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A load of hot air?

Hydrogen is presented as the clean fuel of the future, but it's not always that straightforward. ***Quintin Rayer*** discusses why fund managers may want to divest from it

Hydrogen is being touted as a clean fuel that could support the transition to a low-carbon or net-zero emissions future. Burning hydrogen releases no carbon dioxide (CO_2), making it promising for addressing global warming. But is hydrogen genuinely a clean fuel? In many cases, it is primarily manufactured from fossil fuels. Fund managers' fossil divestment policies need to address this 'fossil hydrogen' – but how?

Including hydrogen in a fossil divestment policy may seem surprising. When hydrocarbons burn, they release greenhouse gases. Burning natural gas (primarily methane) releases CO_2, which accumulates in the atmosphere and causes global warming. Hydrogen, on the other hand, burns 'cleanly'; its only combustion product is water vapour, which seems promising in terms of emissions.

Unfortunately, this is not the whole story. We need to look at the total lifecycle emissions, as much hydrogen manufacture generates CO_2 emissions. Emerging interest in hydrogen as a 'clean fuel' represents a significant challenge in climate terms.

Fossil divestment policies should bar many forms of hydrogen manufacture. Some fund managers appreciate this, although it may be more challenging for tracker funds. Others may query how hydrogen fits with fossil divestment, or have difficulties obtaining necessary company data. Ethical and sustainable fund managers can show climate-friendly leadership by adopting clear, robust investment policies.

Hydrogen as a fossil fuel

Hydrogen burns cleanly but is primarily manufactured from fossil fuels. Different colours denote different production methods:

- Green hydrogen, manufactured via water electrolysis using renewable energy.
- Black or brown hydrogen is manufactured from coal – brown from lignite and black from bituminous coal.
- Grey hydrogen is sourced from natural gas and manufactured via 'steam reformation'. Each tonne of grey hydrogen results in the emission of around nine tonnes of CO_2.
- Blue hydrogen is typically grey hydrogen where much (but not all) of the CO_2 has been captured; total lifecycle emissions are at least as high as natural gas.
- Turquoise hydrogen is manufactured from natural gas via methane pyrolysis, with the carbon extracted into solid form. However, industrial use of the resulting solid carbon leaves it as a potential source of future emissions.

The Hydrogen Council, established by the oil and gas industry, has been promoting hydrogen; it should be noted that switching from natural gas to blue hydrogen may be beneficial to the sector, since more natural gas is needed to generate the same amount of heat.

Blue hydrogen requires the expansion of carbon capture and storage capabilities. To manage climate risk, storage must be robust on timescales exceeding 10,000 years. Blue hydrogen thus increases physical climate risk and poses moral hazard.

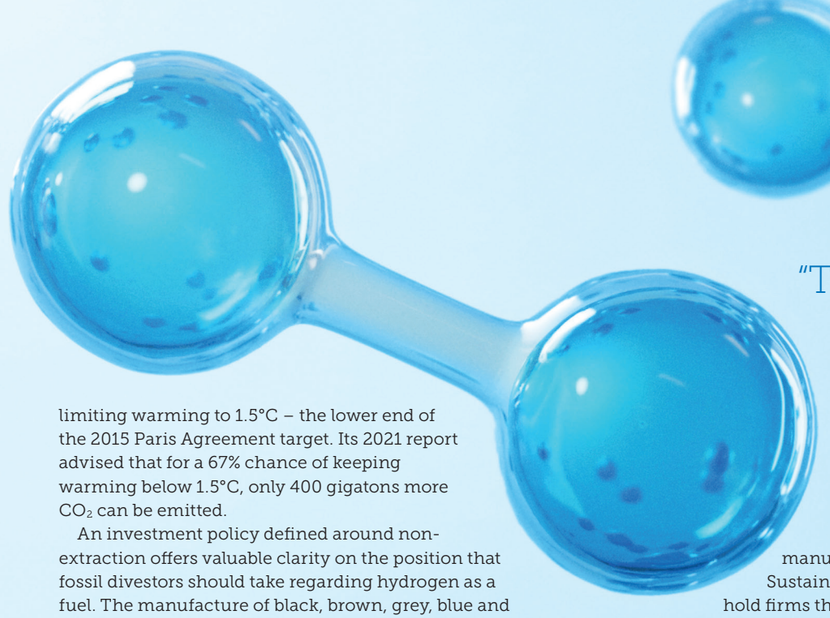
Fossil divestment

For portfolios, fossil divestment helps manage climate risk. It focuses on keeping carbon in the ground or targets emissions from burning fossil fuels. An emissions focus may seem appropriate given the current emphasis on net-zero targets. However, with water vapour as the only combustion product, divestment policies formulated around carbon emissions may find addressing hydrogen challenging.

