Environment and Natural Resources Trust Fund

2025 Request for Proposal

General Information

Proposal ID: 2025-094

Proposal Title: Atmospheric Water Collection Project

Project Manager Information

Name: Jason Amundsen

Organization: Amundsen Farms, Inc DBA Locally Laid Egg Company

Office Telephone: (612) 245-0450

Email: jason@locallylaid.com

Project Basic Information

Project Summary: To find new avenues for water production for farms and municipalities, we are taking established dehumidification technology and adapting it for outdoor use powered either by the grid or solar.

ENRTF Funds Requested: $1,555,000

Proposed Project Completion: June 30, 2028

LCCMR Funding Category: Water Resources (B)

Project Location

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

Region(s): NE

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

Statewide

When will the work impact occur?

In the Future

Narrative

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

Minnesota's farms are becoming increasingly water stressed. Climate change is no longer making rainfall consistent. We are serving LCCMR's mission by bringing established dehumidification compressor technology to the outdoors and engineering it so the device creates water while attached to the grid and/or solar power. Our immediate goal is water for plants and animals, not necessarily human drinking water. Once completed, farmers can have water where and and when they want it. We believe this technology can be scaled up to help address Minnesota's other larger, looming challenges including the depletion of aquifers and the creation of water for municipal water systems.

This project is a collaboration between our company and two MN engineering schools, University of MN - Duluth and The University of St. Thomas. We have signed NDAs' with 3 different companies to build prototypes of these devices. We are working on various sizes of these devices to address various needs. A small 2/4 gallon a day device might be used at an orchard. A 7 gallon a day device(s) might be used by a livestock operation. Larger 15 / 20 gallon a day devices might be used for aquifers, factories or municipal water systems.

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.

Requested funding fulfills LCCMR's mission by creating new sources of water. Funds would be used to hire engineers, develop prototypes, provide funding for testing, travel and the reimbursement of costs associated with turning prototypes into working devices. Because we are making a niche product, manufacturers at first often have large minimums for initial production runs. Further, the challenge with creating a device which is designed for outdoor use is that it requires far more testing than a traditional home dehumidifier. For example, for farms, the device needs to work in a wide variety of environmental conditions requiring both conventional testing and outdoor testing. Because MN's weather is not always conducive, we are requesting some funds be used to test these devices out of state during the off season.

For prototyping, we are starting with devices that produce 2 and 4 gallons of water respectively, at 24 volts say for use in an orchard. A 7 gallon a day device could be for livestock farms while a 15 / 20 gallons a day for government use. All systems can be attached to the grid and/or solar powered. The ultimate goal is to make outdoor dehumidification as ubiquitous and inexpensive as indoor.

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?

By creating new water sources using established, proven technology this proposal dovetails with LCCMR's vision of enhancing MN's natural resources. Water is the bedrock of life in Minnesota. We need it for everything: from wildlife, agriculture, manufacturing, sanitation, drinking water, to manufacturing, et al. Every gallon of water generated through carbon-neutral dehumidification technology is a gallon not being pulled from an aquifer or above ground body of water. As a result, this proposal is core to LCCMR's mission.

At the end of this proposal we will have final designs for multiple sized systems.

Activities and Milestones

Activity 1: Design

Activity Budget: $591,000

Activity Description:
Design 2 and 4 gallon systems at 24 volt. Design a 7 gallon system which could be designed for a farm or household. Design a 15-20 gallon a day system that would be used for manufacturing, aquifers, and municipal water systems, either grid-tied or remote / solar powered. This process involves creating designs, building them, and then testing. Based upon the test results, reconfiguring and remanufacturing the device(s), and upon completion of 3 years of work, we'll have final designs for multiple sized systems. We will also be working with existing dehumification manufacturers to adapt their systems to outdoor use.

Activity Milestones:

Description	Approximate Completion Date
system requirement review	August 31, 2025
conceptual design	November 30, 2025
conceptual design review	December 31, 2025
preliminary design definition	February 28, 2026
preliminary design review	March 31, 2026
Conceptual final design	December 31, 2027
Conceptual final design review	January 31, 2028
Final design	May 31, 2028
Final design review	June 30, 2028

Activity 2: Build

Activity Budget: $684,000

Activity Description:
Build 2/4/7 and 15-20 gallon a day systems. This process will take time because we are working with manufacturers all over the world. Shipping, customs expenses and delays, will add cost and time.

