

1.0 Description:

1.1 This Request for Information (RFI) is intended to gather information on the various micro-reactor technology options available for fixed-site applications only and to survey commercial stakeholders interested in the potential to finance, construct, install, operate, and own a micro-reactor for the notional requirements outlined in this RFI. It should be noted that while this RFI is focused on fixed-site applications, there may be cases where micro-reactor technology developed for mobile applications provides the capabilities required for fixed-site applications. The responses to this request will provide important information and insights for the Government's potential pursuit of a micro-reactor pilot program.

The Department of Defense (DoD) is interested in facilitating the micro-reactor pilot program to:

- Perform technology validation and risk reduction necessary to advance the state of micro-reactor technology by operating a micro-reactor at an Air Force (AF) installation.
- Build upon efforts triggered by the Fiscal Year (FY) 2019 National Defense Authorization Act (NDAA) requiring the Secretary of Energy to submit a report to Congress describing the components of a program to establish one licensed micro-reactor supporting DoD infrastructure by Dec 2027.
- Determine the viability of micro-reactors for future energy assurance initiatives that support DoD critical missions.

The following represents the Government's notional requirements:

- Deliver 1-5MW (anticipated) of power for no less than two years without refueling.
- Deliver 1-5MW (anticipated) of power for the entire duration of a potential Power Purchase Agreement (PPA) (not to exceed 30 years).
- Interconnect to existing energy infrastructure on the installation.
- Meet National Institute of Standards and Technology (NIST), DoD and other applicable cybersecurity standards.
- Be licensed by the Nuclear Regulatory Commission (NRC) prior to operation.
- Meet all applicable Federal and State environmental laws and regulations.
- Construct and operate the power plant in a geographically distant location requiring the long haul of supplies and equipment using rail, air, and highway transportation.
- Operate in a subarctic climate.

1.2 This RFI is for market research purposes only. The Department of the Air Force, Office of Energy Assurance (AF OEA), through the Defense Logistics Agency Energy (DLA Energy) is seeking capability information from interested parties concerning the matters described herein. In

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accordance with Federal Acquisition Regulation (FAR) 15.201(e), responses to this RFI are not offers and cannot be accepted by the Government to form a binding contract. This RFI is issued solely for information and planning purposes and does not constitute a solicitation for proposals. Responses to this notice will be treated as information only.

All responses received may be held for an extended period of time or destroyed. In no case will any response be returned to the originator. DLA Energy will not provide reimbursement for costs incurred in responding to this RFI; all costs associated with responding to this RFI will be the sole responsibility of the responding party. Respondents are advised that DLA Energy is under no obligation to acknowledge receipt of the information received or provide feedback to respondents with respect to any information submitted under this RFI. Responses to this RFI do not bind DLA Energy or AF OEA to any further actions related to this topic.

2.0 Background:

In section 327 of the John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. 115-232 (FY19 NDAA), Congress directed the Department of Energy (DOE) to prepare a report describing the requirements for a micro-reactor pilot program to provide energy resilience for critical national security infrastructure at DoD and DOE facilities using at least one micro-reactor. This report was delivered to Congress in August 2019. As defined under 10 United States Code (USC) § 101(e)(6), Energy Resilience is the “ability to avoid, prepare for, minimize, adapt to, and recover from anticipated and unanticipated energy disruptions in order to ensure energy availability and reliability sufficient to provide for mission assurance and readiness, including mission essential operations related to readiness, and to execute or rapidly reestablish mission essential requirements.” Section 101(e)(7) defines Energy Security as “having assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet mission essential requirements.” Together, energy resilience and energy security provide energy assurance.

The FY19 NDAA language states that the pilot program should contract with a commercial entity to site, construct, and operate a licensed micro-reactor by December 31, 2027. The AF is interested in facilitating a pilot program, working with the DOE to ensure program priorities align with those written in their report to Congress. This effort is aligned with the Office of the Under Secretary of Defense for Acquisition and Sustainment (OUSD(A&S)) regarding fixed-site micro-reactor deployment on DoD installations.

The DoD is interested in two different concepts, and, therefore, it is important to distinguish between two distinct micro-reactor technology applications: fixed-site and mobile. While the DoD Strategic Capabilities Office (SCO) is investigating the feasibility of mobile micro reactors (see RFI number RFI-01182019-RD-WHS019), the AF, through this RFI, is focused on the use of fixed-site

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applications of micro-reactors. The AF and the SCO will share insight gained from these initiatives, but these efforts will remain independent of each other and there is no plan to combine efforts.

