



## Environment and Natural Resources Trust Fund

### 2026 Request for Proposal

#### General Information

**Proposal ID:** 2026-309

**Proposal Title:** Environmental Impacts of Minnesota Sustainable Aviation Fuels

#### Project Manager Information

**Name:** Jason Hill

**Organization:** U of MN - College of Food, Agricultural and Natural Resource Sciences

**Office Telephone:** (612) 624-2692

**Email:** hill0408@umn.edu

#### Project Basic Information

**Project Summary:** This project will use state-of-the-science life cycle analysis methods to assess the potential for Minnesota-grown sustainable aviation fuels to reduce greenhouse gas emissions and improve air quality.

**ENRTF Funds Requested:** \$377,000

**Proposed Project Completion:** June 30, 2029

**LCCMR Funding Category:** Energy (E)

#### Project Location

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

Statewide

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

Statewide

**When will the work impact occur?**

During the Project and In the Future

## Narrative

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

Alternative aviation fuels, commonly referred to as sustainable aviation fuels (SAFs), are receiving growing interest as a means to reduce greenhouse gas emissions from one of the most difficult sectors to decarbonize. As a state with abundant agricultural resources, Minnesota has the potential to contribute large volumes of these fuels. But while our state can produce large volumes of SAFs, the extent to which they will contribute to greenhouse gas reductions relative to fossil fuels is largely unknown. Furthermore, the greenhouse gas accounting studies conducted to date have significant methodological deficiencies. For example, such studies have been overly optimistic in their assumptions, inappropriately extrapolating results from pilot experiments (ones that have produced no more than tens of gallons of aviation biofuels) to state-wide production scenarios of hundreds of millions of gallons. Another major unknown is how the production and use of SAFs will impact air quality. These unknowns hinder the sustainable development of SAFs in Minnesota, since both investments in their production and markets for their use hinge upon demonstrated environmental performance. Developing such knowledge would support the growth of this industry in this state.

**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.**

We propose to prepare the first, to our knowledge, comprehensive overview of the potential for SAFs in Minnesota to contribute to climate change mitigation and cleaner air. This project seeks to fill a critical knowledge gap in the development of a SAF industry in Minnesota. It explores the potential for SAF production in Minnesota to support climate change and air quality goals while improving industrial development and benefiting rural agricultural communities. We propose to prepare the first, to our knowledge, comprehensive overview of the potential for aviation biofuels in Minnesota to contribute to climate change mitigation. Our first goal is to provide an accounting of our state's potential for SAF production, relying upon publicly-accessible data sources to generate a broad overview of potential technologies and scenarios for viable production volumes and feedstock production locations. Our second goal is to quantify how increased SAF production might reduce emissions of pollution that contributes to climate change and harms air quality. We will take a life cycle approach consistent with state-of-science methodologies for assessing changes in emissions from industrial expansion. Our third goal is to estimate the climate change and human health effects of these emissions.

**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 outcome of this project is an increased public understanding of the potential for climate change mitigation and air quality improvements associated with increased SAF production in Minnesota. Our scenario-based approach will consider both near- and long-term growth of SAF production. This information will be described in the form of a public report that will provide actionable information for farmers, agribusiness, investors, environmental non-governmental organizations, policymakers, regulators, and consumers.

## Activities and Milestones

### Activity 1: Assess the current and potential SAF industry landscapes in Minnesota

**Activity Budget:** \$135,000

**Activity Description:**

The objective of this activity is to assess the production potential of SAF in Minnesota. We will explore the range of potential SAFs applicable to Minnesota production from various feedstocks and utilizing different conversion technologies. We will use the results to develop scenarios that consider SAF production of different fuels across a range of volumes. These scenarios will enable the life cycle greenhouse gas and air quality modeling in Activity 2.

**Activity Milestones:**

Description	Approximate Completion Date
Compilation of SAF options for Minnesota across relevant production parameters	December 31, 2026
Development of scenarios for Minnesota SAF production	June 30, 2027

### Activity 2: Assess the potential environmental impacts of sustainable aviation fuels in Minnesota

**Activity Budget:** \$220,000

**Activity Description:**

The objective of this activity is to quantify the changes in human health and environmental justice outcomes arising from the production and use of SAFs in Minnesota. The tasks involved include developing the emissions inventories based upon the scenarios developed in Activity 1. These inventories will then serve as inputs for computer models that estimate net greenhouse gas emissions and changes in health outcomes from changes in air quality. The overall outcome of this activity will consist of quantified changes in health outcomes and climate across the different SAF production scenarios.

**Activity Milestones:**

Description	Approximate Completion Date
Development of SAF inventories for pollutants affecting air quality and climate change	February 28, 2028
Quantification of air quality benefits of Minnesota SAFs	December 31, 2028
Quantification of climate change benefits of Minnesota SAFs	December 31, 2028

### Activity 3: Preparation and Presentation of Final Report

**Activity Budget:** \$22,000

**Activity Description:**

The objective of this activity is to prepare the final report and public presentation. This will be accomplished by writing up the final results and submitting the report for peer comment and review. The outcome, a final report and accompanying database, can be used directly by stakeholders to understand Minnesota's capacity for SAFs, and their potential to benefit air quality and to contribute to state and corporate greenhouse gas reduction targets.

