

Advanced Reactor Demonstration

Q and A at NEI

February 18, 2020

NOTICE: *The DOE answers to questions posed are based on its best knowledge and plans at this time. However, DOE is in the early planning stages of the procurement process and positions on different issues and plans may change as the procurement strategy further develops, particularly after DOE gets inputs from interested parties in response to the Request For Information/Notice of Intent. Accordingly, DOE answers provided here should be considered preliminary, and interested parties should defer to the official Funding Opportunity Announcement (FOA) when it is issued for latest and up-to-date information.*

Q1: Please describe the various funding opportunities out there now and how they all relate.

A: We have a new solicitation under Advanced Reactor Technologies for Reactor Design Demonstrations. You might have heard of the Advanced Reactor Concepts (ARC)15 program. This will become ARC20 program. Also, the Consolidated Nuclear Industry Research (CNIR) continues as normal. This is part of our other on-going FOA for the Office of Nuclear Energy University Programs (NEUP). Finally, the Industry FOA continues.

Q2: There is \$160M of Federal funds, with a recipient 50% share, for a total of \$320M. Does that mean that a \$400M reactor can't be considered?

A: \$160M is for the first year alone.

Q2a: How many years might it run? Out year budget uncertainty is a significant problem for industry; can an upper limit be provided?

A: Congressional language asks for specific out-year cost profiles for each demonstration in future budget requests; this is information DOE will request from applicants as part of your applications. DOE will coordinate with Congress for future funding based on this information, which funding will be at Congressional discretion

Q3: What is the timeline between pre-application and full application?

A: DOE is still in the process of developing the strategy. Our early planning estimates one month. If we do end up getting early application information, we are considering giving feedback to applicants as time allows. If we do give feedback, we are hoping for 3 to 4 weeks of time until the full application.

Q4: You indicated 5 to 7 years. Is that for 50/50 and 80/20?

A: This will be for the 50/50 cost shared reactor demonstrations, but we anticipate the 80/20 cost shared Risk Reduction awards may have a similar period of performance.

Q5: It's impossible to know everything in the applications before you get the applications. Affordability jumps out. Is the intent for teams to prepare a non-licensed reactor with non-licensed fuel?

A: We want your input on this. The goal is to have operating reactors in 5 to 7 years. If that's not doable, please tell us in RFI feedback.

Q6: Gen III reactors meet requirements right now. Definition of "advanced" is important, what does it mean?

A: Regarding what is meant by advanced, Congressional language indicates that for purposes of this program, an advanced reactor can be any light water or non-light water fission reactor with significant improvements compared to the **current generation of operational** reactors. Significant improvements may include: inherent safety features, lower waste yields, greater fuel utilization, superior reliability, resistance to proliferation, increased thermal efficiency, and the ability to integrate into electric and nonelectric applications.

Q7: Can teams just apply for a proto-type knowing that the commercial design will follow?

A: A prototype or even a sub-scale reactor may be acceptable, but at the end of the award it will need to be demonstrated that a full scale design can be licensed.

The FOA's evaluation criteria will also evaluate applications for merit considering the affordability of the design for full-scale construction and cost of electricity generation to be cost competitive with competing forms for energy.

Q8: Is supporting more than one team ok?

A: It is common that a program of this size and complexity would have teams that contain multiple partners. Typically there will be one entity that submits as the prime applicant, with other team members as sub applicants. It is permissible to have more than one Project Manager (sometimes called "Principle Investigator" on research and development awards, but usually called Project Manager on demonstration awards). And it is ok to be on multiple teams (e.g., being a subrecipient on different teams submitting for funding).

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Q9: When you ask for information that demonstrates stable funding, what are you looking for?

A: We realize you may not be able to give firm numbers for your budgets for the entire 5 to 7 years. What we currently have in mind is a budget for the 1st year and estimates and a plan for the following years, but this could change depending on the input we receive.

Q10: How might DOE consider COTS-like payment?

A: We are seeking input on this. We're not sure we'll do the COTS-like approach, but we're thinking about it. We need to work out issues with reimbursable costs regarding milestone attainment.

Q11: What kind of info will you be looking for in the pre-application?

A: Planning at this time anticipates that only applicants applying for the Advanced Reactor Demonstrations will be required to submit early application information; such early submittal information is not planned for the Risk Reduction. Exact information required will be specified in the FOA. However, anticipated early application information may include such things as:

- planned applicant team composition,
- applicant eligibility information,
- statement of team qualifications,
- past performance information,
- limited pricing information (e.g., federally approved rate agreement information, etc.),
- applicant prior audit information,
- preliminary information regarding proposed advanced reactor technology or concept, and
- preliminary information regarding proposed advanced reactor fuel, etc.

