



A Note from the Executive Director

Earth Day 2019 – a view toward an increasingly sustainable industry

With Earth Day 2019 last week on April 22nd, we are just one year away from the 50th anniversary of the very first Earth Day in 1970, and the need for a focused and concerted effort to improve the global sustainability and resiliency of human activity is even clearer today than it was in 1970. This includes aviation, and, as usual, the industry accepts the challenge. We trust you recognize the need too, and are doing your part on both an individual and collective level.

A key difficulty for the aviation industry is that we expect continued growth in societal demand for the safe, reliable, efficient, highly-productive transport of passengers and freight offered by aviation, and therefore, the associated risk of increasing total emissions over time. To overcome this challenge, the aviation industry has been continuously improving the fleet fuel efficiency through new materials, aerodynamics, onboard systems, engines, and overall aircraft designs. Additionally, they have been working on continuous improvements to operational and infrastructure efficiency.

Further, multiple stakeholders from across the aviation and alternative fuels sectors, including government, academic, and private entities, and entities like CAAFI, have also been assisting with development and deployment of a wide range of sustainable aviation fuel (SAF) options, and along the way have also established tools and models to help with SAF assessments and supply chain developments. SAF are drop-in fuels with reductions in the GHG emissions on a life-cycle basis, as they are derived from renewable and reusable energy sources that reduce the amount of carbon we continue to pull out of the ground and add to the biosphere. We also have a need for fuel options other than petroleum-based fuels to address other

sector challenges including supply surety, energy security, and price stability. However, starting a new industrial SAF sector in the face of challenges from incumbents is not a trivial exercise, and as a collaborator with CAAFI, you probably understand this as well as anyone.

Commercial aviation will most likely continue to use liquid hydrocarbon fuel as the primary energy source for aircraft for the next 40+ years, but hopefully from more and more renewable sources. We also expect to see greatly improved aircraft and operational efficiency to achieve the ICAO Carbon Neutral Growth target from 2020. Leveraging efficiency improvements and SAF, we hope to see the aviation industry start on a downward trend toward the ICAO 50% emissions reduction goal by 2050. In the meantime, technical improvements and operational efficiency will continue to advance, and maybe some disruptive technology will come along that changes the game. For now, the aviation sector isn't waiting – we're working towards a more sustainable aviation future with the tools we have at hand. Through research and development of all aspects of the SAF supply value chain, and the methodical continuous deployment of commercial-scale biorefineries, we can and will reduce our carbon emissions.

We believe we will see an increase of initial commercial successes that validate our overall SAF approach in the coming two years. And, there is a lot more to follow, including a robust pipeline of additional SAF production technologies and supply chain developments. We appreciate your assistance in helping the industry meet its goals.

This [CAAFI Quarterly](#) newsletter describes the CAAFI activities and events that occurred January through March 2019.

In this issue, we share industry updates, CAAFI team accomplishments and discuss our switch to using

Sustainable Aviation Fuel (SAF) instead of Sustainable Alternative Jet Fuel (SAJF).

I also want to make sure you're aware of the following upcoming items:

- [Bio International](#), June 3-6, Philadelphia, PA
- [Bio World Congress](#), July 8-11, Des Moines, IA

We appreciate questions, comments, and suggestions at any time. Enjoy!

Steve Csonka and the CAAFI Team

Quick Links

- ⇒ Check out "[What's New](#)" for a brief review of noteworthy SAJF news from the last quarter, including funding opportunities.
- ⇒ Go to "[Ask CAAFI](#)", a segment that highlights and explains relevant topics that impact the SAF/SAJF industry.
- ⇒ See "[CAAFI Team Highlights](#)" for a snapshot of CAAFI work teams' projects and progress last quarter.
- ⇒ Jump to "[SAF Deployment Projects](#)" for a summary of select deployment projects around the United States.

What's New?

[Gulfstream announces first sale of SAF.](#)

[Boeing offering alternative fuel for new plan deliveries.](#)

[Sweden proposes GHG reduction mandate for aviation fuel.](#)

[Mercurius biorefinery pilot plant gets a green light.](#)

[The Netherlands announce 100% commitment to SAF.](#)

[Business aviation community holds sustainable alternative jet fuel demonstration and communication activity at Van Nuys, CA airport.](#)

[Etihad Airways flies from Abu Dhabi to Amsterdam on SAF blend from halophytes.](#)

Additional information on these news items and additional funding opportunities can be found at [caafi.org](#).

