

Scot E3 meeting, 10 December 2022

Hydrogen: the technofix that undermines climate action

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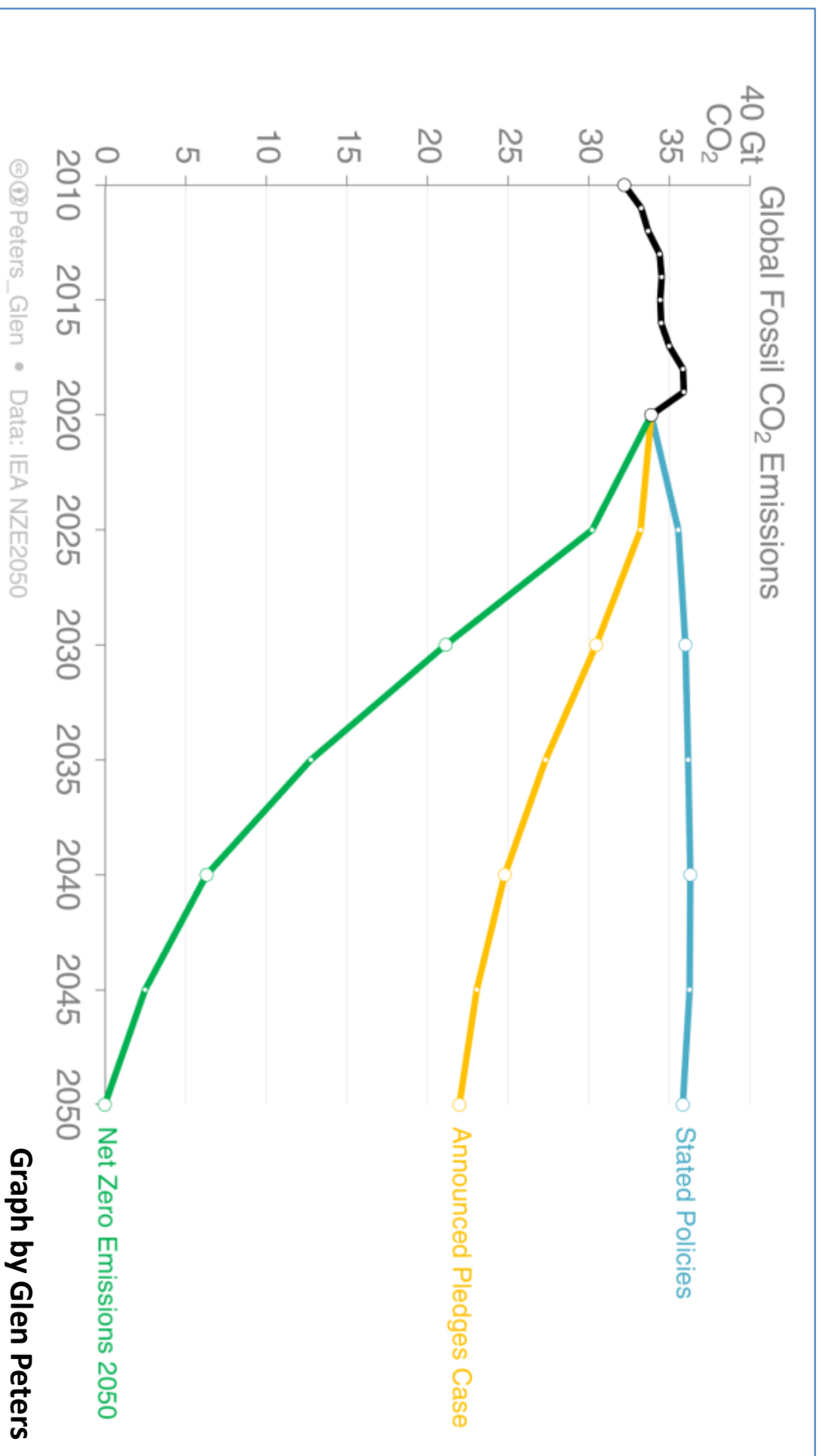
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1. Climate is a global issue