The AF's energy vision is to enhance mission assurance through energy assurance. Energy assurance involves a number of activities across the operational and installation realms designed to ensure the AF has the energy it needs when and where it is needed to accomplish the mission. While the AF and the larger DoD continue to rely on traditional distributed backup generation systems (e.g., solar, diesel), energy technologies are advancing rapidly, and innovative applications of existing technologies are constantly becoming available. As one of these technologies, fixed-site micro-reactors have the potential to increase energy assurance by providing an alternative source of energy compatible with mission requirements and increase access to a reliable and uninterrupted energy supply. This pilot program intends to spotlight an early development effort that will provide information for future energy resilience opportunities.

As a separate effort, and as directed by Congress, the DOE established the Advanced Reactor Demonstration Program (ARDP) within the Office of Nuclear Energy (NE) to help domestic private industry demonstrate advanced nuclear reactors in the United States. Through cost-shared partnerships with industry, ARDP will provide initial funding to build two reactors that can be operational within the next five to seven years. The AF's micro-reactor pilot project is independent from ARDP and focused on using micro-reactors for energy assurance. However, ARDP partners may also participate in the AF's micro-reactor program.

Micro-reactors developed for fixed-site applications may employ a combination of factory and on-site fabrication, have reduced permanent on-site infrastructure construction needs given their small footprint, and would be operated at a single site for the duration of their operational lifetime. They may serve missions similar to commercial systems in operation today and would be licensed by the NRC.

The Government is contemplating entering into a Power Purchase Agreement (PPA) contract for a period of up to 30 years utilizing the authority provided by 10 USC § 2922a, Contracts for energy or fuel for military installations. The contract term of up to 30 years under a PPA shall include the construction, commissioning and potential decommissioning of the generation asset. The Contractor shall fund all actions in preparation of, and submission of, a licensing application to the NRC.

3.0 Information Requested:

As permitted by FAR Part 10, DLA Energy and AF OEA are seeking information on available technologies, acquisition strategies, cost estimates, implementation timelines, and risk mitigation strategies for design and implementation of a fixed-site micro-reactor at an AF base (AFB) to provide energy assurance for critical national security infrastructure.

In addition to responding to this RFI, Respondents are encouraged to provide any comments that may contribute to the design and implementation of this program that demonstrate the ability to execute the AF's notional requirements identified in Section 1.0, Description.

3.1 Available technologies: Micro-reactor technology, licensed by NRC, for fixed-site applications. To support an assessment of the different micro-reactor technology options available for a potential pilot program, AF is seeking a publicly releasable description of reactor technologies. Respondents should describe their company's reactor design technology for the following categories to the extent applicable.

A. Micro-Reactor Design and Technology

- Reactor coolant
- Megawatts Thermal (MWt)
- Megawatts Electric (MWe) (net of station load)
- Heat transfer mechanism
- Design/anticipated operational life
- Ability to utilize waste heat for other purposes (e.g., steam generation)
- Amount of waste heat disposal expected
- Method of waste heat disposal envisioned

B. Power Plant

- Switchyard/interconnection requirements
- Number and type of structures/buildings
- Maximum height/elevation of the tallest structure and depth of any underground components
- Area, in square feet, inside the security fence
- Total area in square feet for all structures
- Anticipated Emergency Planning Zone
- Anticipated on-site construction time
- Any specific soil conditions required or prohibited, e.g., permafrost

C. Energy Resiliency

- Features that contribute to energy resiliency
- Black start capability
- Ability to manage station black out
- Suitability for connection to a micro-grid
- Cybersecurity considerations

D. Fuel

- Fuel description
- Enrichment
- Refueling interval
- Refueling process/required expertise/duration/on or off site

E. Spent Fuel Management

- Plan for managing/disposing of spent fuel
- Unique aspects of managing spent fuel that might require development (e.g., design and licensing of interim storage casks)

F. Operations/Staffing

- Staffing requirements and type
- Anticipated capacity factor
- Water requirement in gallons per day (if required)

G. Pathway to Commercial Operation

- Current utility or other commercial partners
- Anticipated pathway to commercial operation including a timeline with major milestones
- Major development requirements including materials, testing, systems, etc.
- Information on the ownership of all intellectual property, patents, etc.

