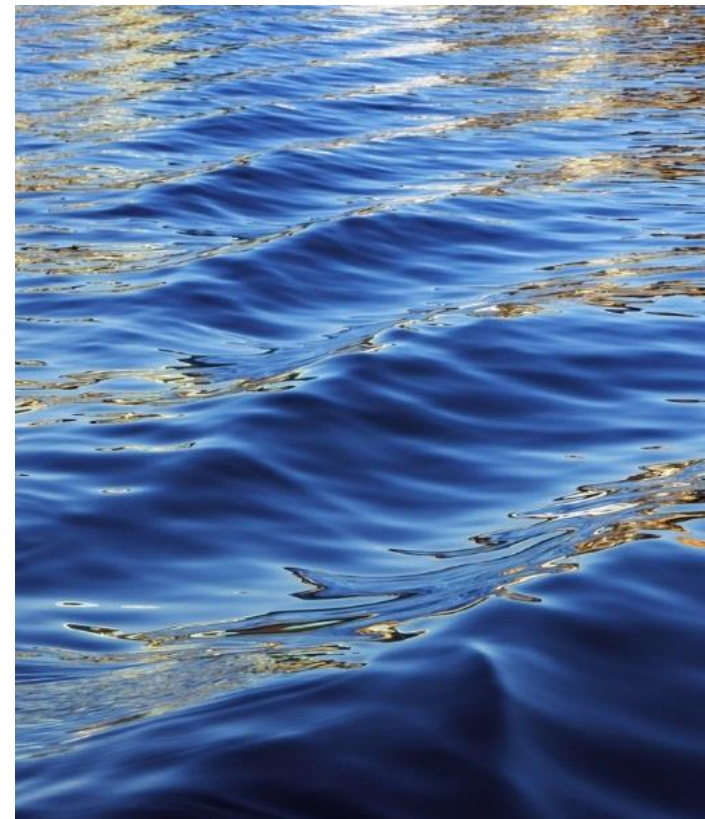




ASCENT 2022

April 5, 2022

Bill Goldner, USDA – Office of the Chief Scientist

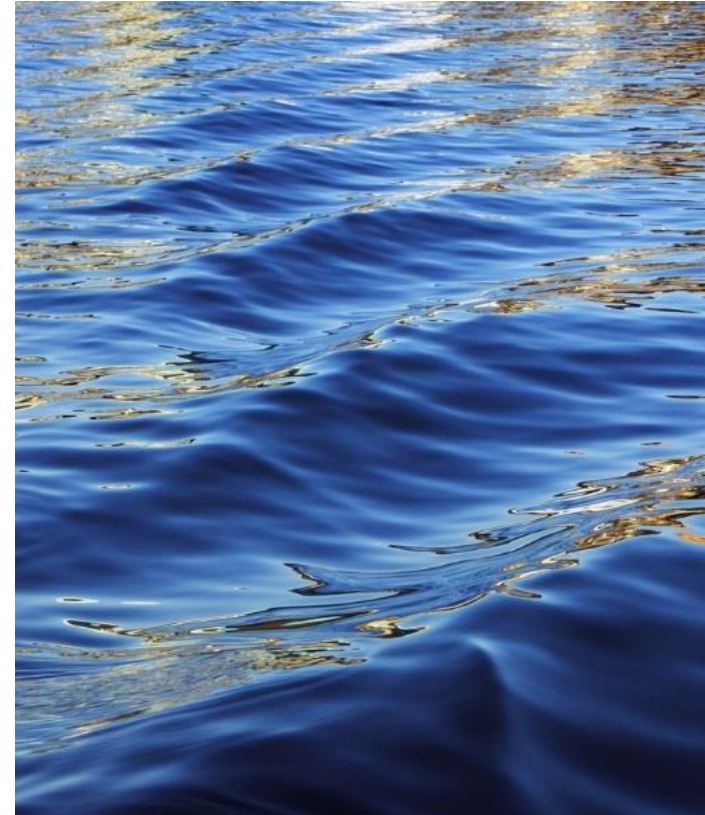


Topics to Cover

- Climate-Smart Agriculture and Forestry
- USDA's Role in the Sustainable Aviation Fuel Grand Challenge
- Partnerships for Climate Smart Commodities



