

QUESTIONS AND ANSWERS

PLEASE REFER TO THE GENERAL FAQs SECTION OF ARPA-E'S WEBSITE ([HTTP://ARPA-E.ENERGY.GOV/?Q=FAQ/GENERAL-QUESTIONS](http://arpa-e.energy.gov/?q=faq/general-questions)) FOR ANSWERS TO MANY GENERAL QUESTIONS ABOUT ARPA-E AND ARPA-E'S FUNDING OPPORTUNITY ANNOUNCEMENTS. ADDITIONAL QUESTIONS SPECIFIC TO THIS FOA ONLY ARE INCLUDED BELOW. PLEASE REVIEW ALL EXISTING GENERAL FAQs AND FOA-SPECIFIC QUESTIONS BEFORE SUBMITTING NEW QUESTIONS TO ARPA-E.

I. Full Application Phase Questions:

Q1. Please clarify what you mean by component, in Category B. Does it mean reactor components only or does it also include all enabling technologies, in a more general sense?

ANSWER: This FOA invites Applications to develop any component or enabling technology that can significantly lower the overnight capital cost of a demonstration fusion power plant based on one or more specific, higher-maturity, higher-cost fusion concepts. Applicant must provide specific arguments on how the proposed component technology lowers the capital cost. Enabling/component technologies that benefit fusion generally without a specific connection to how costs will be lowered are not responsive to this FOA. See also the third bullet of FOA Section III.C.3.

Q2.a We are preparing a proposal for one of the Capabilities Teams in the BETHE FOA. The call discusses the 10% [reduced cost share] requirement if there are private companies as part of the proposal. My question is does this apply to companies who do modeling rather than developing experimental devices? ... Can these companies be on a Category C proposal without being responsible for the [cost share]?

ANSWER: The 10% reduced cost share requirement is available to small businesses and certain project teams with small business participation. It is applicable to all awardees, including those submitting applications under Category C. Although the cost share requirement applies to the Project Team as a whole, the resulting funding agreement makes the Prime Recipient legally responsible for paying, or ensuring payment of, the entire cost share.

Q2.b So even though this is a two person software company, they would be responsible for the 10% cost share. If we subcontract to them instead, does this avoid the cost share requirement? If not, what is the mechanism for the cost share?

ANSWER: As set forth at FOA Section III.B.3, project teams that include small business participation are eligible for the 10% reduced cost share requirement under the following circumstances:

- *Small businesses – or consortia of small businesses – may provide 0% cost share from the outset of the project through the first 12 months of the project (hereinafter the “Cost Share Grace Period”). If the project is continued beyond the Cost Share Grace Period, then at least 10% of the Total Project Cost (including the costs incurred during the Cost Share Grace Period) will be required as cost share over the remaining period of performance.*
- *Project Teams where a small business is the lead organization and small businesses perform greater than or equal to 80% of the total work under the funding agreement (as measured by the Total Project Cost) are entitled to the same cost share reduction and Cost Share Grace Period as provided above to Standalone small businesses or consortia of small businesses.*

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- *Project Teams where domestic educational institutions, domestic nonprofits, small businesses, and/or FFRDCs perform greater than or equal to 80% of the total work under the funding agreement (as measured by the Total Project Cost) are required to provide at least 10% of the Total Project Cost as cost share. However, any entity (such as a large business) receiving patent rights under a class waiver, or other patent waiver, that is part of a Project Team receiving this reduction must continue to meet the statutory minimum cost share requirement (20%) for its portion of the Total Project Cost.*

Projects with small business participation not meeting any of the above criteria are subject to the base cost share requirements described in FOA Sections III.B.1 and III.B.2.

Regulatory requirements for valuing and accounting for the different types of cost share contributions can be found at 2 C.F.R. § 200.306. As previously noted, although the cost share requirement applies to the Project Team as a whole, the resulting funding agreement makes the Prime Recipient legally responsible for paying, or ensuring payment of, the entire cost share.

Q3. We plan to participate in a proposal with a DOE National Laboratory (as lead) to the ARPA-E BREAKTHROUGHS ENABLING THERMONUCLEAR-FUSION ENERGY (BETHE). Our institution is a non-DOE GOGO Federal Laboratory. The Guidance on page 15 of the FOA reads:

Non-DOE GOGOs and Federal agencies may be proposed to provide support to the project team members on an applicant's project, through a Cooperative Research and Development Agreement (CRADA) or similar agreement.

We are familiar with and have in place an Interagency Agreement (IA) for other DOE sponsored research. A new IA with DOE may require less time and overhead costs than a CRADA. Is the IA route available for this FOA?