A crucial message is the need to keep carbon reserves beneath ground. Fossil divestment encapsulates a simple logical argument. In 2012, estimates suggested that, to keep global warming below 2°C, only around 565 gigatons more CO_2 can be released by mid-century, at most. At that time, proven underground coal, oil and gas reserves amounted to 2,795 gigatons. More recent updates indicate that at least two-thirds of known fossil fuel reserves must remain unburned.

Furthermore, in 2018, the Intergovernmental Panel on Climate Change recommended limiting warming to 1.5°C – the lower end of the 2015 Paris Agreement target. Its 2021 report advised that for a 67% chance of keeping warming below 1.5°C, only 400 gigatons more CO_2 can be emitted.

An investment policy defined around non-extraction offers valuable clarity on the position that fossil divestors should take regarding hydrogen as a fuel. The manufacture of black, brown, grey, blue and turquoise hydrogen relies on the extraction of natural carbon reserves. As a result, they are all highly refined fossil fuel gases, breaching a fossil divestment policy of non-extraction of natural carbon reserves.



"The manufacture of black, brown, grey, blue and turquoise hydrogen relies on extraction of carbon reserves"

Climate risks

Plans to continue fossil fuel use and deal with its emissions present significant risks to climate stability in terms of physical climate risk and moral hazard. The physical climate risk is that, once committed to ongoing fossil fuel use, the technologies intended to address emissions might not prove capable of deployment at the necessary scale. It is safer to reduce dependence on these technologies through emissions reduction.

Moral hazard arises when schemes offer the lure of not needing to change behaviours, resulting in delays to the rapid and decisive emissions reductions necessary. For example, blue hydrogen could lock the economy into using fossil fuels instead of emissions reduction.

Adoption by sustainable fund managers

Some fossil-divested fund managers appreciate these arguments and have concluded that black, brown, grey, blue and turquoise hydrogen are fossil fuel-related and should be divested from. However, fund manager discussions have also identified concerns. Where can managers find data on the hydrogen-manufacturing activities of potential investments? Some environmental, social and governance data providers' content may be insufficient for identifying different forms of hydrogen production. As clients of these data providers, fund managers should make it clear that they require this information in order to implement their fossil divestment policies. Alternatively, fund managers may have to conduct research themselves to fill the gap.

How do hydrogen-based applications fit into divestment policy? What about technologies using green hydrogen? Fossil divestment policies based on non-extraction of natural carbon focus on hydrogen manufacture, not use.

Sustainable investors can still hold firms that are developing hydrogen technology or better electrolysers; the electricity source can be addressed separately.

What about firms with a partial involvement in, say, grey hydrogen, that are developing green hydrogen? Wouldn't grey hydrogen manufacture be banned? Yes, but a *de minimis* policy can address it. Fund managers often use *de minimis* levels in existing fossil divestment policies, making this consistent with current practice.

Suppose a firms' sales or turnover from fossil hydrogen manufacture is less than the stated de minimis – say, 10%. Then investment would not be prohibited since the involvement is considered minimal. Fund managers could also actively engage with the firm to reduce its fossil hydrogen involvement.

Fossil-divested trackers

Actuarial pension consultants often recommend using index trackers to reduce scheme fees. Sustainable tracker funds may be fossil divested, but the index methodology may not address fossil hydrogen. If so, tracker funds based on it are unlikely to be fossil hydrogen-free. If index providers have no interest in updating policies to address fossil hydrogen, this would be a concern.

Really clean hydrogen

Sustainable fund managers' fossil divestment policies should emphasise non-extraction of carbon reserves. Vested interests promote hydrogen as a clean fuel, even though this is often not the case. Prohibiting investment in black, brown, grey, blue and turquoise fossil hydrogen production will help protect the climate. Fund managers need to robustly define their fossil divestment policies to make it clear they prohibit fossil hydrogen. Clients will appreciate the clarity and demonstrable leadership on climate-friendly investment.

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