Climate-Smart Agriculture and Forestry

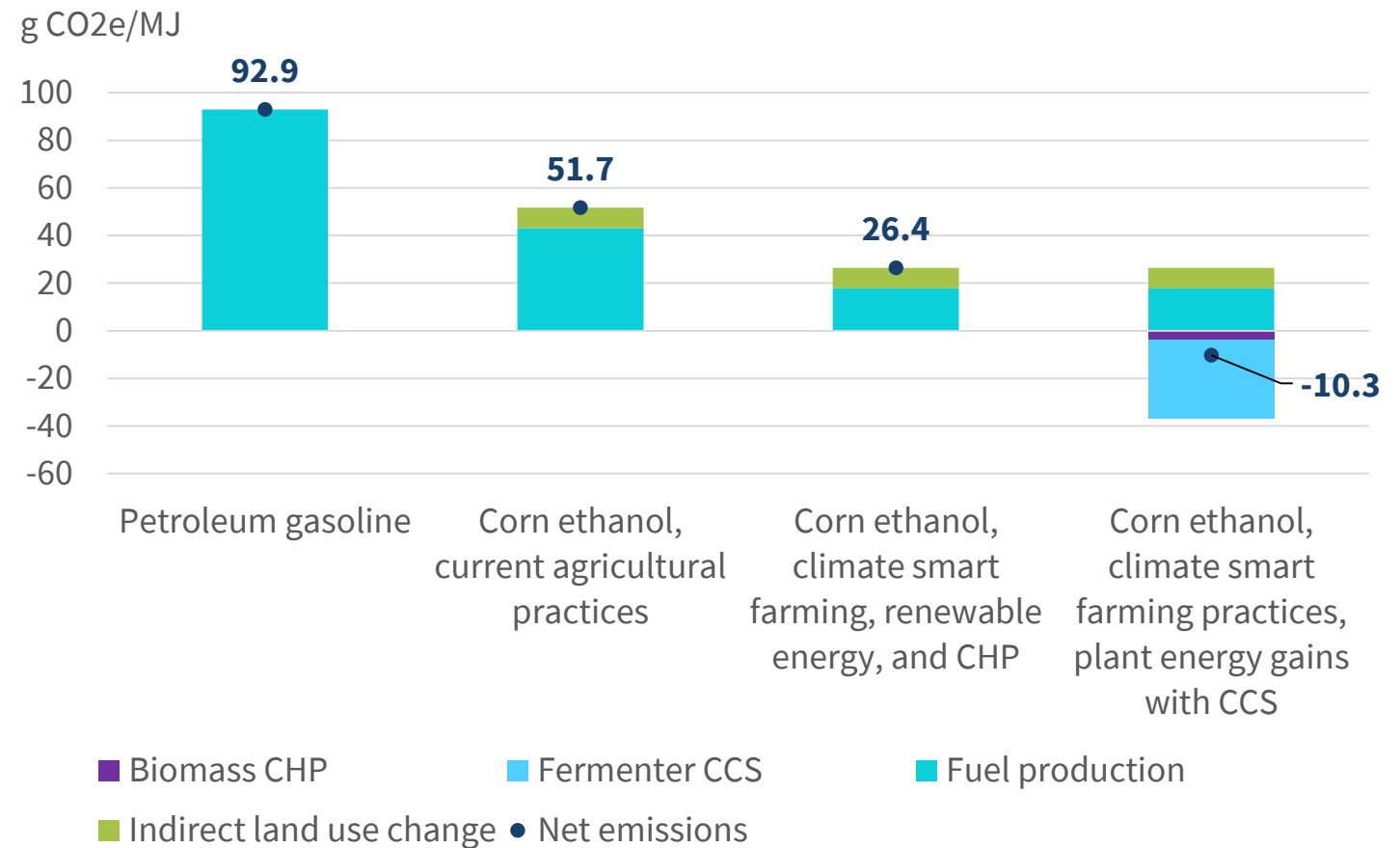


Climate-Smart Agriculture and Forestry

- Significantly reduce crop production and management inputs for water, nutrients, energy while optimizing productivity (yield, quality farm/forest-gate income) per unit land:
 - Improved water quality
 - Reduced GHG and CI
 - Improved air quality (e.g., particulates, odor)
 - Soil protection from erosion
 - Soil regeneration and carbon sequestration
- Accruing benefits across the stakeholder landscape, including disadvantaged communities.
- Supporting the development and commercialization of:
