TULSA AREA CLEAN CITIES

Stakeholder Spotlight

EMERGING FUELS TECHNOLOGY

Emerging Fuels Technology: Pioneers in Sustainable Aviation

Emerging Fuels' Integrated Demonstration Unit in Tulsa, OK.

Aviation accounts for 2.5% of worldwide greenhouse gas emissions today and is considered to be a sector where emissions abatement is particularly challenging.[1] Given the aviation industry's heavy demand for traditional fossil-based jet fuel, policymakers and aircraft fleets around the globe are looking for solutions to decarbonize flight. Efforts toward battery and hydrogen-powered aviation have faced logistical challenges, with no scalable technologies on the horizon at present. Luckily, a renewable, lower-carbon replacement for fossil jet fuel has emerged over the last decade: Sustainable Aviation Fuel (SAF).

Like renewable natural gas and renewable diesel, SAF is chemically equivalent to its fossil-derived counterpart, meaning it's compatible for use in existing planes and can be blended with conventional jet fuel. SAF can be produced from a multitude of renewable sources (called feedstocks), and depending on the feedstock, lifecycle emissions can be reduced by up to 94% compared to traditional jet fuel made from oil.[2]

Emerging Fuels Technology (EFT) has been an early leader in the Sustainable Aviation Fuel industry, with innovations stretching back to before the company's founding in Tulsa in 2007. Emerging Fuels' President Ken Agee worked for decades as the Founder and CEO of Syntroleum, a gas-to-liquids technology developer that converted natural gas into synthetic fuels using the Fischer-Tropsch process. Syntroleum's synthetic fuels technology was developed for very large plants in response to fears of a peak oil crisis in the 1990s and early 2000s. When horizontal drilling and fracking changed the outlook on oil reserves, Syntroleum's opportunities began to shrink to only a few locations in the world. Syntroleum pivoted its business from producing synthetic crude oil and diesel to jet fuel research partly because its equipment could easily be tweaked to produce jet fuel—a change that placed the company at the forefront of global SAF development. In 2006, Syntroleum's fuel was used by the United States Air Force in the first-ever test flights of B-52 bombers powered by synthetic jet fuel. These early test flights proved to be influential for aviation industry

standards: in 2009, ASTM, an internationally respected agency that defines standards for industries, approved the use of Fischer-Tropsch derived SAF, like EFT's, in blends of up to 50% with conventional jet fuel. With significant early successes amid a growing international push for decarbonization, Ken Agee departed from Syntroleum in 2007 and founded Emerging Fuels Technology, focused on making synthetic jet fuel production sustainable at a much smaller scale and using renewable feedstocks instead of fossil natural gas.

Brothers Ken Agee (left) and Mark Agee (right) have been business partners since Syntroleum's founding in 1984.

Since EFT's founding, the SAF market has evolved dramatically. EFT spent its first five years researching and developing catalysts and performing long-term studies to ensure commercial viability and predictability in preparation for building commercial plants. Following the first ASTM-approved pathway for SAF in 2009, four more pathways were approved during the 2010s, and another four have been approved since 2020.[3] SAF production is still considered by the U.S. Department of Energy to be in an early stage, with initial commercial production occurring in the U.S. around 2016. Incentives and mandates for SAF have grown in recent years, including the European Union's ReFuelEU aviation regulation, the United Kingdom's SAF Mandate, and the United States' Renewable Fuel Standard (RFS) program and federal 45Z tax credit.[4,5,6,7] Several U.S. states also offer state-based incentives, including Low Carbon Fuel Standard (LCFS) programs and per-gallon fuel production credits.[8] Notably, the EU and UK's programs were only recently implemented in 2025, sparking a surge in demand for SAF that will gradually grow as airports are required to blend increasing amounts of SAF into their fuel through 2050. Due to the global implications of SAF, EFT does not expect to slow business activity or innovation anytime soon. Responding to concerns about losing incentives, EFT's VP of Business Development Mark Agee explained that "aviation needs SAF if it is going to decarbonize." Recent legislation enacted in the U.S. indicates that policymakers agree about the need for SAF—in the One Big Beautiful Bill Act signed into law on July 4th, 2025, credits for SAF were extended.

As an industry frontrunner, EFT currently holds over 20 patents for its Fischer-Tropsch process and related technologies, which have been adapted to work with nearly every feedstock in the SAF market—including natural gas from both fossil and renewable sources, CO_2 from industrial sources and extracted from seawater, and multiple types of biomass.

