

Written Evidence Submitted by Mr Steve Green (HNZ0009)

I practiced as a chartered chemical engineer for 3 decades plus and designed/supported, and for periods had group chem eng technical authority over multi billion projects for big companies.

Gas processing was my main area of expertise.

Please allow me to address your numbered topics.

3. Engineering challenges

Where are we going to store all this hydrogen ?

Liquefaction throws away 36% of its energy and even in pressure vessels at hundreds of atmospheres it has a very low energy density needing a massive number of vessels.

Even with salt caverns we'd need dozens / hundreds of them but we only have very limited UK sites in Yorkshire, Cheshire and Dorset, not where we'd like them to be.

This is a potential show stopper, hydrogen cannot meaningfully support our grids if we cannot store it in bulk.

The H21 report explains our high pressure gas grid is not suitable for pure hydrogen, page 12, due to the likely embrittlement and failure of such pipelines.

Production of blue hydrogen will greatly increase natural gas imports (balance of payments problems) and they are not net zero in the countries where its produced, they have significant overseas CO2 emissions.

4. Infrastructure

Heating engineers will tell you many homes do not have piping which will be leak tight enough for hydrogen and will need replacing / digging up.

Industrially hydrogen is more dangerous than natural gas and needs proper ventilation, something many current homes wont have.

H21 report says it will cost £3k to convert each home, money which could be better spent on electrification.

5. Cost Benefit Analysis

Natural gas today costs 3 p / kwh, many people are today heating their homes with heat pumps for 3 p / kwh of heat.

H21 report forecasts H2 will cost 9 p / kwh and the recent European Commission report says 10 to 30 p per kwh.

Heat pumps will then be much much cheaper than H2, people will rapidly switch to the cheaper fuel and hydrogen boilers will be consigned to history books.

6. H2 Advantages / Disadvantages

Low carbon hydrogen will be essential for some sectors but is totally inappropriate for others. Many of the proposed uses are just spin from fossil and gas grid companies to justify their own survival/profitability and dependence on them regardless of consequences and costs.

H2 Home Heating - its silly, electrification will be far cheaper / safer

Cars - its silly, BEVs are 3 times more efficient

Electricity Storage - its a very low energy density and extremely difficult to store in bulk at the huge volumes required. Poor round trip efficiency. We have better chem eng options.

Ammonia / Fertilisers

Other Petrochemicals

Metal Refining

Specialist Heating

Synthetic Fuels - aviation/shipping

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