 - Low carbon intensity ethanol
 - Renewable diesel
 - Sustainable Aviation Fuel (SAF)
 - Renewable natural gas (RNG)
 - Bioproducts, biochemicals, biomaterials

Ethanol carbon intensity

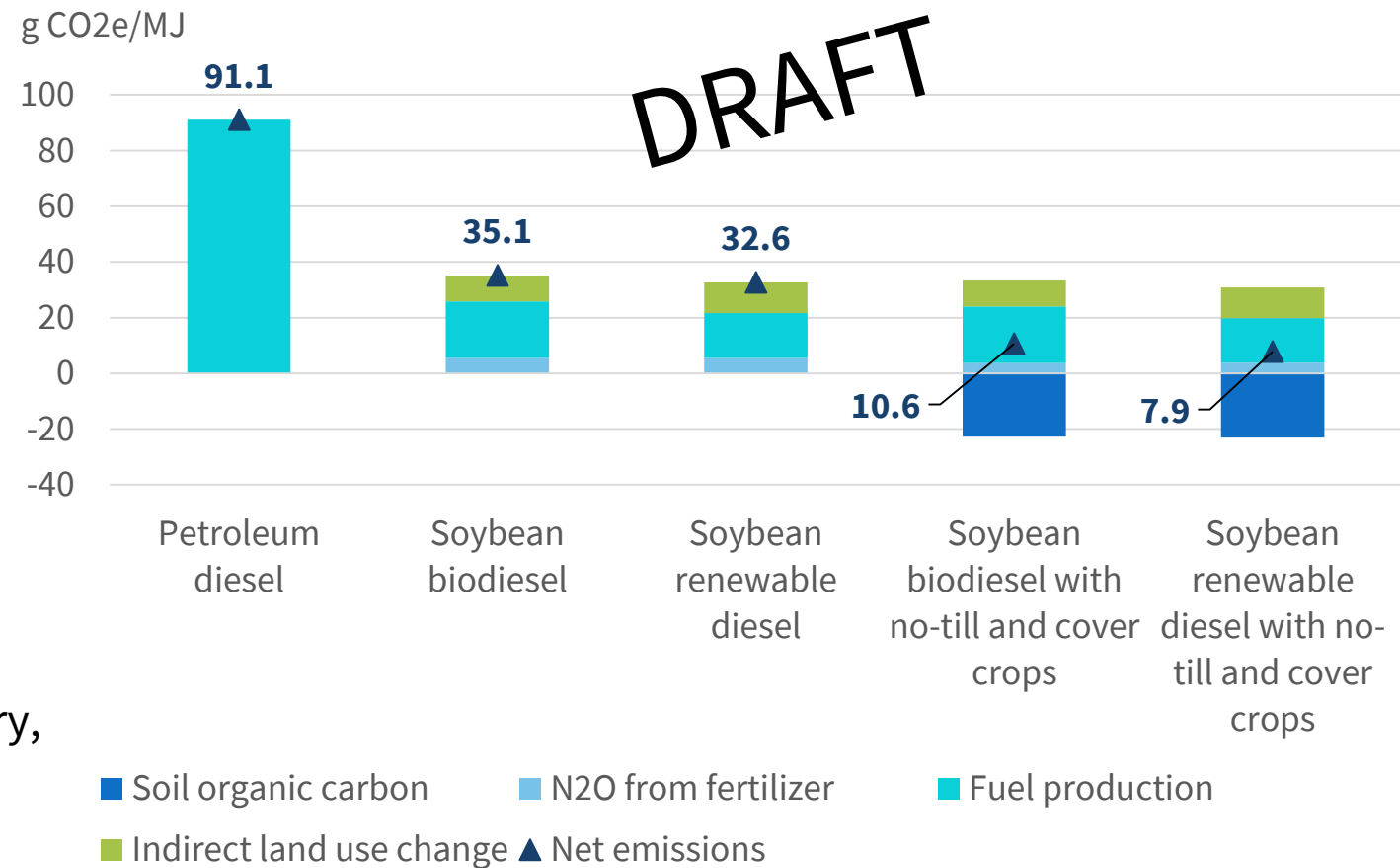
Ethanol produced from corn grown using existing practices is already less carbon-intensive than petroleum gasoline. **With reduced tillage and cover crops, ethanol from corn can reduce carbon intensity relative to petroleum gasoline by up to 72%.** Capture and sequestration of CO₂ from the fermenter in conjunction with regenerative agriculture can Make ethanol carbon-negative.



