IRA Section 40007 FAST-SAF and FAST-Tech Grant Program

To: FAST-SAF/Tech Meeting

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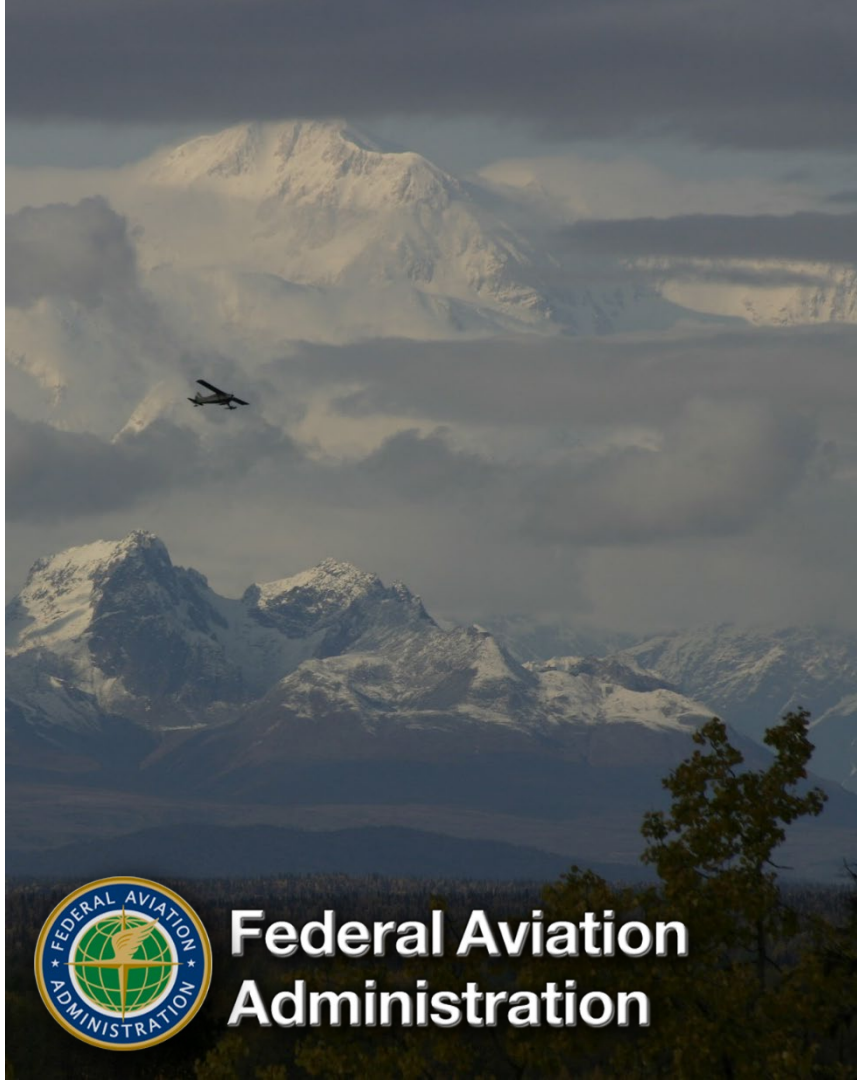

Disclaimer

After this briefing, the floor will be open for discussion of the following material amongst the attendees. The Government may observe the discussions and take notes regarding the individual opinions expressed, but these discussions, and the Government's observations and notes, will not be used by the Government to establish a consensus regarding any aspect of the program.

Background

The United States Aviation Climate Action Plan, released in 2021, sets a goal of net-zero greenhouse gas emissions from the aviation sector by 2050.

FAA is undertaking initiatives to accelerate development and deployment measures to achieve this net zero goal:

- Sustainable Aviation Fuels through the SAF Grand Challenge
- Aircraft tech through Sustainable Flight National Partnership (SFNP)
- Operational measures to improve efficiency via the Next Generation Air Transportation System

Section 40007 of Inflation Reduction Act of 2022

Directs the Secretary of Transportation to implement a “competitive grant program for eligible entities to carry out projects located in the United States that produce, transport, blend, or store sustainable aviation fuel, or develop, demonstrate, or apply low-emission aviation technologies.”

