2022 due to physical challenges at the site^x.
- A study into Norway's CCS projects under the sea bed found that storage conditions "began deviating dramatically from design plans only 18 months into CO2 injections, necessitating major interventions and investments" despite the geology being some of the most studied in the world.^{xi}
- A report from the IEA notes that CCS cannot be used to maintain the status quo because if fossil fuel consumption rises as projected, limiting emissions would require an inconceivable 32 billion tonnes of carbon captured for utilisation or storage by 2050. The amount of electricity needed to power these technologies would be greater than the entire world's electricity demand today."^{xii}
- A high CCS pathway to net zero emissions in 2050 is expected to cost at least \$30 trillion more than a low CCS pathway^{xiii}

Recommendations

The Solent Cluster proposes to explore low carbon innovation and sustainable fuel sources. The Climate Commission recognises that there is a role for transitional technologies if they meet a rigorous standard such as The Clean Hydrogen Definition, however the priority should be reducing emissions with CCS as a last resort therefore the Climate Commission recommends that:

- The Solent Cluster explores the full range of net zero technologies and options available to industry and ensures greater investment is made in renewable energy and a rapid transition to net zero.
- The role of hydrogen needs to be appropriate, offer the best net zero solution and not hamper other opportunities that have the potential to deliver more cost effective and sustainable reductions in emissions.
- Any role for low carbon hydrogen is dependent upon there being confidence that the reductions in emissions are achievable, that there is scientific and engineering certainty around the capture and storage of carbon emissions, and that such storage is financially guaranteed in perpetuity.
- There is a focus on a transition to zero carbon hydrogen and that development of a low carbon hydrogen market does not impede that transition. Zero carbon hydrogen requires investment in renewable energy sources.
- Carbon capture and storage is focused on "hard to treat" emissions, such as those emitted by chemical and industrial processes, rather than enabling business as usual extraction and use of fossil fuels.

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- ⁱ i.e. not going beyond 1.5C of global warming and relying on carbon capture technologies to bring global temperatures back down. [Overshoot | Overshoot Commission](#)
- ⁱⁱ [Net Zero by 2050 – Analysis - IEA](#)
- ⁱⁱⁱ 'IPCC AR6 Synthesis Report *"Risks are increasing with every increment of warming"*
https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf
- ^{iv} [How green is blue hydrogen? - Howarth - 2021 - Energy Science & Engineering - Wiley Online Library](#)
- ^v [Hydrogen Science Coalition | Clean Hydrogen Definition - Hydrogen Science Coalition % \(h2sciencecoalition.com\)](#)
- ^{vi} [The role of hydrogen in achieving Net Zero \(parliament.uk\)](#)
- ^{vii} [Technical annex - Hydrogen heating - NIC](#)
- ^{viii} [Project Plan | The Solent Cluster](#)
- ^{ix} [ExxonMobil, SGN, Green Investment Group sign MoU to explore potential for Southampton Hydrogen hub | ExxonMobil](#)
- ^x [Gorgon Gas Development and Jansz Feed Gas Pipeline Environmental Performance Report 2022 \(chevron.com\)](#)
- ^{xi} [Norway's Sleipner and Snøhvit CCS: Industry models or cautionary tales? | IEEFA](#)
- ^{xii} [The Oil and Gas Industry in Net Zero Transitions – Analysis - IEA](#)
- ^{xiii} [Heavy dependence on Carbon Capture and Storage 'highly economically damaging', says Oxford report | Smith School of Enterprise and the Environment](#)