ANSWER: Yes, however, as set forth in FOA Section III.A.2: *Federal agencies and instrumentalities (other than DOE) are eligible to apply for funding as a member of a Project Team, but not as a Standalone Applicant or as the lead organization for a Project Team.*

Q4. For our BETHE proposal, we are going to propose the construction of multiple [description omitted]. There will be 1000's of components. What fidelity will be needed for the proposal? Can we propose at the unit level, such as a line item under equipment for [description omitted] or do you need a spreadsheet for all of the components that will go into the [description omitted] based on prior fabrication? Or do you need even more information that may include current vendor quotes? Part of the work ahead will be to perform engineering designs, so some of the components that we identify now may change, but would likely remain within the budget envelope.

ANSWER: For fabricated items of equipment, applicants may submit estimates of quantity and unit prices. If selected for award negotiations, applicants can expect that ARPA-E will examine the basis of estimate and supporting documentation for those fabricated items.

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Q5. DE-FOA-0002212 ... sets out an organizational structure that includes concept teams (Category A) and capability teams (Category C). Is it okay for an individual who is submitting a capability team proposal (Category C) to also be a collaborator on a concept team (Category A) proposal? For example, if a concept team (Category A) desires access to a certain capability, whether or not that capability team gets funded more generally in Category C, can they include them in their Category A proposal, with the understanding that if they both get funded, they can work with them through the Category C avenue just as well.

ANSWER: It is reasonable for a Concept Development/Category A applicant to include a required, distinct task within their application that might overlap with a potential Category C capability. However, if the Category C application is eventually awarded, ARPA-E's strong preference is that the task be predominantly executed by Category C capability team. Per Section I.E.1.c of the BETHE FOA, Category A applicants are encouraged to discuss their potential needs with Category C teams; while the applicants should provide a plan to accomplish necessary diagnostic measurements and theory/modeling, they need not include Category C teams on the proposal as these teams will be funded separately. ARPA-E will manage award negotiations to ensure that Category A teams are not duplicating work performed by Category C teams.

Additionally, ARPA-E prefers that Category C application teams not include Category A applicants as collaborators. However, if there is a unique, needed capability possessed only by the Category A applicant, we will consider the situation on a case-by-case basis.

Q6. I am writing to inquire about the expected reporting requirements. Unless I missed it in the FOA (in which case I apologize!), do you have information on the reporting requirements for the [FOA]? Is it expected to be significant, in which case, is budgeting for some hours of an administrative person a reasonable option?

ANSWER: Attachment 4 of ARPA-E's sample cooperative agreement sets forth Recipient reporting obligations. It can be found at <https://arpa-e.energy.gov/?q=site-page/funding-agreements>.

Cost principles for Institutions of Higher Education and nonprofit organizations can be found at 2 C.F.R. Part 200, Subpart E. As set forth at 2 C.F.R. § 200.403(c), allowable costs under Federal awards must:

Be consistent with policies and procedures that apply uniformly to both federally-financed and other activities of the non-Federal entity.

Additionally, 2 C.F.R. § 200.403(d) states that costs must:

Be accorded consistent treatment. A cost may not be assigned to a Federal award as a direct cost if any other cost incurred for the same purpose in like circumstances has been allocated to the Federal award as an indirect cost.

Cost principles for commercial entities include similar guidance that can be found at 48 C.F.R. § 31.202 (i.e., FAR 31.202).

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Q7. Can you give me examples of funds that may be used to cost share obligations by a University o[r] Federal Lab?

ANSWER: Prospective Applicants should check with their advisors regarding acceptable forms of cost share.

Q8. We are considering a Category-A proposal, but based on language in the FOA, we are uncertain of our concept's eligibility for Category A.

Language describing Category A includes: "...this program aims to enable at least two or three lower-cost concepts to reach $T_e, T_i \geq 1$ keV for the first time.... Similarly, the program aims to enable at least one concept to achieve fusion triple product $nT\tau \geq 10^{18}$ keV·s/m³ for the first time...."

Language describing Category B includes: "...demonstration of the component technology that can significantly reduce the capital cost of a specific, more-mature, higher-cost fusion concept, such as but not limited to the tokamak, stellarator, reversed-field pinch (RFP), or inertial confinement fusion (ICF)."

Concepts listed explicitly in the Category-B language are assumed in the FOA to be higher cost. But the language for Category A implies that only lower-cost concepts are eligible for that Category, at least in the context of the temperature metric. But that's not obvious in the context of the triple-product metric.

So if one's concept is listed in the Category B language, is it automatically ineligible for consideration in Category A? Or could it be eligible if one targeted only the triple-product metric?

