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Green Hydrogen: Exploring Economic Viability and Alluring Business Scenarios

Authors : S. Sakthivel

Abstract : Currently, the global economy is based on the hydrocarbon economy, which is referencing the global hydrocarbon industry. Problems of using these fossil fuels (like oil, NG, coal) are emitting greenhouse gases (GHGs) and price fluctuation, supply/distribution, etc. These challenges can be overcome by using clean energy as hydrogen. The hydrogen economy is the use of hydrogen as a low carbon fuel, particularly for hydrogen vehicles, alternative industrial feedstock, power generation, and energy storage, etc. Engineering consulting firms have a significant role in this ambition and green hydrogen value chain (i.e., integration of renewables, production, storage, and distribution to end-users). Typically, the cost of green hydrogen is a function of the price of electricity needed, the cost of the electrolyser, and the operating cost to run the system. This article focuses on economic viability and explores the alluring business scenarios globally. Break-even analysis was carried out for green hydrogen production and in order to evaluate and compare the impact of the electricity price on the production costs of green hydrogen and relate it to fossil fuel-based brown/grey/blue hydrogen costs. It indicates that the cost of green hydrogen production will fall drastically due to the declining costs of renewable electricity prices and along with the improvement and scaling up of electrolyser manufacturing. For instance, in a scenario where electricity prices are below US$ 40/MWh, green hydrogen cost is expected to reach cost competitiveness.

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