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February 26, 2020

Department of Energy  
Office of Nuclear Energy  
Office of Reactor Fleet and Advanced Reactor Deployment  
1000 Independence Ave. SW  
Washington, DC 20585

**Subject:** Response to Information Request on the Advanced Reactor Demonstration Program  
DE-FOA RFI-0002271

The Nuclear Energy Institute (NEI)<sup>1</sup> appreciates the opportunity to respond to the Information Request on the Advanced Reactor Demonstration Program. The attached responses were prepared with input from the NEI Advanced Reactor Working Group and input and endorsement from SMR Start.

The demonstration program, established in the FY 20 appropriations, will help facilitate the accelerated development and deployment of advanced reactors, including light water and non-light water reactors. Demonstrating the next generation of reactors will support both domestic deployment and export of U.S. technology and enable broad U.S. leadership in new and innovative advanced nuclear technologies. NEI encourages DOE to continue to actively engage with the industry and to maintain a sense of urgency as the Advanced Reactor Demonstration Program progresses.

NEI's principal point of contact for the attached responses is Everett Redmond, Senior Technical Advisor, and he can be reached at [elr@nei.org](mailto:elr@nei.org) or 202-739-8122.

Sincerely,

A handwritten signature in black ink, appearing to read "Doug True", is written over a horizontal line. The signature is fluid and cursive.

Doug True

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<sup>1</sup> The Nuclear Energy Institute (NEI) is the organization responsible for establishing unified industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include entities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel cycle facilities, nuclear materials licensees, and other organizations and entities involved in the nuclear energy industry.

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

### QUESTIONNAIRE

1. Preliminary planning calls for DOE to issue an FOA with the intent of making two cooperative agreement awards (Demonstration awards) for the construction and demonstration of two advanced reactors, as well as two to five awards to assist in technology risk reduction for advanced reactor designs (Risk Reduction awards) not selected for a Demonstration award. Please comment on your experience with approaches that could potentially streamline the FOA process.

#### **Response:**

NEI appreciates and supports DOE's efforts to streamline the process and to quickly issue the FOA and the awards. It is essential that this process be executed in a thoughtful, efficient and timely manner. The issuance of this RFI/NOI was an important step in this process. As the process continues we encourage DOE to maintain a FAQ with responses that can be easily accessed. DOE should continue to engage with industry often and host at least one industry day after the issuance of the FOA to address questions from interested parties. DOE should use the industry day and other pre-application engagements to mitigate areas that could result in delays in the selection and award phase. These topics include intellectual property and foreign content considerations which often times result in extended contract negotiations.

In order to ensure the highest quality responses, NEI encourages DOE to provide 90 days (preferred) and no less than 60 days for the industry to respond. These time periods assume that the FOA does not contain a pre-application phase. If a pre-application phase is added the response times can be adjusted accordingly. We also encourage DOE to review the applications and make selections as quickly as possible. Selection of the demonstration projects should be completed preferably within 30 days of the application deadline. As discussed below, the timeline to select the risk reduction projects should allow for proposal revisions by applicants to the demonstration program that are not selected. In order to increase efficiency in the selection process, DOE should consider simultaneous sequestration of the selection team. After selection, DOE should expeditiously negotiate the contractual agreements recognizing that delays in finalizing the contractual agreements will delay the project.

The FY20 appropriations language states that "The Secretary is directed to select two to five teams that were not selected as one of the two Advanced Reactor Demonstrations and that represent a diversity in designs of the advanced nuclear reactors to enter into cost-share agreements to address technical risks in each proposal's reactor design." NEI fully supports awards for demonstration and awards for risk reduction. However, in our view it would be

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

best if the FOA discusses the demonstration and risk reduction programs separately and provides the option for applicants to choose either the demonstration or risk reduction program. Some companies may not be in a position to apply for the demonstration program with a 50/50 cost share but would be interested in applying directly for the risk reduction program with an 80/20 cost share. In addition, we recommend that the FOA include an option that applicants to the demonstration program that are not selected may be able to quickly revise their proposal for the risk reduction program.