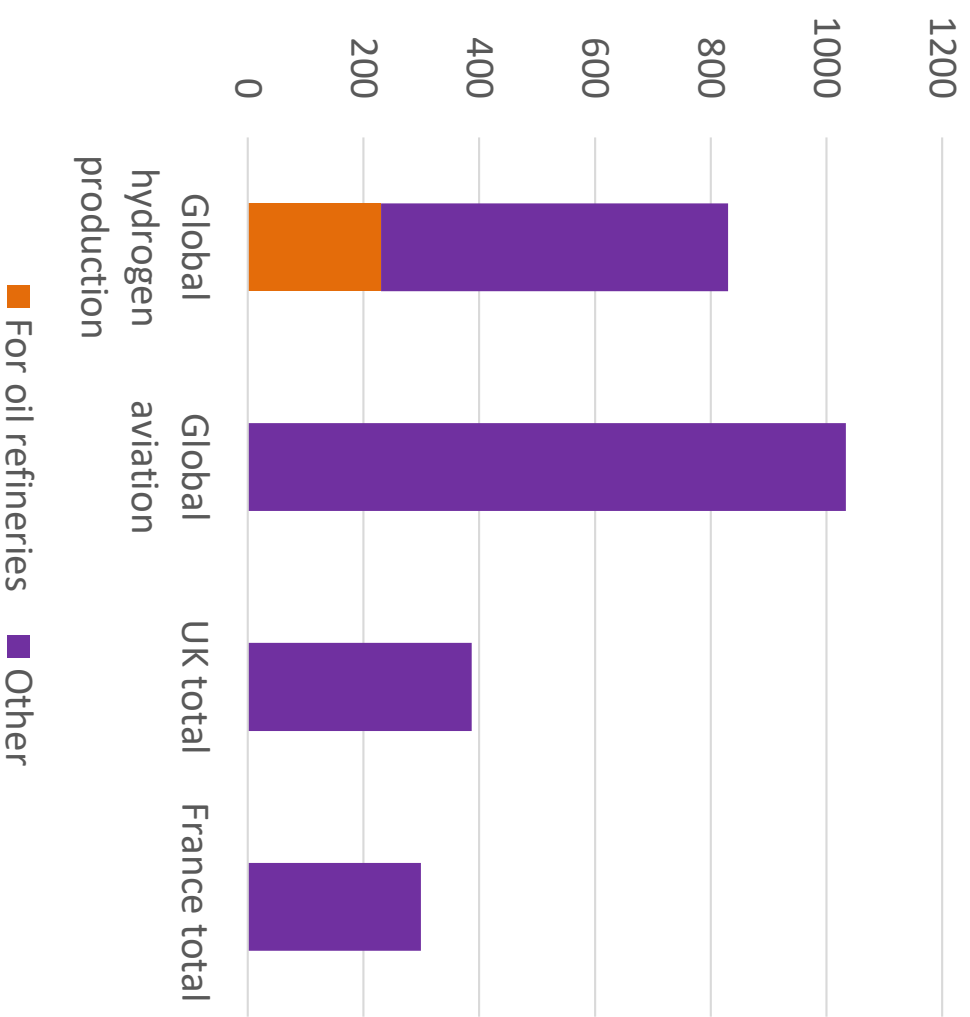


- Government policies, including the UK's, lead to disaster
- Beware of greenwash ('net zero', 'negative emissions', etc)
- Socially just decarbonisation is good. Technofixes may not be