Activity Milestones:

Description	Approximate Completion Date
make vs buy	May 31, 2026
supplier down select	July 31, 2026
place orders	August 31, 2026
receive orders	February 28, 2027
assemblies complete	April 30, 2027

Activity 3: Test

Activity Budget: $280,000

Activity Description:
Test: test four designs for performance, off grid functionality and outdoor resilience. Testing will be our biggest hurdle because many manufacturers have minimums for each design which needs to be met, i.e. a certain number of units

before they will do a run. Further, our weather in MN is not conducive to year-round testing. As a result, we are requesting the opportunity to travel to a climate where testing is possible when it's prohibitive .

Activity Milestones:

Description	Approximate Completion Date
place contract with test facility	June 30, 2027
test items delivered	July 31, 2027
test readiness review	August 31, 2027
test finish	September 30, 2027
test report complete	October 31, 2027

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
University of Minnesota Duluth	Engineering School	Engineering	No
University of St. Thomas	Engineering School	Engineering	No

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 are a for profit company. At the end of this proposal we will have achieved final designs which will lead us into production. We expect that these devices will be manufactured and sold to individuals, non-profits, and units of government looking for options to solve their water problems. We expect that once this grant period is over, we will have inexpensive, durable options for Minnesotans and a working, viable business. This business will not only help meet Minnesota's water needs, but will have fulfilled LCCMR's vision of preserving and enhancing MN's natural resources.

Project Manager and Organization Qualifications

Project Manager Name: Jason Amundsen

Job Title: Jason Amundsen

Provide description of the project manager's qualifications to manage the proposed project.
Jason is disabled veteran who, with no previous experience, entered into agriculture in 2012. He went on to build, and now daily operates, Locally Laid Egg Company statewide.

Jason earned his bachelors from the University of St. Thomas and earned a MS while serving in the 1st Armored Division as NATO peacekeeper in Bosnia. In addition to being a seasoned entrepreneur, Jason farms in Wrenshall on 45 acres. Jason and his employees operate a livestock operation with pasture-raised hens along with a vibrant berry farm - FARM LOLA. FARM LOLA is the berry wing of Locally Laid Egg Company and grows blueberries, strawberries and honeyberries. It was Jason's pioneering efforts around honeyberries - a fruit which originated in Siberia and Japan- which resulted in the the nation's first commercial honeyberry orchard. Jason, and others, planted 10,000 plants in 2016.

Years later, seeing the need on his farm, Jason asked this question: is it possible to inexpensively and reliably produce water from the air using a 12 volt battery? Since asking that question over a year and a half ago, two engineering schools are now working on this problem. It's gone through many iterations and many failures. Many of the assumptions the engineers and Jason started with have proven to be faulty and a lot of learning and lessons have taken place.

So, with the hard failures mostly over Jason and the engineers have come to the conclusion that to solve the problem - inexpensive atmospheric water to be used on farm or for an aquifer - modifying existing, proven indoor dehumidification technology for outdoor use will lead to the highest likelihood of success.

Jason has hired Nate Capistrant to work full-time on this project. Nate has a degree in engineering physics with minors in electrical engineering and physics.

Organization: Amundsen Farms, Inc DBA Locally Laid Egg Company

Organization Description:
We are an agriculture company. We are incorporated in Minnesota as a S Corp. We operate statewide. Via four distributors, our eggs are sold in retail locations across the state. We also sell eggs to a small number of restaurants. Further, we farm on 45 acres, operate 4 Air B N Bs, and produce eggs, honeyberries, strawberries and blueberries. Hundreds of people visit our farm annually for picking fruit along with staying at our guest cabins. We have successfully collaborated with ice cream makers, cider makers and breweries to make honeyberry related products.

