

Syngas, which is a mixture of CO, H₂, and often times CO₂, can be produced from many sources, including coal, biomass, petroleum based materials, municipal waste or other carbon-containing materials that would be rejected as waste. Syngas has 50% of the energy density of natural gas. It cannot be burnt directly, but is used as a fuel source. Since syngas is available through relatively more available sources compared to natural gas, power generation through their utilization is an incredible move towards sustainability in energy production.

Syngas is majorly produced by reaction of feedstock with steam (steam reforming), carbon dioxide (dry reforming) or oxygen (partial oxidation). There are, as well, several common “non-gasification” processes that are used to produce syngas on an industrial scale for eg. autothermal reforming and steam-methane reforming.

A primary use of syngas is for electricity generation such as in integrated gasification combined cycle (IGCC) power plants, where the feedstock can first be converted into syngas which is then converted to electricity in a combined cycle power block which consists of a gas turbine process and a steam turbine process with heat recovery generator (HRSG).

The economics and the environmental footprint of synthetic fuel manufacture vary greatly depending on the feedstock used, transportation distance, the precise process employed as well as end product distribution, but by using these relatively more available gases compared to natural gas for power generation, a huge amount of CO₂ savings can be achieved.

Sources:

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