



## A Note from the Executive Director

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

In this issue, we share industry updates and CAAFI team accomplishments.

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

- [GTI TCBIomass Conference](#), 07 – 09 October, Chicago, IL
- [ABLC Next](#), 30 October – 01 November, San Francisco, CA
- [ASA-CSSA-SSSA Meeting](#), 10 – 13 November, San Antonio, TX
- [IATA SAF Symposium](#), 14 – 15 November, New Orleans, LA

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

Steve Csonka and the CAAFI Team

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## 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.

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## What's New?

[United's Flight for the Plant](#)

[Four Finalists Announced for Canada's The Sky's the Limit \\$5 Million Prize](#)

[KLM, SkyNRG, and SHV Energy will Build Commercial SAF Facility](#)

[Business Aviation Community Demonstrates Gevo's ATJ Fuels at EBACE](#)

[First Ever Carbon-Minimizing 'Perfect Flight' Achieved in Sweden](#)

[\\$79 Million in Funding Available for Bioenergy Research and Development](#)

[Auburn University Awarded Grant for Carinata Feasibility Study](#)

[Earth Day 2019 Message from CAAFI's Executive Director](#)

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

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## Ask CAAFI

**Question:** What is happening w.r.t. SAF from an offtake and deployment perspective?

**Answer:** CAAFI recently put together a summary of the current state of play regarding the development and deployment of SAF. You can find the slides here: [Current State of Alternative Jet Fuel Deployment](#).

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## 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 National Institute of Food and Agriculture (NIFA)/Agriculture and Food Research Initiative (AFRI)/Coordinated Agricultural Projects (CAP), namely the Southeast Partnership for Advanced Renewables from Carinata ([SPARC](#)), and Sustainable Bioeconomy for Arid Regions ([SBAR](#)).
- ⇒ Continued discussions with A4A regarding the concept of assisting future SAF producers with business maturation leading to airline engagement for the purpose of achieving offtake agreements.

#### Certification/Qualification —

- ⇒ The ASTM ballot to add a “fast track” provision to the D4054 qualification process was passed in May and has been incorporated in the current version of D4054. This annex allows for a reduced testing scope for candidate alternative fuels that have a jet fuel-like composition; however, such approvals will initially include a maximum 10% blend limitation, until the practitioners of such production request a modification of the approval from the aviation community, after having demonstrated production robustness at a minimum.
- ⇒ 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) are being 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 three negatives and has been withdrawn. ARA is conducting supplemental fuel property testing and will re-ballot when that data is available. It is

still possible that the new D7566 annex for CHJ fuel will be issued before the end of the year.

- ⇒ 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. An earlier change in corporate ownership had slowed the activity on this project, but it may now be back on track.
- ⇒ Shell/CRI submitted their initial batch of test fuel from their IH<sup>2</sup> 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 completed D4054 Fast Track testing and has submitted their research report to the OEM team for review. They are targeting approval by next spring to support fuel usage in flights supporting the 2020 Tokyo Olympics.
- ⇒ Swedish Biofuels and Vertimass, both with alcohol-derived pathways, have recently engaged with CAAFI and ASTM to initiate their ASTM qualification efforts.

#### Sustainability —

- ⇒ Continued to participate in the LCA, sustainability and alternative fuels tracking work in the ICAO CAEP Fuels Task Group (FTG) and Working Group 4 (CORSA)..

#### R&D —

- ⇒ Continued engaging companies with emerging alternative jet fuel pathways.
- ⇒ Hosted a CAAFI Webinar [“Direct Air Capture of CO<sub>2</sub> and Recycling CO<sub>2</sub> into Sustainable Aviation Fuels”](#) presented by Ellen Stechel (ASU LightWorks/

Arizona State University) and Anna Stukas (Carbon Engineering Ltd.).

## SAF Deployment Projects

### ◇ Connecticut

Efforts to examine the potential to convert a brownfield at the Hartford MSW to fuel facility were reenergized during the quarter. Velocys, Pratt & Whitney and Praxair Linde, a CT-based Fischer Tropsch component supplier, toured the Materials Innovation and Recycling Authority (MIRA) facility in Hartford, CT on June 28th. The exploration seeks to establish whether the initial findings of the two USDA Rural Business Enterprise Grants (RBEG) that were completed over 5 years ago are still applicable and whether investors would be interested in the project. MIRA's Board of Directors support the approach and follow-up is anticipated.

