Posting to the Q&A Section of the Industry FOA Webpage

Question: Is the Office of Nuclear Energy (NE) able to continue its support of the *U.S. Industry Opportunities for Advanced Nuclear Technology Development* Funding Opportunity Announcement (Industry FOA) in fiscal year (FY) 2022?

Answer: Yes, the Industry FOA has stimulated interest in advanced reactor technology development and deployment since 2018. These efforts, combined with other industry-supporting initiatives, have been highly successful. We now have many projects underway through joint agreements with industry that span from conceptual design through development and demonstration of innovative advanced reactor technologies. Given recent changes in available funding and areas of interest, NE has decided to extend Cycle 2022-1 to October 11, 2022. Please refer to the FY 2022 budget request for more information about NE programs (DOE FY 2022 Budget Request Vol 3.2 (energy.gov)). NE was able to apply nearly all available prior year funding towards awards under Cycle 2021-1; thus, there are no prior year funds available for Cycle 2022-1. **Please Note: NE has striven to maximize and diversify the funding made available to the Industry FOA throughout its 12 cycles, and communicate funding amounts and programmatic sponsors to the Industry Community as quickly as possible to facilitate applicant planning. NE continued this approach by posting the below table in mid-May 2022. However, based on updated planning requirements, the below tables have been revised to adjust available funding amounts, sources, and guidance. NE regrets any inconvenience caused by these changes.**

Nuclear Energy Industry FOA Funding Sources ($ millions) Cycle 2022-1[1, 10]										
	Nuclear Energy Enabling Technologies			Reactor Concepts RD&D			Fuel Cycle R&D	Advanced Reactor Demonstration Program (ARDP)		
Funding	Nuclear Energy Advanced Modeling and Simulation (NEAMS)	Advanced Sensors and Instrumentation (ASI)	Advanced Materials and Manufacturing Technologies (AMMT)	Light Water Reactor Sustainability (LWRS)	Advanced SMR RD&D	Advanced Reactor Tech. (ART)	TRISO	National Reactor Innovation Center	Reg. Devel.	Total
Total Funding Avail. for Cycle 2022-1	1.0	0.5[2]	2.0[3]	20.0-40.0[4]	0.0	2.0 MicroRx[5] 2.5[6] MSR Adv. Isotope Seps.	2.0[7]	1.0[8]	1.0[9]	41.0-61.0

Notes:

1. The due date for submission of NE Industry FOA Cycle 2022-1 applications has been extended from **June 29, 2022 to October 11, 2022, at 5:00 p.m. Eastern Time**. DOE will not accept questions after September 27, 2022.

2. Advanced Sensors and Instrumentation (ASI) seeks applications to develop methods of implementing digital innovation in the development of Instrumentation and Control (I&C) systems for advanced reactor concepts. Successful proposals should include digital engineering of a relevant advanced reactor component or system with full integration of I&C. The proposal should include the development of a Digital Twin of the component through modeling and simulation and the fabrication of a physical system with the capability for hardware-in-the-loop implemented on a surrogate non-nuclear facility or testbed. The system demonstration should focus on the integration of advanced I&C technologies and the assessment of their impact on the system performance. The developed system should be able to demonstrate high coupling factor with the physical non-nuclear surrogate through experimental testing and allow for historical and time-forward perturbation studies. Additionally, applicants are highly encouraged to pursue system designs that are directly connected with an advanced reactor facility or testbed already existing or under construction. If applicants do not have access to the physical resources, they should seek partnerships with advanced reactor developers to provide relevance of the digital engineering to a physical system already under development to aid in the maturation of an established reactor component or system.

3. AMMT seeks applications with industry to research and demonstrate accelerated testing in the area of radiation effects to catalyze the adoption of cutting-edge technologies. The primary objective is the identification of the significant property changes induced in new structural materials by radiation from nuclear reactor

sources and through accelerated testing to determine the predictive modeling and component life expectancy. An example could be combined neutron and ion irradiation testing. The results of these efforts should be the testing of reactor materials, parts, components, and subsystems under demanding service conditions relevant to reactor applications. The data generated would be used to validate modeling, manufacturing, performance, and support the regulatory process for use. A total of $2.0 million is available for this scope area.