Ask CAAFI

Question: SAJF vs. SAF, What's in a Name?

Answer: The efforts to commercialize jet fuel from petroleum alternatives have been carried out under many names. CAAFI's long-preferred term to refer to aviation fuels that are sustainably produced from renewable resources has been Sustainable Alternative Jet Fuel (SAJF) as it provides a distinction between jet fuel and the many other types of aviation fuels. However, recognizing the International Civil Aviation Organization's (ICAO) adoption of the term Sustainable Aviation Fuel (SAF), and as part of the international aviation fuel community, CAAFI has chosen to move forward using SAF as well to synchronize the use of a term that describes our efforts and displays a consistent and cohesive industry worldwide. You will see us make this change to CAAFI presentations and throughout the CAAFI website over the next several months.

CAAFI Team Highlights

Business —

- ⇒ Continued to expand work with prospective alternative fuel producers and airlines to facilitate opportunities for airline and other end user engagement, identifying supply logistics needs and informing contract processes.
- ⇒ CAAFI leadership continues to work with several firms approaching commercialization, including SG Preston, ARA (and several of its licensees), Velocys, LanzaTech, and others.
- ⇒ Continued to foster expanded engagement by the latest two NIFA/AFRI/CAP projects, [SPARC](#) and [SBAR](#).
- ⇒ At the CBGM, introduced the Commercialization Engagement Framework and Commercialization

Committee concept to assist future SAF producers with business maturation leading to airline engagement for the purpose of achieving offtake agreements.

Certification/Qualification —

- ⇒ An ASTM ballot proposal to add a “fast track” option to the D4054 qualification process is nearing completion (released on 17Oct). This annex will allow for reduced testing scope for candidate alternative fuels that have a jet fuel-like composition.
- ⇒ HFP-HEFA (Green Diesel): The OEMs have completed their review of the Phase 1 version of the research report, but additional investigation of the feedstock quality and composition is currently underway. Additional fit-for-purpose testing and rig testing (combustor, fuel nozzle spray, APU cold/altitude starting) have been conducted under the FAA CLEEN II R&D program per recommendations from this OEM review.
- ⇒ ARA CHJ: The OEM review of the Phase 2 research report was completed and the new annex was submitted for the first round of ASTM balloting on March 11. The ballot received two negatives which will need to be resolved before it advances to the final balloting round. It is now anticipated that the new D7566 annex for CHJ fuel will be issued sometime between September and December 2019.
- ⇒ Virent Hydrodeoxygenation: The OEMs have completed their Step 3 review of the Synthesized Aromatic Kerosene (HDO-SAK) research report and have submitted their comments and Tier 3 and 4 test requirements to Virent. Virent is now reviewing the comments. The FAA is collaborating with an OEM to conduct the required rig testing under the CLEEN II R&D program. However, a change in corporate ownership has resulted in a re-evaluation of the priority of this project
- ⇒ Shell/CRI submitted their initial batch of test fuel from their IH² demonstration facility to the D4054 Clearinghouse at UDRI and Tier 1 and 2 testing has been initiated. Shell is also working with the FAA to provide additional fuel for testing under the ASCENT National Jet Fuel

Combustion Program (NJFCP) to provide data that will help develop streamlined rig testing concepts that may be used to pre-screen candidate alternative jet fuels.

- ⇒ IHI has delivered an initial batch of hydroprocessed Bb oil to the University of Dayton for D4054 Clearinghouse for the start of D4054 Tier 1 & 2 testing.

Sustainability —

- ⇒ Continued to participate in the LCA, sustainability and alternative fuels tracking work in the ICAO CAEP Alternative Fuels Task Force (AFTF) and Global Market-based measure Task Force (GMTF).
- ⇒ Provided supporting environmental sustainability data for CA LCFS and Oregon Clean Power Plan proposals to add sustainable jet fuel to their programs on a voluntary basis.
- ⇒ Presented on LCFS and the Carbon Offsetting and Reduction Scheme for International Aviation (CORSA) at the CBGM.