Of course, we understand that for Category A, one has to demonstrate that one's concept can reasonably meet the \$100M spreadsheet criterion.

ANSWER: The four example fusion concepts listed in Category B (tokamak, stellarator, RFP, and ICF) are not automatically excluded from Category A. However, Category A applications, regardless of the concept on which it is based, must satisfy all the eligibility requirements for Category A as stated in the FOA.

Q9. There are four concepts (tokamak, stellarator, RFP, ICF) listed in Category B as examples of those that are more mature and higher cost. Does this automatically preclude any of the listed concepts from being the basis of a Category A proposal, which emphasizes lower cost?

ANSWER: The four example fusion concepts listed in Category B (tokamak, stellarator, RFP, and ICF) are not automatically excluded from Category A. However, Category A applications, regardless of the concept on which it is based, must satisfy all the eligibility requirements for Category A as stated in the FOA.

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Q10. I am requesting clarification on the cost share rules. It is clear that the same in-kind cost share equipment cannot be used simultaneously on more than one project at a time. However, if a piece of equipment was previously used for in-kind cost share on the ALPHA program, can that piece of equipment be used again as in-kind cost share on the BETHE program?

ANSWER: Among other things, per 2 C.F.R. § 200.306(b)(2), proposed cost share contributions must be accepted when they are not included as contributions for any other Federal award. To the extent that a particular cost has previously been accepted as a cost share contribution on another Federal award, it may not be claimed as cost share on any subsequent award.

Q11. The enabling technology (category B) paragraph states that applicants must make a quantitative argument “that a grid-ready demonstration power plant enabled by the new technology can potentially satisfy the metric of OCC <US\$2B and <\$5/W for a grid-ready demonstration.” Based on the current state of the art and my discussions with industry, this appears to be impossible. Can you please confirm that this program really seeks a fusion plant with an overnight capital cost of less than \$2B?

ANSWER: This program seeks component technologies with potential to reduce the cost of the fusion core, based on a higher-maturity concept, to below \$1B, which should enable a grid-ready demonstration power plant with an overnight capital cost of below \$2B.

Q12. I have a few questions regarding the Funding Opportunity No. DE-FOA-0002212 (CFDA Number 81.135) “Breakthroughs Enabling Thermonuclear-Fusion Energy (BETHE)”.

Q12.a Is it permissible to include the overhead associated with the personnel cost, such as Workers’ Compensation & Unemployment Insurances ... and the employer portion of payroll taxes, to the sheet “Other” (Form SF-424A)?

ANSWER: Assuming this cost accounting practice is consistently applied to all of an organization’s activities, both government and commercial, this is an acceptable practice. Entities should expect that, among other things, they will need to demonstrate the basis for their proposed fringe benefit cost allocations and consistent application of this practice to ARPA-E if their proposal is selected for award negotiations.

Q12.b If “de minimis” 10% rate for indirect cost is used in the application budget, do we still need government agency approval of this rate?

ANSWER: No. Note that eligibility for the de minimis rate, consistency in cost accounting practice, and allowability of costs when proposing to use this rate are discussed at 2 C.F.R. § 200.414(f).

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Q13. Our Concept Development team is working with Capability teams to define a statement of work and we are wondering how to include each other in our proposals. Our Concept Development team usually would sub-award to Capability teams, but since Capability teams under BETHE propose budgets for the work they'll be doing, how should our budgets be separated? How should our Concept team budget for work done by a Capability team, and how should Capability teams budget for work being done for our Concept team, when both budgets include the same work?

ANSWER: It is fundamental that costs incurred may only be assigned to a single cost objective, or pooled and allocated as indirect cost in proportion to the benefits received. Duplication of work and corresponding estimates of cost are not permitted under any circumstance. Each organization should budget only for the estimated costs it will incur performing the work for which it is seeking financial support from ARPA-E.

Q14. In order to better align with the FOA requirements/recommendations, could you clarify whether there are specific 'evidences' that we need supply in terms of interactions with Concept teams?

ANSWER: Please review section I.E.1.c of the BETHE FOA, which details the expected nature of the interactions between Concept Development applicants and Capability Team applicants. Capability Team applicants are encouraged to provide evidence of discussions or interactions between concept teams and capability teams. Providing some evidence (i.e. past collaborative publications, joint presentations, or rough plans for future collaboration) may help establish a Capability Team's value..

Q15. For a small business Bethe project that is proposed as only 12 months long, is it necessary to still explicitly include cost share or can that be ignored in the proposal budget?

