



## Micro-Reactor Pilot | FAQs | *\*Last Updated Jan 2023*

### **Q: What is a micro-reactor?**

A: Micro-reactors have high energy output and a small footprint, producing between 1-20 megawatts (MW) of electrical and/or thermal energy. Micro-reactors are expected to come in a variety of designs that can safely produce both power and heat for long intervals between refueling and can operate independently from the grid. The technology is characterized by the following features:

- Micro-reactors are expected to operate at full power more frequently and for longer period than research and test reactors;
- Micro-reactors are expected to include inherent safety features such that some accident scenarios may not occur (e.g., loss of coolant, loss of electrical power);
- Micro-reactors are expected to have automatic features for accident response; and  
Micro-reactors are expected to be closed systems.

### **Q: Why is the Department of the Air Force participating in the pilot?**

A: The Air Force strives to stay on the forefront of technology innovation and is always in search of new options for future energy assurance initiatives that reduce the potential loss of critical mission capabilities due to power disruption. A pilot plant is needed to determine the viability of micro-reactor use at Air Force installations.

### **Q: Why is the Department of the Air Force considering micro-reactors?**

A: The Air Force views micro-reactors as a promising clean energy technology able to ensure energy resilience and reliability at its installations. Micro-reactors are capable of supplying energy to a wide range of DoD installations, and may be well suited to power and heat remote domestic military bases that are a critical part of the national security infrastructure.

### **Q: Are micro-reactors safe?**

A: Yes. Micro-reactors are self-adjusting – this means built-in safety features that require little human oversight or offsite electrical power prevent conditions that could lead to overheating the fuel. Micro-reactors can have a significantly smaller (1-5 acres) site footprint than a traditional nuclear power plant without posing unacceptable risk to nearby workers or the public.

### **Q: What installation or installations have been selected for the pilot?**

A: In August 2018, the Air Force Office of Energy Assurance (OEA) recommended Eielson Air Force Base for the micro-reactor pilot. The installation was determined to be an ideal location for the pilot due to the existing infrastructure, suitable climate, and critical mission resilience requirement. A micro-reactor could also meet the base's year-round energy needs for station heating.

### **Q: How many pilot sites will there be?**

A: The Air Force is currently considering one pilot site. Additional sites may be considered in the future. During the NRC National Environmental Policy Act review, alternative sites for the Eielson pilot plant will be identified and evaluated as required in the development of an environmental impact statement, but only one site will ultimately be chosen.

### **Q: Will the pilot be subject to Nuclear Regulatory Commission (NRC) safety standards and inspections?**

A: The pilot will be licensed by the NRC and the Air Force will cooperate with the NRC to ensure the pilot owner and operator strictly follows all safety standards imposed during the NRC licensing process. The NRC oversees all nuclear energy facilities from the time licensing applications are submitted through the operation of the facility, and through the decommissioning process until the residual radioactivity at the facility site has been reduced to a level that permits termination of the NRC license. In addition to regulating reactor siting and construction, the NRC regulates reactor operations through a combination of regulatory requirements, licensing and oversight, including inspections. For more details, see [NRC's FAQ](#).

### **Q: Is the Department of the Air Force coordinating with the NRC?**

A: Yes. The Air Force has been working closely with the NRC to ensure the pilot aligns with NRC requirements.



**Q: What are the expected energy resilience benefits of a micro-reactor?**

A: The micro-reactor technology for the pilot is expected to produce 1-5 MW of energy to supplement current installation energy sources as a redundant resilience measure. Micro-reactors will allow the DAF to continue to support mission assurance through energy assurance, while also reducing greenhouse gas emissions.

**Q: Is the Department of the Air Force concerned about a nuclear disaster at its installation?**

A: Along with the nuclear industry, the NRC, and DOE, the Department of the Air Force is evaluating the safety of each potential reactor technology to ensure strict safety standards.

**Q: Is the Department of the Air Force prepared to manage a nuclear meltdown at one of its installations?**

A: The system operators, NRC inspection team, and Department of the Air Force, like any commercial nuclear power operator, will take every safety measure to ensure this highly unlikely event does not occur, and will have emergency procedures and trained personnel in place to respond to such an event.

**Q: Has the type of reactor been selected yet?**

A: No, the reactor technology has not yet been determined.

