Micro-reactor Pilot

The Department of the Air Force is piloting the development of a nuclear micro-reactor to provide clean, reliable, and resilient energy supply for critical national security infrastructure. The pilot will help determine the technology's viability for future energy resilience initiatives.

Why it Matters

In an era of Great Power Competition, identifying innovative solutions that maximize operational capacity and ruggedize Department of the Air Force (DAF) installations against a full spectrum of threats is critical. Advanced nuclear micro-reactor technology can provide reliable baseload electric and thermal power to support critical national security infrastructure, while aligning with the decarbonization targets laid out in the DAF Climate Action Plan.

What's a Micro-reactor?

Micro-reactors are a simple and compact form of nuclear reactor capable of producing between 1-20 megawatts of carbon free electricity. The technology has a high energy output, small footprint, and can operate independently from the grid.

Micro-reactors are defined by their smaller size enabling a range of potential benefits, including fewer components, smaller plant footprints, and reduced construction schedules. They are equipped with safety features that allow them to self-adjust during operation to prevent conditions that could lead to overheating. The combination of these innovations presents potential benefits for safety, operational and deployment flexibility, and scalability.

Key Policy Drivers

Jul 2018 | FY2019 National Defense Authorization Act required identification of potential locations to site, construct, and operate a micro-reactor by the end of 2027

Jul 2020 | SAF/IE developed Arctic-region investment plan, with energy resilience targets for Alaskan bases

Jan 2021 | Executive Order 13972 directed demonstration of a micro-reactor at a domestic military installation

Oct 2022 | DAF Climate Action Plan released, including Micro-Reactor Pilot Program as Key Result

Micro-Reactor Pilot Program

Eielson Air Force Base was chosen as the preferred location to pilot the first US commercial advanced nuclear micro-reactor, due to the base's existing infrastructure, suitable climate, and critical mission resilience requirement. The micro-reactor will supplement electricity produced by the existing base combined heat and power plant by producing up to 5 MW of electrical energy and variable amounts of steam heating.

To facilitate a successful pilot program, the Office of the Deputy Assistant Secretary of the Air Force for Environment, Safety and Infrastructure is working with Alaskan stakeholders (Tanana Chiefs Conference, state and local government, the University of Alaska and installation leadership, among others) and federal partners. Federal partners include: the Defense Logistics Agency (DLA) Energy Office; Air Force Civil Engineer Center Energy Directorate; Office of the Deputy Assistant Secretary of Defense for Energy Resilience and Optimization; Department of Energy; and the Nuclear Regulatory Commission (NRC).

Successful pilot program completion will inform an enterprise framework for future advanced nuclear reactor projects and pave the way for similar future projects throughout Alaska and beyond.

Pilot Execution Timeline

The DAF is partnering with DLA to execute a power purchase agreement with a third-party developer. The developer will own and operate the micro-reactor licensed by the NRC to deliver electricity and steam to Eielson in exchange for DAF's long-term purchase of the energy it generates. Major timeline milestones are reflected below:

Sep 2022 | Request for Proposal for Pilot Project at Eielson Air Force Base Released

Jan 2023 | Request for Proposal Closed

Sep 2023 | Defense Logistics Agency Energy Office issued a Notice of Intent to Award for the siting, design, construction, ownership and operation of a micro-reactor facility at Eielson Air Force Base in August, 2023. A protest filing temporarily halted the acquisition process. Further questions about this ongoing and active procurement process should be directed to the Defense Logistics Agency.

TBD 2024 | Initiate project planning for future siting, permitting, licensing activities, including the National Environmental Policy Act assessment.

TBD 2027 | Demonstration and operational testing is targeted to begin (*timeline is tentative and subject to change*)

Program Information and Updates

DAF is committed to frequent, clear, and transparent communication with all Tribal, federal, state, and local stakeholders to ensure this project benefits both the installation and broader local community.

Pilot project updates will be shared on https://www.eielson.af.mil/microreactor/. For more information, contact SAF.IEE.Micro-reactorPilot@us.af.mil

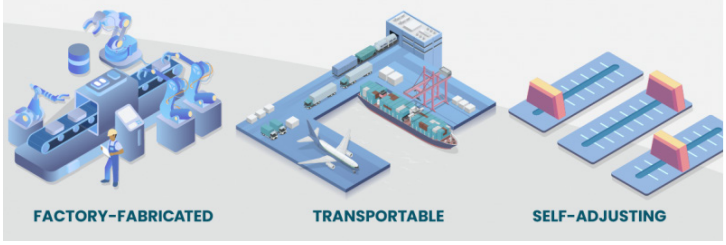

Image credit: U.S. Department of Energy.

The Department of the Air Force Installation Energy Program is committed to developing and deploying policies and guidance to ensure the enterprise is prepared to deliver energy and water when and where needed.

For more information:

safie.hq.af.mil/InstallationEnergy

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