Given the complexity of a FOA resulting in two types of awards (demonstration and risk reduction) and the need to allow for modification of scope for those not selected for demonstration awards, DOE should place the higher priority on the selection of the demonstration awardees followed by selection of the risk reduction awardees while endeavoring to minimize the time between selection for the demonstration program and selection for the risk reduction program.

As DOE executes the advanced reactor demonstration program, DOE should seek to ensure that the demonstration program does not cause any delay in the progress of an advanced reactor project by private industry or any advanced reactor project that is currently supported by DOE.

2. Please provide information on any regulatory hurdles that would limit the ability to successfully carry out an advanced reactor demonstration, and provide feedback on how DOE can help in overcoming those challenges. Please comment on:
  - a. Considerations and rationale to authorize and operate under authority other than NRC.
  - b. Current status and licensing/regulatory efforts to-date.
  - c. Critical issues requiring NRC approval.

### **Response:**

Project teams may consider a variety of NRC licensing processes including Part 50 construction permit followed by an operating license, a Part 52 design certification followed by a COL application, or a Part 52 COL application without a design certification. DOE should not limit this choice. The NRC is able to license advanced reactors at this time. Over the last few years the industry and the NRC have been working to improve the efficiency of licensing advanced reactors, and further efficiencies can be gained if the NRC more expeditiously addresses advanced reactor topics including facilitating risk-informed performance-based advanced reactor reviews; content of applications guidance for advanced reactors; SMR and

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

other new technologies emergency planning rulemaking; and Advanced reactor limited scope physical security rulemaking. While the Nuclear Energy Innovation and Modernization Act required the NRC to complete rulemaking by 2027 to support advanced reactor licensing, this rulemaking does not need to be completed before a non-LWR advanced reactor is reviewed by NRC.

NRC has published generic timelines for reviews of applications (<https://www.nrc.gov/about-nrc/generic-schedules.html>). These timelines are consistent with current experience and practice but should be accelerated to ensure that the timelines for the demonstration program can be met. We encourage dialogue between DOE and NRC concerning the timelines for and urgency of the demonstration program.

The NRC's continued storage rule predominately addressed light water reactor fuel in the Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel. As a result, non-LWR project teams may need to provide additional information in the licensing process and the DOE should be willing to provide assistance to the project team to address the long-term storage issues of non-LWR fuel if appropriate.

3. Please provide information on any market limitations that would limit the ability to successfully carry out an advanced reactor demonstration (e.g., supply chain limitations, availability of fuel), and provide feedback on how DOE can help in overcoming those challenges.

### **Response:**

Enriched uranium up to 5% is readily available and is used by light water reactors and at least one non-light water reactor. However, many non-LWRs will need High Assay Low Enriched Uranium (HALEU) up to 19.75% U-235. Currently, commercial nuclear fuel suppliers, with the possible exception of Russia, can only produce uranium enriched to 5%. The current lack of a domestic commercial supply of HALEU should not be considered as a negative in the review of applications. Rather it is an opportunity for DOE to help jumpstart the domestic HALEU fuel cycle infrastructure and increase the international competitiveness of the U.S. industry.

The development, demonstration, and deployment of many non-LWR nuclear technologies is challenged since there is no certainty that a HALEU fuel infrastructure will be in place when they are ready to enter the market. At the same time, investment into a HALEU fuel infrastructure is highly unlikely given the market uncertainty. To help bridge this gap in supply, the Department of Energy (DOE) should commit to providing an interim supply of HALEU and the associated transportation infrastructure and thereby accelerate the

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

development of both HALEU fuel infrastructure and advanced reactors and advanced fuels that require HALEU. The DOE's activities in this area to date are appreciated and encouraging but not sufficient to ensure an interim supply.

DOE should support the accelerated development of codes and standards as identified in NEI 19-03, "Advanced Reactor Codes and Standards Needs Assessment." While this will benefit the advanced reactor industry, completion of this work is not mandatory for the licensing of an advanced reactor.

4. Demonstration projects shall require a cost share of not less than 50 percent from non-federal sources. Risk Reduction projects shall require a cost share of not less than 20 percent from non-federal sources. Please provide any feedback regarding:
  - a. Concerns related to this cost sharing, including industry willingness and ability to do so.
  - b. Commitments DOE should obtain from applicants related to cost sharing.

