

A Note from the Executive Director

This CAAFI Quarterly newsletter describes the CAAFI activities that occurred April through June 2023. In this issue, we share industry updates and CAAFI team accomplishments.

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

Steve Csonka and the CAAFI Team

Quick Links

- ⇒ [CAAFI will be hiring](#) in the fourth quarter
- ⇒ Check out “[What’s New](#)” for a brief review of noteworthy SAF news from the last quarter, including funding opportunities.
- ⇒ Go to “[Ask CAAFI](#)”, a segment that highlights and explains relevant topics that impact the SAF industry.
- ⇒ Get updates regarding the “[SAF Grand Challenge](#)”.
- ⇒ Go to “[CAAFI Webinars](#)”, a segment that highlights and links to webinars that occurred during this period.
- ⇒ See “[CAAFI Team Highlights](#)” for a snapshot of CAAFI work teams’ projects and progress last quarter.
- ⇒ Jump to “[SAF State and Regional Efforts](#)” for a summary of select deployment projects around the United States.

Upcoming

- ⇒ CAAFI Webinars:
 - Methanol-to-Jet, July 25
 - Bioenergy Research Centers, August 15
 - ILUC/Food vs Fuel, Oct 19
- ⇒ [National SAF Conference & Expo](#), being held in collaboration with CAAFI, Aug 29-30, Minneapolis. We hope to see you there, and recall CAAFI members are offered a \$200 registration discount using discount code CAAFI200 on the second page of the registration section.
- ⇒ [USDA biomass supply chain listening session](#). USDA invites interested stakeholders to participate in a virtual public listening session about the domestic

biomass supply chain system. **Date/Time:** July 18, 3:00 – 4:30 pm ET, **Allotted time for speakers:** 3 minutes each. Note: preregistration is required to attend and/or speak at the event.

CAAFI plans to be hiring!

With the burgeoning expansion of SAF activity, and the support of various industry entities, CAAFI funding is being expanded, and we envision adding three roles in the fourth quarter this year, at varying experience levels, roughly summarized as follows:

- A ~20 year experienced person to replace our Assistant Director, Chris Tindal, who will be retiring at year’s end, and with such person having the necessary experience, capabilities and interest in advancing into the Executive Director role within the next couple of years.
- A ~15 year experienced person focused on Industry Engagement.
- A ~10 year experienced person focused on leading and executing Special Projects.

CAAFI will target filling these roles with independent contractors who contract with CAAFI for specified levels of effort and duration, but with an expectation of candidate interest in continued engagement on SAF at least through the 2030 timeframe of the first SAF Grand Challenge goal achievement. Rates will be competitive and commensurate with experience and capabilities. CAAFI will have prerequisite experience requirements (including research & development, demonstration & deployment, and day-to-day functioning) in several of the following fields related to SAF: fuel production (specs, testing, quality, & handling, both petroleum and synthetic jet fuels), business development, OEM activity, airline activity, agriculture/feedstocks, supply chain development, bio-chemical and thermo-chemical conversion processes, airport activities dealing with fuel and marketing and communications. If you have interest in pre-positioning yourself with us as we work to finalize our specific experience requirements, qualifications, and responsibilities, please respond with a brief introduction and resume to info@caafi.org under the subject line of **CAAFI Roles**. And, if you know someone whom you feel would be a great addition to

the work of CAAFI as an independent contractor, feel free to pass this along to them. We anticipate a formal hiring process will commence starting in September.

What's New?

We continue to see significant offtake and commercialization announcements, as well as engagement from new producers.

[United Airlines Targets Using 10M Gallons of SAF in 2023](#)

[The Aviation Climate Taskforce Announced Funding for Direct Air Capture \(DAC\)-to-Jet Approach](#)

[India's First Commercial Passenger Flight Using SAF Produced in India](#)

[Neste Increases SAF Production Capacity at Singapore Facility](#)

[EU SAF Usage Targets Will Include Provision to Track SAF Consumption](#)

[Alder Joins BDO Zone Strategic Alliance](#)

[Summit Next Gen to Produce 250M Gallons of SAF Annually from Gulf Coast Facility Starting in 2025](#)

[Montana Renewables Delivers First SAF Shipment to Shell](#)