**Activity Milestones:**

Description	Approximate Completion Date
Final report prepared and public release	April 30, 2029



## Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Dylan Millet	University of Minnesota - Dept. of Soil, Water, and Climate	co-PI	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?**

We will communicate our findings through publications and at conferences, by presenting to state and local elected officials, and by discussing results at state agencies including MNDOT, MDA, and MPCA. We will collaborate with the Minnesota Climate Adaptation Partnership to ensure that outcomes are disseminated to relevant policymakers and stakeholders. All modeling and analysis results will be permanently archived and made publicly available at the Data Repository for the University of Minnesota. No additional work will be needed for this project, but we anticipate seeking funding for subsequent work from a combination of federal, state, and foundation sources.

## Project Manager and Organization Qualifications

**Project Manager Name:** Jason Hill

**Job Title:** Distinguished McKnight University Professor

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

Dr. Jason Hill is a Professor in the Department of Bioproducts and Biosystems Engineering at the University of Minnesota. He received his A.B. from Harvard College in 1997 and his Ph.D. from the University of Minnesota in 2004. Dr. Hill has been studying the environmental, human health, and climate impacts of energy and natural resource use for over 20 years. As a central part of this work, his group has completed multiple projects using life cycle analysis to compare the environmental effects of conventional versus alternative energy sources, and of agriculture, within Minnesota and beyond.

Dr. Dylan Millet is a Professor in the Department of Soil, Water, and Climate at the University of Minnesota. He received his B.Sc. from the University of British Columbia in 1997, his Ph.D. from U.C. Berkeley in 2003, and completed postdoctoral training at Harvard University in 2007. Dr. Millet has been studying air pollution and atmospheric chemistry for over 20 years. He has completed many research projects examining how human-caused and natural emissions affect air quality and climate change. As part of these studies, his research team has successfully used ambient measurements, satellite data, and atmospheric modeling to characterize emissions for a wide range of air pollutants and greenhouse gases across Minnesota.

Drs. Hill and Millet have worked together on successful grants before, including as project leads in the US-EPA funded Center for Air, Climate and Energy Solutions. If funded, Drs. Hill and Millet will work together to accomplish the research scope of this project and to co-supervise the project's postdoctoral researcher. They will be responsible for fulfilling project milestones and reporting requirements, and for working with relevant stakeholders to ensure that project findings are broadly and effectively disseminated.

**Organization:** U of MN - College of Food, Agricultural and Natural Resource Sciences

**Organization Description:**

The University of Minnesota is one of the largest US universities and offers a rich research and academic infrastructure.

PI Hill is in the Department of Bioproducts and Biosystems Engineering, which has a mission to develop solutions for the sustainable use of renewable resources and the enhancement of the environment. The department discovers innovative solutions to advance sustainable production and consumption of energy, food, feed, fiber, materials, and chemicals through engineering, science, technology, and management.

Co-PI Millet is in the Department of Soil, Water, and Climate, which has a mission to advance understanding of Earth system processes and the interactions among land, atmosphere, and water. The department seeks to improve and protect the quality of soil, air, and water resources in natural and managed ecosystems; enhance agricultural and forest productivity and sustainability; predict and mitigate impacts of environmental change on ecosystems and society; and provide science-based knowledge for improved decision-making and a better-informed citizenry.

Drs. Hill and Dr. Millet have sufficient office and laboratory space, and computing resources, to conduct the proposed research. The project will also make use of the University of Minnesota Supercomputing Institute (MSI), which provides extensive software options and an array of high-performance computing systems.

## Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
<b>Personnel</b>								
Lead PI - summer salary only		Direct all research and personnel: create models			36.6%	0.24		\$64,339
Post Doc		test models, run calculations			25.9%	3		\$244,530
Co-PI - summer salary only		Collaborate on all research and model making			36.6%	0.24		\$66,514
							<b>Sub Total</b>	<b>\$375,383</b>
<b>Contracts and Services</b>								
							<b>Sub Total</b>	-
<b>Equipment, Tools, and Supplies</b>								
							<b>Sub Total</b>	-
<b>Capital Expenditures</b>								
							<b>Sub Total</b>	-
<b>Acquisitions and Stewardship</b>								
							<b>Sub Total</b>	-
<b>Travel In Minnesota</b>								
							<b>Sub Total</b>	-
<b>Travel Outside Minnesota</b>								
							<b>Sub Total</b>	-

<b>Printing and Publication</b>								
	Publication	Cost of publication in 1 journal	To share results and receive peer review					\$1,617
							<b>Sub Total</b>	<b>\$1,617</b>
<b>Other Expenses</b>								
							<b>Sub Total</b>	-
							<b>Grand Total</b>	<b>\$377,000</b>



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: \$377,000

This amount accurately reflects total project cost?

Yes

## Attachments

### Required Attachments

#### *Visual Component*

File: [c42b0d0e-1af.pdf](#)

#### *Alternate Text for Visual Component*

This figure is an overview of the proposal and includes supporting images of a graphic showing carbon dioxide emission trends from aviation, a photograph of a jet at MSP airport, a description of an emissions inventory, and a graphic showing possible feedstocks for SAFs....

### Supplemental Attachments

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

Title	File
Letter of Authorization to Submit	<a href="#">9e3d56ae-cc9.pdf</a>
Audit	<a href="#">6d0e88e0-686.pdf</a>

## Administrative Use

**Does your project include restoration or acquisition of land rights?**

No

**Do you understand that travel expenses are only approved if they follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?**

N/A

**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:**

Sponsored Projects Administration of the University of Minnesota

**Do you understand that a named service contract does not constitute a funder-designated subrecipient or approval of a sole-source contract? In other words, a service contract entity is only approved if it has been selected according to the contracting rules identified in state law and policy for organizations that receive ENRTF funds through direct appropriations, or in the DNR's reimbursement manual for non-state organizations. These rules may include competitive bidding and prevailing wage requirements**

N/A