### **Response:**

The FY20 appropriations language states that "The Secretary is directed to select two to five teams that were not selected as one of the two Advanced Reactor Demonstrations and that represent a diversity in designs of the advanced nuclear reactors to enter into cost-share agreements to address technical risks in each proposal's reactor design." NEI fully supports awards for demonstration and awards for risk reduction. However, in our view it would be best if the FOA discusses the demonstration and risk reduction programs separately and provides the option for applicants to choose either the demonstration or risk reduction program. Some companies may not be in a position to apply for the demonstration program with a 50/50 cost share but would be interested in applying directly for the risk reduction program with an 80/20 cost share. In addition, we recommend that the FOA include an option that applicants to the demonstration program that are not selected may be able to quickly revise their proposal for the risk reduction program.

Securing the entire 50% non-federal commitments for the life of the project (development, licensing, construction) at a single point in time early in the project will be extremely difficult if not impossible. As an example, utilities and other end-customers will have different decision-making processes that could include multiple decision point milestones within a nuclear licensing and construction project that would require approval by their governing bodies before moving to the next phase (e.g., approval to initiate COL development, approval to begin site work, approval to begin construction). The uncertainty associated with out-year federal funding creates an additional challenge in the decision-making

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

process. Therefore, DOE must allow applicants to address the financial security requirements by staging their financial assurances over the course of the project. Such an approach could possibly be part of a milestone-based approach.

5. Understanding that DOE has a major interest in assuring that taxpayers benefit from this project, please comment on any considerations relating to intellectual property and data rights that the Department should consider.

### **Response:**

Beyond the fundamental benefit of enabling broad U.S. leadership in new and innovative advanced nuclear technologies, taxpayers are expected to benefit from these projects in numerous additional ways including the development and deployment of new reliable and resilient carbon-free energy sources, substantial job creation, and export of U.S. technology and the associated benefits from the up to 100-year relationship that will be established with the receiving country. The development of nuclear power systems is a long-term effort spanning a decade or more. Recognizing this unique aspect of nuclear energy and the benefits to the taxpayers from the projects, the government should enable the retention of intellectual property and data rights by the project team to the maximum extent permissible and protect intellectual property created during the course of the project for up to 30 years or the maximum extent permissible.

Long term financial commitments on the part of the industry and the federal government are essential to a successful demonstration program. Since the federal portion of the cost-share awards is contingent upon the annual appropriations process and therefore not guaranteed, DOE should consider a contractual provision that would revert all intellectual property to the project team in the event the DOE is unable to continue its portion of the cost share.

6. Regarding project work to be done under the cooperative agreements, DOE intends to include requirements substantially as follows:

"All work performed under DOE awards must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment; however, the Prime Recipient should make every effort to purchase supplies and equipment within the United States. The Prime Recipient must flow down this requirement to its sub-recipients. DOE may deny reimbursement for the work conducted outside the United States and such costs may not be recognized as allowable recipient cost share. The Prime Recipient is responsible should any work under this award be performed outside the United States, absent a waiver,

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

regardless if the work is performed by the Prime Recipient, sub-recipients, contractors or other project partners. There may be limited circumstances where it is in the interest of the project to perform a portion of the work outside the United States. To seek a waiver of the Performance of Work in the United States requirement, the applicant must submit a written waiver request to DOE.”

- a. Please provide comments on related concerns.
- b. Please comment on your need for foreign partnership or suppliers.
- c. Please comment on your likelihood of requesting a waiver.

### **Response:**

The Advanced Reactor Demonstration Program envisions the construction of an economical advanced reactor. These reactors are complex and involve specialized engineering services and equipment for which a domestic supply chain may not be readily available or may be at a significant competitive disadvantage relative to foreign suppliers. NEI supports the goal of fully utilizing the domestic supply chain for construction of the demonstration reactors and subsequent reactors. However, requiring the sole and exclusive use of a domestic supply chain for this first-of-a-kind project may result in significant additional costs beyond the original estimates and may delay the construction schedule. The demonstration program is intended to prove that the reactor can be constructed in a cost-effective manner while maintaining an aggressive construction schedule. These goals must be a priority and will be at risk if the project team must also deviate from using a proven foreign supply chain in order to develop a domestic supply chain. Once the demonstration program is a success and multiple projects are initiated, it is likely that more U.S. suppliers will enter the nuclear equipment and services market. It should also be recognized that utilizing established foreign supply chains can support future U.S. exports as potential export markets endeavor to utilize local supply chains. Therefore, project teams should be permitted to utilize resources that will include foreign suppliers when necessary for the project to achieve construction success on budget and on schedule.