### ◇ Vermont

A Vermont-based anaerobic digester project to build a resilient product stream based on GSR technology to create a biocrude stream from dairy cow manure was invited to submit a full proposal under the \$79 million DOE Biomass Energy Technology Office (BETO) Multi-Topic Funding Opportunity Announcement (FOA). The project offers an array of co-products including biocrude (for jet and other middle distillate processing), organic fertilizer and biochar. Early work on the concept under USDA RBEG and Value-added contracts has drawn the support of environmental interests in the state due to its potential to offer a commercially viable approach to limiting phosphorus and nitrogen runoff into lakes and rivers that is creating algae bloom.

### ◇ Florida-based Regional Effort

CAAFI's engagement with SPARC is helping set important supply chain development precedents. NIFA developed increased interest in the situation and has added funding to member states.

In Alabama, CAAFI along with Auburn University, Agrisoma, and the SPARC leadership are

collaborating with the offices of Department of Agriculture and Industry (ADI) and Alabama Department of Economic Development and Community Affairs (ADECA) in response to a Request for Proposal (RFP) to support supply chain development in the state. Auburn is leading the effort which in part utilizes the Freight and Fuel Transportation Optimization Tool (FTOT) and SPARC's analysis capabilities to optimize opportunities to enhance supply chain economics from aggregators to end user distribution in the state. Mobile, AL has been identified as a viable production node as it provides a sizable shipping port for Agrisoma and has an Airbus aircraft production facility.

During the quarter, the team agreed to run four FTOT scenarios. One of the scenarios focuses on supplies aggregated entirely in Alabama. Volpe will run the scenarios once they receive the necessary inputs for the four identified scenarios. Additionally, work has begun to exercise FTOT's resiliency modeling features at the University of South Florida.

In Florida, the SPARC project leader, Dr. David Wright, has agreed to coordinate the separate efforts of the University of Florida on six candidate feedstocks (carinata, beets, sorghum, elephant grass, eucalyptus, and pongamia) that might be used for improving water quality on a landscape design basis. Initial efforts are now focused on aggregating available water runoff modeling data from existing projects (e.g. SPARC SWAT modeling and infiltration modeling) and the proposed efforts in Alabama.

Funding up to \$15 million over a five-year period for red tide and blue green algae research is currently pending final state legislative approval.

In Georgia, the State Rural Economic Development office and CAAFI have discussed a Value-Added Producer Grant application to examine supply chain development options for ethanol and jet fuel and co-products from multiple processors for containing the entire supply chain within the state. If it can be done, the GA Economic Development office estimates a five times job benefit beyond crop cultivation. Key feedstocks to be examined are

sorghum, for which there is a grower population in SW Georgia, and carinata as part of an energy crop rotation.

#### ◇ **Additional Southeast Regional Effort**

Oak Ridge National Lab (ORNL) and the University of Florida submitted a proposal for the \$79 million DOE BETO Multi-Topic Funding Opportunity Announcement (FOA), and the concept was approved for full proposal submittal. The concept examines the use of eucalyptus derived terpene molecules as a jet fuel blendstock. CAAFI is working with ORNL to execute economic and environmental analysis of a blend involving terpenes. CAAFI, in consultation with Georgia Tech, Vertimass and others, is also working to define an acceptable characterization for a terpene blendstock for jet fuel. Eucalyptus is of interest in Florida as it is one of six feedstocks having potential to remediate nitrogen and phosphorous runoff affecting water quality. This issue has been a major focus to build a Florida-based supply chain benefiting from supplemental value derived from the avoidance of quantifiable water remediation costs as an environmental benefit available in Florida and other east coast locations.

#### ◇ **Other**

##### **Upcoming State and Regional Initiatives Webinar - September 2019**

In support of the one of the goals coming out of the 2018 CBGM of expanding state and regional efforts, CAAFI state and regional project development templates and case studies will be the subject of a CAAFI webinar in September. As part of the webinar, candidate representatives of CAAFI who support supplementary initiatives in additional regions will be invited to introduce themselves to the audience and explain their geographic, business and technical focus areas to gain interest and resources for their proposed effort(s).

##### **Upcoming California Low Carbon Fuel Standard Webinar – July 18, 2019**

The University of Tennessee held a workshop in March 2019 to gain support for a Southeast regional

SAF project. Participants came up with a prioritized list of action items to help move the effort forward. One of the key barriers is a lack of appropriate policy in place in the US. Knowing that California is a leader in policy when it comes to incentivizing the renewable fuels market, we have invited Graham Noyes to conduct a webinar on the California Low Carbon Fuel Standard.

UT is hosting this webinar on Thursday, July 18 at 3:00pm EDT. The link to the webinar is [here](#). You can also call in to the webinar at the numbers below.

1-646-568-7788 (US Toll) or 1-415-762-9988 (US Toll)

Meeting ID: 865 946 1116

*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.*

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

*Email [peter.herzig@dot.gov](mailto: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.*