

THE MESSAGE



THE CORNERSTONE

Hydrogen

Massimiliano Comità, Portfolio Manager

Over the last few months there's been much agitation on hydrogen, the cornerstone of the energy transformation: without this tiny molecule the net zero target may not be reached, and only with hydrogen we can de-carbonise the high emissions sectors such as heavy transportation, steel, cement, refineries, fertilisers etc.

Although hydrogen is the most common element on our planet, its molecule (H_2) is usually derived by other compounds. Depending on how it is produced, we can distinguish three types of hydrogen. Typically hydrogen is produced by methane, causing CO_2 emissions in the atmosphere: this is the grey hydrogen. If the CO_2 is

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Luxembourg

CONTACTS

info@aism.lu

+352 27 85 47 1

21 Rue Aldringen

L-1118 Luxembourg

captured and put in depleted oil or gas storage, we have blue hydrogen. When it is produced via water electrolysis, using renewable energy such as solar or wind, we have then green hydrogen. Today 99% of produced hydrogen is grey, and the reason is the price: 1.5\$/kg for the grey one, while the blue one includes the additional cost of capturing CO₂ (estimated at 0.5\$/kg) and the green one may cost more than 5\$/kg.

With Biden's IR Act and the 470 billion dollars coming to renewables via subsidies and loans, as much as 13 bn are earmarked for the production of green hydrogen, filling the 3.5\$ cost gap versus the grey one and enabling the former's development and usage.

On Sep 22nd the US Department of Energy also contributed to the push by making 7 bn available for an hydrogen hub through the United States.

China, very active on this theme, has contributed 20 bn dollars to reach an overall target of 150 bn by 2025.

Europe, on the other hand, keeps increasing the power targets for green electrolyzers installed within 2025, from the 6 GW of the Green Deal to the 17.5 GW of RepowerEU. The available resources are now 5.2 bn dollars, and is trying to get 7 bn more by private investors via the new SFDR and Taxonomy regulations.

The main cost for hydrogen is the energy necessary to split the water molecule. About 50-60 kWh are needed to produce 1 kg of green H₂ which makes the current technology inefficient given the price of 20€/MWh of electricity that would make the cost similar to grey hydrogen.

The development of renewable energies is therefore even more necessary, as their production costs have already substantially decreased over the last few years to the point that they are now cheaper than the energy produced by fossil fuels, and they are expected to continue to decrease in the future.

It is also essential to prepare hydrogen production sites near wind turbines or solar panels whose energy would be used to produce hydrogen, which would then be transferred where needed. In this way hydrogen could also serve as energy storage, and not only as fuel.

The governments' acceleration towards decarbonization will increase the world demand of green hydrogen over the next few years. Estimates available on the web are wide ranging, but all in agreement on a growth rate of multiple times from now to 2050.

Such huge growth causes wild ups and downs of the share price of listed companies, that may gain 50% or more depending on the mood, as well as lose it in a matter of days. After all these are companies that have negative



cashflows for the next two-three years exactly because of the massive investments planned. While they could suffer from increasing interest rates, all CEOs and CFOs of the companies active in this sector are excited by the opportunities

foreseen in the near and far future.

Hydrogen is an explosive element, and should be handled with care: so should the investment in hydrogen companies.