7. The following minimum award evaluation criteria are planned: (1) technical feasibility that the demonstration can be operational in five to seven years; (2) likelihood that the design can be licensed for safe operations by the NRC; (3) use of certified fuel design, or demonstration of a clear path to certification within five to seven years; (4) affordability of the design for full-scale construction and cost of electricity generation; (5) ability of the team to provide its portion of the cost share; and (6) technical abilities and qualifications of teams desiring to demonstrate a proposed advanced nuclear reactor technology. Please

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

comment on information needed to clarify any of the proposed criteria, as well as any additional criteria DOE should consider, along with your rationale.

### **Response:**

The following comments address a few of the planned criteria identified.

NEI fully supports the aggressive timeline for the demonstration projects as outlined in the FY20 appropriations language. However, it should be recognized that substantial time will lapse between the passage of the FY20 appropriations and the finalization of contracts between the DOE and the project winners. Therefore, at a minimum, the 5 to 7-year time window should be relative to expected contract award. In addition, NEI recommends that the timeline to become operational be a weighted selection criterion (with shorter timelines, and DOE confidence in those timelines, being given greater weighting), rather than using the 5 to 7-years as an absolute go-no-go criterion. NEI believes that the primary goal of the demonstration program should be the demonstration, in the 2020s, of reactors that the domestic and international marketplace will procure and construct in the early 2030s.

The review criteria "use of certified fuel design, or demonstration of a clear path to certification within five to seven years" implies that nuclear fuel is "certified" separately by the NRC. This is not necessarily the case. Nuclear fuel is an integral part of the reactor design and will be approved by the NRC as part of the reactor design. Therefore, the second criteria, "likelihood that the design can be licensed for safe operations by the NRC" effectively encompasses the fuel qualification criterion.

The criterion "affordability of the design for full-scale construction and cost of electricity generation" should be interpreted as affordability of future reactors to end customers constructed after the demonstration program is complete. Affordability should not be interpreted strictly in terms of the cost to the government. For example, when comparing two projects with different MW ratings and different capital costs, affordability should refer primarily to the relative costs and attributes of the design (e.g., overnight capital cost per kWe, levelized cost of electricity, flexibility for load following, ability to integrate with renewables, future market demand) while the total capital cost of the reactor to be built should be deemphasized as an element of the "affordability" criterion.

8. The evaluation may consider diversity in designs for the advanced reactors to be demonstrated as a policy factor impacting the selection. Please comment on this consideration.

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

### **Response:**

NEI believes that the primary goal of the demonstration program should be the demonstration, in the 2020s, of reactors that the domestic and international marketplace will procure and construct in the early 2030s. As energy markets continue to evolve and more energy producers and end users make commitments to reduce their carbon footprint, reactors of varying sizes and reactors that offer energy products beyond just electricity will be needed. Therefore, a diversity in designs with a focus on the marketplace should be considered in the final evaluation.

9. The evaluation may consider foreign ownership, control, or influence (FOCI) as a policy factor impacting the selection. Please comment on this consideration.

### **Response:**

Any Foreign ownership, control, or influence policy factors from the DOE should be no more restrictive than NRC requirements. The DOE should welcome international collaboration and investment especially from those countries with a long history of civil nuclear energy expertise and interactions with U.S. companies.

10. DOE cooperative agreements contain a "Statement of Substantial Involvement" detailing the type and nature of the engagement DOE intends to have in the project, e.g., DOE contributions to the technical aspects of the effort necessary for its accomplishment, etc. This involvement may include collaboration, participation in the management of the project, design or readiness reviews, or intervention in the activity, over and above the exercise of normal Federal stewardship responsibilities.
  - a. Please provide information on the types and extent of substantial involvement DOE should have in the review and oversight of selected projects, including any rationale.
  - b. Substantial involvement could also include National Laboratory support or Laboratory partnerships, and government furnished equipment. Please comment on how DOE should structure this support.

