



IGas hydrogen proposal

Summary:

- The production of hydrogen from fossil gas produces significant amounts of CO₂ and Igas currently have no plans to capture and store these emissions.
- Igas' fossil hydrogen production proposals, if they go ahead, will therefore likely lead to a significant increase in direct emission from their sites impacting on Surrey County Council's ability to achieve their net-zero carbon by 2050 target.
- These proposals by Igas appear to be an attempt to greenwash continued production of unabated fossil gas from existing and potentially new sites across the South East of England; locking us in to decades of emissions under the false premise that it will contribute towards the transition to net-zero.

IGas are proposing to install hydrogen generation systems at two sites in Surrey. At present they have an on-line exhibition of their plans and they say they will be submitting a planning application in July.

Hydrogen burns without producing any carbon dioxide and other emissions except water. Consequently, IGas are claiming that their hydrogen production can be part of the transition to the UK Net Zero. This is misleading on a number of grounds. **Their plans will lead to a significant increase in direct emissions at their sites in Surrey**

Hydrogen production and its emissions

IGas propose using a process called Steam Methane Reforming (SMR). This is a system that mixes natural gas (methane) with high temperature steam (700^o C – 1000^o C) ¹

IGas state that SMR "is a widely used and safe process to produce hydrogen". This is true to some extent. Hydrogen is already an established global industry. A 2019 report by the International Energy agency (IEA)² stated that globally 6% of all gas production and 2% of coal production is used to produce hydrogen. However, it also stated that this also produced about **830 million tonnes** of CO₂ each year. This is equivalent to the combined annual CO₂ emissions of the United Kingdom and Indonesia.

Hydrogen production results in significantly higher greenhouse gas emissions than using natural gas directly. This is mainly for three reasons:

1. The SMR process splits methane (CH₄) using steam (H₂O) and this produces hydrogen (H₂) and carbon dioxide (CO₂). Each 1Kg of hydrogen results in 9.3 Kg of carbon dioxide.³

¹ <https://www.energy.gov/eere/fuelcells/hydrogen-production-natural-gas-reforming>

² <https://www.iea.org/reports/the-future-of-hydrogen>

³ <https://www.forbes.com/sites/rrapier/2020/06/06/estimating-the-carbon-footprint-of-hydrogen-production/?sh=34c0626f24bd>

2. SMR process requires a great deal of heat. Presumably IGas will be burning their own gas to produce this heat. This combustion process will release climate changing emissions.
3. All conversion processes from one form of energy to another result in some loss. A recent parliamentary⁴ briefing states we will need to use 15-66% more natural gas to make up for energy losses should we replace natural gas with hydrogen made with the SMR process in our heating systems.

Both of these processes mean that additional natural gas is required to make up the shortfall. This additional gas results in additional emissions. The IGas claim that their hydrogen, to be used in vehicle fuel cells etc is “displacing the diesel which would otherwise have been used for fuel” is misleading because it does not take into account the full cost in terms of emissions.

Production on the site

IGas plan to use a modular system produced in the US by Bayo Tech⁵. Their specifications include

Emissions

CO₂ (gross) 8.9 kg per kg H₂

CO₂ (net) 10.1 kg per kg H₂

SO_x Negligible, removed before conversion

NO_x Complies with local limits

Noise < 80 decibels at 20 feet

IGas state that their system will avoid the nitrogen oxides (NO_x) and sulphur oxides (SO_x) emissions released when burning diesel. They have not stated what will happen to the SO_x that is removed as part of the hydrogen purification process. In the Bayo Tech specifications It would appear that NO_x emissions comply with US local limits but we are not clear how this relates with UK limits. However, this does suggest that all IGas calculations concerning their emissions levels need to be scrutinised in detail.

Hydrogen as part of the energy transition

In their proposal IGas refer to the role of hydrogen in the governments Ten Point Plan for a Green Industrial revolution as if their proposal is part of this plan.

It is not.

The Ten Point Plan has two key proposals for hydrogen production.

⁴ <https://researchbriefings.files.parliament.uk/documents/CDP-2020-0172/CDP-2020-0172.pdf>

⁵ <https://www.bayotech.us/products-bayotech-h2-200>

1. Hydrogen production from fossils fuels but with Carbon Capture use and Storage (CCUS). Here most of the emissions will be captured and not released into the atmosphere. This is known as “blue’ hydrogen. Blue hydrogen is at present very expensive and as yet there are no fully functioning, large-scale projects in the UK or globally. The UK government⁶ has recently started investing in developing this technology in six low carbon hubs. They are all large industrial clusters with very high rates of industrial emissions and none of these are here in the south of England. It is the scale of the projected emissions savings and the importance of the industries and jobs in these clusters⁷ that justifies both government and industry investment. However, only two of these low carbon hubs are projected to be completed by 2030.

Clearly, the project proposed by IGas is not the kind of project proposed in the Ten Point Plan. Instead, it will commit Surrey to allowing the production of “grey” hydrogen, that is hydrogen that is highly polluting, and which adds significantly to the county’s greenhouse gas emissions. IGas acknowledge they are producing grey hydrogen but say there are future opportunities for the emissions to be captured and stored. In fact, there are no plans, as far as we know, to develop any CCUS facilities in the south in the next decade.

2. The other main source of hydrogen in the Ten Point Plan is “green” hydrogen production; that is hydrogen produced from water using electrolysis. Where the electricity comes from renewable resources it results in very low emissions indeed. There are in fact plans for such a facility in the south-east UK, in Kent⁸. Ryse Hydrogen are building a plant in Herne Bay, using electricity from the nearby wind farm and hope to be in production by 2022.

The implication that IGas make that their proposal is part of the Ten Point Plan is, in our opinion, highly misleading. It is yet another example of greenwashing; a fossil fuel company trying to claim some renewable credentials that are completely unwarranted.

The government was due to produce a hydrogen strategy earlier this year, but it has been delayed and it is now due to be published in July 2021. Once this strategy is published any role for on-shore gas sites, should there be any, will become much clearer.

What does seem clear already is that hydrogen production will increase greenhouse gas emissions in Surrey at a time when the county says it is endeavouring to reduce them. Oil and gas oil sites are already a point source of large amounts of greenhouse gases. However, at present gas produced at the current sites is distributed and therefore the emissions are released over a wider area and not all contained specifically in the county. Hydrogen production will mean that all those emissions will be released at the site. In terms of global warming this is irrelevant, once in the atmosphere the effects of these emissions are global.

⁶ <https://www.gov.uk/government/news/green-boost-for-regions-to-cut-industry-carbon-emissions>

⁷ <https://www.zerocarbonhumber.co.uk/>

⁸ <https://rysehydrogencanterbury.co.uk/about-the-scheme>



However, if Surrey commits to emission reduction targets it could find that their reduced emissions are simply replaced by the new emissions produced alongside the hydrogen.

The Weald Action Group consider that IGas, in their presentation of this proposal, are misleading residents of Surrey. Without CCUS hydrogen production will increase greenhouse gas emissions significantly and there are no plans for CCUS in Surrey. The urgency to reduce greenhouse gas emissions and avert catastrophic climate change is now being recognised is the most unlikely of circles. Even the International Energy Agency in a recent report stated categorically that “there are no new oil and gas fields approved for development in our pathway”⁹. Surrey needs to reject this attempt by IGas to avert the decline that their industry faces by misleading its residents and work towards promoting genuine, low carbon industries.

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⁹ <https://iea.blob.core.windows.net/assets/4719e321-6d3d-41a2-bd6b-461ad2f850a8/NetZeroBy2050-ARoadmapfortheGlobalEnergySector.pdf>