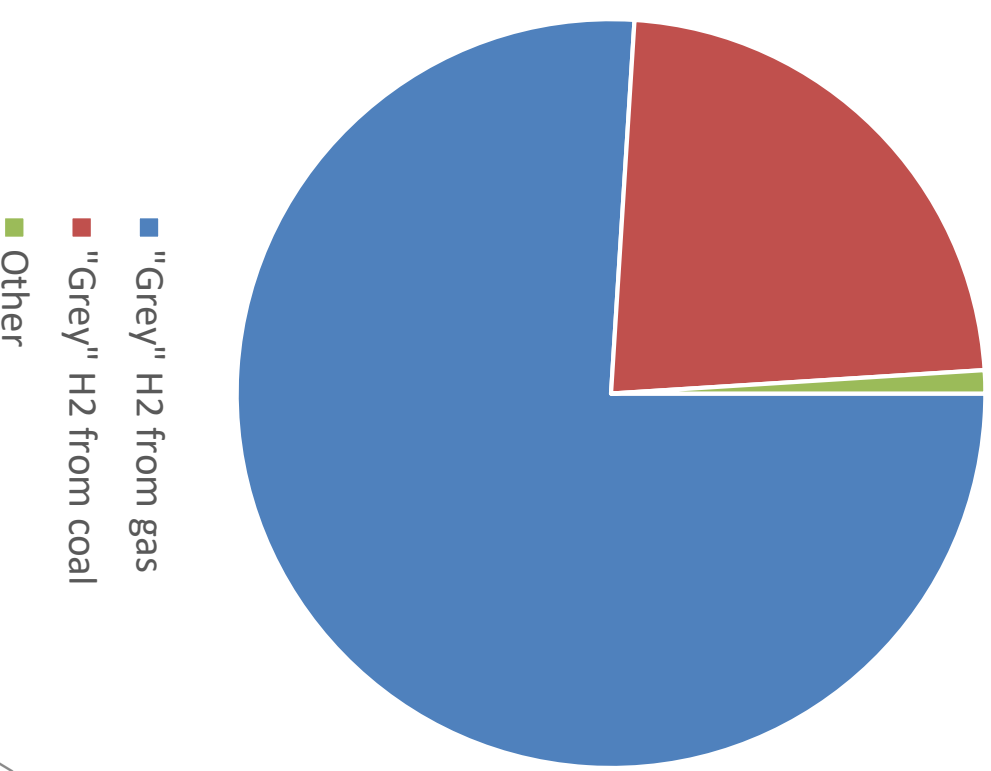
2. Hydrogen basics

It is not “clean”
(even though some of it could be, one day)

