

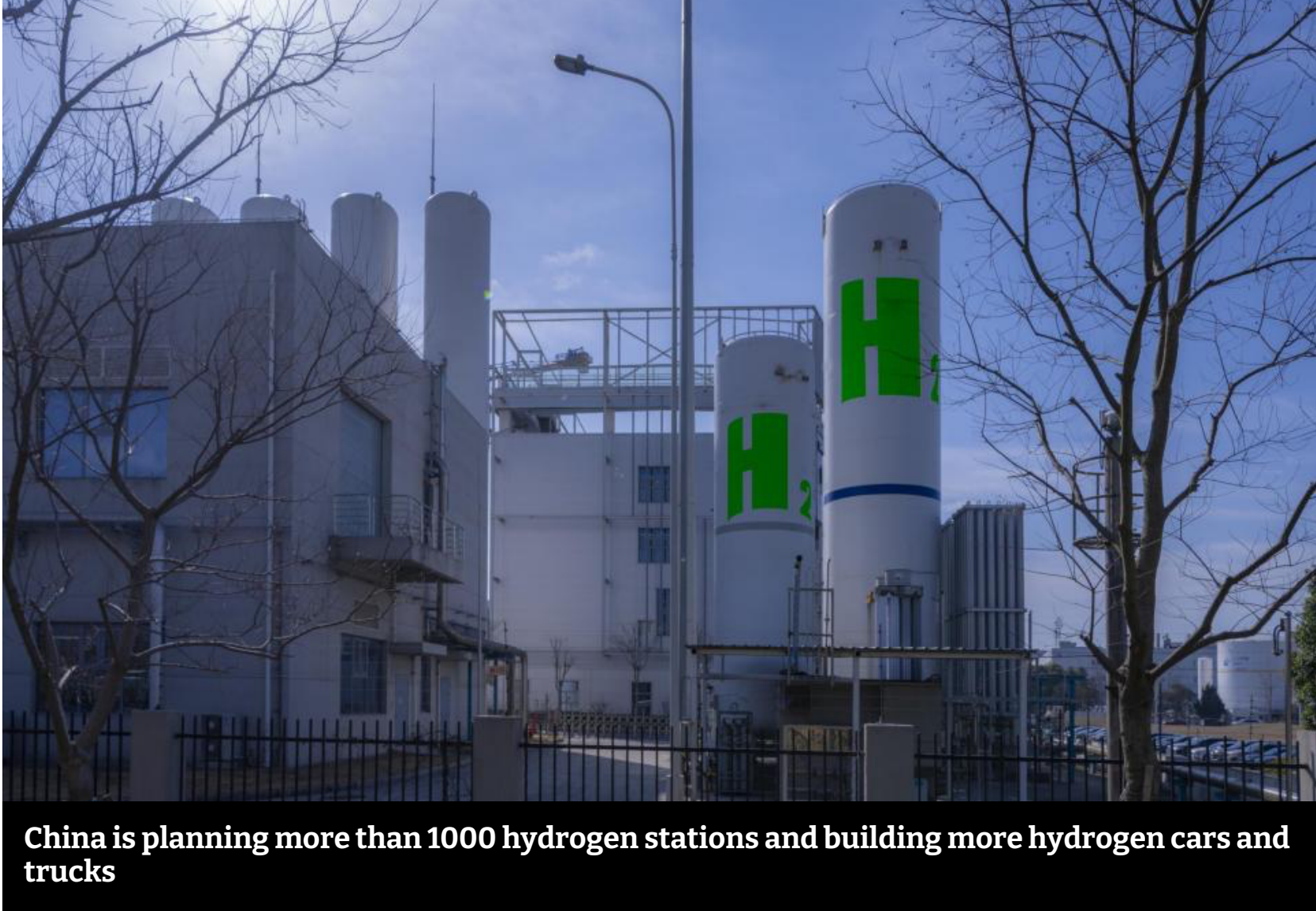
THE THREE ENGINEERS

# Scotland's energy future will be hydrogen based

14TH MARCHHYDROGENRENEWABLE ENERGYRENEWABLESENVIROMENTINDUSTRYSCOTLAND

By Dick Winchester

Share16 Comments



China is planning more than 1000 hydrogen stations and building more hydrogen cars and trucks

**HYDROGEN is the most common element in the universe and also the most important chemical building block we have.**

Along with oxygen, it's what makes water, which is critical to life. It's the hydro in hydrocarbons and it even makes up nearly 10% of our bodies.

It seems logical then, doesn't it, that we should be making as much use as possible of this massively abundant molecule. Of course, some countries and some industries are already making progress in developing its production and application.

For example, Sweden is using it to make steel, Scotland has some **whisky** production projects and the EU is rolling out refuelling stations for both heavy goods vehicles and cars.

**READ MORE: Reform UK councillor reported to Police Scotland over alleged 'hate crime' video**

China is planning more than 1000 hydrogen stations and building more hydrogen cars and trucks.

In fact, they've just delivered the first 100 of a batch of hydrogen HGVs. The Japanese company Toyota has developed a more efficient fuel cell engine.

The German company BMW is introducing a new fuel-cell vehicle. Hydrogen fuel cell-powered ferries and even a fishing boat have been built by Norway.

