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LNG AS COST EFFECTIVE HYDROGEN LIQUEFACTION ENABLER

Cost of hydrogen liquefaction is a challenge for liquid hydrogen (LH2) deployment due to both intensive capital investments and high specific energy consumption (SEC). Existing plants liquefy hydrogen up to 35 ton per day (TPD) with a SEC about 12-15 kWh/kg. Alongside cost trimming from production scale-up, the possible synergy between LNG-regasification and H2 precooling offers an appealing opportunity of low cost liquefaction. Some early studies considered implementing LH2 near an LNG terminal. Specific energy reduction was often the main key parameter indicator considered and few attention has been paid so far to the LNG economic impact on the overall liquefier and terminal costs.

Therefore this paper investigates the economic relationship between LNG and LH2 process to analyse to what extend a fossil fuel might ease the transition to a low carbon energy carrier. It presents the cold recovery impact for two complementary configurations. Best processes options were simulated and studied with Aspen Hysys®. Sensitivity analysis to LNG pressure, composition and availability were investigated

Main conclusion is that a strong economic interest to synergize LNG with LH2 is achievable, decreasing the cost of the last by one third at least. It was showed that in terms of SEC results are aligned with literature and the integration cuts up most of the energy required to precool H2. Three key challenges facing adoption were also identified.