H. End-of-Life

- Plan, timeline, and requirements to decommission and dismantle the micro-reactor and potential associated spent-fuel upon reaching end-of-life

3.2 Acquisition Strategy: Information on alternative acquisition strategies will be considered. Additionally, feedback on the Government's proposed acquisition strategy should be incorporated into the response.

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3.3 Cost Estimates: Total cost for design, construction, licensing, testing, and operation of the micro-reactor along with a forecasted levelized cost of energy (\$/MWh) for the term of a potential 30-year PPA.

3.4 Implementation Timeline: Feasibility of commencement of micro-reactor operations at a subarctic AFB with year round surface transportation by December 31, 2027. The timeline should include all actions needed in preparation of, and submission of, a licensing application to the NRC along with the current status of any licensing efforts to date.

3.5 Decommissioning Timeline: Provide a detailed outline of processes that should occur for the decommissioning of the resource prior to contract term expiration. The timeline should include all actions needed in preparation of the decommissioning of the operations and eventual removal of the resource from Government property.

3.6 Risk Mitigation Strategies: The AF shall consider all risk mitigation strategies recommended by the respondent, however the AF does not intend to assume any risks associated with the design, development, construction, licensing, testing, initial 12-24 months of operation, and potential decommissioning and extraction of a micro-reactor technology.

3.7 Project Financial Plan: The finance project plan should comprehensively address how a potential micro-reactor project will be financed. The plan shall address: (i) all anticipated sources of funding, aggregate amount and type, including any construction period financing and term financing; (ii) a schedule showing the expected amount and timing of project funding by source (sponsor equity, tax equity, and construction and term and debt from the development period through operation); (iii) sources and uses of funds; (iv) a description of any firm funding commitments already in place and available to the Contractor for the project and the conditions to funding from such sources.

4.0 Responses:

Interested parties are requested to respond to this RFI with a whitepaper.

4.1 RFI Whitepaper. The RFI whitepaper should be in Portable Document Format (PDF) compatible format. The whitepaper response is limited to 20 single sided pages (12 point font, 1 inch margins). Emailed submissions shall not exceed 10 MB. The whitepaper responses should include the following information:

- A. A Company Profile to include: (a) Name and address; (b) Brief description of firm including the year the firm was established, where it is incorporated, whether it is owned

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or controlled by another entity, and number of employees; and (c) Names of two points of contact (including title, telephone number and email addresses).

- B. Detailed description of efforts of similar scope completed within the last five years by the responding firm.
- C. Information the Government should provide to prospective offerors in a solicitation.
- D. Responses to the information requested in Section 3.0.

Responses should be complete and sufficiently detailed to address the specific information requested. The Government also encourages any additional information that would help to make a project of this scope viable to industry. The Government will consider all information submitted in response to this request for information up to the maximum page limitation.

4.2 Business Sensitive, Proprietary, or Otherwise Confidential Information. As information received in response to this RFI may be used to structure future solicitations, if a respondent chooses to submit any business sensitive, proprietary, or otherwise confidential information, it must be marked as proprietary or restricted data in the response. Information received from respondents will not be shared with any other respondent. Respondents will not be notified of the results of this market research. Response to this RFI is not required in order to respond to any future solicitation that may possibly follow, but information gathered through this RFI may influence future solicitation development.

4.3 RFI Whitepaper Review. Respondents are advised that data submitted to the Government in response to this RFI may be released to non-Government advisors for review and analysis. All Government and contractor review personnel have executed Non-Disclosure Agreements. If a respondent has any objection to a non-Government advisor accessing its response information, the respondent shall notify the Government immediately and provide grounds and justification for its objections. The non-Government advisors are: Booz Allen Hamilton and Exeter and Associates.

4.4 Response Date and Time: The Government appreciates your interest in advance in supporting the Government's requirements. Interested parties must provide the requested information via email submission by 12:00 pm (noon) Eastern Standard Time (EST), 9 November 2020. Responses should be emailed to DLAEnergyResilience@dla.mil.

5.0 Meetings and Discussions:

Government representatives may or may not choose to meet with RFI respondents. Such meetings and discussions would only be intended to get further clarification of potential capability, especially

any development and licensing risks.

6.0 Questions:

Questions regarding, and the whitepaper responding to this RFI, should be submitted by email to DLA Energy at DLAEnergyResilience@dla.mil.