Funding available:

- $244.53M for projects relating to production, transportation, blending, or storage of Sustainable Aviation Fuels
- $46.53M for projects to develop, demonstrate, or apply low-emission aviation technologies
- $5.94M for program oversight

IRA Section 40007: FAST-SAF & FAST-Tech

FAA Office of Environment and Energy (AEE) is developing a new grant program, Fueling Aviation's Sustainable Transition (FAST), with elements focused on SAF, to be termed FAST-SAF, and elements focused on low-emission aviation technologies, to be termed FAST-Tech.

FAST-SAF and FAST-Tech Programs are initially planned to:

- Complement ASCENT COE, CAAFI, and CLEEN Programs
- Be executed in coordination with interagency partners, the SAF Grand Challenge, and the Sustainable Flight National Partnership

Cost Share Requirements

(c) COST SHARE.—The Federal share of the cost of a project carried out using grant funds under subsection (a) shall be 75 percent of the total proposed cost of the project, except that such Federal share shall increase to 90 percent of the total proposed cost of the project if the eligible entity is a small hub airport or non-hub airport, as such terms are defined in section 47102 of title 49, United States Code.

Eligible Participants in FAST-SAF & FAST-Tech

A. a State or local government, including the District of Columbia, other than an airport sponsor;
B. an air carrier;
C. an airport sponsor;
D. an accredited institution of higher education;
E. a research institution;
F. a person or entity engaged in the production, transportation, blending, or storage of sustainable aviation fuel in the United States or feedstocks in the United States that could be used to produce sustainable aviation fuel;
G. a person or entity engaged in the development, demonstration, or application of low-emission aviation technologies; or
H. nonprofit entities or nonprofit consortia with experience in sustainable aviation fuels, low-emission aviation technologies, or other clean transportation research programs.

FAST-SAF Grant Program

Overview

- **Key Objective**: *make investments to accelerate the production and use of SAF, thereby supporting the goals of the SAF Grand Challenge, to meet U.S. aviation climate goals to reduce aviation carbon emissions*

- **Section 40007 Direction:** "carry out projects located in the United States that produce, transport, blend, or store sustainable aviation fuel"

Definition of a Sustainable Aviation Fuel (1 of 2)

For the purposes of this grant program, "sustainable aviation fuel" means liquid fuel, produced in the United States, that-

(A) consists of synthesized hydrocarbons;

(B) meets the requirements of

i. ASTM International Standard D7566, or

ii. the co-processing provisions of ASTM International Standard D1655, Annex A1 (or such successor standard);

(C) is derived from biomass, (in a similar manner as such term is defined in section 45K(c)(3) of the Internal Revenue Code of 1986), waste streams, renewable energy sources, or gaseous carbon oxides;

(D) is not derived from palm fatty acid distillates and…

Definition of a Sustainable Aviation Fuel (2 of 2)

…

(E) achieves at least a 50 percent lifecycle greenhouse gas remissions reduction in comparison with petroleum-based jet fuel, as determined by a test that shows

i. the fuel production pathway achieves at least a 50 percent reduction of the aggregate attributional core lifecycle emissions and the induced land-use change values under a lifecycle methodology for sustainable aviation fuels lar to that adopted by the International Civil Aviation Organization with the agreement of the United States; or

ii. the fuel production pathway achieves at least a 50 percent reduction of the aggregate attributional core lifecycle greenhouse gas emissions values and the induced land-use change values under another method ology that the Secretary determines is-

I. reflective of the latest scientific under standing of lifecycle greenhouse gas emissions; and

II. as stringent as the requirement under clause (i).

SAF Grand Challenge Agency Roles

https://www.energy.gov/sites/default/files/2021-09/S1-Signed-SAF-MOU-9-08-21_0.pdf

Sustainable Aviation Fuel Grand Challenge

DOE

- Continue investments and develop expertise in sustainable technologies to develop cost effective low carbon liquid fuels and enabling coproducts from renewable biomass and waste feedstocks
- Continue a significant multi-year SAF scale-up strategy committed to in FY21
- R&D aimed at creating new pathways toward higher SAF production
- Advance environmental analysis of SAF

DOT/FAA

- Develop overall strategy to decarbonize aviation
- Coordinate ongoing SAF testing and analysis
- Work with standards organizations to ensure safety and sustainability of SAF
- Continue International technical leadership
- Promote end use of SAF
- **Support infrastructure and transportation systems that connect SAF feedstock producers, SAF refiners, and aviation end users**