EFT's technologies are developed, tested, and proven in its Tulsa laboratory, which houses 25 pilot-scale reactors that simulate long term, real-world scenarios of all kinds. The company recently erected a new integrated demonstration unit at its laboratory that houses a Fischer-Tropsch synthesis reactor, hydrocracker, and distillation unit to make finished fuels, simulating a full-scale commercial system.

EFT's Tulsa laboratory.

Technology in Action

EFT's range of intellectual property has attracted more active licensees than any other SAF technology-licensing firm. Within the United States, EFT has worked with licensees on SAF production for commercial and military applications.

One licensee in the U.S., Twelve, produced the first synthetic jet fuel from industrial CO_2 emission sources in 2021 with funding from the U.S. Air Force. Twelve is currently using EFT's technology at its e-SAF plant in Moses Lake, Washington using CO_2, water, and renewable electricity as feedstocks. The company broke ground on the project in 2023 and announced full-scale operation in June 2026. Twelve expects to produce 50,000 gallons of SAF per year at the Moses Lake facility for use in commercial flights.

Twelve's AirPlant One facility in Moses Lake, Washington began production in June 2026.

In Kona, Hawaii, EFT and licensee Sea Dragon Energy are partnering with the U.S. Navy to develop offshore SAF production using hydrogen and carbon dioxide extracted from seawater. The project, called GENESIS, aims to provide long term fuel security for aircraft on seaborne military applications. The jet fuel produced through GENESIS is expected to reduce costs compared to jet fuel delivery at sea and result in fewer greenhouse gas emissions than conventional fuel.

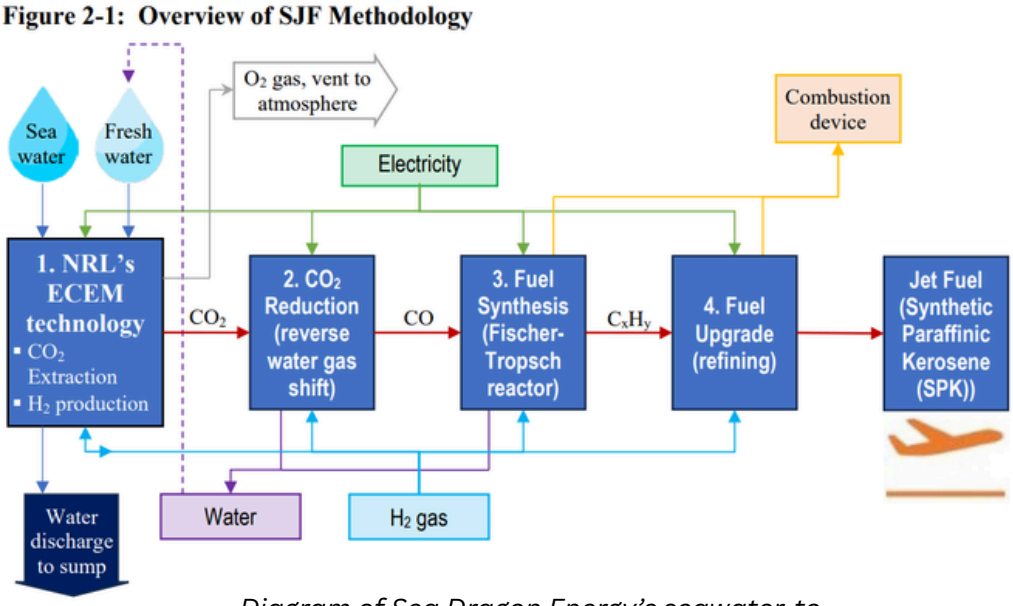
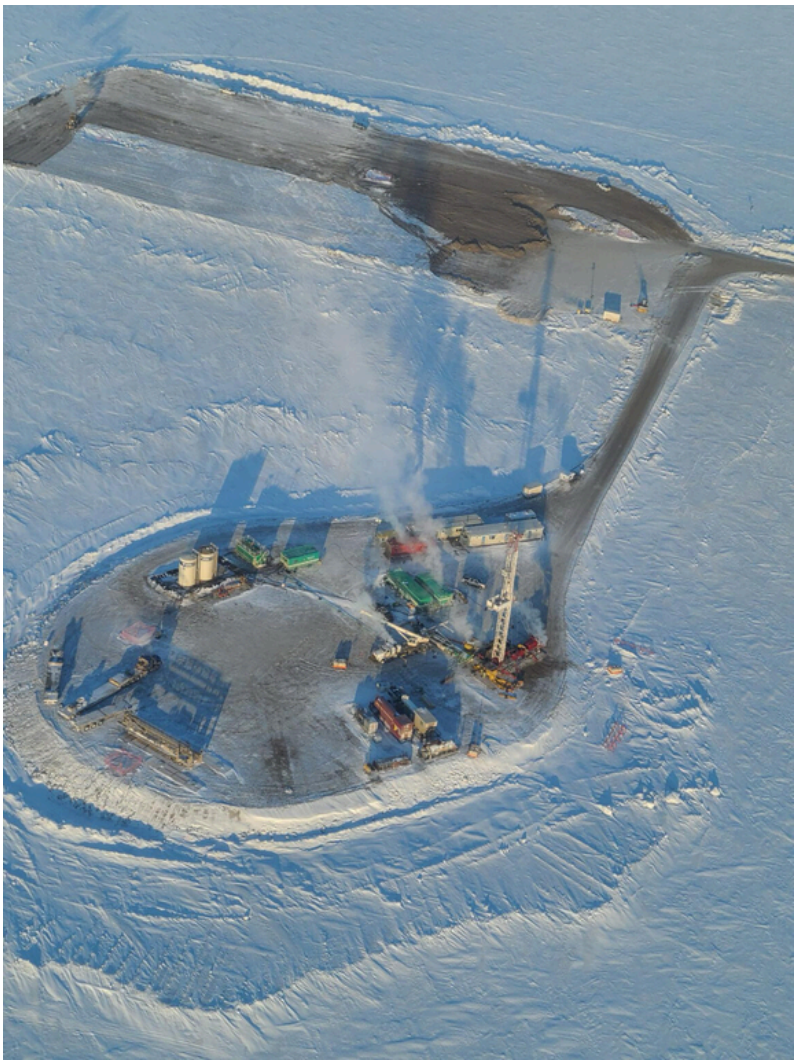