[Honeywell Announces New Technology to Produce SAF](#)

[LanzaJet Announced Australian SAF Production Facility](#)

[Partnership Announced to Promote the Development of SAF in Columbia](#)

[Twelve and Emerging Fuels Technology Agreed to Collaborate to Scale SAF Production](#)

[Fulcrum Received Investment in SAF Production Plant in England](#)

[Norwegian and Wizz Air Invest in SAF Producers](#)

[LanzaTech Announced Plan for SAF Production in Wales](#)

[United Invests \\$15M in Canadian Carbon Capture Technology Company](#)

[RAF Conducted SAF Air-to-Air Refueling](#)

[SAS Launched Ticket Types that Include Biofuel](#)

The above are some of the activities that took place in Q1, but many more can be found (e.g. [SAF Magazine](#), [Biofuels Digest](#), [Biofuels International](#), [GreenAir Online](#), etc.).

Ask CAAFI

Question: What is the industry considering on 100% drop-in synthetic aviation turbine fuel (SATF) approval?

Answer: The jet-powered aviation industry continues to pursue the qualification of a wide range of drop-in synthetic jet fuels, produced from an ever-expanding set of feedstocks and conversion processes. The intent is to enable cost-effective SATF/SAF production around the world using local resources (feedstocks). In order to deliver lowest cost and maximum GHG reduction, we are including the potential for producing 100% synthetic formulations that may not require blending with conventional jet fuel. These will likely be SATF that mimic all the characteristics of petroleum based jet fuel (e.g. including iso- and normal paraffins, cycloparaffins, and aromatics well distributed in the C₇-C₁₇ hydrocarbon range, and deliver other fit-for-purpose characteristics essential for jet fuel), which we discuss as being 'fully formulated' SATF.

Over the next 12 months we will likely see the ASTM's aviation fuel subcommittee propose and evaluate a framework within the practices and specifications detailed in ASTM D4054 and D7566 respectively to allow certain types of SATF to be produced and used at up to 100% levels. This will likely entail two approaches initially:

- Some currently defined pathways (e.g. Annexes A4, A6, and A8) will likely have their maximum blending ratio extended to up to 100% (used neat without the need for petroleum jet blending).
- Additionally, the community will consider the concept of blending of certain blending components from already approved D7566 pathways as a viable way to produce a fully formulated SATF.

However, in the marketplace you will continue to hear about other explorations, but they don't need to create confusion with regard to our primary focus on drop-in SAF:

- OEMs will continue to ensure that that aircraft and their systems (legacy, in-production, and new concepts) are able to operate on all such drop-in fuels defined by the ASTM aviation fuel subcommittee.
- Some equipment may also be able to operate on non-drop-in fuels, to achieve various operational efficiencies (i.e., from fuels with higher energy per unit mass), but we recognize there are many non-aircraft issues to address before such concepts are able to advance to commercialization. We will continue to explore such in the background, to see if such issues can be addressed in meaningful ways.
- However, there may be ways to carefully tailor certain 100% synthetic definitions, such that we get advantaged fuel formulations while still maintaining a drop-in, which is of paramount interest, and the community will be working with the aviation industry and synthetic fuel researchers and producers on robustly exploring such evaluations, and getting such fuels qualified for use by 2030.

SAF Grand Challenge Update

DOE adds new Earthshot at 24May press event at INL – [Clean Fuels & Products](#):

- Adds an overlay element to the SAF Grand Challenge with a target of achieving 85% lower GHG by 2035.
- Bolsters SAF Grand Challenge – adds perspective of aviation fuel being held to higher ambition than other fuels and chemicals by 2050: 100% of aviation fuel, while 50% of maritime, offroad, and chemicals.
- DOE BETO expects this release helps to further integrate the broader totality of DOE efforts (e.g. Advanced Research Projects Agency - Energy, Office of Science, Biomass Research Centers, ...)
- Two specific goals:
 - Expand and Develop New Feedstocks
 - Develop New Conversion Paradigms

The agencies participating in the SAF GC are currently involved in multiple roll-out activities, e.g.:

⇒ Inventory analysis of existing funded programs and how such efforts can be folded into SAF GC efforts or

form the basis for execution of SAF GC tasks. Various of the action areas will likely be executed by Interagency Working Groups.