Sources: EPA, ICF, Argonne National Laboratory, and Office of the Chief Economist

Biodiesel and renewable carbon intensity

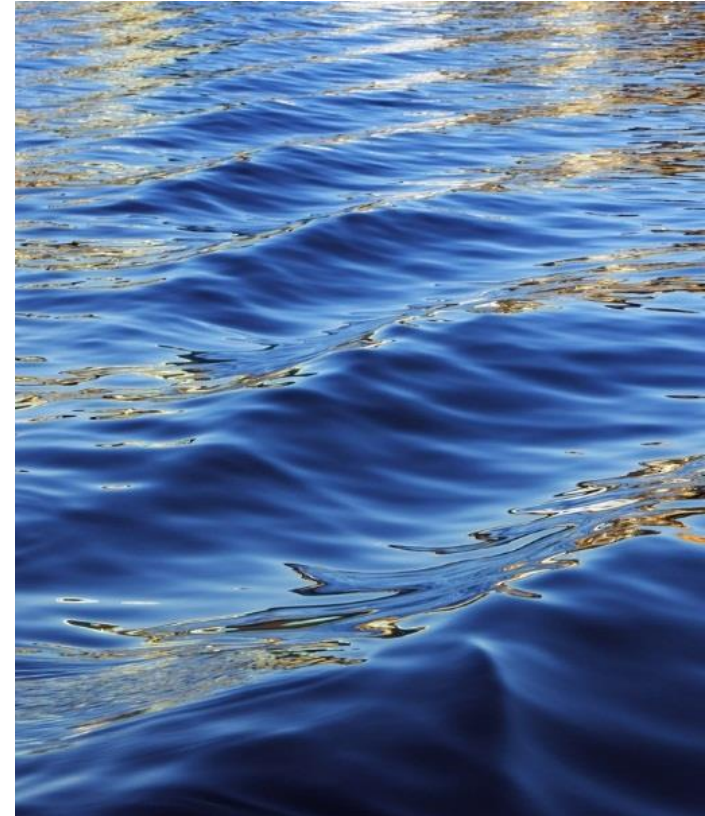
Biodiesel and renewable diesel produced using oil from soybeans grown using existing practices are already less carbon-intensive than petroleum diesel. **With no-till production and the use of cover crops, biodiesel and renewable diesel from soybean oil can reduce carbon intensity relative to petroleum diesel by up to 89% and 92%, respectively.**



Sources: EPA, Argonne National Laboratory, Colorado State University, and Office of the Chief Economist



USDA's Role in the Sustainable Aviation Fuel Grand Challenge



The Sustainable Aviation Fuel Grand Challenge: Focusing Unique Federal Resources and Capacities on Enabling Sustainable Aviation Fuel at Scale