If you have suggestions of other typical application information that could be submitted early in the process, please let us know as part of your submissions to the RFI

DOE's intent in getting this early application submission information is to:

- Break up the application preparation and submission process for applicants to facilitate the application preparation process
- Permit DOE to begin the evaluation early on to comply with Congressional language to pursue an aggressive evaluation schedule
- Permit DOE to better plan for the evaluation of full applications, including to have qualified reviewers, as well as to manage any conflict of interest issues with reviewers, etc., and
- Permit DOE to possibly advise the applicants early on in the process about their potential to be viable competitors (time permitting in the schedule)

Early application information submission may be required in order to continue the FOA application process and submit a full application. Criteria for evaluation of this information will be detailed in the FOA.

Our plan is to also require Letters of Intent to help us in planning for the merit review process.

The types of information typically included in Letters of Intent consists of:

- Prime applicant name, address, point of contact information (name, title, telephone and email address)
- Team member and/or subapplicant name, address, point of contact information (name, title, telephone and email address), for as many teams and subapplicants as are known at this stage, and
- To specify whether you will be applying for the Advanced Reactor Demonstration funding opportunity, the Risk Reduction funding opportunity, or both funding

opportunities.

Q12: Is there a limit to foreign-owned company funding?

A: The Primes must be eligible to own and operate an NRC-licensed reactor. Sub-recipients – We'd like these subrecipients to be US-based companies as well. We're thinking about including a waiver process for foreign participation as part of the FOA. We'd like feedback on this via the RFI.

Q13: Is it feasible to partition work on the project off to US work versus non-US work? Separate from the applicant cost-share?

A: Potentially, but DOE will need to research and consider this approach. The US-only work requirement would apply to work done under the award that is funded by Federal funds and non-Federal cost sharing funds. So, feasibly anyway, the awardee could do work toward the advanced reactor outside of the award (i.e., work that is not part of either the award's project plan or its accompanying budget that does not use either Federal award funds or non-Federal cost shared award funds). However, there will be many things to consider here, e.g., the advanced reactor must be able to be licensed by NRC; there may be information security issues, export control considerations, security (including cyber security) aspects for plant operations, etc., that could be impacted by foreign participation in the reactor design – even if that participation is done outside of the award. If the reactor is built on a Federal site, there may be other considerations and security requirements as well.

DOE may include one or more program policy factors that relate to this. Examples could include:

- Applications that have the potential to enhance U.S. nuclear infrastructure may be given preferential consideration.
- DOE may consider foreign interest in the selection of application(s) for negotiation of award, including type and amount of foreign involvement in the reactor project (both within and outside of the award's project scope, as well as any foreign ownership, control, or influence (FOCI) issues.

Q14: Would DOE consider making more than two 50/50 awards if companies are already involved and further along with licensing and deployment?

A: The Congressional language instructs us to request proposals for two demonstration advanced reactors. If you have a scenario in mind, please provide that in the RFI feedback.

Q15: If the mission is two completed demos, do you envision a package with facility, site, and customer outlined? And who owns the reactor (developer, operator, DOE)?

A: The goal of the program is to produce two operating commercially viable reactors. These reactors can operate as part of a power generation facility of an electric utility system or any other manner to demonstrate suitability of the reactor for commercial application. The RFI asks for feedback on ownership. We are not prescriptive at this stage. Regarding ownership, we are

still working with Congress on this issue. We request any feedback or suggestions that you may have regarding ownership of the reactor.

Q16: What about power level?

A: There is nothing prescribed regarding power level. We want your feedback on this in the RFI.

Q17: We have a sub-critical power producing device; no control rods. Will a proposal from a technology like ours be competitive? Can the definition of reactor be changed and make it more broad?

A: We'll take that question and see if we can provide clarification. The Congressional language establishing this program specifies the following: "For purposes of this program, an advanced reactor can be any light water or non-light water fission reactor with significant improvements compared to the current generation of operational reactors".

Q18: The attributes don't match the merit review criteria. Please clarify?

A: The Congressional language tells us that we must have merit review as follows:

"(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 Nuclear Regulatory Commission; (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. The evaluation board should consider diversity in designs for the advanced nuclear reactors to be demonstrated..."

But, these are considered the minimum evaluation criteria; we can, and likely will add others including to be sure our objectives are covered by the evaluation criteria.

Q19: Is an NRC license a requirement for one of the demos?