The [SAF Grand Challenge website](#) has been launched.

SAF GC funding will likely be allocated to a broad group of activities that contribute to the roadmap execution, as demonstrated by the following examples already in execution:

- ⇒ DOE Award: [\\$118 Million to Accelerate Domestic Biofuel Production](#)
- ⇒ DOE Award: [\\$590M to its four existing Bioenergy Research Centers](#). The BRC's all have elements of SAF R&DDD, as well as a mandate to collaborate with one another on such work.
- ⇒ DOE RFA: The 2023 [Waste-to-Energy Technical Assistance](#).
- ⇒ DOE [Agile BioFoundry NOFO](#).
- ⇒ DOE [2023 Conversion Research and Development \(R&D\) funding opportunity announcement](#) FOA.

CAAFI Webinars

⇒ Overview of SAF Research at USDA-ARS

Dr. Bill Orts (USDA ARS)

· [Perspectives from USDA research...Hot Feedstocks for SAF](#)

Dr. Colleen McMahan (USDA-ARS)

· [Guayule Bagasse as a Biomass Feedstock for Liquid Fuels](#)

⇒ [CAAFI 2023 2-Day Virtual Event](#)

CAAFI Team Highlights

Misc –

On 31May'23, Mark Rumizen stepped away from his role at the FAA, after 32 years with the agency. Mark was present at the founding of CAAFI in 2006, and was instrumental in establishing the overall efforts of CAAFI and their focus on creating a drop-in fuel evaluation and qualification approach. CAAFI honored Mark with a Leadership Award at the ASTM J02 Meeting in June, including our coveted CAAFI cap (of 'immeasurable value') and plaque, along with a modest bit of roasting.



The good news for our community is that Mark will continue to be engaged on SAF, embarking on a new role with The Air Company working on their SAF commercialization approach. Mark will also continue to serve as chair of the ASTM D02.J0 subcommittee activity on jet fuel, but will step down from his oversight of the Cert/Qual efforts at CAAFI, leaving such work to his successor, yet to be named. We wish Mark every success and look forward to more years of thought leadership in the SAF space.

Business —

New producers, new suppliers, new customers, and many adjacent participants continue to contact us for guidance and assistance (continuing on a weekly basis) or asking for introductions to others who can assist with their commercialization efforts. We would like to remind any producer of this available resource document: [Guidance for Selling Alternative Fuels to Airlines](#). Additional tools can be found [here](#).

We are very pleased to see this continued level of engagement as we are now at more than 190 companies exploring SAF commercialization. Further, our latest roll up of intended U.S. SAF production capacity (with identified offtake partners) exceeds 2.0B gpy by YE 2028, with others working quietly in the background on additional capacity.

Certification/Qualification —

The work of the Cert/Qual team is aligned with the activities of ASTM's aviation fuel subcommittee, the [Aviation Technical Committee of the Coordinating Research Council \(CRC\)](#), and the now completed National Jet Fuel Combustion Program. It is also supported by periodic OEM meetings in the US and UK and various ASCENT projects. The qualification process is described in a recently issued paper "[Qualification of Alternative Jet Fuels](#)". This paper may be found at the

Frontiers in Energy Research Sustainable Aviation Fuels "Research Topic."

The summer meeting of the ASTM Aviation Fuels subcommittee was held in Denver from 26-29 June, where the following qualification activity was announced.

- ATJ-SKA (a mixed alcohols conversion process that includes aromatic content, as championed by Swedish Biofuels) has been qualified as our pending 8th pathway;
- IBN-SPK (the olefin iso-butene) is added to ATJ-SPK Annex A5 as a new feedstock;
- Co-processing from hydroprocessed biomass has been approved as the third approach for co-processing in existing refineries.

Final printing in ASTM D7566 and D1655 will likely take several more weeks.

