Environment and Natural Resources Trust Fund

2026 Request for Proposal

General Information

Proposal ID: 2026-415

Proposal Title: Immersion Cooling AI Computing in a Microgrid Environment

Project Manager Information

Name: Todd Matvick

Organization: Ascentek Inc

Office Telephone: ( ) -

Email: toddmat@ascentek.com

Project Basic Information

Project Summary: This proposal seeks funding to implement an innovative immersion cooling system for artificial intelligence (AI) computing within a microgrid environment. By eliminating the need for traditional water-based cooling HVAC systems.

ENRTF Funds Requested: $500,000

Proposed Project Completion: September 30, 2028

LCCMR Funding Category: Water (B)

Project Location

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

Region(s): Metro

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.

Data Centers utilizing traditional HVAC methods consume approximately 1.8 liters of water per kWh. It is estimated that data centers in the USA consume approximately 620 billion liters of water per year. Immersion cooling is a technology that submerges electronic components, such as servers, in a thermally conductive, dielectric liquid. This method significantly reduces water usage and energy consumption compared to traditional air-cooling systems.

In conventional data centers, air conditioning and liquid cooling systems require large amounts of water for evaporative cooling towers. Immersion cooling eliminates the need for these towers, drastically cutting water consumption. The dielectric liquid absorbs heat more efficiently than air, enabling direct heat transfer from the components. This reduces the energy required to cool the system by 30-50%, lowering the overall power usage effectiveness (PUE).

Additionally, immersion cooling allows for higher server density without overheating, optimizing space and performance. The captured heat can also be reused for secondary purposes, such as heating buildings, further improving energy efficiency. By reducing water waste and energy demands, immersion cooling offers a sustainable solution for data centers, lowering their environmental impact and operational costs. This study will help lower the hurdle for data centers to adopt immersion cooling.

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.

This proposal seeks funding to implement an innovative immersion cooling system for artificial intelligence (AI) computing within a microgrid environment. By eliminating the need for traditional water-based cooling and achieving a 33% reduction in energy consumption compared to conventional data center HVAC methods, this project aims to enhance energy efficiency, reduce operational costs, and minimize environmental impact.

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?

This project aims to demonstrate the effectiveness of immersion cooling in an AI environment. It is estimated that the power consumption to run data centers in the future will require as much as 8% of the energy that is produced in the USA. Coupled with the increased energy demand is greater consumption of water. Immersion cooling can reduce energy consumption by 33% and drive water usage to zero.

Activities and Milestones

Activity 1: Select Immersion Cooling Technology and AI Hardware

Activity Budget: $150,000

Activity Description:
Selecting the right immersion cooling technology for a microgrid environment involves choosing between single-phase and two-phase systems, each with distinct benefits.

In single-phase immersion cooling, the dielectric liquid remains in liquid form while absorbing heat. This method is simpler and more cost-effective, making it ideal for smaller-scale microgrids. It offers stable and consistent cooling without the need for complex vapor management, reducing maintenance requirements.

Two-phase immersion cooling, on the other hand, uses a liquid that evaporates into gas when heated. The vapor condenses back into liquid, creating a continuous heat exchange cycle. This approach offers higher thermal efficiency, making it suitable for larger or high-density microgrids. However, it requires more advanced infrastructure and careful fluid management.

When selecting the technology, consider factors such as heat load, space constraints, and budget. Single-phase systems are often preferred for cost efficiency and simplicity, while two-phase systems excel in heat dissipation and energy reuse. Compatibility with existing hardware and the ability to integrate with microgrid energy management systems (EMS) are also critical factors. Ultimately, the choice depends on the scale, efficiency goals, and long-term sustainability of the microgrid.

Activity Milestones:

Description	Approximate Completion Date
Have the immersion cooled AI hardware chosen and ready for installation	May 31, 2026
Design the heat sink and determine build plan	May 31, 2026
Stage hardware and all components at UST's Microgrid	November 30, 2026

Activity 2: Design and install cooling system, AI hardware integration with existing microgrid infrastructure

Activity Budget: $150,000

Activity Description:
Selecting AI hardware with high processing power and energy efficiency. Prioritize energy-efficient chips to minimize power consumption and heat generation, which is critical in microgrid environments.

For the immersion cooling system, we will choose between single-phase or two-phase for higher thermal efficiency. Ensure the system supports the AI hardware's thermal load and integrates with the microgrid's energy management system (EMS). Select a non-conductive dielectric liquid with high thermal conductivity and low environmental impact.

We will use liquid-to-liquid heat exchangers to transfer excess heat into the microgrid's waste heat recovery system or design a dry cooler. This enables us to also examine heat reuse for building heating or other thermal applications, enhancing overall efficiency.

Align with UST microgrid's current and future energy demands. Ensure all components are compatible with existing infrastructure and comply with safety standards.

Activity Milestones:

Description	Approximate Completion Date
installation complete of all system components	April 30, 2027

Activity 3: Implementation, maintenance and reporting. Calculation and report writing of water and energy savings extrapolated to the data processing industry.

Activity Budget: $200,000

Activity Description:
Install dielectric liquid enclosures and integrate heat exchangers for efficient heat transfer. Connect the system to the microgrid's energy management system (EMS) for real-time monitoring.