### **Response:**

NEI is focused on the goal of successfully constructing and operating two advanced reactors in the demonstration program, and two to five advanced reactors for risk reduction. To achieve this goal, DOE's involvement should be minimally intrusive and be focused primarily on ensuring efficient execution of the projects. Substantive involvement by the national

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

laboratory complex can be useful in accelerating progress provided the associated laboratory has the subject matter expertise.

11. DOE is exploring alternative implementations of its financial assistance in the solicitation for Demonstration and Risk Reduction awards. An example is a public-private partnership modeled after the National Aeronautics and Space Administration (NASA) Commercial Orbital Transportation System (COTS) experience. Specifically, payments would be made upon the successful completion of performance milestones as proposed by the participants or as negotiated with DOE. Please provide any concerns you have with this approach or alternate methods that you believe would benefit the project.

**Response:**

NEI supports the concept of a milestone-based approach to be used in the advanced reactor demonstration projects as long as the utilization of such an approach does not significantly delay the advanced reactor demonstration program. NEI encourages the DOE to further engage with the industry on this topic.

12. DOE could require pre-applications in the FOA application process to assist entities unlikely to be a viable competitor from having to prepare full applications. In addition, this would help DOE streamline its application evaluation process. Please provide information on concerns or suggestions regarding this approach, including information DOE should obtain from applicants for this early phase of the submission, and any criteria you suggest DOE should use to evaluate the pre-applications.

**Response:**

DOE should only use pre-applications if it will result in a more efficient FOA process. If DOE uses pre-applications, DOE should avoid significant delays in the time to selection.

13. DOE cooperative agreements have typical standard reporting requirements, including Management Reporting, Research Performance Progress Reporting, Scientific and Technical Reporting, Financial Reporting, etc.
  - a. Please provide information on specific reporting that should be required for selected projects, including purpose, frequency, and content.
  - b. Please comment on a proposed frequency of reporting for cost and schedule information.

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

### **Response:**

DOE should balance the need for reporting with the burden caused by reporting. Efforts should be made to streamline reporting, avoid unnecessary reporting, and avoid creating new reporting processes that are not already being executed for internal project management. In summary, DOE should minimize reporting requirements to the maximum extent possible, particularly for contracts that adopt a milestone-based approach. Reporting requirements have an associated financial cost which can be significant when considered in aggregate.

14. Government financial assistance rules permit a cooperative agreement to be terminated by the non-Federal entity upon sending to DOE written notification. However, given the importance of the Demonstration projects, DOE intends to include specific award language outlining the termination process to protect the Government's interests. For example, the award may contain a requirement that an awardee can only terminate the award with prior written notice to DOE and with prior written concurrence from DOE at least 120 days prior to the planned termination date.
  - a. Please provide information on any concerns you may have with this approach.
  - b. Please provide information on ideas you may have to help guarantee the recipient's performance of the award.

### **Response:**

NEI is focused on the goal of successfully constructing and operating two advanced reactors in the demonstration program. The best way to reduce the chances of termination by either the non-Federal entity or by DOE is to structure and launch a successful project. This includes parties to the agreement that are committed to the success of the program, have the right approach and consistent funding. While NEI agrees that protecting the financial investment of all parties is important, NEI does not see a need to use non-standard termination provisions at this time.

15. Congressional language directs DOE to fund ARD projects which can be operational no later than five to seven years from the date of award.
  - a. Please comment on the feasibility of this requirement.
  - b. If not feasible, please provide information on a recommended completion date.

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

- c. If not feasible, please comment on the significant barriers preventing completion of the Congressional direction.

### **Response:**

NEI fully supports the aggressive timeline for the demonstration projects as outlined in the FY20 appropriations language. However, it should be recognized that substantial time will lapse between the passage of the FY20 appropriations and the finalization of contracts between the DOE and the project winners. Therefore, at a minimum, the 5 to 7-year time window should be relative to expected contract award. In addition, NEI recommends that the timeline to become operational be a weighted selection criterion (with shorter timelines, and DOE confidence in those timelines, being given greater weighting), rather than using the 5 to 7-years as an absolute go-no-go criterion. NEI believes that the primary goal of the demonstration program should be the demonstration, in the 2020s, of reactors that the domestic and international marketplace will procure and construct in the early 2030s.