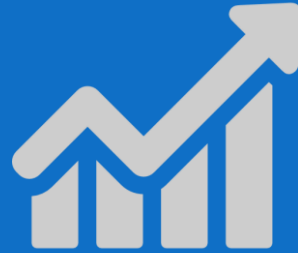
- A **government-wide effort** to **reduce cost**, **enhance sustainability**, and **enable production and use** of Sustainable Aviation Fuel (SAF) to meet 100% of aviation fuel demand by 2050.
- The effort will require a **coordinated government wide approach** to catalyze synergy and collaboration: research and development activities; outreach/technology transfer; demonstration & deployment; commercialization support; workforce development; and policies to address critical objectives in federal support for the expansion of SAF.
- It will also **affirm to industry that** the **US government**, across multiple agencies, is **committed to SAF** research, development, and deployment and will provide a plan for continuing, long-term, secure, substantial assistance.

USDA Role in the SAF Grand Challenge



Feedstock Supply Chain Systems

- Genetic Development
- Sustainable Production and Management
- Supply Chain Logistics
- Extension and Workforce Development



Conversion and Sustainability Analysis

- Bioconversion
- Oilseed conversion system optimization
- Co-products
- Analysis – Environmental, Economic, Social



Commerciali- zation Support

- 9003 Biorefinery Assistance Program
- Other Financial Assistance Programs

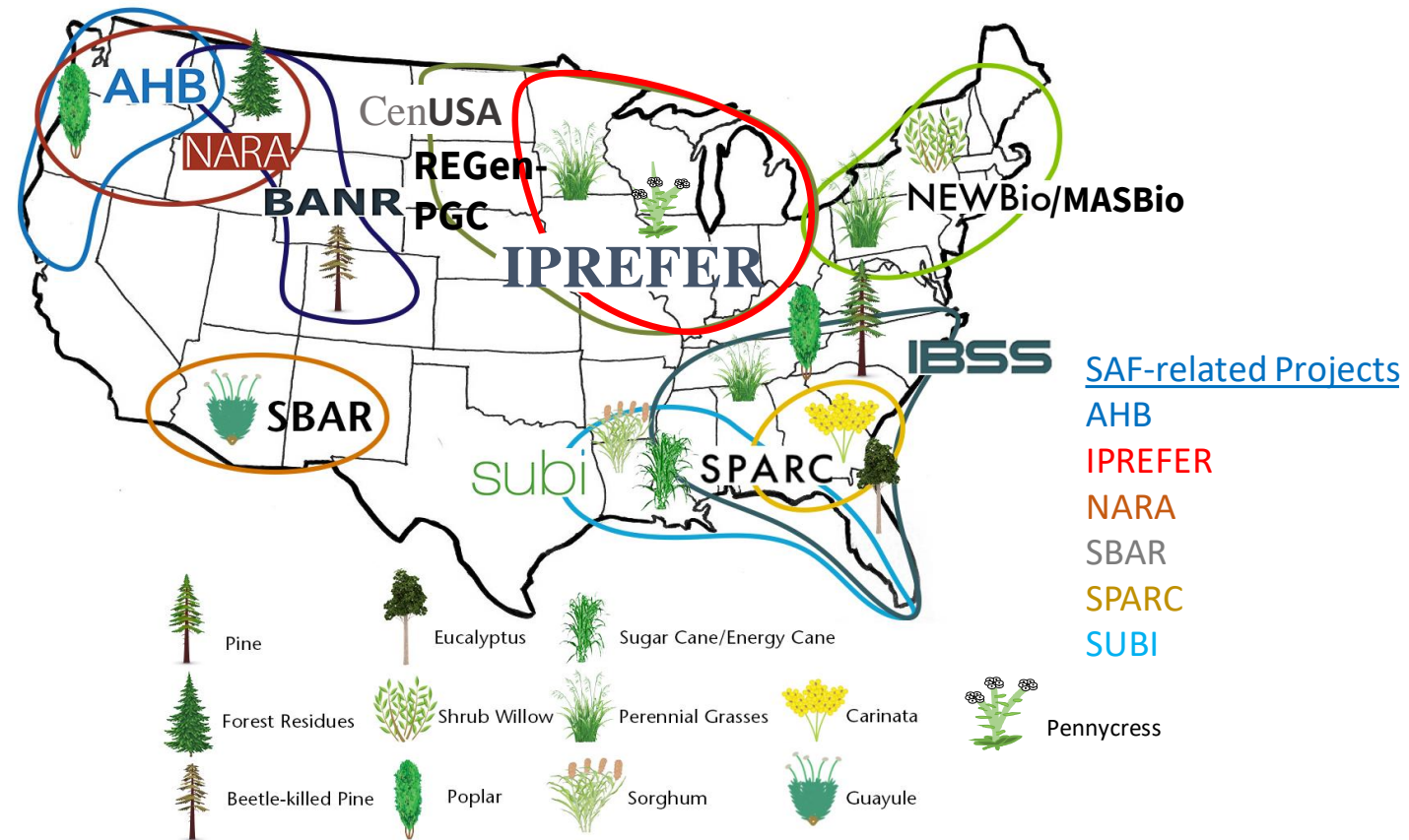
USDA: Agricultural Research Service

- Capabilities to advance SAF research at four ARS regional Unitization Centers (Albany, CA; Wyndmoor (Philadelphia), PA; New Orleans, LA; and Peoria, IL)
- Current efforts on SAF by ARS are located in Peoria, IL
 - yeast-based oils to produce biodiesel/biojet from lignocellulosics
 - biorefinery compatible oily yeast strain platform for synthetic biology
 - *Mechanism for in situ* detoxification pathway for biomass contaminants for ARS tolerant industrial yeast
- ARS Biomass Research and Development Centers