Diagram of Sea Dragon Energy's seawater-to-jet fuel (SJF) production process.[9]

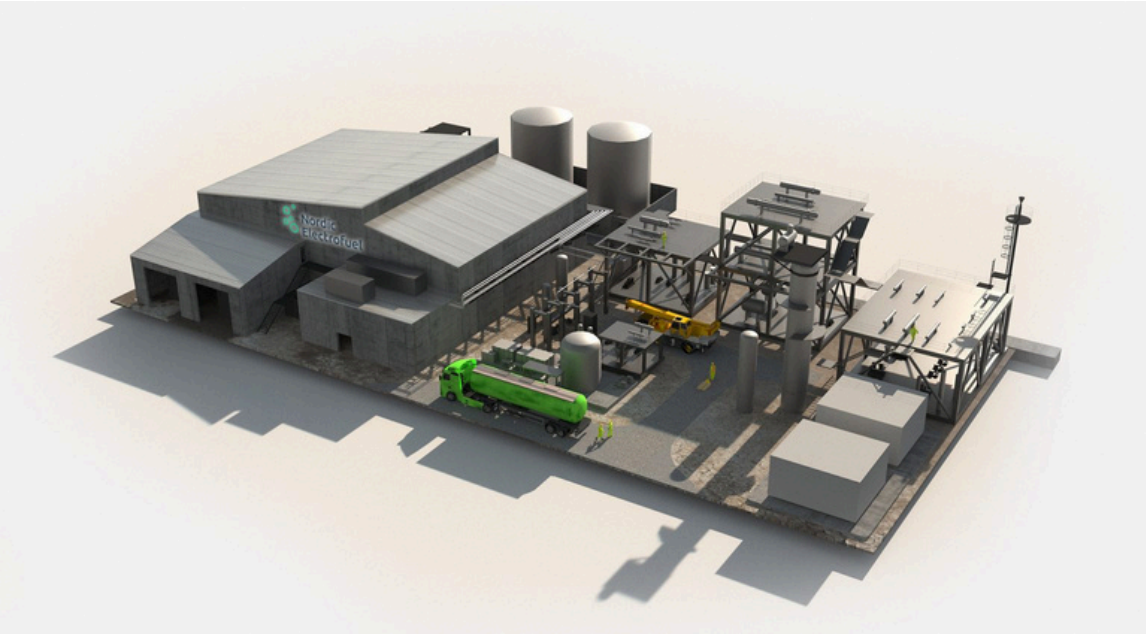
Beyond the U.S., EFT's solutions are also making an impact.