Marine energy is potentially a huge market. Fortescue Green Pioneer, the world's first dual-fuelled ammonia-powered vessel, has arrived in London. You need hydrogen to make ammonia.

There are now a few companies building hydrogen fuel-powered drive train units for small to medium size propeller-driven aircraft. It's quite reasonable to claim that all internal flights could now use similar technology.

The use of liquid hydrogen for long-distance flights using jet engines is also progressing, although this sector may be better served by so-called SAF (sustainable aviation fuel) which has hydrogen as one component. New Zealand already has a company manufacturing small-scale liquid hydrogen systems.

The iconic English company JCB has developed a hydrogen-fuelled internal combustion engine which it is using in its excavators and other vehicles. In Germany, they've even started using it to make glass and in Austria, it's used in a major supermarket bakery and for powering their delivery trucks.

In Wales, Panasonic is using hydrogen fuel cells to power its new microwave factory. It produces hydrogen using solar energy and stores the excess for when the sun isn't shining.



(Image: Canva)

It's not a new idea. A kindergarten in Sweden has been doing it for a while. It works like a dream. In Germany, France and Italy there are already companies building similar systems for domestic use. This means they are not connected to the electricity supply system.

"Off-Grid" living like this means no more electricity bills and as close to 100% energy security and resilience as you can get.

They're not cheap, of course, but as a long-term investment added onto the mortgage for a new build, they make perfect sense and of course, their costs will go down as production builds and technology improves as it is now almost daily.

The electricity industry hates the idea as would any enemies because it's almost impossible to target.

I love it.

The key advantage here for both domestic and industrial off-grid applications is hydrogen's long-term and relatively compact storage capability.

So, what are the issues with hydrogen and why is there such opposition to its adoption?

Well, you don't make hydrogen as such, but "liberate" it from other substances, including but not limited to natural gas, water, and even plastic waste. It's not the easiest of molecules to liberate though and the process requires a fair amount of energy.



That said, natural hydrogen also exists. In 2023, France announced the discovery of a massive natural hydrogen reserve in the Moselle region's Lorraine mining basin.

We'll watch that closely.

Reforming natural gas is the dominant method of production today. It has big drawbacks, not least of which is that it produces carbon dioxide and many see it as a way for the oil and gas industry to keep on producing hydrocarbons.

Slowly, though, production is shifting to electrolysis in order to produce "green hydrogen" which is when the electrolyser is powered by wind, solar or some other sustainable energy source such as tidal.

The anti-hydrogen argument here is that such systems are inefficient in that it takes around three times the amount of electricity to produce the hydrogen you need to achieve the same result as you would if you used the electricity directly.

It's a good academic point but I like to point out that the reality is that it doesn't really matter how much electricity you use if it's from a renewable source because nobody will send you an invoice for the solar or wind energy you've used.



(Image: NO)

The capital cost will be higher, but this can be justified provided it achieves the objective which, for example in the case of cars, is no need to change your behaviour and ensure the fuel is available to everyone in the same way petrol and diesel are now and refuelling speeds are also the same. Everyone could access a hydrogen dispenser but only a limited number can have a home charger for their battery vehicle. Hydrogen supports equality – a characteristic most of Scottish society supports.

The Netherlands have a number of trials running on the use of hydrogen for domestic heat and for extended energy storage using green hydrogen. Hopefully, Scotland will have a similar trial running later this year unless the efforts to stop it finally succeed as they have with similar trials in England.

The objection here is that it's unsafe and inefficient. Yet the Dutch have not reported a single incident and, as I pointed out to one objector, if it's a real concern then simply mount them externally. Hydrogen dissipates rapidly and is considered an indirect greenhouse gas because it interacts with airborne molecules called hydroxyl radicals to prolong the lifetime of atmospheric methane – a highly potent greenhouse gas – and increase the production of ozone, another greenhouse gas.

However, the lifetime of hydrogen in the atmosphere is only around two years as against 12 for methane and hundreds of years for carbon dioxide. Hydrogen does not therefore accumulate in the same way as methane or carbon dioxide and so can't really be considered a threat.

For me, one of green hydrogen's big attractions is that it can make Scotland energy independent and avoids the imposition of a privatised all-electric monopoly on mobility and all things domestic.

It hands control back to the consumer or the community and away from the energy oligarchs and enables choice. That sort of aspiration is also very characteristic of our Scottish society.

HYDROGENRENEWABLE ENERGYRENEWABLESENVIROMENTINDUSTRYSCOTLAND

Share16 Comments

Get *involved* with the news

Send your news & photos

Most read

- 1'Sad to see it go': Popular BBC Scotland drama axed after 20 years
- 2Labour announce £5 billion of welfare cuts with changes to PIP eligibility
- 3Scottish butcher's 'pre-war recipe' wins best black pudding in UK
- 4Body found on Scottish beach amid hunt for woman missing from Edinburgh
- 5Fencing plans for popular Munro branded 'insane' by campaigners
- 6Proclaimers and Val McDermid lead calls to scrap controversial Elsie Inglis statue
- 7How do DWP changes to PIP and Universal Credit impact Scotland?
- 8The main points from Liz Kendall's DWP overhaul, at a glance
- 9Led By Donkeys stage 'world's biggest Elon Musk protest' on Welsh beach
- 10Michelin-starred Scottish restaurant on sale 'after 250 years in hospitality'

Show more articles