Carbon dioxide emissions, 2018,
millions of tonnes

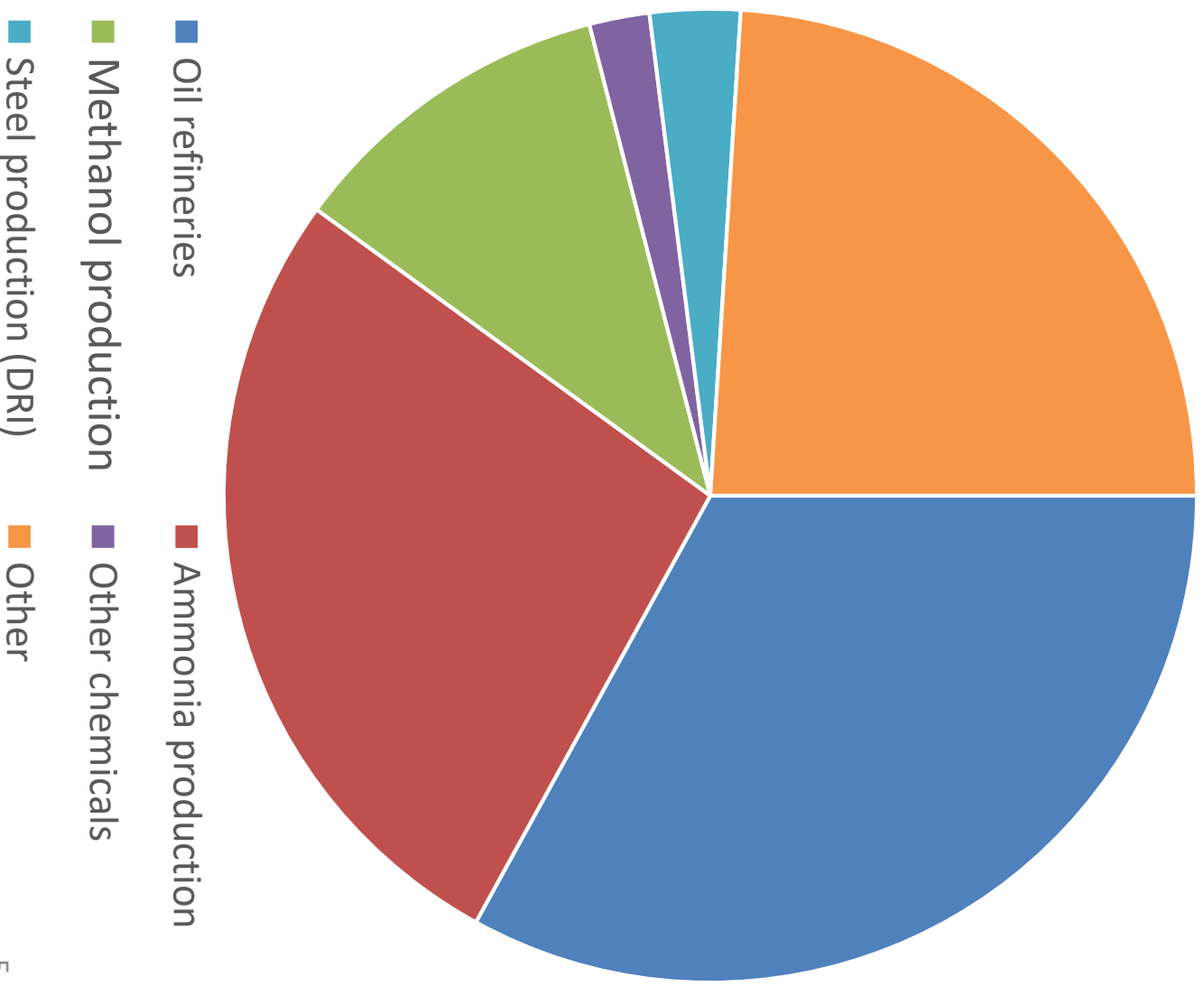


Global hydrogen production



Consumption of H2 needs to be repurposed and reduced

Uses of hydrogen



But what about blue and green hydrogen?

■ **'Grey' hydrogen.** Made from gas, by steam methane reforming*, or from coal. Carbon Dioxide is a by-product (10 or more tonnes per tonne of hydrogen)

■ **'Blue' hydrogen.** Grey hydrogen, with the Carbon Dioxide captured and stored. *BUT* ...

... carbon capture and storage is problematic. After 30 years of trying, it is only working at one stand-alone plant (and for Enhanced Oil Recovery at several locations)

■ **'Green' hydrogen.** Produced by electrolysis water, *BUT* ...

... you put in more energy (in the electricity) than you get out, and ...

... the process is only truly 'green' if the electricity comes from renewables



The priority for renewables: get fossil fuels off the grid

1 kWh
rnwbls

produces as
much
electricity as

2 kWh of gas

with 0.4 kg
CO2
emissions

1 kWh
rnwbls

produces as
much
electricity as

2.5-3 kWh of coal

with 0.8-1
kg CO2
emissions

1 kWh
rnwbls

produces via
electrolysis

0.8 kWh
H2

replaces

0.8 kWh
of gas

with 0.16
kg CO2
emissions

Until all fossil fuels are off the grid, renewables used for H2 have a carbon cost

Biofuels and carbon capture potential is exaggerated

- A review of all 29 CCS plants in the world found: more are ‘failed or underperforming’ than working. Carbon captured is mostly used for enhanced oil recovery. – [Institute for Energy Econs & Financial Analysis, September 2022](#)
- Drax power station burns biomass. It plans ‘by far the most ambitious CCS project ever’ (8mt/year) but, so far, tests did not work. Drax’s subsidies run out in 2027 and it needs to promise CCS to get more – [Biofuelwatch, November 2022](#)



Demonstrators against the Drax power station. Photo by [York Green party](#)

3. Hydrogen uses and abuses

- National Engineering Policy Centre: "Hydrogen is a highly versatile energy vector that could be used in many hard-to-decarbonise sectors", e.g. industrial direct-firing processes.
- It has high energy per unit of mass, so is good for storing. It burns at high temperatures.
- But it is not usually the best choice for home heating or transport

National Engineering Policy Centre, The role of hydrogen in a net zero energy system (November 2022)

