

Levelized hydrogen cost assessment For Dynamic Operation Of Hydrogen Production Via Alkaline Water Electrolysis with Battery energy storage system

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Hydrogen is referred to as an energy carrier of the forthcoming generation as it can be used to store the fluctuating renewable energy such as solar and wind. Among various hydrogen production routes, alkaline electrolysis is the most mature and industrially widespread water electrolysis technology for green hydrogen production. In this study based on actual weather data, a solar powered 6.5 MW alkaline water electrolyzer (AWE) and battery energy storage system (BESS) is presented to overcome the renewable energy's dynamic nature. A comparative techno-economic study for solar photovoltaic (PV) and AWE, with and without BESS, is conducted to evaluate the maximum operational and economic potential of the proposed models. Levelized cost of hydrogen (LCOH) was evaluated for systems with and without BESS. Results revealed a 28 % increased in the annual hydrogen production for Solar powered AWE with BESS, thus highlighting the benefits of AWE with a BESS i.e., improved efficiency and increase in annual hydrogen production.