Additional ASTM D4054 updates, many of which will be further discussed at the winter meeting, 04-07 December in New Orleans include:

- ⇒ The Methanol to Jet ASTM task force has been established and meeting to coordinate production of test samples for testing at the D4054 Clearinghouse, some of which have already been delivered to UDRI. Some results will be reviewed in December. A CAAFI Webinar will be held on the topic on 25 July.
- ⇒ The recent interest in unblended, or 100% SAF has reenergized the Virent SAK D4054 effort. Virent SAK is a pure aromatic stream that when blended with other SPKs such as FT or HEFA will result in a fully formulated fuel. Virent is nearing completion of a final round of testing and expects to ballot a new D7566 annex later this year.
- ⇒ OMV Downstream GmbH has formed an ASTM task group to coordinate the development of a D7566 annex and D4054 Fast Track testing of fuel samples from their plastics to jet pathway. Testing is currently in process with the FAA/ASCENT Clearinghouse.
- ⇒ Shell IH2: Shell has finalized their D4054 Tier 3 & 4 test plan with the OEMs and is now working with the OEMs to identify test facilities. Shell is also working on scaling up production to supply the

necessary quantities of test fuel to conduct the testing.

- ⇒ Council of Scientific and Industrial Research (CSIR): The Indian Institute of Petroleum has completed an initial round of testing at the FAA/ASCENT D4054 Clearinghouse but more testing will be required. A new fuel sample has been submitted for additional Tier 1 and 2 fuel property testing.
- ⇒ Topsoe is working to enable the aviation/ASTM D02.J0 community to evaluate the modest level of aromatic content in their HEFA-SPK conversion technology suite that exceeds the current levels allowed in D7566 Annex A2.

Another ASTM task force is continuing its work to develop specification criteria for an unblended (or 100%) alternative jet fuel. A research report providing supporting technical data is being developed by GE and that report along with the proposed revisions to D7566 will be submitted to the OEM team and the ASTM task group members for review. It is expected that the review and continued editing will take some time before the draft D7566 specification revisions are ready for balloting to the ASTM aviation fuel subcommittee.

We continued to see increased engagement from petroleum refiners and suppliers who are interested in increasing the types and maximum blend levels for SAF co-processing at existing refinery installations. Task forces have been established to develop specification criteria for **co-processing of pyrolysis oil derived from discarded tires**, and to increase the current approved 5% limit on **co-processing of lipids feedstock to 30%**. Note that these specification provisions will be incorporated into the ASTM D1655 conventional jet fuel specification upon approval.

If you have interest in seeing new pathway approval, or simply getting more engaged in the qualification efforts, consider joining ASTM D02 and participating in its activities. You can also reach you to us at info@caafi.org for more information on getting involved.

Sustainability —

Most of the effort and focus of the Sustainability team continued to support deliberations of ICAO and its work on CORSIA.

- ⇒ Continued participation in the LCA, sustainability and alternative fuels tracking work in the ICAO CAEP Fuels Task Group (FTG), Working Group 4 (CORSIA),

and Sustainability Certification Scheme Evaluation Group (SCSEG).

- ⇒ ICAO's most recent [set of sustainability criteria](#) covers the pilot and voluntary phases, and includes carbon capture and sequestration and to address fossil-based lower carbon aviation fuels (LCAF) as well as SAF.

R&D —

- ⇒ The R&D team continues to support the execution of CAAFI's webinar series and coordinates with the CAAFI leadership and certification/qualification teams regarding emerging companies and fuel qualification.
- ⇒ Reach out to [Josh Heyne](#) on CAAFI's R&D team if you have interest in new SAF candidate [pre-screening efforts](#).

State and Regional Projects

CAAFI principals continue to participate in and foster regional development activity, on feedstocks, supply chain analysis & establishment, and with various entities. Stay tuned for an update from ASCENT (likely Q4 CAAFI Webinar) on ways that they can work with customers to provide keys insights and analysis.

Previously outlined supply chain building efforts continue in FL and VA. Multiple activities are ongoing in WA state, reflecting the continued building of momentum on SAF that comes from collaboration between exploratory working groups, interested policy makers, academia and industry. Stay tuned for further updates.

The Mid-Atlantic Sustainable Biomass (MASBio) project held their quarterly All Hands meeting to discuss the current status of their various projects. Additionally, there was a discussion about their annual meeting which will be held this quarter on September 11-13 in State College, PA. MASBio is a USDA NIFA AFRI Coordinated Agricultural Project (CAP) grant project.

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.