R&D —

- ⇒ Continued to discuss engaging companies with emerging alternative jet fuel pathways.
- ⇒ Kicked-off the 2019 CAAFI Webinar Series with Juju Wang, an MIT graduate student presenting [“Quantitative Policy Analysis for Alternative Jet Fuel Pathways”](#)

SAF Deployment Projects

◇ Florida, Alabama, Georgia

The Alabama Department of Economic Development and Community Affairs (ADECA) issued a \$40,000 grant to Auburn University to describe the opportunity to define the best route to the development of a sustainable distribution system for sustainable biofuels in Alabama. Auburn will leverage the Southeast Partnership for Advanced Renewables from Carinata (SPARC) project and Volpe’s Freight/Fuel Transportation Optimization Tool (FTOT) to enhance state efforts to commercialize Carinata. The program will be

executed over a six-month period and was a direct result of visits by SPARC participants, Auburn University representatives and CAAFI members to Montgomery, AL at the end of May 2018. Read more about the grant [here](#).

Other Florida supply chain developments have focused on building a public private coalition that will establish combined landscape water remediation value with the value of energy crops and co-products. The Florida Department of Agriculture and Community Services (FDACS), University of Florida, and University of South Florida have engaged in dialogue on an initial mapping opportunity of six different energy feedstocks with potential application in the region surrounding a primary source of both red tide and blue green algae formation. The intensity of that issue reached a peak last summer with significant impacts for Florida's tourist trade. DOE BETO briefed the core group of coalition members on prospects for a near-to mid-term solicitation to address the issue as early as the next quarter.

The Georgia Office of Rural Economic Development is supportive of both the supply chain development for oil seeds and sustainable ethanol supply via sugar crops. Discussions are focused on possible reforming of the Valdosta Carinata USDA Rural Development proposal as well as the possibility of a proposal to establish a sustainable ethanol supply chain.

Volpe / SPARC efforts to develop eight practical scenarios for FTOT analysis which results will form the basis for pragmatic case studies of value to feedstock producers and processors have progressed during the first quarter. In addition, the University of South Florida members of SPARC have initiated dialog with Volpe to propose approaches to exercising resiliency analysis algorithms.

◇ **South Carolina, North Carolina, Virginia**

The full NIFA / CAP proposal for the Southcentral Atlantic State Supply Chain Alliance (SASSCA) was provided to NIFA early in the last quarter of 2018 by project lead Clemson on behalf of the rest of the proposed team, including North Carolina State, Virginia Tech and University of Virginia.

The SASSCA proposal concentrated on finding new jet fuel and co-product applications for the supporting forest interests in the region to open new markets for wood residuals in the near-term and possible cellulosic ethanol supplies in the longer term to support the budding ATJ market in the region. Clemson was advised that it had not been selected and extensive feedback was offered by the reviewer.

The team will evaluate the comments from the reviewer and consider whether or not to rebid the FY19 proposal and contemplate any changes. Maintaining the research team structure to approach other projects that might seek to take advantage of the team's unique research focus on both near-term supply economics and long-term opportunities for high value co-products will be evaluated.

◇ **Vermont**

Vermont efforts are now focusing on possible engagement in the Canadian Green Aviation Fuel Innovation Competition. F2F2 team members are contacting aviation, dairy and research focals in Canada to establish interest. Communication was initiated with a key potential Canadian energy producer and it was agreed to develop a proposal. It was determined it is desirable to maintain efforts focused on digester utilization predicated on Canadian regulatory policy considerations.

◇ **Connecticut**

Discussions continued with the Connecticut Center for Advanced Technology (CCAT) regarding how to reopen consideration of the conversion of the current South Hartford Materials Innovation and Recycling Authority (MIRA) facility.

Visits to CCAT early in the quarter discouraged near-term communications with MIRA in view of current operating issues at the facility that have produced poor opportunities for near-term success. The opportunity will be revisited in the second quarter with potential customers and a determination will be made if and how to move forward.

◇ **Other**

CAAFI has been engaged with another group that has received notice that they will be awarded a SAS CAP grant targeted at SAF production. Details to follow.

The USDA AFRI RFA is already out for 2019. See: <https://nifa.usda.gov/sites/default/files/rfa/FY19-AFRI-SAS.pdf>. If you have interest in engaging with CAAFI on research efforts that fit this funding opportunity, please let us know. We are already working with a couple entities on such proposals.

If you are aware of other scenarios that could be appropriate for a regional development effort, please let us know. For more information, see [CAAFI's State Initiatives](#) page.

Please check the [CAAFI website](#) on a regular basis for more detail on pending activities.

Email peter.herzig@dot.gov with any ideas for CAAFI Quarterly items of interest, caafi.org news suggestions, or inquiries about subscription to the CAAFI Membership group.