

**Emerging Energy Opportunities for Alaska**

**FY2023 Request: \$0**

**Reference No: AMD 64202**

**AP/AL:** Appropriation

**Project Type:** Research / Studies / Planning

**Category:** University

**Location:** Statewide

**House District:** Statewide (HD 1-40)

**Impact House District:** Statewide (HD 1-40)

**Contact:** Michelle Rizk

**Estimated Project Dates:** 07/01/2021 - 06/30/2026

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**Brief Summary and Statement of Need:**

UAF proposes a \$2.5M investment through the Alaska Center for Energy and Power (ACEP) to address important gaps in our understanding of emerging energy technologies and applications for Alaska. The global energy landscape is transitioning to lower carbon resources, and Alaska has the opportunity to meet demand for and profit from clean energy-derived products and services. Alaska is home to abundant renewable energy resources and is well situated geographically to meet global export markets. It is an ideal location for next generation small-scale transportable nuclear reactors, with one of the first commercial demonstration projects in the U.S. scheduled for deployment in 2027 at Eielson Air Force Base.

<b>Funding:</b>	<u>FY2022</u>	<u>FY2023</u>	<u>FY2024</u>	<u>FY2025</u>	<u>FY2026</u>	<u>FY2027</u>	<u>Total</u>
1004 Gen Fund	\$2,500,000						\$2,500,000
<b>Total:</b>	\$2,500,000	\$0	\$0	\$0	\$0	\$0	\$2,500,000

<input type="checkbox"/> State Match Required	<input checked="" type="checkbox"/> One-Time Project	<input type="checkbox"/> Phased - new	<input type="checkbox"/> Phased - underway	<input type="checkbox"/> Ongoing
0% = Minimum State Match % Required		<input checked="" type="checkbox"/> Amendment	<input type="checkbox"/> Mental Health Bill	

**Operating & Maintenance Costs:**

	<u>Amount</u>	<u>Staff</u>
Project Development:	0	0
Ongoing Operating:	0	0
One-Time Startup:	0	0
<b>Totals:</b>	<b>0</b>	<b>0</b>

**Prior Funding History / Additional Information:**

**Project Description/Justification:**

These funds will be used to support targeted research in key emerging energy technology areas, working in close collaboration with Alaska industry, communities, and agencies. The focus will be on filling needs and developing research products that help address critical gaps and unknowns, as well as developing targeted roadmaps for positioning Alaska at the forefront of next-generation energy technologies. This funding will allow ACEP to focus first and foremost on Alaska's opportunities and challenges which often differ from national R&D priorities.

The development of a composite roadmap for small nuclear technologies in Alaska will be a priority area of emphasis for this program. To develop this roadmap, ACEP will work with state agencies as well as other industry and community stakeholders to better understand the possible use cases and economics of deploying small nuclear energy in Alaska, within the context of other energy options. The roadmap will incorporate key readiness metrics, critical action steps, decision gates, etc. based

on consideration of a minimum of five specific case studies (military base, Railbelt utility, remote industrial site, hub town, and remote community). ACEP will also continue to track technology advancements at the national level, collaborate with federal agencies and national laboratories, and continue to manage a state working group on nuclear energy.

#### Alternate Energy \$1.5 million

UAF proposes an investment to address important gaps in our understanding of small nuclear energy systems and related technologies for the Alaska market through work already taking place in ACEP. Alaska is in a strong position to be an early adopter of a new generation of small micro- and modular nuclear reactor technologies that could unlock economic development opportunities currently constrained by access to stably priced, reliable energy including heat and power. This includes expanded economic development opportunities for rural communities, military bases and defense sites, and place-based industries such as mines whose development is often hampered by energy access and cost.

Microreactors could also play an important role in attracting more renewable energy development to the state, since they can provide a carbon-free source of baseload power and regulation services to support variable renewable technologies like wind and solar. In addition, because these systems can readily supply heat in addition to electric power, the Arctic is ideally suited to be an early technology adopter. Over a dozen vendors have expressed interest in specific Alaska use cases, and this project will leverage and accelerate that interest from the private sector – including both developers and end-users – ensuring Alaska remains at the forefront of the national conversation when it comes to the development of small reactor technologies.

This project will involve a number of agency and industry collaborations. Primary state agencies will include the Department of Environmental Conservation, and the Alaska Energy Authority. These will complement federal agency and national laboratory engagement including the Nuclear Regulatory Agency, Department of Defense, and the Department of Energy Office of Nuclear Energy. We also anticipate accessing subject matter expertise from relevant Department of Energy national laboratories, including Idaho National Laboratory, Pacific Northwest National Laboratory, and Los Alamos National Laboratory.

Industry partnerships will include the electric power industry (primarily Railbelt utilities), the mining industry, native corporations, and the small business/entrepreneurial sector. UAF will also explore opportunities for attracting new place-based industries and opportunities to Alaska ranging from the petrochemical industry, to manufacturing, to hydrogen production and export.

#### Alaska Roadmap for Nuclear Reactor Applications \$1.0 million

This funding request is designed to enable the ACEP to engage with Alaskan stakeholders in the exploration of safe, affordable and impactful pathways for potential implementation of advanced nuclear reactors.

The advanced nuclear reactor industry is focused on developing systems that are sized to provide combined heat and power services on a scale well-aligned with the heat and power needs of multiple defense, industry, utility, and community sectors in Alaska. A roadmap is required to appropriately

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prioritize and sequence the related opportunities, identify needed risk mitigation activities specific to Alaska applications, and characterize key integration and implementation requirements. Near-term actions aligned with the roadmap’s guidance can gather critical information, mitigate key risks, and ensure maximum synergy with existing conventional energy systems.

ACEP has the technical acumen, Alaska stakeholder awareness, and industry access required to develop and launch implementation of this needed roadmap. The effort will incorporate insights from 2019/2020 Department of Energy and Department of Defense grants to the University of Alaska for preliminary analyses related to nuclear microreactor integration, and build on the foundation provided by the Small Scale Modular Nuclear Power: An Option for Alaska? study published in 2011 at the request of the Alaska legislature. In addition, future federal fiscal resources will be leveraged at up to a 4:1 ratio through availability of the state funding investment.