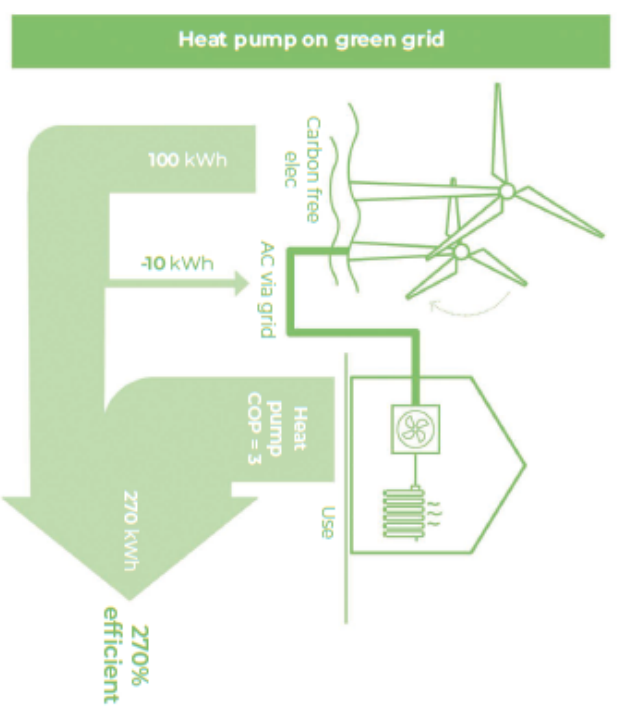
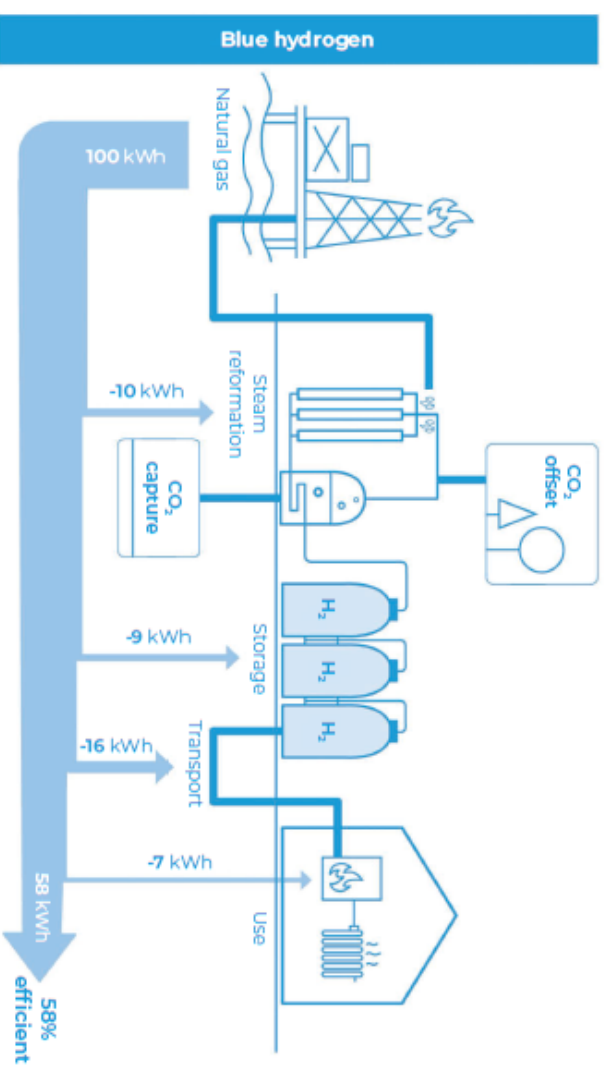
- For home heating, "gas industry claims that clean alternatives are too expensive, too difficult and too disruptive are overblown"

Jan Rosenow, Regulatory Assistance Project

Home heating: heat pumps 4+ times as efficient as H2

■ 32 academic studies compared hydrogen to heat pumps. 32 said heat pumps are more efficient

■ National Engineering Policy Centre: ‘The decision on the best use of available low-carbon hydrogen needs to be made from a whole-system decarbonisation point of view’

