100 years of Fischer-Tropsch: From the coal age to the post-fossil future

Summary of the presentation by Christian Bernier, CEO of INERATEC Schweiz AG, at the SPIN Annual General Meeting on 2 April 2025.

INERATEC's presentation at SPIN provides an impressive overview of the history, development and future of the Fischer-Tropsch process – a central building block for a sustainable energy supply after the fossil fuel age.

The starting point is the vision of a planet worth living on, where everyone has access to affordable, reliable and sustainable energy. To realise this vision, INERATEC relies on so-called Power-to-X technology. This uses electricity from renewable sources to produce synthetic fuels and chemical raw materials – so-called e-fuels and e-chemicals – together with the greenhouse gas CO2.

INERATEC acts in two ways: as a technology provider of modular plants and as a producer of synthetic fuels such as e-kerosene, e-diesel and e-gasoline, which can be fed directly into today's infrastructure (drop-in ready).

The company has over 150 specialists on its books, with expertise ranging from development and engineering to the realisation, maintenance and operation of complete plants. Successful areas of application, such as the DAWN project at the premises of Synhelion (also a SPIN member) in Jülich, a commercial plant, are currently being prepared for operation in Frankfurt (2.5 million litres per year), as well as a planned large-scale plant in Chile with an annual capacity of up to 400 million litres, demonstrate the scalability and marketability of the technology.

The presentation will also focus on the now century-old history of the Fischer-Tropsch process. Since its patenting in 1925 by Franz Fischer and Hans Tropsch, the process has evolved from fossil coal- and gas-based applications to a modern solution based on CO_2 and green hydrogen – largely through INERATEC's innovative reactor technology. From synthesis gas (from hydrogen and CO2), which is converted into liquid, synthetic hydrocarbons such as fuels, waxes or chemicals in micro-structured Fischer-Tropsch reactors.

The latest developments are based on microstructured reactors developed at the Karlsruhe Institute for Technology (KIT). These enable compact, flexible and highly efficient plants with over 98 per cent utilisation of CO_2 and hydrogen. This not only achieves the energy density of fossil fuels, but also creates an economically viable alternative to today's petrochemicals.

The new generation of this technology promises decentralised production with capacities of up to 30 million litres per year – the ‘oil field of the future’ will no longer be located centrally, close to fossil raw material sources, but in modular production plants in combination with renewable electricity generation.

Some of the solutions for climate protection have been around for a long time. What is missing is the will to implement them – one of the challenges that SPIN is working on.