



Environment and Natural Resources Trust Fund

2025 Request for Proposal

General Information

Proposal ID: 2025-249

Proposal Title: Industrial Decarbonization in Minnesota through Sustainable Aviation Fuels

Project Manager Information

Name: Jennifer King

Organization: National Renewable Energy Laboratory

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Project Basic Information

Project Summary: Performing TEA/LCA of the relevant SAF pathways leveraging MN resources, providing a preliminary design of a potential SAF plant, identifying demonstration facilities necessary to derisk the MN SAF hub

ENRTF Funds Requested: \$1,000,000

Proposed Project Completion: June 30, 2026

LCCMR Funding Category: Air Quality, Climate Change, and Renewable Energy (E)

Project Location

What is the best scale for describing where your work will take place?

Region(s): SW

What is the best scale to describe the area impacted by your work?

Statewide

When will the work impact occur?

During the Project

Narrative

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Minnesota presents a significant opportunity to become a leader in industrial decarbonization and in particular, the sustainable aviation fuel (SAF) sector, given its access to renewable energy, hydrogen production and storage capabilities, robust agricultural, ethanol, and resources industry, and the establishment of the SAF hub led by Greater MSP bringing together industry leaders. SAF represents a critical solution to potentially reduce greenhouse gas emissions significantly compared to conventional jet fuel. However, the transition to SAF is encumbered by uncertainties in economic competitiveness, lifecycle environmental benefits, and scalability of production technologies.

The problem lies in the early stage of SAF technologies which poses a high risk for early adopters, deterring investment, and widespread implementation. There is a lack of comprehensive analysis specific to MN context and resources that evaluates the economic and environmental viability of different SAF pathways to accelerate the SAF hub in MN. Moreover, the absence of a demonstrative SAF production plant means that potential risks remain unmitigated, and the practicality of production at scale is unproven. Filling this gap will allow MN to capitalize on its resources and progress towards national and international leadership in decarbonization targets in aviation.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

The proposal targets the challenge of integrating SAF within Minnesota's energy portfolio and accelerating the SAF Hub. Despite SAF's potential to significantly reduce aviation-related carbon emissions, the industry faces hurdles in economic viability, lifecycle environmental impacts, and technological maturity.

To address these challenges, the project proposes a three-phase approach:

- 1) Conducting a thorough Techno-Economic Analysis (TEA) and Life Cycle Assessment (LCA) to evaluate the feasibility, economic implications, and environmental impacts of various SAF pathways. This will demonstrate the most promising routes for SAF production, based on Minnesota's specific resource landscape and industrial capabilities. This phase will include a workshop to identify R&D gaps and key industry participants
- 2) Creating a preliminary design for a prospective SAF production plant in MN, considering the state's unique infrastructure, cross-sector coupling opportunities with other related industries especially in hydrogen, feedstock availability, and energy mix. This design will serve as a blueprint for potential future development of industrial decarbonization applications and help attract investment.
- 3) Identifying demonstration facilities to demonstrate and validate the chosen SAF pathways; bridging the gap between research and deployment leveraging existing demonstration capabilities such as those at WCROC/UMN-Morris. A workshop will bring stakeholders together to identify gaps in facilities.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

The specific project outcomes are as follows:

Comprehensive Report: Deliver a detailed report from the techno-economic analysis (TEA) and life cycle assessment (LCA) of various SAF pathways, emphasizing those that use Minnesota's natural resources effectively and sustainably.

Preliminary Plant Design: Based on the insights from the TEA/LCA report, produce a preliminary design for a potential SAF production plant. This design will incorporate Minnesota's unique resource availability.

Demonstration Project Design: Develop a detailed plan for a demonstration facility, in collaboration with UMN and NREL, that showcases the viability and efficiency of the proposed SAF pathway.

Activities and Milestones

Activity 1: Techno-Economic Analysis and Life Cycle Assessment (TEA/LCA)

Activity Budget: \$250,000

Activity Description:

Objective: To assess the economic viability and environmental impact of various SAF pathways specific to Minnesota.

Tasks:

- Collect data on different SAF production methods.
- Analyze cost factors, energy inputs, and outputs for each pathway.
- Evaluate environmental impacts throughout the life cycles of various SAF pathways.
- Summarize findings into a comprehensive report.

Method: Engage with academic and industry experts to gather the latest data, utilizing state-of-the-art software and methodologies for TEA/LCA.

Outcomes: A detailed report identifying the most promising SAF pathways for Minnesota, with clear indicators of economic and environmental performance.

Activity Milestones:

Description	Approximate Completion Date
Completion of the TEA/LCA Report	October 31, 2025

Activity 2: Preliminary Design of a Potential SAF Production Plant

Activity Budget: \$500,000

Activity Description:

Objective: To create a preliminary design for a SAF plant based on the results from the TEA/LCA.

Tasks:

- Draft design specifications including technology selection, capacity, and layout.
- Conduct a feasibility study for the proposed design.
- Prepare a preliminary cost estimate and project timeline.

Method: Collaborate with engineering firms and consult with potential operators.

Outcomes: A ready-to-implement design document for a potential SAF plant in Minnesota.

Activity Milestones:

Description	Approximate Completion Date
Finalization of the Preliminary Plant Design	April 30, 2026

Activity 3: Demonstration Facility Design

Activity Budget: \$250,000

Activity Description:

Objective: To design a demonstration facility that can de-risk the SAF technology.