USDA

- Continue investments and build expertise in sustainable biomass production systems
- **Decarbonize supply chains**
- Invest in bio-manufacturing capability & workforce development
- Community and individual education
- Provide outreach & technology transfer to producers, processors and communities to accelerate adoption and participation
- Commercialization support

Collaborate with EPA on regulatory approvals of SAF with significant life-cycle GHG reductions

Considerations for Discussion

- In order to achieve the SAF Grand Challenge goal of 3 billion gallons of domestic SAF production and use by 2030, the Government must prioritize certain areas of SAF infrastructure development.
- The following areas of infrastructure development are examples of what the Government presently considers high priority:
  - Install blending facilities where unblended SAF can be delivered, stored and blended
  - Upgrade existing facilities to support SAF production, delivery, and storage
- This is not an exhaustive list, and these priorities continue to evolve as we stand up this program and pursue our SAF goals.

Potential Two Tier Structure*

- Tier 1 grants: Smaller grant awards focused on regional supply chains that could identify infrastructure and distribution needs of key proponents (e.g., airports)
- Tier 2 grants: Larger grant awards for infrastructure projects to facilitate and scale fuel production, transportation, blending, and storage
- Relationship of Tier 1 and Tier 2 Projects
  - Tier 1 project results could support follow-on funding with Tier 2 grants
  - Would also allow for direct application to Tier 2 grants without first doing Tier 1 work as there are existing high quality supply chain studies
- Exploring the possibility of separately funding ASCENT and Volpe Center for tools and analyses that could be used by Tier 1 applicants to help them identify their infrastructure needs

*Please note that the structure of the program is still evolving and this structure merely represents one potential structure that the Government is exploring. The Notice of Funding Opportunity will provide definitive details as to the award structure and how applicants will be evaluated.

Potential Tier 1 Projects

- Support for identifying regional supply chains and identifying infrastructure needs, as well as other project preparation and scoping-type actions, that are part of a larger project that ultimately produce, transport, blend, or store sustainable aviation fuel.

Considerations for Discussion

- To meet SAF production and use goals, the Government must consider what types of project scoping, feasibility, and supply chain analyses are needed to facilitate development of SAF supply chains to support deployment.
- These analyses may include, without limitation, the following:
  - Optimization of blending facility locations
  - Modeling measures to reduce SAF production carbon intensity

Considerations for Discussion

- The Government desires to structure the FAST-SAF program in a way that funded projects reduce SAF supply chain development risk.
- Some examples of ways this could be accomplished include, without limitation:
  - Modeling SAF logistics networks to connect producers with delivery infrastructure
  - Analyzing regional network needs and resources to effectively supply local airports

Potential Tier 2 Projects (1 of 2)

- Larger grants for actual infrastructure investment
- Examples include, but would not be limited to:
  - Enhance existing jet fuel transportation and logistics networks to supply airports with SAF
  - Install blending facilities where unblended SAF can be delivered, stored and blended
  - Upgrade existing facilities for SAF production, delivery, and storage

Potential Tier 2 Projects (2 of 2)

- Installation of equipment to enable SAF production at an existing fuel production facility or other facility that is processing biomass or wastes
- Installation of distillation columns at renewable diesel facilities to enable SAF production
- Installation of ethanol-to-jet conversion equipment at existing ethanol production facilities

Considerations for Discussion

The Government hopes that the outcomes of the grants will support the goals of the SAF Grand Challenge, particularly in the 2023-2030 timeframe. This places emphasis on projects that:

- Target SAF production at existing fuel facilities, including but not limited to renewable diesel or ethanol production facilities
- Employ existing pipeline, rail, marine or trucking systems for SAF transportation
- Support SAF blending with conventional jet fuel
- Facilitate SAF storage at on-airport or off-airport facilities
- Ensure jet fuel certification at appropriate locations

Selection Criteria for evaluating potential projects (1 of 2)

Statutory criteria (1-5). May develop additional criteria – see slide 2 of 2.

