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# Bizav's climate-change response gets back on track

Sustainable fuel leads to renewed calls for carbon neutrality.

*by James Wynbrandt*

**E**fforts to reduce business aviation's carbon footprint—loudly promoted a decade ago but seemingly soon forgotten—are back on track. The most visible sign of this is a report-cum-guidebook on sustainable alternative jet fuel (SAJF) that an industry consortium released at the 2018 European Business Aviation Convention and Exposition (EBACE) in Geneva in May.

Meanwhile, the scheduled implementation in 2021 of a plan by the International Civil Aviation Organization for reining in carbon emissions has renewed a focus on upcoming regulatory requirements and costs. (The ICAO

plan is known as CORSIA, an acronym for Carbon Offsetting and Reduction Scheme for International Aviation.) Concurrently, carbon-offset programs continue to evolve and provide ways for individuals and organizations to compensate for their emissions of greenhouse gas (GHG), which contribute to climate change.

One important step came in 2009, a year after the first test flight using SAJF. That's when industry representatives, led by the General Aviation Manufacturers Association (GAMA), committed to achieving 2 percent annual improvements in efficiency from 2010 until 2020, carbon-neutral growth from 2020

onwards, and a 50 percent reduction in carbon emissions by 2050, relative to 2005.

Meeting these goals will require upgrades in operations, infrastructure, and technology, as well as market-based measures. Operational changes will need to include better flight planning, one-engine taxiing, and reductions in aircraft weight. As for infrastructure, modernization of air traffic control and air traffic management is the focus. We'll also need to see technology advances, such as more efficient engines and airframes and sustainable alternative fuels; and market-based measures, like emissions-trading plans and carbon-offset programs and subsidies.

**A**mong all of these advances, the development and deployment of SAJF (*see sidebars*) has the potential to offer the biggest bang for the buck in reducing GHG emissions, according to the *Business Aviation Guide to the Use of Sustainable Alternative Jet Fuel*. At the guide's release, the consortium members—GAMA, the International Business Aviation Council, the National Air Transportation Association, the National Business Aviation Association, and the European Business Aviation Association—signed a declaration of commitment to the goals the industry set for itself in 2009.

Currently, you'll find SAJF at only a few airports, including Los Angeles International; Oslo and Bergen, Norway; and Stockholm, Sweden. This year, Geneva Airport will add SAJF to all jet fuel supplied there and its continual availability will spread to Australia, with Brisbane's airport pledging to dispense SAJF in all its jet fuel sales.

SAJF is now used in blends with conventional jet fuel, not just because of its limited supply, but to maintain "a minimum level of aromatics," whose content varies with the SAJF product. Aromatics, hydrocarbons derived from crude oil, improve performance of fossil-based fuels. It's expected that "higher blend limits will be approved in the future, and that some alternative types may contain a full suite of hydrocarbon molecules that fully mimic those found in jet fuel," and may not require any blending, according to the guidebook.

Technical barriers to producing SAJF in quantity have been overcome; there are now five approved "pathways" for converting feedstocks into jet fuel, and more methods are under review. But a big stumbling block, says the coalition, is lack of commercial-scale investment. The guidebook aims to create pressure to step up such investment.

Meanwhile, the consortium's message is that SAJF works, is compatible with Jet A and current delivery systems, and is approved for use by all engine and business aircraft manufacturers. (This differs markedly from the status of an FAA-led effort to develop an unleaded fuel to replace 100LL for piston aircraft, a program recently halted temporarily, reportedly because of issues with the fuels.)

In fact, more than 100,000 flights operated by aircraft manufacturers, airlines, and other parties have used a blend of conventional fuel and SAJF. Gulfstream Aerospace and United Airlines both inked three-year purchase agreements with Alt Air for SAJF that began in 2016. Meanwhile, manufacturers such as Bombardier, Embraer, Dassault, Gulfstream, and Textron Aviation are helping their

operators increase their use of SAJF, according to the consortium, with several undertaking high-profile SAJF-powered flights to promote the fuel's availability and efficacy.

**W**hile the world awaits a greater supply of SAJF, market-based measures to mitigate aviation's impact on climate change continue. In 2016, the ICAO reached a global agreement on the aforementioned CORSIA plan, which seeks to reduce aviation's carbon emissions as part of a larger program focused on new technologies, air-traffic-management modernization, and operational improvements. The plan aims to limit the growth of GHG emissions from 2021 onward via a carbon-offsetting mechanism.

Under the CORSIA requirements, some operators will have to offset carbon emissions from international operations above their 2020 levels by purchasing emission credits, or by buying alternative fuels to lower their emissions and resulting offset costs. (Most business aircraft emissions and usage fall below allowable emissions levels, rendering them "small emitters" exempt from these

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requirements.) CORSIA, which takes effect in 2021, is expected to preempt the European Union Emissions Trading Scheme, which requires aircraft operating into or within the EU to track and report their emissions and pay for emissions credits if they exceed limits set by the EU.

