100% Renewable UK

https://100percentrenewableuk.org/

Hydrogen – can it help or hinder a 100 per cent renewable energy economy?

In reality the most efficient way to utilise renewable energy to provide energy sources is to use it through electricity, which is the form in which most (sustainable) renewable energy is produced. Not only that, but the technology that is used by (renewable) electricity tends to use energy rather more efficiently than technologies that can be used by hydrogen.

In essence this means that we should be using renewable electricity to be supplying services such as space heating and also transport as much as we can.

Now there are still important niche functions that hydrogen can provide. This includes helping to store renewable energy to provide long term firm power (in particular to make ammonium as a storage material), maybe provide some niche industrial purposes that electricity cannot provide (manufacture of steel, cement, fertiliser, shipping fuel) and possibly fuel some heavy vehicles that are not best powered by batteries. An article by David Joffe explains this as below:

https://www.newscientist.com/article/2186273-hydrogen-will-never-be-a-full-solution-to-our-green-energy-problems/

Also see an article by David Fickling:
https://www.bloombergquint.com/opinion/hydrogen-merits-stimulus-support-in-post-coronavirus-economy

Some examples of how renewable energy from hydrogen is technologically less efficient than using electricity from renewables is demonstrated by a comparison between heat pumps powered by electricity and boilers using hydrogen. Heat pumps can produce 3xs as much energy (for heating) as is contained in the electricity input. The heat pumps take energy from the environment – water, air or ground.

Meanwhile if hydrogen is produced from renewable electricity through electrolysis 20 per cent of the energy is lost through this process. So we would need more than three times as much renewable energy to provide heating if we used hydrogen from renewable energy (‘green hydrogen’) compared to using renewable energy to provide heating through powering heat pumps.

Even ordinary bog standard ‘resistive’ electric heating (like standard electric water heaters, fan heaters etc) using renewable energy is a more energy efficient option than ‘green hydrogen’.

In transport, the fuel cells that are used in hydrogen vehicles are only around 50 per cent efficient, whereas electric motors are close to 100 per cent efficient. It is true that electric vehicles are heavier than ones using fuel cells, but then the energy density of batteries (the amount of energy carried by a given weight of battery) is improving rapidly. Hydrogen powered fuel cells may look a better bet for especially large vehicles (lorries) at the moment, but even this advantage is declining compared to electrically powered lorries.

I am sorry to hydrogen afficianados for sounding some caveats about ‘green hydrogen’ – but my concern is to use renewable energy as efficiently as possible -after all, the higher the projections of renewable energy there are then the more difficult and expensive it becomes to achieve 100per cent renewable energy supply.

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