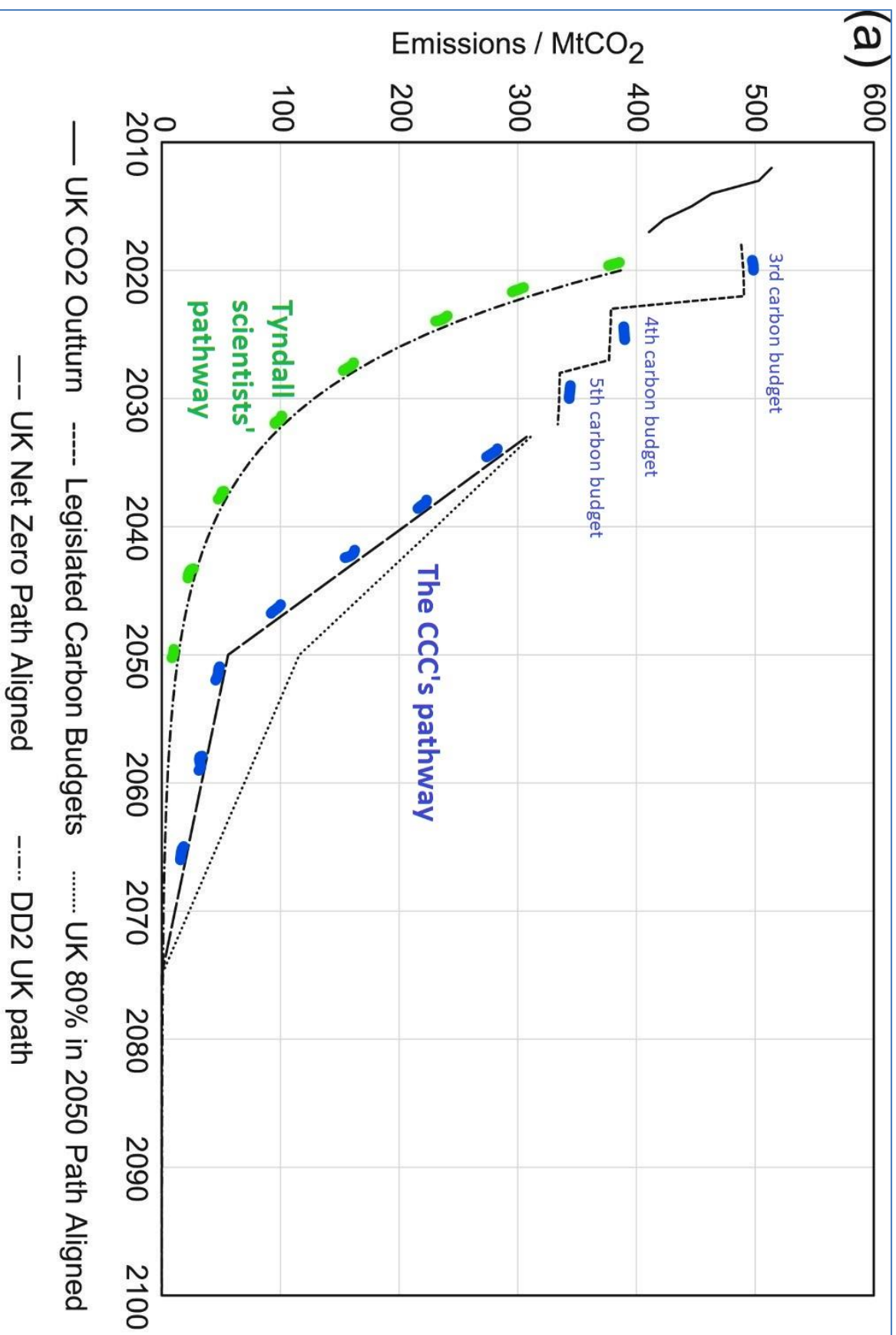


Note: COP = coefficient of performance

Figure 2.2. | Useable heat output compared with energy sourced for input of hydrogen boilers and heat pumps²²

Graphic by NEPC

4. UK gov't on 'net zero' & hydrogen



- Tyndall Centre research: government carbon budgets provide for only HALF the emissions cuts that are needed