We have formed deep relationships with two engineering schools. Recognizing the need and our increasing ability to solve the problem, the University of MN Duluth Engineering School has said that the atmospheric water collection project is a top tier project. Resultantly we get student engineer placement just below the U.S. Air Force. The University of St. Thomas Engineering School has asked us to partner again and said that they are willing to diversify and deepen the disciplines involved in this project beyond mechanical engineering to electrical engineering and computer science.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Engineering Project Manager		manage the budget, engineering schedule, oversee testing, manufacturing contacts, prototypes, and junior engineers			20%	3		$358,194
Lead technical engineer		Is in charge of all technical aspects of the project			20%	3		$334,326
assistant engineer		work on the technical aspects of the project under the lead engineer			20%	3		$187,080
engineer/translator		Will help translate virtual meetings with manufacturers from china. He will also help work on technical aspects of the project			20%	3		$120,000
overhead		purchasing, payroll, documentation			20%	6		$120,000
							Sub Total	**$1,119,600**
Contracts and Services								
TBD	Professional or Technical Service Contract	IP testing				6		$10,000
airserve	Professional or Technical Service Contract	HVAC company				6		$2,000
TBD	Professional or Technical Service Contract	Performance testing				6		$20,000
Engineering schools	Professional or Technical Service Contract	working on portions of the project like the design for the casing. assisting the lead technical engineer in his or her tasks. students will perform tests on the prototypes.				0.45		$13,000
contract managment	Professional or Technical Service Contract	contract supervision				3		$20,000

outside engineering firm	Professional or Technical Service Contract	additional engineering resources				0.08		$50,000
							Sub Total	**$115,000**
Equipment, Tools, and Supplies								
	Tools and Supplies	tools, wires, electrical tape, solder, soldering iron, blow torch, heat gun, refrigerant, rubbing alcohol, acetone. ETC...	building prototype and performing tests					$5,000
	Equipment	testing equipment. humidifiers, heaters, AC, dehumidifiers, insulation, 3D printer/parts.	for testing area and prototyping					$10,000
	Equipment	order prototypes from manufacturers, includes prototypes of various sizes, freight, customs and engineering costs from manufacturers	Prototypes showcase design attributes, functionality, flaws, and areas for improvement.					$250,100
							Sub Total	**$265,100**
Capital Expenditures								
		CAD software	this is required to create designs and send them off for manufacturing	X				$12,500
							Sub Total	**$12,500**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	10 trips, 2800 miles, 2-3 people. $0.67 per mile	to go to university of Minnesota and university of St Thomas where these devices are being engineered.					$2,000
							Sub Total	**$2,000**
Travel Outside Minnesota								
	Miles/ Meals/ Lodging	4 trips, 11,000 miles, 2-3 people. 10 days/trip $200 a night, $600 airfare, per diem 60. car rental 600	Out of state testing is required because MN's climate only allows for testing at most 6 months a year.	X				$40,800
							Sub Total	**$40,800**

Printing and Publication								
							Sub Total	**-**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$1,555,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Capital Expenditures		CAD software	it is required to create designs for manufacturing. **Additional Explanation :** this will be used throughout the whole project
Travel Outside Minnesota	Miles/Meals/Lodging	4 trips, 11,000 miles, 2-3 people. 10 days/trip $200 a night, $600 airfare, per diem 60. car rental 600	We need to travel out of state to get true outdoor tests all 12 months of the year. Potential locations could be Texas/Arizona/Florida.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
Cash	Agriculture Demonstration Grant	payroll for engineer	Secured	$48,955
			State Sub Total	**$48,955**
Non-State				
Cash	Amundsen Farms Inc	Payments to University Engineering Schools	Potential	$5,000
			Non State Sub Total	**$5,000**
			Funds Total	**$53,955**

Total Project Cost: $1,608,955

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: ac8c9e37-60c.pdf

Financial Capacity

Title	File
Financial Capacity Note	5417ebac-f3a.pdf

Supplemental Attachments

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

Title	File
support letter from UMD Engineering Chair	6c680ddd-ddf.docx
Professor Carillo letter of support	1352a03e-342.pdf
University of St. Thomas' letter of support	c581291c-d53.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?

Yes

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

Yes

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF? If so, describe here (1) the source and estimated amounts of any revenue and (2) how you propose to use those revenues:

Yes, Because this project is so uncertain, and the need for water is so great, any profits we would generate would be reinvested into greater research, manufacturing capacity, and prototyping so create additional avenues toward solving the need for water.

Does your project include original, hypothesis-driven research?

No

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:

Nate Capistrant