Inspect the fluid quality, topping off or replacing it as needed. Monitor temperature stability, power usage, and heat recovery efficiency. Perform periodic checks on hardware, seals, and pumps to prevent leaks and ensure optimal performance.

Reporting findings, collect data on energy consumption, cooling efficiency, and water savings. Our key metrics will be Power Usage Effectiveness (PUE) and Water Usage Effectiveness (WUE) to quantify the impact. Highlight operational cost reductions, thermal efficiency improvements, and potential heat reuse benefits. Present the findings through data visualizations and performance trends to demonstrate the system's sustainability and economic value.

Activity Milestones:

Description	Approximate Completion Date
Have sufficient data to complete reporting	May 31, 2028
Complete reporting to the State	August 31, 2028

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 be partnering with the University of St. Thomas in a workforce development capacity resulting in an Engineering workforce that understands how to implement immersion cooling in multiple environments; be it cloud applications, co-location, edge or on premise. This will ultimately lead to more adoption of this technology and more sustainable computing methods.

Project Manager and Organization Qualifications

Project Manager Name: Todd Matvick

Job Title: Senior Technical Fellow

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

Qualifications

Highly experienced Senior Technical Fellow with 26 years in oil formulation and 20 years of leadership at the director level. Proven expertise in developing high-performance lubricants across automotive, industrial, and specialty applications.

Industry Expertise:

Extensive hands-on experience in lubricant formulation, testing, and performance optimization. Skilled in base oil and additive selection, with deep knowledge of industry standards (ASTM, SAE, ISO) and regulatory compliance.

Leadership and Team Management:

20 years of experience leading cross-functional R&D teams. Adept at strategic planning, project management, and fostering collaboration across departments to drive product innovation and market success.

Technical Proficiency:

Expert in designing and analyzing lab tests, field trials, and performance validation studies. Demonstrated ability to troubleshoot and optimize lubricant performance through data-driven insights.

Toxicology and Safety Expertise:

Bachelor's degree in Toxicology from Mankato State University, earned in 1996. Skilled in assessing product safety, material interactions, and potential health or environmental impacts of lubricant formulations.

Innovation and Problem-Solving:

Proven track record of driving product innovation, contributing to new product lines and formulation improvements. Strong analytical skills with a focus on continuous improvement.

Communication and Collaboration:

Excellent technical writing and presentation abilities. Experienced in delivering reports, proposals, and technical papers, while collaborating effectively with internal teams, clients, and industry partners.

Continuous Learning:

Committed to staying current with emerging trends, technologies, and best practices in lubricant science. Experienced in implementing process improvements to enhance efficiency and product quality.

Organization: Ascentek Inc

Organization Description:
Ascentek is a company located in Golden Valley, Minnesota, that serves global OEMs and various industries. We specialize in providing solutions for automotive, heavy-duty equipment, fleet, industrial, outdoor power equipment, marine, powersports, specialty, and vehicle wash sectors. Our expertise lies in delivering high-quality products and services tailored to meet industry-specific needs, with a strong focus on supporting OEMs worldwide.

Ascentek has a dedicated R&D focus on high-performance lubricants and thermal management fluids, developing innovative solutions to enhance efficiency, durability, and performance. Acentek's research efforts are aimed at optimizing fluid properties for improved heat dissipation, reduced wear, and enhanced reliability in demanding applications.

Known for its commitment to innovation and precision, Ascentek offers reliable, industry-specific solutions that help clients improve performance and efficiency. Our products and services are designed to meet the rigorous demands of their diverse client base, making them a trusted partner in the manufacturing and industrial sectors.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Todd Matvick Senior Technical Fellow, Ascentek		Project lead			25%	100		$50,000
Mechanical Engineer Justin Brinkman		Design of heat sink & installation			25%	100		$60,000
							Sub Total	**$110,000**
Contracts and Services								
University of St Thomas	Service Contract	Hosting the project at the UST Microgird				100		$60,000
LiquidCool Inc	Service Contract	Design and install AI immersion hardware				100		$60,000
							Sub Total	**$120,000**
Equipment, Tools, and Supplies								
	Equipment	AI immersion hardware	will be the main focus of the experiment and accomplish AI compute					$150,000
	Equipment	Heat sink	dissipate the heat generated by the immersion cooled servers in a sustainable manner					$50,000
	Tools and Supplies	All additional materials needed to complete the experiment	Piping, hoses, thermocouples and sensors need to collect data					$50,000
							Sub Total	**$250,000**
Capital Expenditures								
							Sub Total	-

Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Conference Registration Miles/ Meals/ Lodging	30 trips to and from UST	required to conduct the experimental set up and maintanence					$10,000
							Sub Total	**$10,000**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
	Publication	publication of findings	to make the IT public more aware of this technology and lower the hurdle for adoption for this sustainable computing method					$10,000
							Sub Total	**$10,000**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$500,000**

Classified Staff or Generally Ineligible Expenses

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

Non ENRTF Funds

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

Total Project Cost: $500,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: f56d3121-878.pdf

Alternate Text for Visual Component

Immersion cooled AI compute using a dry cooler to dissipate the heat...

Financial Capacity

Title	File
Financial Capacity Note	ee2c0676-0e3.pdf

Supplemental Attachments

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

Title	File
Letter	59563217-11d.pdf

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?

Yes, I understand the Commissioner's Plan applies.

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?

Yes

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:

Tyler Ryan Controller at Ascentek

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

Yes, I understand