



Converting coal to liquid fuels

Regenerative sources of energy will not be sufficient to meet growing global energy demands. As an alternative to oil, coal has re-entered the picture as a promising source of liquid fuel.

Fischer-Tropsch synthesis

Coal reserves worldwide outsize and will outlast those of natural gas and crude oil. Studies estimate that fossil fuels will account for around 80 percent of the primary energy mix in 2030. This is a relatively insignificant drop relative to the current balance. Coal will continue to meet more than one third of total energy requirements in this future scenario. However, this projected reliance on fossil fuels is at odds with the need to stabilise the world's climate. Unless technologies such as carbon capture and storage are deployed on a much broader scale worldwide.

Coal was first directly liquefied at the start of the last century. In 1925, Franz Fischer and Hans Tropsch pioneered a new indirect method, which still bears their names today – Fischer-Tropsch synthesis.

Coal to liquids (CTL)

The Fischer-Tropsch process uses synthesis gas as the feedstock – a mixture of carbon monoxide and hydrogen. The synthesis gas can be produced from coal or natural gas (and also from oil fractions such as heavy oil). It is completely sulphur-free, although purification is sometimes required to achieve this. Consequently, the fuels produced by Fischer-Tropsch synthesis are also completely free from impurities.

High crude oil and natural gas prices mean coal is becoming increasingly important as a raw material in synthesis gas plants. The purity of the synthesis gas is a key benefit for all downstream steps, as it helps minimise harmful emissions released when the fuel is burnt. Against this background, The Linde Group is constructing a gas purification pilot plant in China for Shell. This plant will be an important milestone in the journey towards CTL fuel projects.

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