

Abstract

“Direct conversion of CO₂ to renewable methanol by standardized synthesis modules”

As stated by the IRENA Innovation Outlook on Renewable Methanol from 2021 ^[1], renewable methanol will play a key role to increase the value of green energy and to store it safely. Based on a current global methanol demand of approx. 100 Mio. t per year, more than 99% is produced from fossil feedstock. The anticipated total demand of methanol from renewable and biogenic sources will rise to roughly 385 Mio. t per year in 2050 contributing to the so-called sector coupling and bringing renewable power into renewable chemicals (e. g. formaldehyde, olefins) and fuels. To reach the stated capacities, modular and standardized synthesis units are required.

BSE has successfully developed a skid-based and prefabricated solution for industrial methanol synthesis plants. Our own process is focused on the direct conversion of CO₂, a technically and economically optimized interface within the process units (e. g. electrolysis and methanol synthesis) by special adaption on the operation conditions as well as dynamic operation according to the availability of renewable power. Capacity of the skid-mounted units refer to 10 and 20 MW electrolysis power corresponding to roughly 0.95 and 1.9 t/h of methanol according to the IMPCA specifications. Higher capacities can be realized by operating several skid units in parallel.

^[1] <https://www.irena.org/publications/2021/Jan/Innovation-Outlook-Renewable-Methanol>