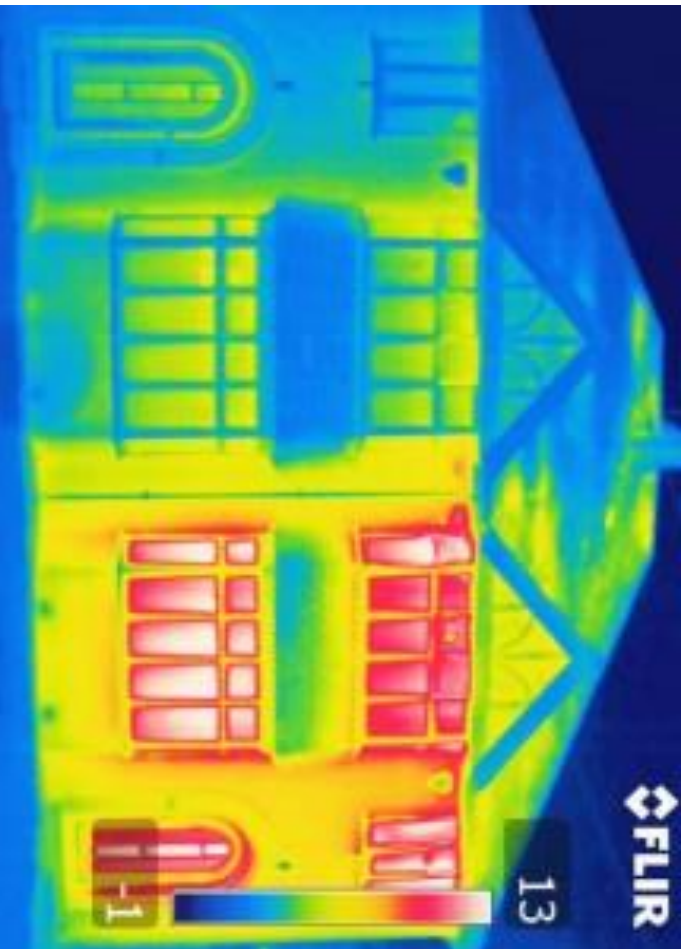
UK government hydrogen strategy

- **Energy Security Strategy (April 2022) raised hydrogen output target from 5 GW to 10 GW. (Half 'green', half 'blue'?)**
 - **Two carbon capture and storage 'clusters' approved: East Coast Cluster and Hynet (Merseyside). These are linked to 'blue' hydrogen and biofuels projects**
 - **Green hydrogen generation planned by SSE at Gordonbush. But shouldn't that renewable electricity go into the grid?**
 - **A decision next year on a test 'hydrogen village' (hydrogen for home heating). Either Redcar or Whitby (Merseyside). Residents not queuing up to be guinea pigs**
 - **Ministers NEVER talk about decarbonising current 'grey' hydrogen production**
 - **Centrica is in partnership with Ryze. Jo Bamford, Ryze CEO, is son of Anthony Bamford, a big Tory donor and JCB boss**

Northern Gas Networks H21 project

- **Aims to convert 15.7m homes from gas to hydrogen by 2050**
- **To do it with “green” H2 would need more than six times UK current wind capacity**
- **To do it with “blue” H2 would need 60 carbon capture and storage plants, as big as the current biggest in the world**
- **Sponsored by Equinor, Cadent and Northern Gas Networks**
- **Initial reports were funded by the taxpayer (£15.8m in 2017-19). A Front End Engineering & Design study would cost £250m**

Leeds TUC retrofit +heat pumps proposal



Thermal imaging of heat escaping a house with insulation (left), and without. It's energy efficiency measure #1

- UK government targets for “net zero by 2050” are too little, too late
- Fossil-fuel-based technologies, with or without CCS, can and should be avoided
- Super-insulation and heat pumps are established technologies
- They compare well with other pathways
- Deep retrofitting = opportunities for community involvement and democratic governance
- IPPR estimates heat networks, heat pumps and energy efficiency could need 300,000+ jobs in the UK by the mid 2030s
- Training for low-emission construction and retrofit is a key

Greenwash is everywhere

- Essar Oil, owner of Stanlow refinery at Ellesmere Port, says it hopes its carbon capture and storage facility, to open in 2027, will eliminate 0.81 million tonnes/year of CO2 emissions.

- That's 2.9% of the lifecycle emissions of their oil products
- Promising to cut emissions by less than 3%, over five years, is the road to catastrophe



- Essar Oil also says that installing its new hydrogen-compatible furnace will save 16,600 tonnes/year of CO2 emissions.

- That's less than one tenth of one per cent of the lifecycle emissions of their oil products

Suggestions for actions and policies

- A moratorium on hydrogen for home heating and transport
- A moratorium on hydrogen import plans that plunder the global south
- More, faster funding for insulation, heat pumps and training for engineers
- Demand investment in public transport and non-car transport modes
- Use life cycle emissions standards to combat greenwash
- The labour movement and communities could develop holistic post-fossil-fuel strategies that treat energy a service, not a commodity

Let's push for unions to rethink on technologies

- Unison Energy Service Group conference, 2019, decided to 'continue to lobby for a hydrogen future for the gas industry' and 'support the work of the All Party Parliamentary Group for Hydrogen'
- Unite Plan for Jobs states that 'using our North Sea gas and oil network to store excess carbon would create 68,000 jobs by 2050'. False logic

5. The politics of technology

- **Technology is not neutral. It develops in social and economic contexts**
- **For the oil and gas companies, hydrogen is part of a survival strategy, at a time when the world needs to move away from their products**
- **For the government, hydrogen is a business-friendly way of pretending to embrace decarbonisation**
- **The government's claim that hydrogen (or oil or gas) is the best way to protect jobs is a myth**
- **The labour movement can and should make its own choices about technologies that can serve communities' needs**

Thanks for listening

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