Proposals should be considered for their total viability, absent an arbitrary or rigid timeline requirement, to ensure that viable projects are selected with manageable risks. A firm 5 to 7 year criterion could inadvertently screen out designs that would have a high market viability.

DOE should apply the selection criteria, including the 5 to 7 year criterion, on a weighted scale. DOE should score the demonstration schedule, based upon the duration and the confidence in the proposed duration, and then combine with the scoring from other criteria. This will enable DOE to compare proposals based upon a composite score from all selection criteria.

16. DOE intends to utilize outside subject matter experts to assist with the evaluation of applications submitted in response to the FOA, including: (1) a representative from an electric utility that operates a nuclear power plant; (2) a representative from an entity that uses high-temperature process heat, district heating, hydrogen production, or heat for manufacturing, industrial processing, or other purposes; (3) experts from industry with experience in design, manufacturing, and operation of nuclear reactors; and, (4) a representative from the finance industry with background in the nuclear field.
  - a. Please explain any conflict of interest concerns you may anticipate, as well as your mitigation suggestions.
  - b. Please comment on other categories of subject matter experts DOE should consider in addition to those listed.

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

### **Response:**

NEI believes that the primary goal of the demonstration program should be the demonstration, in the 2020s, of reactors that the domestic and international marketplace will procure and construct in the early 2030s. As energy markets continue to evolve and more energy producers and end users make commitments to reduce their carbon footprint, reactors of varying sizes and reactors that offer energy products beyond just electricity will be needed. Therefore, a diversity in designs with a focus on the marketplace should be considered in the final evaluation. NEI is supportive of an external review committee, as described above, providing input to the selection process. It is important to have the voice of potential end users and outside experts to help ensure success for the demonstration program and the long-term market viability for advanced nuclear products. NEI appreciates the potential challenges associated with conflict of interest requirements and is confident that DOE can adequately address these challenges and we encourage DOE to do so in an expeditious manner so as not to delay the selection process.

17. Please provide information on the skills and capabilities of your organization that support achieving the described demonstration objectives in the following areas:
- a. Major development requirements including materials, testing, systems, etc.
  - b. Capabilities to resolve development requirements and area of potential government support.
  - c. Major risks to accomplishing commercial operation.

### **No Response Provided**

18. The following is a list of potential information that will be required for the response to the FOA. Please comment on the relevancy of the potential requested information. Specifically, identify what should be added or removed and the associated rationale.
- a. Advanced Reactor Design and Technology
    - i. Reactor type
    - ii. Reactor coolant
    - iii. MWt
    - iv. MWe (net of station load)
    - v. Heat transfer mechanism

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

- vi. Safety features and systems
  - vii. Safeguards and security considerations
  - viii. Anticipated coping time with station blackout
  - ix. Design life
  - x. Transportability
- b. Nuclear Power Plant
- i. Scalability – number of potential reactors per site
  - ii. Switchyard / interconnection requirements
  - iii. Structures / buildings
  - iv. Maximum height / elevation of the tallest structure
  - v. Area, in acres, inside the security fence
  - vi. Total area in acres for all structures
  - vii. Anticipated Operating Basis Earthquake (ground acceleration)
  - viii. Anticipated Safe Shutdown Earthquake (ground acceleration)
  - ix. Anticipated Emergency Planning Zone
  - x. Anticipated on-site construction time
  - xi. Anticipated peak on-site construction personnel requirement
- c. Energy Resiliency
- i. Features that contribute to energy resiliency
  - ii. Cyber security
  - iii. Resistance to electromagnetic pulse (EMP) and geomagnetic disturbances (GMD)
  - iv. Black start capability
  - v. Ability to manage station black out
  - vi. Suitability for connection to a micro-grid
- d. Fuel
- i. Fuel description
  - ii. Fuel Acquisition Strategy