1. "the capacity for eligible entity to increase the domestic production and deployment of **sustainable aviation fuel** or the use of low-emission aviation technologies among the United States commercial aviation and aerospace industry;
2. the projected greenhouse gas emissions from such project, including emissions resulting from the development of the project, and the potential the project has to reduce or displace, on a lifecycle basis, United States greenhouse gas emissions associated with air travel;
3. the capacity to create new jobs and develop supply chain partnerships in the United States
4. for projects related to the production of sustainable aviation fuel, the projected lifecycle greenhouse gas emissions benefits from the proposed project, which shall include feedstock and fuel production and potential direct and indirect greenhouse gas emissions (including resulting from changes in land use)
5. the benefits of ensuring a diversity of feedstocks for sustainable aviation fuel, including the use of waste carbon oxides and direct air capture"

Selection Criteria for evaluating potential projects (2 of 2)

Developing method to evaluate lifecycle greenhouse gas reductions:

- Building on work already undertaken in ICAO
- Leveraging SAF Grand Challenge LCA Working Group efforts
- Considering DOE methods for fuel production facilities
- Could leverage ICAO-GREET tool maintained by Argonne National Labs

Note that additional criteria may be applied, and National and Departmental policy considerations will be reflected in the selection decision, as appropriate.

Considerations for Discussion

For evaluating SAF projects, the Government may consider multiple elements that are consistent with the authorizing legislation and policy objectives. Some elements the Government may consider, without limitation include:

- How the project would help increase SAF production and use
- If the proposed work has been previously identified in studies or infrastructure analyses
- The size of the market that the project could benefit
- The magnitude of the funding level needed versus the expected impact on SAF production, transportation, blending or storage (e.g. gallons of projected SAF production, volume of SAF storage facility, capacity of SAF blending site)
- The potential for leveraging additional financial support for the project

Considerations for Discussion

Additional elements the Government may consider for SAF projects, without limitation:

- Recognition of potential trade-offs/risks that may occur as a result of the projects given the interconnectedness of conventional fueling infrastructure (e.g., increased SAF storage at the expense of conventional jet fuel storage)
- Extent of project impact: whether the project could benefit multiple airports and jet fuel consumers or is limited to a specific airport or region
- Identification of challenges that may exist for the project but are outside of the realm of experience for conventional jet fuel production, transportation, blending and storage

Tracking Progress

- As we stand up FAST-SAF Program, may gather input and data from other federal agencies and stakeholders to track progress
- Want to track projects being supported, increased use of SAF and emissions reductions that will come from supported projects
- As different projects come online at different times, will create a time history and show future projected benefits of supported projects
- Will also consider how to capture geographical distribution of awards and how they are supporting different regions across the nation

FAST-Tech Grant Program

Overview

- **Key Objective**: *make investments to accelerate the development and demonstration of low-emission aviation technologies in line with U.S. aviation climate goals to reduce aviation carbon emissions*

- **Section 40007 Direction:** "carry out projects located in the United States that develop, demonstrate, or apply low-emission aviation technologies."

- **Definition of Low-Emission Aviation Technologies from Section 40007:** "technologies, produced in the United states, that significantly—(A) improve aircraft fuel efficiency; (B) increase utilization of sustainable aviation fuel; or (C) reduce greenhouse gas emissions produced during operation of civil aircraft"

Interagency Coordination

- FAA coordinates regularly with other government agencies including NASA, ARPA-E, and DoD as part of our environmental aircraft technology development programs and projects, including for work under CLEEN and ASCENT.

- Existing FAA environmental technology development programs are aligned to support SFNP. FAST-Tech will be aligned with SFNP as appropriate and to the extent consistent with the authorizing legislation.

- As we are standing up the low-emission aviation technology grant program, we are gathering input and data from other federal agencies to coordinate, as appropriate and to the extent consistent with the authorizing legislation, our technical focus and ensure that it is complementary to their research and development investments.

Range of Potential Projects - Overview

- Low-Emission Aviation Technologies Definition (in Section 40007):
  A. Improve aircraft fuel efficiency;
  B. Increase utilization of sustainable aviation fuel; or
  C. Reduce greenhouse gas emissions produced during operation of civil aircraft”

- FAA is already working with industry, academia, and other government agencies to approve SAF that can be used without blending with conventional jet fuel thus enabling a 100% utilization of SAF in any gas turbine powered aircraft.