Tasks:

- Identify suitable existing facilities for the demonstration (West Central Research and Outreach Center).
- Design modifications required to convert them for SAF production and identify cross-sector coupling opportunities.
- Develop a plan for the demonstration project, including objectives, scale, and duration.
- Include one stakeholder workshop to evaluate necessary facilities to derisk and accelerate SAF at scale.

Method: Work in partnership with facility owners and leverage their existing infrastructure.

Outcomes: A demonstration facility design plan that can validate the chosen SAF pathways and encourage investment.

Activity Milestones:

Description	Approximate Completion Date
Report on Demonstration Facility Design	June 30, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Jennifer King	National Renewable Energy Laboratory	TEA/LCA and relevant preliminary design	Yes

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?

Upon project completion, the report from phase one will guide stakeholders in decision-making and investment. The potential plant design will be proposed to industry partners and investors as a blueprint for implementation. For the demonstration design, we will engage with existing facilities to plan pilot projects. We aim to secure ongoing funding through public grants, private investments, and partnerships, particularly focusing on support from the Department of Energy for a first-of-its-kind plant. This will serve as a scalable model for a future statewide SAF hub, aligning with both environmental and economic objectives.

Project Manager and Organization Qualifications

Project Manager Name: Jennifer King

Job Title: Manager, Wind-Based Hybrid Systems

Provide description of the project manager’s qualifications to manage the proposed project.

Extensive experience managing multi-million dollar projects across multiple DOE labs and industry stakeholders.

Manage and lead team of 15+ engineers to develop wind-based hybrid systems solutions for communities across the nation.

Organization: National Renewable Energy Laboratory

Organization Description:

The National Renewable Energy Laboratory (NREL) is at the forefront the energy transition to achieve our decarbonization goal. NREL has experience in industrial decarbonization and sustainable aviation fuels (SAF) nationwide, while also prioritizing collaboration with local communities for sustainable energy practices. NREL's industrial decarbonization efforts are focused on reducing carbon emissions through enhancing energy efficiency, incorporating renewable energy in industrial operations, and advancing carbon capture technologies. A critical part of industrial decarbonization expertise at NREL is system integration of co-located systems across renewables, hydrogen production/storage, and end-uses such as SAF. NREL is instrumental in researching bio-based and synthetic SAFs to decrease the industry's reliance on fossil fuels, working closely with various stakeholders to scale up SAF production sustainably.

Community engagement is integral to NREL's strategy, emphasizing partnerships with local entities to foster renewable energy adoption and address unique energy challenges. Through these efforts, NREL supports the development of localized, sustainable energy solutions, showcasing a holistic and cross-sector approaches to combating climate change and advancing towards a more sustainable future.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
NREL		Contribute to TEA/LCA, preliminary design, and demonstration design assistance. Partnering with UMN campuses to determine experimental capabilities. TBD at time of proposal and will be subcontracted in Phase 1.			0%	3		\$660,000
Greater MSP		Project management			0%	0.25		\$150,000
Great Plains Institute		Stakeholder engagement through workshops, assisting in analysis with location and feedstock feedback			0%	1		\$150,000
							Sub Total	\$960,000
Contracts and Services								
							Sub Total	-
Equipment, Tools, and Supplies								
							Sub Total	-
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
							Sub Total	-
Travel Outside Minnesota								

	Conference Registration Miles/ Meals/ Lodging	SAF major conference to receive feedback on current results	SAF major conference to receive feedback on current results					\$10,000
							Sub Total	\$10,000
Printing and Publication								
	Publication	Open-source journal publication, 2 papers	Describe the SAF pathways available in the state and attract stakeholders and investments to accelerate SAF.					\$10,000
							Sub Total	\$10,000
Other Expenses								
		Stakeholder workshop	2 workshops: 1) Bring together stakeholders across the supply chain to accelerate development of SAF pathway for MN, 2) focused on demonstration capabilities needed to accelerate at scale SAF.					\$20,000
							Sub Total	\$20,000
							Grand Total	\$1,000,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
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Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub Total	-
Non-State				
			Non State Sub Total	-
			Funds Total	-

Total Project Cost: \$1,000,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [ee6d1888-49a.pdf](#)

Alternate Text for Visual Component

MN has the opportunity to be a leader in industrial decarbonization based on access to green energy, hydrogen production/storage, raw materials, and existing infrastructure. SAF is a critical component to this industrial decarbonization strategy. This map demonstrates many of the critical components and their strategic location for cross-sector coupling....

Supplemental Attachments

Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other

Title	File
Letter of Support	8105ddb1-24e.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have potential for royalties, copyrights, patents, sale of products and assets, or revenue generation?

No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

N/A

Does your project include original, hypothesis-driven research?

Yes

Does the organization have a fiscal agent for this project?

No

Does your project include the pre-design, design, construction, or renovation of a building, trail, campground, or other fixed capital asset costing \$10,000 or more or large-scale stream or wetland restoration?

No

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services (as defined in Minnesota Statutes section 299C.61 Subd.7 as "the provision of care, treatment, education, training, instruction, or recreation to children")?

No

Provide the name(s) and organization(s) of additional individuals assisting in the completion of this proposal:

Robert Baldwin, NREL; Julia Silvis, Greater MSP; Brendan Jordan, GPI

