

WHAT ARE eFUELS?

eFuels are one of the renewable fuels of the future! Electrofuels, or eFuels for short, are synthetic, renewable fuels made from CO₂ and green hydrogen produced via water electrolysis (see Figure 1).

They offer a promising way to reduce greenhouse gas emissions and combat climate change. eFuels provide a carbon-neutral to carbon-negative solution for fuel production, allowing the use of existing petroleum infrastructure and logistics channels.

Products include eNaphtha, eGasoline, eSAF, eDiesel, and eHeating Oil, which can be used in vehicles, ships and airplanes.

eFUELS FOR AVIATION

Using eFuels for aviation is particularly compelling given that aviation is one of the most challenging sectors to electrify. This difficulty arises from current battery technology, which lacks the energy density required for long-haul flights. Batteries are much heavier and bulkier compared to jet fuel, and existing airports and maintenance facilities are not equipped to support electric aircraft.

eSAF, or electro-Sustainable Aviation Fuel, offers a promising alternative. Produced through the process shown in Figure 1, with special upgrading required in the synthesis step, eSAF can power aircraft without the need for extensive infrastructure changes.

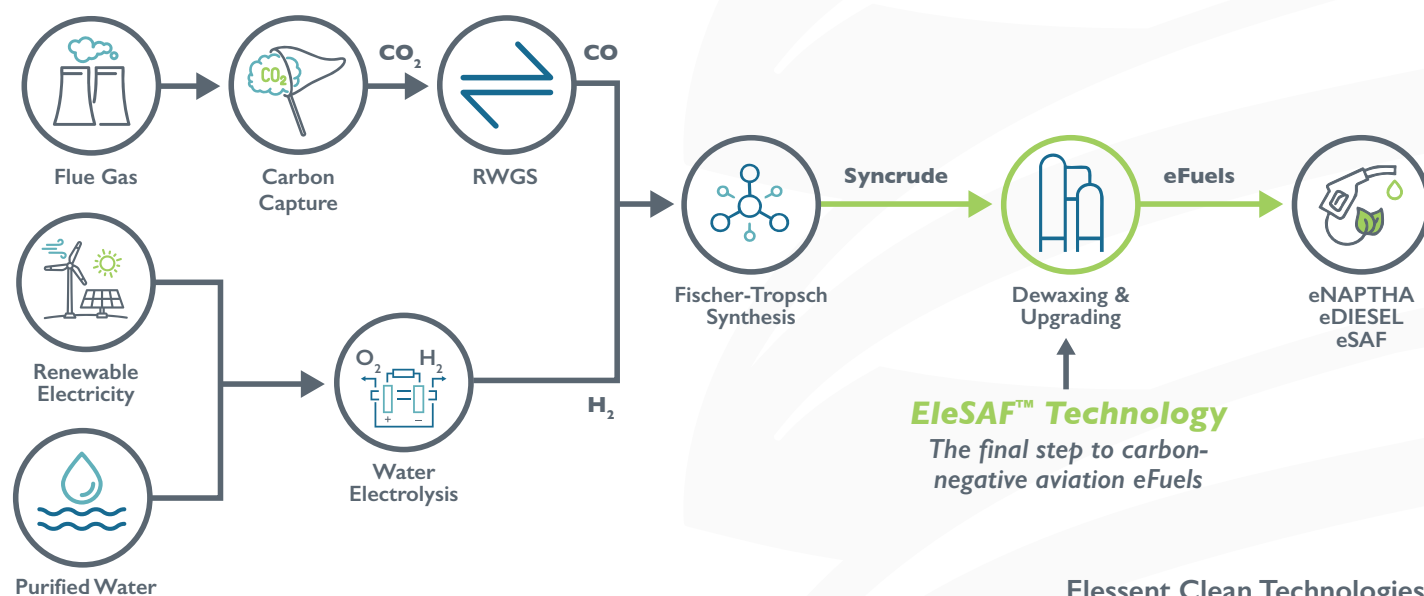
The “synthesis step” in eFuels production can be accomplished through the Fischer-Tropsch (FT) process, the product of which must be upgraded to aviation fuel meeting SAF (SPK) specifications.

EleSAF™ TECHNOLOGY

EleSAF™ technology transforms the production of eSAF from synthetic liquids derived from the FT process using a liquid-full catalytic reactor system, **eliminating the need for a recycle gas compressor.**

Our innovative single-phase process minimizes hydrogen consumption and produces high-quality eSAF that meets stringent ASTM D7566 specifications, with a smaller physical and carbon footprint compared to traditional trickle bed technology. The compact design of EleSAF™ technology facilitates modularization, while its reduced carbon footprint minimizes environmental impact. EleSAF™ enables the aviation industry to achieve greater efficiency, sustainability and profitability.