**Q: Is this technology similar to that used in Fukushima?**

A: While a specific reactor technology has not yet been selected for the pilot, micro-reactors are different than the large-scale models used at Fukushima. The small size of these reactors minimizes decay-heat generation after shutdown, preventing it from reaching levels that can damage the core, which was the point of failure at Fukushima.

**Q: When will the reactor be online?**

A: According to the Nuclear Energy Institute's (NEI) technical report, titled [Roadmap for the Deployment of Micro-reactors for Department of Defense Installations](#), a timeline and set of recommended actions support the deployment of a micro-reactor in the mid- to late-2020s. The Air Force is targeting 2027.

**Q: Will the reactor be connected to the commercial grid?**

A No, the reactor will only serve the installation and will not be connected to the grid.

**Q: Who will operate the reactor?**

A: Well-trained, highly capable operators from the utility owner and licensed by the NRC. These operators will follow detailed written procedures and ensure safe operation of the reactor.

**Q: Will operators be properly trained?**

A: Yes, and depending on the chosen reactor model, NRC-licensed micro-reactor operators complete extensive training before being certified. Reactor operators continue training throughout the life of their license. Some reactor models are autonomous and can be monitored remotely.

**Q: What will the Air Force do with the nuclear waste?**

A: At this time, we anticipate a fueled micro-reactor delivered to the site and subsequently returned to the vendor for refueling or disposal. We do not anticipate refueling processes or storage of nuclear waste at the installation. The vendor will be responsible for nuclear waste and subject to the same rigorous storage and control requirements of the commercial nuclear industry under license by the NRC.

**Q: How will this project impact the coal industry?**

A: This project is not designed to disrupt the coal industry in the area. This is a new generation asset, not a replacement asset. Its relatively small scale will also not disrupt coal plant demand should the asset ever be connected to the grid. The Air Force recognizes the importance of the industry to the community.

**Q: What will the environmental impacts be of this pilot project?**

A: Thorough environmental studies will be conducted as part of the pilot evaluation process in compliance with National Environmental Policy Act (NEPA) requirements. The Air Force is coordinating closely with NRC, DOE, Air Force Civil Engineering Center/Environmental Directorate (AFCEC/CZ), and the Under Secretary of Defense for Acquisition and

For more information about the Micro-Reactor Pilot and other Department of the Air Force Installation Energy initiatives, visit [www. https://www.safie.hq.af.mil/installationenergy/currentinitiatives/](https://www.safie.hq.af.mil/installationenergy/currentinitiatives/) or contact [SAF.IEE.Workflow@us.af.mil](mailto:SAF.IEE.Workflow@us.af.mil)



Sustainment (OUSD(A&S)) to ensure environmental impacts are evaluated prior to a decision to proceed with the pilot. The NRC-led NEPA process will involve public meetings and coordination, and the NEPA document will be available for the public to review.

**Q: Is there a risk to installation staff or occupants?**

A: NRC has developed standards for acceptable occupational and public exposure to radiation from licensed nuclear facilities. The Air Force will strictly adhere to standards set by the NRC which have kept nuclear plant operators and communities safe in the U.S. for nearly 70 years.

**Q: Is there a risk to the community?**

A: Micro-reactors are designed to cool without the need for offsite power without fuel damage, which significantly reduces the potential for accidents and risk to surrounding communities. However, as with all nuclear energy facilities in the U.S., the pilot micro-reactor owner will be required to develop and test detailed emergency response plans to protect the public that are reviewed and approved by the Air Force and NRC.

**Q: Are you working with the nuclear community to use their expertise in evaluating micro-reactors?**

A: Yes. For example, in October 2018, the NEI released a technical report titled, [Roadmap for the Deployment of Micro-reactors for Department of Defense Installations](#). The Air Force coordinated with the NEI during their development of the report and continue to reference it moving forward. The Air Force is also coordinating with the Department of Energy to obtain expertise from the National Laboratories in micro-reactor design and deployment.

**Q: Have you engaged with industry for this pilot project?**

A: In September 2018, DOE released a Request for Information (RFI) to inquire about technical and financial data points and project development concepts from industry. The Defense Logistics Agency (Energy) issued a similar RFI in 2020. The Air Force was part of the review of these solicitations. In September 2022, the DAF released its request for proposal (RFP) for a nuclear micro-reactor. In October 2022, the DAF and DLA Energy hosted a two-day pre-proposal conference and site visit at Eielson AFB. Industry representatives were able to ask questions about the RFP and tour relevant sites at Eielson AFB. Answers to questions are available as amendments to the RFP.