Range of Potential Projects - Details

Two project categories being considered for the FAST-Tech Program:

1. Designing, prototyping, and testing of discrete low-emission aviation technologies
   - Relatively near-term impact on emissions from future engine and aircraft designs
   - Technologies might be limited vehicle types or specific company product lines
   - Similar to technology development efforts in CLEEN and ASCENT
2. Enhancing aircraft and engine technology testing and demonstration capabilities to accelerate development and demonstration of a broad range of low-emissions aviation technologies.
   - Longer-term impact on emissions from future engine and aircraft designs
   - Support development of tech over broad range of vehicle types
   - Impact of projects could endure for long time period and help entire industry
   - Improve understanding of technologies to enable future benefits
   - AEE currently standing up one project within ASCENT that fits in this category (ASCENT Project 92 at Penn State University to expand turbine facility)

Selection Criteria for evaluating potential projects (1 of 2)

Statutory selection criteria (1-3). May develop additional criteria – see slide 2 of 2

1. “the capacity for eligible entity to increase the domestic production and deployment of sustainable aviation fuel or **the use of low-emission aviation technologies** among the United States commercial aviation and aerospace industry;
2. the projected greenhouse gas emissions from such project, including emissions resulting from the development of the project, and the potential the project has to reduce or displace, on a lifecycle basis, United States greenhouse gas emissions associated with air travel;
3. the capacity to create new jobs and develop supply chain partnerships in the United States”

Selection Criteria for evaluating potential projects (2 of 2)

Notes on selection criteria:

- Regarding criterion 2, emissions associated with the project itself, including its development, will be orders of magnitude lower than benefits associated with use of supported technology.

- Additional criteria may be applied, and National and Departmental policy considerations will be reflected in the selection decision, as appropriate.

Considerations for Discussion

For low-emission aviation technology projects the Government may consider multiple factors that are consistent with the authorizing legislation. Some of those factors may include, without limitation:

- The potential for leveraging additional financial support for the project
- The potential of the project to help the aviation sector reach net zero greenhouse gas emissions by 2050
- How the project's benefits can be assessed
- Whether technologies provide a step-change in emissions reduction, and whether enhanced test/demonstration capabilities are state of the art
- The strong interdependencies across fuel burn, noise, and emissions in modern air vehicles, including any potential trade-offs that may occur as a result of these technologies (e.g., reduction in fuel burn/CO2 emissions at the expense of increased noise or other emissions)

Considerations for Discussion

Additional considerations for low-emission aviation technology projects may include, without limitation:

- The timeframe for market introduction of technologies following conclusion of research and development; or the timeframe during which an enhanced test/demonstration capability will have an impact
- The applicability of technologies or test/demonstration capabilities to multiple aircraft size classes and market segments
- Whether a broad range of organizations and segments of the industry could utilize the enhanced test/demonstration capabilities
- The potential to retrofit these technologies
- The airworthiness certification implications of these technologies
- The maturity level of technologies that would be able to be tested and demonstrated with any new or enhanced test/demonstration capability
- Any challenges beyond the realm of past experience

Considerations for Discussion

- The following are some examples of areas of low-emissions aircraft technology development that the Government sees as having potential to achieve reductions in emissions:
  - Airframe technologies and architectural changes
  - Propulsion technologies and architectural changes
  - Operational technologies that change the way an aircraft flies/operates
  - Enhanced test/demonstration capabilities that enable development for the above technology areas

- This is not an exhaustive list and these priorities continue to evolve as we stand up this program and otherwise pursue our low-emission aviation technology goals.

Tracking Progress

- Intend to quantify emissions reductions over time that will come from project investments
- FAA currently works to model and assess benefits of its CLEEN Program via ASCENT system-level assessments being done by Georgia Tech in ASCENT Project 37
- Projects funded under FAST-Tech Program will likely be assessed via a similar process, to quantify their contribution to emissions reduction on an individual aircraft basis, as well as on the future fleet of civil aircraft
- Will also consider how to capture geographical distribution of awards and how they are supporting different regions across nation

Next Steps

Tentative Timeline – Subject to Revision

Date	Milestone
Dec 14, 2022	Conduct a one-day hybrid meeting to solicit input at DOT Headquarters. Beginning of open period to gather input.
Jan 31, 2023	End of open period to gather input.
Spring / Summer 2023	Issue Notice Of Funding Opportunity (NOFO) for the FAST-SAF and FAST-Tech Programs
Autumn 2023 / Winter 2024	Award first round of grants (Sept 2023), which would expend up to half of the total funding for FAST-SAF Program and all of funding for the FAST-Tech Program

Contact us!

You are invited to submit any comments, feedback or questions concerning this program and the information presented in today's event to fast-saftech@faa.gov on or before January 31st, 2023.

Please note that any individual input from participants in today's meeting will be considered by the FAA individually, with equal consideration afforded to each participants' input, and will not be used for establishing a consensus concerning any aspect of the program.