 - Research on crop genetic development, sustainable crop production and management, landscape integration

USDA National Institute of Food & Agriculture

- **AFRI:** Agriculture and Food Research Initiative
- **SAS:** Sustainable Agricultural Systems Program
- **2022 Request for Applications now open for 4-5 year projects, up to \$10M.** Agriculture and Food Research Initiative - Sustainable Agricultural Systems | National Institute of Food and Agriculture (usda.gov)
- **Coordinated Agricultural Projects (CAPs)**
 - **Integrate** research, development, demonstration, education/workforce development, Extension/outreach/tech transfer to producers and processors
 - **Regional biomass supply chains linked to bioeconomic value propositions** (biofuels, biobased chemicals and products), **overarched by environmental, economic, and social sustainability analysis**

National Institute of Food and Agriculture - Coordinated Agriculture Projects



USDA SAF Coordinated Agricultural Projects (CAPs)

- **SPARC** (\$15 M - UFL, NuSeed, ARA, others) A CAAFI-initiated project
 - Oilseed (Brassica) Carinata winter crop to SAF and non-GMO animal feed
 - **Already commercial in Argentina and Uruguay**
 - ARA received ASTM fuel certification
 - Nuseed signed development agreement with BP
- **IPREFER** (\$10 M – Western Illinois U, USI, UMN, CoverCress, REG/Chevron) A CAAFI-initiated Project
 - Oilseed domesticated Pennycress cover crop to SAF and co-products (**huge potential acreage**)
 - **First commercial plantings in Fall 2021.**
 - Pennycress and Carinata can dramatically reduce the CI for corn, soy, and other rotations.
- **SBAR** (\$15 M - UAZ, USDA-ARS, NMSU, Bridgestone Americas)
 - Desert shrub Guayule is an emerging source for natural rubber. ~80% of guayule biomass is lignocellulosic bagasse that could be converted into SAF. All aviation tires are made of 100% natural rubber. US imports 100% of natural rubber.
 - **Biorefinery in AZ by 2026.**

