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# Green Hydrogen–Future of Energy Transition to Net Zero

Although the COVID-19 pandemic left a lasting impact, it was also remarkable for the worldwide energy transition and the progression of hydrogen technology. Several governments aligned their pandemic response with their long-term objectives and made public announcements about incorporating hydrogen as an essential source of energy. Furthermore, various countries, cities, and companies declared their net-zero targets for carbon dioxide emissions related to energy, underscoring the significance of hydrogen.

Hydrogen can be categorized into three types – grey, blue, and green, which depend on the method of production. Grey hydrogen is generated by steam methane reformation of natural gas or methane, without capturing the greenhouse gases emitted during the process. Blue hydrogen, on the other hand, is produced using the same method as grey hydrogen, but with the addition of Carbon Capture and Storage (CCS). At the far end of the spectrum is green hydrogen, which is produced using clean energy sources.

Therefore, the use of current assets should be continued while still reducing Green House Gas (GHG) emissions by retrofitting facilities with CCS. This is a way to manufacture hydrogen with fewer GHG emissions while increasing renewable energy capacity. Energy transition is a process, not a destination.

Blue hydrogen in particular could promote the development of a hydrogen market in the early phases of the energy transition. Notably, industrial activities like steel manufacturing need a constant flow of hydrogen; blue hydrogen could be a starting point, while producers ramp up production and storage capacity for green hydrogen to satisfy the continuous flow demand.

Ultimately, the only type of hydrogen that is suited for an entirely sustainable energy transition is green hydrogen. Water electrolysis, powered by renewable electricity, is the most viable technological alternative for creating green hydrogen in the long term.

There are various ways to manufacture hydrogen that rely on renewable energy, but apart from gasification using biogases, all technologies are yet to reach commercial maturity. However, low-cost solar and wind energy and technology advancements are bringing down the price of producing green hydrogen. These factors have boosted interest in green hydrogen produced by water electrolysis.

Over the past two years, momentum has grown, with more than 25 nations either adopting or declaring their desire to adopt national hydrogen strategies. By 2026, industry investors anticipate having at least 25 gigawatts of green hydrogen electrolyzer capacity. To achieve aggressive climate objectives and keep the increase in average world temperatures at 1.5 degrees Celsius, much steeper growth is still required in both renewable energy sources and green hydrogen capacity.

Within a decade, the cost of the generated green hydrogen might drop to below $1-2 per kilogram, which would be competitive. This will pave the way for increased manufacturing capacity, new employment opportunities, and economic expansion.

But to get there, it is necessary to choose the best business model, build markets, and optimize the supply chain so that both developed and developing countries benefit equally from switching to a clean, reliable energy system.

The GCC has emerged as an epicenter of the global green hydrogen revolution. The UAE will launch its National Hydrogen Strategy, establishing a framework to position the country as an exporter of clean fuel and tap into its future potential.

## CALL TO ACTION

Green hydrogen policies need to be created to enable comparison with other energy sources. These should ensure consistency and compatibility with emissions for other commodities, and enable understanding of the impact of this energy carrier by policymakers and end users. Such policies will provide the framework for national hydrogen strategies that specify a nation's ambition for hydrogen and the level of assistance necessary to meet these objectives. They can work as a guide for private operators in the hydrogen sector, aiding in the promotion of higher levels of financing. Ultimately, well-defined steps should be taken to increase hydrogen adoption through effective national policies.

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