

Utilization of CO₂ from Waste Incineration Plants for Power-to-Fuel Technology

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Abstract

Sector coupling can play a major role on one hand in achieving the targets set for the climate protection. On the other hand, it opens the new chances for the traditional power producers to diversify, in order to attract sufficient revenues in future markets with high penetration of renewable energy sources (RES). Sector coupling enables the utilization of resources from energy sector and industry, coupled with the production of fuels for transport, offers a unique chance to integrate more renewables in the electricity grid and enable sustainable, rapid decarbonisation of mobility. Fuels like methanol, gasoline, diesel or kerosene derived from hydrogen - produced from low carbon electricity via water electrolysis - and CO₂ - captured from industrial emissions - have a lower CO₂ footprint and do not compete with food production, as in the case of bioethanol or biodiesel.

Methanol production from low carbon electricity provides low carbon fuel to the transport sector immediately, while reducing other emissions from transportation as well. Waste incineration plants and other must-run plants have very high potentials to be coupled to this technology. A combination of waste incineration plant with Power to Methanol technology brings benefits regarding the energy balance, carbon footprint, economic viability and regulatory conditions. Methanol can be produced from hydrogen and CO₂ through direct catalytic synthesis. Methanol production allows carbon reduction and generates a new income stream for the operators, supporting the economics of must-run power plants in an environment where income from electricity production is no longer sufficient. The necessary back-up function and operation of these power plants (in the case of waste incineration, landfill gas or industrial waste gas disposal) would otherwise have to be subsidized in the future. As of today, there is no solution which is more economical than PtM, which both can increase the share of renewable energy in the transport sector and provides a way to operate power plants flexibly utilizing surplus electricity.