In the far reaches of Canada's Northwest Territories, the Inuvialuit Regional Corporation is using EFT's technology to enhance energy security for indigenous populations in the Inuvik Region. Using natural gas as a feedstock, the new facility will produce 625 barrels of synthetic diesel per day, meeting local needs for heating, power generation, and transportation. The Inuvialuit Energy Security Project will reduce the area's reliance on expensive fuel delivery and the impact of intermittent road outages, in addition to improving economic opportunity and creating local jobs.



Conducting natural gas well reconditioning for the Inuvialuit Energy Security Project in Inuvik, Canada.[10]

In Norway, EFT licensee Nordic Electrofuel is building one of the world's first commercial-scale e-SAF production plants using €40 million awarded by the European Union Emissions Trading Innovation Fund. Carbon used at the Norwegian SAF plant will be sourced from waste gas at a nearby Ferro/Silicon-Manganese plant to produce an expected 20,500 tonnes per year of synthetic hydrocarbons. The refined synthetic hydrocarbons will be used to replace fossil-based products in aviation and other hard-to-abate sectors, projected to avoid 570,000 tonnes of CO_2 equivalent in the first 10 years of the plant's operation.



Rendering of Nordic Electrofuel's E-fuel1 plant, set to begin production in Porsgrunn, Norway in 2029.[11]

Another EFT licensee, Germany-based Caphenia, is using EFT's Fischer-Tropsch and upgrading technologies to produce SAF using synthesis gas made from renewable natural gas and electricity. While the company's pilot syngas production plant is still under construction as of 2026, Caphenia has established over 20 partnerships with companies across the world, including SAFAsia in the Philippines, which is working to help address the SAF supply gap in southeast Asia and in the EU.

Caphenia's pilot plant in Frankfurt, Germany began construction in 2024.[12]

Future Outlook

Emerging Fuels Technology's visionary leadership has had a global impact on the state of sustainable aviation technology and continues to push the company to new boundaries. In May of 2025, EFT expanded its team and global reach with new offices established in Sydney, Australia, and Hamburg, Germany, led by new Chief Commercial Officer David Lloyd (Australia) and Chief Development Officer Dr. Helge Sachs (Germany). These two additions to EFT's leadership bring international expertise in business strategy and power-to-liquids projects.

EFT sees ample business opportunities on the horizon. One is flare reduction: according to the company's analysis, of the estimated 10,000 flares across the world burning natural gas from oil operations, only 536 are responsible for half of the worldwide volume of natural gas being flared.[13] That volume being burned by the 536 most active flares is enough fuel to produce more than 1 million barrels per day of low-carbon jet fuel. Low-carbon jet fuel produced from a "waste" fossil feedstock such as flare gas offers a two-fold benefit in reducing emissions, by (1) curbing direct emissions from the flare itself, and (2) offsetting the demand for further extraction of the fossil fuel. When accounting for methane slip, EFT has calculated that the carbon intensity of fuel produced from flare reduction could actually be negative.[14] Super low-emission and circular approaches to SAF production like this concept can further incentivize adoption by aviation companies looking to improve their footprint.

Another prospect for the industry is strategically co-locating SAF production plants close to airports and local feedstock sources. So far, no such co-location projects have been implemented in the U.S., but the idea is gaining momentum. A co-located approach to SAF production would achieve higher profits and greater sustainability benefits as well, through reduced transportation costs and associated emissions between production and end-use.

While EFT currently focuses on licensing its technologies to third parties across the world, the company has ambitions to take advantage of new market opportunities, including possibilities in Tulsa. EFT has remained in Tulsa due to many competitive advantages the area offers, including deep industry resources in oil and gas, aerospace, and cleantech, all of which intersect with SAF production. Both Mark Agee and Ken Agee share a vision to co-locate SAF production near the Tulsa International Airport and source renewable feedstocks, such as renewable natural gas from local landfills, wastewater treatment facilities, and anaerobic digesters. While a project in Tulsa is still in the development stage, the team has started discussions with community partners and airports interested in hosting a SAF plant.

Learn more about Emerging Fuels Technology at emergingfuels.com.

This article was developed following an interview with Emerging Fuels Technology Founder, Ken Agee, and VP of Business Development, Mark Agee. TACC staff visited and toured EFT's Tulsa Lab facility where they got an up-close look at SAF innovation.

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