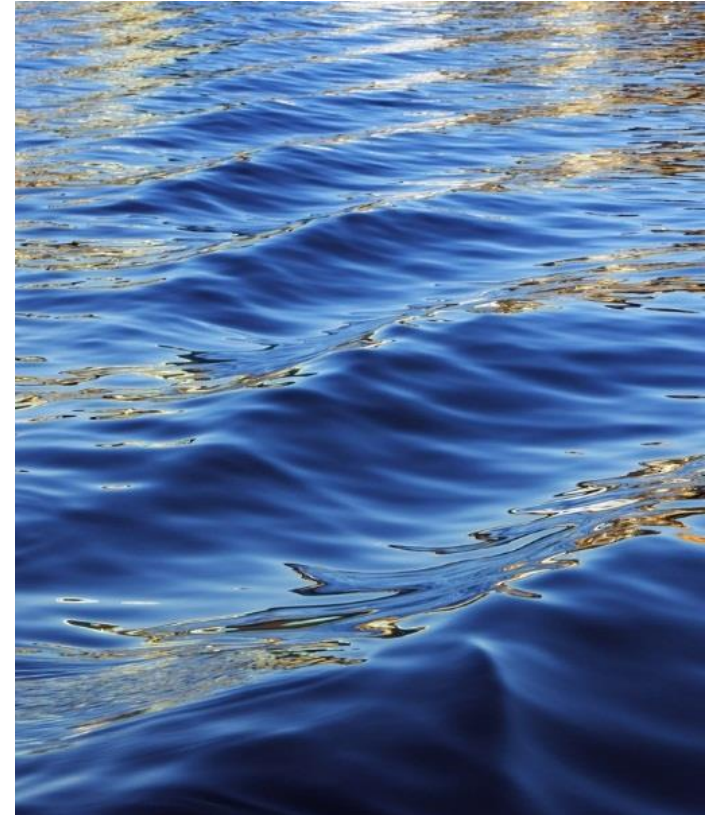
USDA Rural Development 9003 Biorefinery Assistance Program: SAF Applications in Progress

- Commercialization Assistance

• LanzaJet	\$ 65,000,000
• Aemetis	125,000,000
• Readifuel	86,250,000
• Wellington	198,000,000
• AIC	<u>250,000,000</u>
	\$694,250,000



Partnerships for Climate Smart Commodities



Market Opportunities

- Markets are demonstrating demand for commodities produced using climate-smart practices
- Consumers are increasingly interested in how their products are produced
- **This program is about leveraging that demand to create new revenue streams for producers**



Key Principles

- Focused on creating new opportunities and markets for agriculture and forestry
- Focused on partnerships
- Voluntary and incentive-based
- Farmer, rancher, and landowner-led
- Accessible to small and/or underserved producers
- Accessible to early adopters



Partnerships for Climate-Smart Commodities

\$1B grant funding available for pilot projects:

[Partnerships for Climate-Smart Commodities | USDA](#)

Projects will:

- Implement climate-smart production practices, activities and systems on working lands
- Measure/quantify, monitor and verify the associated GHG benefits
- Develop markets and promote resulting climate-smart commodities

Funding Pools/Application Deadlines

POC: Kathryn Zook, Kathryn.zook@usda.gov

Applications will be accepted from two pools:

- **First Funding Pool** – [May 6, 2022](#), by 11:59 p.m. ET

Proposals from **\$5 million to \$100 million** are in the first funding pool and should include pilot projects that emphasize the greenhouse gas benefits of climate-smart commodity production and include direct, meaningful benefits to a representative cross-section of production agriculture, including small and/or historically underserved producers

- **Second Funding Pool** – [June 10, 2022](#), by 11:59 p.m. ET

Proposals from **\$250,000 to \$4,999,999** are in the second funding pool and are limited to particularly innovative pilot projects. These projects should place an emphasis on:

- Enrollment of small and/or underserved producers, and/or
- Monitoring, reporting and verification activities developed at minority-serving institutions.