FIG. 1: eFuels Production





KEY FEATURES OF
EleSAF™ TECHNOLOGY

ASTM D7566 Compliant

EleSAF™ technology has successfully produced eSAF that meets stringent ASTM D7566 specifications, guaranteeing safety and compatibility with existing aviation infrastructure.

No Recycle Gas Compressor Required

Reduced Capital Costs: EleSAF™ technology's compact and modular design leads to significant savings in upfront capital costs. By replacing high-pressure recycle loop equipment with a single recycle pump, the overall capital expenditure is reduced.

Lower Operating Expenses: The streamlined process eliminates the need for a hydrogen gas compressor and ancillary equipment, resulting in lower energy consumption and maintenance costs. This translates to substantial operating cost savings over the lifecycle of the unit.

Compact and Modular Design

EleSAF™ technology has proven its suitability for modularization, allowing for easy transportation, installation and scalability. This modular approach reduces construction time and costs, providing a flexible solution for various production needs.

COMPETITIVE ADVANTAGES

Environmental Sustainability

Lower Carbon Footprint: EleSAF™ technology offers a significantly lower carbon footprint and produces lower emissions compared to other hydroprocessing technologies used for upgrading synthetic hydrocarbon liquids to eSAF. This makes it a more sustainable choice for the aviation industry.

Energy Efficiency: The simplified liquid-full reactor system reduces energy consumption and operational costs by eliminating the need for complex equipment required to manage separate gas and liquid phases. This streamlined approach enhances efficiency and reduces the overall infrastructure demands.

Optimized Hydrogen Supply

Efficient Hydrogen Use: Hydrogen is supplied through a liquid stream, simplifying the process and eliminating the need for additional compressors. This ensures optimal hydrogen utilization and process efficiency, particularly important when consuming green hydrogen.

Reliable Operation

The continuous liquid-full reactor system acts as a heat sink, dissipating heat, therefore improving temperature control across the reactor. This prevents localized hotspots, pressure spikes and uncontrolled reactions, ensuring an inherently safer, more reliable operation.

Feedstock Flexibility

Adaptable Processing: EleSAF™ technology adapts to varying feedstocks, including wax fluctuations from the Fischer-Tropsch process. This adaptability allows EleSAF™ operation to be adjusted based on economic conditions.

Seamless Integration: Designed to integrate seamlessly with the Fischer-Tropsch synthesis process, optimizing the conversion of syngas into high-value aviation fuel.

Effective Heat Management

Stable Operations: The reactor operates closer to isothermal conditions, which helps maintain stable temperatures and reduces unwanted byproducts. This results in higher-quality fuel production as well as increased catalyst stability and life.

ADDITIONAL ADVANTAGES

Upgrading for eNaphtha

EleSAF™ technology excels in upgrading synthetic hydrocarbon liquids to eNaphtha, providing high-quality feedstock for petrochemical applications.

eDiesel for Cold Climate Applications

Our technology produces eDiesel with improved cold flow properties, making it ideal for use in cold climate regions.

Wax Upgrading

EleSAF™ technology can upgrade wax into a variety of high-value products, enhancing the versatility and profitability of your production processes.



READY TO ELEVATE YOUR
FUEL PRODUCTION?

Discover how EleSAF™ technology can transform your sustainable aviation fuel production. Contact us today to learn more about our innovative solutions and how we can help you achieve your sustainability goals.



EleSAF™ TECHNOLOGY

THE FINAL STEP TO CARBON-NEGATIVE AVIATION eFUELS

ELESSENT CLEAN TECHNOLOGIES is a leading source of solutions for decarbonizing the industrial manufacturing sector and transitioning the industry to a sustainable future. Our clean technology solutions minimize environmental impact and optimize productivity while remaining cost competitive. As a responsible supplier and partner to the metal, fertilizer, chemical, petrochemical and oil refining industries, our technology portfolio includes MECS® sulfuric acid production, STRATCO® alkylation, BELCO® wet scrubbing and IsoTherming® hydroprocessing. Offering critical process equipment, products, technology and services, we are dedicated to helping our customers produce high-quality, cleaner products for the world.



GLOBAL OFFICES

NORTH AMERICA

Global Headquarters
Saint Louis, Missouri, USA

ContactUs-NA@ElessentCT.com

LATIN AMERICA

ContactUs-LA@ElessentCT.com

EUROPE | MIDDLE EAST AFRICA | INDIA

EMEAI Headquarters
Hoeilaart, Belgium

ContactUs-EMEAI@ElessentCT.com

ASIA PACIFIC

AP Headquarters
Shanghai, China

ContactUs-AP@ElessentCT.com

Jakarta, Indonesia

ContactUs-INDO@ElessentCT.com