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

- iii. Enrichment
- iv. Refueling interval
- v. Refueling process / duration / on or off site
- vi. Fuel fabrication process
- vii. Ability to tolerate impurities in fuel material
- e. Spent Fuel Management
  - i. Please describe the plan for managing spent fuel (on or off site)
  - ii. Please describe any unique aspects of managing spent fuel that might require development, e.g., design and licensing of interim storage casks
- f. Operations / Staffing
  - i. Staffing requirements
  - ii. Total personnel
  - iii. Operators
  - iv. Maintenance
  - v. Security
  - vi. Administration
  - vii. Other
  - viii. Anticipated capacity factor
  - ix. Cooling system options and requirements (wet or dry)
  - x. Water requirement in gallons per day for conventional cooling
- g. Economics
  - i. Estimated overnight capital cost - \$/kw of capacity
  - ii. Forecasted Levelized Cost of Energy
- h. Licensing / Permitting
  - i. Current status and licensing / regulatory efforts to date
  - ii. Critical issues requiring U.S. Nuclear Regulatory Commission (NRC) approval
  - iii. Pathway to Commercial Operation

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

- iv. Please provide an assessment of the maturity of the design and the technology readiness level using the DOE Technology Readiness Level (TRL) scale (see [DOE G 413.3-4A, Technology Readiness Assessment Guide](#)).
  - v. Please describe the anticipated pathway to commercial operation including a timeline with major milestones.
  - vi. Please describe any major development requirements including materials, testing, systems, etc.
- i. End-of-Life
    - i. Please describe a plan, timeline and requirements to decommission and dismantle a nuclear power plant using your technology when it reaches end-of-life

### **No Response Provided**

19. Please specify a high level cost estimate by year for a project your organization might propose and identify critical elements that could significantly impact the cost. Include rationale for the estimate.

### **No Response Provided**

20. DOE intends to request questions from interested parties to the FOA upon its issuance, as well as hold an Industry Day to provide a program overview and explain solicitation requirements, including the possibility of one-on-one meetings with interested applicants.
- a. Please provide information on what information DOE can present that would be most beneficial to interested applicants at this Industry Day.
  - b. Please provide suggestions for the location and timing of the Industry Day.

### **Response:**

An industry day will be welcomed and should be held shortly after issuance of the FOA, preferably within two weeks. NEI recommends that DOE consider holding two industry days within the same week with one of them in Washington, D.C. and the other one on the west coast. Based on the interactions during the industry days and the need for additional follow-up, DOE may wish to consider a second set of industry days a few weeks after the first ones. At the industry day, DOE should consider proactively addressing intellectual property

# Nuclear Energy Institute

## Response to Information Request on the Advanced Reactor Demonstration Program DE-FOA RFI-0002271 February 26, 2020

and foreign content considerations among other topics, for which early engagement can enable a more efficient FOA process.

21. DOE recognizes that some applicant companies competing for a Demonstration award may not be as mature as others, or are proposing technologies that involve risks that would likely prevent them from meeting the goal of deployment in five to seven years. For these applicants, DOE anticipates making two to five additional awards under the FOA using the \$30 million Risk Reduction award funding identified in the FY 2020 appropriation to address these risks and potentially position these technologies as the next group of domestic reactor designs to be demonstrated. Please provide input regarding how NE should approach this aspect of the solicitation and selection process.

**Response:**

The FY20 appropriations language states that "The Secretary is directed to select two to five teams that were not selected as one of the two Advanced Reactor Demonstrations and that represent a diversity in designs of the advanced nuclear reactors to enter into cost-share agreements to address technical risks in each proposal's reactor design." NEI fully supports awards for risk reduction. However, in our view it would be best if the FOA discusses the demonstration and risk reduction programs separately and provides the option for applications to either the demonstration or risk reduction program. Some companies may not be in a position to apply for the demonstration program with a 50/50 cost share but would be interested in applying directly for the risk reduction program with an 80/20 cost share. In addition, we recommend that the FOA include an option that applicants to the demonstration program that are not selected may be able to quickly revise their proposal for the risk reduction program.

22. Respondents are invited to provide any other suggestions or concerns that may not have been addressed in this RFI/NOI.

**Response:**

A project team will likely consist of many companies (e.g. contractors, utilities, etc.) in addition to the prime applicant. It is possible that some companies may wish to participate in multiple project teams. This should not be prohibited because it could limit the diversity of applications and the qualifications of project teams.