ANSWER: Small businesses, consortia of small businesses, and project teams where a small business is the lead organization and small businesses perform greater than or equal to 80% of the total work under the funding agreement (as measured by the Total Project Cost) are not required to provide cost share if a project's period of performance is less than twelve months in duration. Reasonableness of the proposed project schedule and budget to accomplish the proposed project is subject to merit review.

Q16. The BETHE technical report template includes a cover page, with some required headers and notices on it, and also a section header for an Executive Summary. It states that "The Executive Summary shall not exceed 1 page in length." Are the cover page and the executive summary supposed to be on the same page? Does the Executive Summary need to share space with the project title and the disclosure notice, or can the Executive Summary be on a full page by itself, separate from the cover page?

ANSWER: The Executive Summary can be submitted on a separate page. All requirements for marking confidential, proprietary and privileged information are applicable.

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Q17. We are considering proposing a study of Cryogenic systems to the “Breakthroughs Enabling Thermonuclear-fusion Energy” (BETHE) RFP. With high Tc superconducting magnets, refrigeration systems will be departing from the 4 K systems used in previous designs. We are interested in looking at higher temperature systems designs. These designs would potentially reduce the size and cost of the required cooling plant as well as reducing the parasitic electrical demand on the fusion plant. In addition, we are also interested in working to measure transport properties, thermodynamic properties and develop equations of state for potential cryogenic mixtures for cooling high TC magnets for fusion. Is either of these concepts appropriate for this call?

ANSWER: The concepts mentioned are responsive to the BETHE FOA if and only if a specific, credible, quantitative argument is made to demonstrate how these technologies could enable a mature fusion concept, e.g., tokamak or stellarator, to fulfill the high-level capital-cost metrics of <\$2B OCC and \$5/W for a grid-ready fusion demonstration. General advances in technical feasibility or qualitative improvements in economic attractiveness are not responsive to this FOA.

Q18. We are a small business looking at submitting to the BETHE program under the “Category A Concept Development” category. We are looking at collaborating with a government lab “Category C Capability Team”. Between our conversations with the Category C Capability Team and preparing the proposal artifacts, it’s become unclear how we are expected to structure our respective proposals. In the language of section “II” and “III” of the FOA, is it the intent that:

- 1. We (small business category A team) should submit a proposal as the lead organization and Prime Recipient for the Project Team (footnote 29), and the government category C capability team is applying as a Member (Subrecipient) of this Project Team, with the with the government C capability team expenses for this project listed out in tab “f. Contractual” of our (Prime Recipient) Budget Justification Workbook, and their (Sub-recipient) Budget Justification workbook, exclusively containing tasks specific to our project, inserted as additional sheets within our (Prime Recipient) Budget Justification workbook? And does this mean that the Total Project Cost for purposes of cost share includes all of the funds spent by both us (small business category A team) and the government lab (category C capability team) in execution of the project?**

OR, is it intended that:

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2. we (small business category A team) should submit as a “standalone applicant” (footnote 28), with a category A proposal and Budget Justification Workbook that solely describes the tasks that we will perform in our project. And then the government C capability team includes their supporting tasks and Budget Justification Workbook within their own standalone application (presumably including other tasks supporting other teams as well)? And, if this is the answer, is it true that we (small business category A team) should not include the government C capability team costs in section “f. Contractual” of our Budget Justification Workbook. And, if this is the answer, does this mean that the Total Project Costs for us (small business category A team) for the purposes of cost share are solely the costs that we describe in our standalone application, excluding the expenses that that government C capability team incurs in their own standalone application, even if some of the work done by the government C capability team under their standalone application will be in collaborative support of our project?

ANSWER: Refer to FAQ 13.

Q19. I have a question regarding the Funding Opportunity No. DE-FOA-0002212 (CFDA Number 81.135) “Breakthroughs Enabling Thermonuclear-Fusion Energy (BETHE)”. Full Application includes Costing Spreadsheet, in which we are advised to use the following reference *J. Sheffield et al., Fus. Sci. Tech. 70, 14 (2016)*; <https://doi.org/10.13182/FST15-157>. Unfortunately, the libraries available to us do not have an open access to this journal. We did not hear back from the first author as well. Would you, please, be so kind to send a copy of this paper to ... or make this publication accessible for general public.

ANSWER: Prospective applicants are responsible for obtaining all materials they deem necessary to prepare an application.

Q20. I'm a researcher at We are collaborating with [non-DOE Federal entity omitted] on a proposal for a fission/fusion hybrid concept. Do we submit separate proposals or does one of us lead and subcontract the other?

ANSWER: A single application must be submitted.