4. LWRS, in coordination with DOE's Office of Energy Efficiency and Renewable Energy (EERE) - Hydrogen and Fuel Cell Technologies Office (HFTO), seeks applications that support development of nuclear plant thermal integration that would be required for high temperature hydrogen production or hydrogen coupled end-uses for nuclear energy. In preparation for future scaleup of industrial use of nuclear energy, it is anticipated that selected awardees from this announcement could design and develop the heat extraction infrastructure needed for a nuclear and hydrogen industrial energy park or develop hydrogen coupled end-uses for nuclear produced hydrogen. This effort will enable the use of nuclear thermal and electrical outputs to produce hydrogen at higher efficiencies than today's low temperature electrolysis technology and enable the scale up of co-located hydrogen infrastructure and end use applications. Potential activities that advance nuclear integration beyond the current DOE funded high and low temperature electrolysis projects may include:

Nuclear Plant Thermal Integration:

- Front end engineering and design (FEED) studies for nuclear plant thermal energy extraction, distribution, and control at the 20 to 300 MW_{th} levels. FEED studies should include high temperature electrolysis designs, as well as develop accurate construction costs to demonstrate economic viability. These FEED studies may include infrastructure for distribution of hydrogen, electricity, heat, and other potential feedstocks or products near existing nuclear plants supporting development of an energy park based on nuclear energy and hydrogen. The energy park could ultimately involve multiple end uses and revenue streams. Factors such as modularity, scalability and flexibility should be considered.

- License amendments, other regulatory and permitting requirements of the Nuclear Regulatory Commission (NRC), or requirements of other authorities having jurisdiction, as needed to demonstrate thermal extraction infrastructure and associated hydrogen production and infrastructure.

Hydrogen Coupled End-Uses:

- Development of scalable prototype systems that integrate nuclear powered electrolysis with the development and demonstration of a specific hydrogen end-use. The focus is on applications that offer potential for significant greenhouse gas emission reduction as well as cost competitive market potential. End use applications may include, but are not limited to, using hydrogen for transportation applications, such as heavy-duty hydrogen fuel cell applications or drop-in/synthetic fuels; power generation and energy storage; and/or industrial and chemical applications such as ammonia, metals, or oxygen utilization. Prototype hydrogen systems may be used for verification of chemical conversion or manufacturing efficiencies, development of fully autonomous plant controls, or demonstrating technical and economic viability. Although low temperature proton exchange membrane (PEM) electrolyzers for hydrogen production or gas turbines for end-use applications may be considered as part of a larger application, these specific topics would not be eligible for project funding (neither Federal nor applicant cost share) as DOE is already supporting work in this area.

It is expected that these first-of-a-kind activities will support and lead to an eventual demonstration of thermal energy extraction, distribution, and control at the 20 to 300 MWth levels. The resulting information produced from these activities will be used to benefit all U.S. nuclear plants through data sharing and by providing a basis for the development of regulatory requirements and eventual licensing. It is also expected that any demonstration activities would engage local communities and support DOE's environmental and energy justice priorities, including providing benefits to disadvantaged communities.

5. ART seeks applications to support activities related to microreactor development and future demonstration. Other reactor types will not be considered for this funding.

6. ART seeks applications for the research and development of advanced isotope separation processes needed to support development and future demonstrations of molten salt reactors (MSR). Potential activities could include: development of novel isotope separation processes, maturation of current isotope separation processes and activities to support scale-up of current processes to produce isotopes at levels required for commercial MSRs. Proposals focused on chlorine isotope (Cl35/Cl37) separation will be a priority. Although this FOA supports research and development activities to develop isotope separation processes, activities to establish commercial production will not be considered. Finally, this FOA does not support activities related to the routine production and processing or sale of any isotopes. The Office of Science's Isotope Program Office (DOE IP) has the lead Departmental responsibility for R&D for isotope production and processing methods and commercialization of isotope production to the domestic private sector. Applications will be coodinated with the DOE IP and should not duplicate efforts supported by the DOE IP.

7. TRISO seeks applications to support activities related to TRISO fuel and graphite qualification, fabrication of TRISO fuel, use of TRISO fuel in advanced reactors, and closing regulatory gaps associated with the qualification and use of TRISO fuel and graphite in advanced reactors.

8. NRIC seeks applications to support activities to enable advanced reactor development, testing, and demonstration.

9. Advanced Reactor Regulatory Development seeks applications to support activities to establish a regulatory framework and licensing technical requirements for advanced reactors and perform targeted research to reduce the regulatory risks associated with advanced reactors.

10. DOE will not execute additional cycles in FY 2022. Accordingly, the NE Industry FOA (#DE-FOA-0001817) will permanently close upon completion of Cycle 2022-1. Analysis and planning for follow on engagements between NE and United States Industry is underway and outcomes will be communicated separately.