A: The RFI wants input from industry on this. The Congressional language contemplates reactors of a type that would be licensed by the NRC even if built at a DOE site. If you envision a pathway other than an NRC license, please let us know in the RFI feedback - we want your input.

Q20: Can the advanced reactor demo awards be used for foreign licensing or use of foreign designs?

A: US dollars are for investments in US companies and US infrastructure.

Q21: Has DOE gotten a resource commitment from NRC?

A: Lots of legislation calls for close coordination with NRC. We now have an MOU with NRC. We are in close coordination.

Q22: Would information on a COTS-like proposal involving a 3:1 private/fed split, with private being used up first be valuable?

A: Since affordability is a merit review criterion, it could be rated higher in the merit review process. Affordability is a criterion. Also, it is feasible that an applicant which has already accomplished much pre-award work could better show that its proposed advanced reactor has greater technical feasibility that the demonstration can be operational in five to seven years, which is also one of the merit review criterion.

Q23: What if proposal has lower funding requirements or if we conduct significant pre-award work will we have a better chance?

A: Since affordability is a merit review criterion, it could be rated higher in the merit review process. Affordability is a criterion.

Q24: What are you doing to ensure this effort doesn't delay or compete with private investment or deployment approaches?

A: By DOE contributing funding toward this it should in no way delay private investment; in fact, it should help accelerate everything. Since we are doing this as an open competition that any interested and otherwise qualified US company can apply for, this effort should also not compete with private investment but should serve to augment it.

Q25: In working with NRC, we have developed some creative approaches to licensing. Do you want this input?

A: Yes, we want that input. Please submit it as input for the RFI

Q26: For the reactor demo, you provided minimal criteria on slide 12. When would we get the criteria for risk reduction or are they the same?

A: We do anticipate that the evaluation criteria for Risk Reduction awards may be different than for the Demonstration awards. At the very latest, you will see this criteria when the FOA goes out.

Q27: What is your best guess date for the FOA?

A: Late spring for the FOA release. For the selection announcement, late summer or early fall. For the award, late this FY or very early next FY.

Q28: What about awards in the future? FY21 and FY22?

A: We are challenged to move aggressively, we take this seriously and Dr. Baranwal takes it seriously. We are moving out aggressively. The program is envisioned to result in two operational reactors within five to seven years of award. As with all programs, this is subject to future Congressional appropriations and directions.”

Q29: If we are selected do we have to start immediately or can we delay?

A: The applicant will propose the timeframes for performance as part of the application, so it is feasible that an applicant could propose a delay and if selected for award it would not have to begin immediately. Please keep in mind that when DOE does the merit review of your application that the review process will look at: (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 Nuclear Regulatory Commission; and (3) use of certified fuel design or demonstration of a clear path to certification within five to seven years.

Accordingly, any significant delay in the applicant’s proposed schedule could adversely impact the evaluation of the application. You would want to explain and justify the delay and specify how your project would still have merit under the aforementioned merit review criteria.

Q30: What about proposals involving waste-related fuels? Would DOE consider a selection criteria dealing with unwanted nuclear materials? We see this as a security concern.

A: That’s within the realm of potential selection criteria. We want that input.

Q31: Will the \$160M be split evenly? How long is it available? And do have to spend it all in the first year?

A: The congressional budget tables show it split between \$80M for Demo 1 and \$80M for Demo 2. Funding for future fiscal years will depend on Congressional appropriations. It does not have to be spent in one year.

Q32: Is this a cooperative agreement or an alternative such as NASA’s Space Act Agreement method?

A: Our current path is Financial Assistance using a cooperative agreement. We did consider other approaches such as a Federal Acquisition Regulation (FAR) based contract, as well as doing this under DOE’s Other Transaction Authority. Weighing all the pros and cons of each, we have decided on using financial assistance as the best approach. But, we welcome any comments or suggestions on this.

Q33: Regarding the documents requirements, especially the narrative file, will you be providing guidance on this? Is there a page limit?

A: This is primarily up to the applicant. We will give more definitive guidance in the FOA. There will probably be a page limit.

Q34: What is the NRIC's role in this?

A: NRIC is a broad available resource. Using NRIC is not required.

Q35: How is improved fuel utilization measured?

A: We invite your comments on that.

Q36: At what point do you want milestones for the 5-7 years? And to what extent do you want to see go/no go milestones in the proposal?

A: We're not sure we'll use that approach, but give us your input. We are considering the payments for milestone achievement approach as an additional way to incentivize the recipient to make good progress toward completing the award objectives, but there is much to be considered, so please give us your feedback.