Some fuel companies offer additional ways for customers to reduce their carbon footprints. Air BP's Target Neutral carbon-emissions program, for example, combines emission reduction and offset strategies. "Once we've helped our customers to reduce their

## What Is SAJF?

Sustainable alternative jet fuel (SAJF) is a general term for non-petroleum-based jet fuels, which have two key characteristics:

1. They are sustainable, capable of being continually and repeatedly created without depleting natural resources, while mitigating contributions to climate change.
2. They are truly alternative, in that they are processed into jet fuel in an alternative manner, including via thermochemical, biochemical, and catalytic production methods, and are made from renewable materials—such as used cooking oil, plant oils, solid municipal waste, purpose-grown biomass, and agricultural residues. (Not all alternative fuels are sustainable. Corn-derived ethanol, for example, is an alternative but non-sustainable fuel, as its use impinges on corn's availability for food or increasing its supply, which creates a net GHG increase.)

Of course, SAJF must have the same characteristics and qualities—for example, energy density, freezing point, volatility, viscosity, and thermal stability—as conventional fuel. That's to ensure that it provides equal performance and doesn't compromise engine operations, and that

it's compatible with fuel-distribution-system requirements. SAJF is envisioned as a drop-in replacement, meaning that it can be blended with conventional fuels, as it is now, or can be used by itself, and standards have been established to ensure it meets these benchmarks.

SAJF creates a net reduction in carbon dioxide emissions across its life cycle, even when you take into account emissions generated during its production, transport, refinement, and distribution. Compared with fossil fuels, moreover, it provides significant reduction—typically 50 to 80 percent—in overall carbon dioxide life-cycle emissions. Additionally, with fewer impurities, such as sulfur or complex hydrocarbons, SAJF results in even greater reductions in sulfur dioxide and particulate matter emissions.

As for how much difference SAJF can make, a large-cabin business jet on a 1,000-nautical-mile mission might burn enough fuel to produce nearly 22,800 pounds of carbon dioxide. If the 30 percent SAJF/70 percent conventional fuel blend currently produced at the Alt Air refinery in California were used for the same mission, emissions would drop about 4,100 pounds, or 18 percent, on a life-cycle basis. —J.W.

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carbon impacts, then we move to the carbon-offsetting element,” says Neil McGuinness, global offer development manager for Air BP.

Through offset programs, customers fund environmentally and socially beneficial programs shown to lead to long-term reduction in carbon emissions. Global standards and watchdog groups such as the Gold Standard have been created to audit and certify programs that purport to meet these goals. If you’re considering an offset program as part of a carbon-reduction plan, ensure that it has been certified by an accredited standards agency.

“Over the past decade, the standards, the best practices, and the framework [of offset projects] have all matured, and there are internationally recognized best practices and audited processes for high-quality offsetting,” says Robert Stevens, head of partnerships at U.K.-based ClimateCare, a major provider of carbon-offset programs and services. ClimateCare has been the International Air Transportation Association’s carbon-offset partner for the last decade, and “within that context, we have seen a steady increase in the number of airlines offering voluntary offset programs to passengers.”

Air BP itself is “independently certified carbon neutral in our inter-plane fueling operations around the world,” according to McGuinness; and it recently signed carbon-offset agreements with Signature Flight Support and U.K.-based charter broker Victor. Customers purchasing Air BP fuel at a Signature FBO will now receive offsets for the fuel, as will anyone who books a charter flight through Victor.

The actual costs of SAJF can vary greatly, and providers hesitate to give exact numbers, but the price is generally “higher than [for] traditional fuel, and this impedes its wider use,” the consortium’s guidebook notes. However, costs are expected to decline as more is produced and distribution channels are optimized. Then again, the true cost of conventional jet fuel is largely unknown. We see the price per gallon at the pump, but what is the cost in climate change and the disruption it can cause?

As an end user, you can’t do much now about SAJF besides lobby for its use and talk up its benefits. According to the guidebook, these include the fact that it can be a more efficient than conventional jet fuels, and that it can help meet personal or corporate social-responsibility objectives. **BJT**

## Bizav’s Skeptical View of SAJF

If supplies of sustainable alternative jet fuel are limited, so is the business aviation community’s confidence that it will play a role in operations in the near term. A JetNet iQ survey of some 500 business aviation professionals in about 50 countries released in the first quarter of 2018 found that 60 percent of respondents disagreed either strongly or somewhat with the statement that they would “seriously consider flying with alternative jet fuels in 2018.” More than 15 percent were uncertain while only 12 percent strongly agreed. The responses were strikingly similar from operators of small, medium, and large jets.

—J.W.

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