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Upstream and Feedstock Requirements for Cost-Competitive Green Methanol Production

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Abstract

Price is the most significant factor influencing changes in the chemical market. This is particularly true in the commodity market, where the price of raw materials is a key factor. For the majority of commodities, such as methanol, hydrocarbons, and aldehydes, the synthesis gas cost factor is the most relevant. The capital expenditure (CAPEX) may play a dominant role in the case of small plants, given the smaller scale of decentral sustainable feedstock volumes.

A willingness to pay a premium of up to twice the cost of fossil fuels for green hydrogen or green syngas-based products can be observed. Given the circumstances that only a limited number of commercial projects on relevant scales are currently operational, and many where canceled within the last years, there are some significant barriers to overcome. Regulatory pressure on sectors such as aviation and shipping has led to an artificial increase in the willingness to pay. To ensure the long-term viability of the green hydrogen and green syngas markets, it is essential to comprehensively address the technical, economic, and distribution-related challenges.

Different feedstocks require different purification processes, which in turn affects the process design and the economics of the plant. It is essential to consider the whole process from the raw material composition, impurity grade, and availability to the technical specification of the final product.

Given the pivotal role that hydrogen and, in particular, synthesis gas play in the transformation of the chemical industry, it is essential to address the key factors hindering the large-scale production of green chemicals surviving a FID (final investment decision). These factors will be discussed in that presentation.