

QUESTIONS AND ANSWERS

PLEASE REFER TO THE GENERAL FAQs SECTION OF ARPA-E'S WEBSITE (<https://arpa-e.energy.gov/faqs/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. The following questions are regarding DE-FOA-0001953, Topic Q: CABLES.

Q1.1 Under Topic Q "CABLES", Table A "Comparison of the cabling FOA goals and proposed solution", does not explicitly include a standard for System Generated Electromagnetic Pulse (SGEMP) which strategic air and space systems will need to be hardened against. Are SGEMP considerations in scope for this call?

ANSWER: As set forth at FOA Appendix XVII, Section 2.B: "... ARPA-E seeks novel and transformative technical solutions that will address the development of reliable power cables, connectors, and circuit breakers in a twin-aisle, all-electric aircraft." Proposed technical solutions for use in a twin-aisle, all electric aircraft meeting or exceeding the pertinent Technical Performance Targets specified in Section 2.B are responsive to this Technical Topic. This does not preclude or prohibit technical solutions that may have applications in addition to use in a twin-aisle, all electric aircraft.

Q1.2 Since vacuum-jacket cabling options are being considered, is it in scope of this call to proposed medium voltage cabling solutions explicitly for space applications?

ANSWER: Refer to STINPA Topic Q FAQ 1.1.

Q2. ... I have a question with respect to [FOA Appendix XVII, Section 2.B.2, Table B] "B.5 -- Current rating per connector -- 1,000 A" (page 180). ... Is requirement B.5 binding? ...

ANSWER: Proposed technical solutions for use in a twin-aisle, all electric aircraft meeting or exceeding the pertinent Technical Performance Targets specified in Section 2.B are responsive to this Technical Topic. The applicant should provide an explanation if a metric is not considered or is changed from the FOA suggested goal.

Q3. ... Our question is: will it be possible to modify the FOA target goal to the range of 1-2 kV distribution? Or if not possible to modify, would it be acceptable to ARPA-E if we propose some solutions at 1 - 2 kV range under the current FOA? ...

ANSWER: Proposed technical solutions for use in a twin-aisle, all electric aircraft meeting or exceeding the pertinent Technical Performance Targets specified in Section 2.B are responsive to this Technical Topic. The applicant should provide an explanation if a metric is not considered or is changed from the FOA suggested goal.

QUESTIONS AND ANSWERS

Q4. My question is regarding DE-FOA-0001953. For Technical Area C: Circuit Breakers, is the "temperature" specification listed in Table C [Item C.4] the ambient, case, or junction temperature?

ANSWER: The temperature specification listed in Table C [Item C.4] refers to ambient + rise peak temperature. The applicant should provide an explanation if a metric is not considered or is changed from the FOA suggested goal.

Q5. We would like to request clarification of the temperature range in the Metrics Table A [Item A.4] and Table B [Item B.4], -55C to 300C? Does the 300C mean ambient temperature, or it is the targeted conductor operating temperature?

ANSWER: The temperature specification listed in Metrics Table A [Item A.4] and Table B [Item B.4] refers to ambient + rise peak temperature. The applicant should provide an explanation if a metric is not considered or is changed from the FOA suggested goal.

Q6. The CABLES program is listed under both DE-FOA-0001953 and DE-FOA-0001954, but only the FOA-1954 looks like an SBIR. Please confirm the CABLES program (DE-FOA-1954) is an SBIR/STTR opportunity

ANSWER: DE-FOA-0001954 is targeted at small business concerns under the Small Business Innovative Research (SBIR) and Small Business Technology Transfer (STTR) programs, and reflects the unique rules and regulations applicable to those programs. Entities that qualify as "Small Business Concerns" are strongly encouraged to apply under DE-FOA-0001954. To determine eligibility as a "Small Business Concern" under DE-FOA-0001954, review the eligibility requirements in Sections III.A-III.D of that FOA.

Q7. Questions for Topic Q. Thank you for your assistance.

- **Is Temperature in tables of FOA goals (all three components) ambient or absolute maximum temperature of any point including junction temperature of power semiconductor (in case of circuit breaker)?**
- **Continuous current rating of CB is $\geq 100A$, whereas for cable and connector current rating is 1000A: Does it mean these CBs are in downstream of distributed propulsion system where current can not go beyond 100A in normal operation? Does it mean instantaneous trip rating for breaker could be 1000A?**
- **Does interrupt time start from command signal to CB and ends at current falls to zero?**

ANSWER: The temperature specifications in Table A [Item A.4], Table B [Item B.4], and Table C [Item C.4] refer to the ambient + rise peak temperature that the component must withstand without failure. The continuous and breaking current for the circuit breaker should be justified by the team's proposed layout and architecture and the continuous current should be at least 100 A per Table C [Item C.5]. The Interrupt time in Table C [Item C.7] is the time from when the fault is detected until the current falls to zero at the fault location.

QUESTIONS AND ANSWERS

Q8. We're reviewing the requirements for submitting a proposal for a recently published FOA [DE-FOA-0001953].

Q8.1 The link that was provided, to access a template for the rate agreement, appears to have been broken

ANSWER: ARPA-E recently updated the ARPA-E.energy.gov website resulting in changes to the website addresses. ARPA-E is in the process of updating links to the ARPA-E website in its published documentation. For information on the rate agreements please visit the following website address: <https://arpa-e.energy.gov/technologies/project-guidance/pre-award-guidance>

Q8.2 Just to confirm – the indirect rate proposal needs to be submitted only if we've been selected award (Feb. 2021), and does not need to be submitted with the proposal (Nov. 2020)

ANSWER: If selected for award negotiations an indirect cost rate proposal will be required of those entities that have not negotiated an indirect cost rate agreement with the U.S. Government.

Q9 ... We are seeking to partner with a firm from Sweden in the EU that is going to be doing the manufacturing of parts as part of the project. They have significant established capital equipment that is directly useful for achieving the FOA objectives and have a history of collaboration with US aerospace companies. We believe they are the world leader in non-partial discharge cabling. Is this an issue in terms of teaming for the application?

ANSWER: As a general rule, all work under ARPA-E awards must be conducted in the United States or in U.S. territories. ARPA-E will consider requests to perform work outside the United States on a case-by-case basis. Only in compelling circumstances, and only for discrete parts of a project that necessitate foreign work, would ARPA-E grant such a request. Such requests are rarely made or granted. If seeking a foreign work waiver applicants must complete the pertinent part of the Business Assurances & Disclosures Form. In addition, a project team proposing to manufacture parts outside of the United States that will be used in the project may be required to request and receive a partial waiver of U.S. manufacturing requirements, as described in Section VI.B.8 of the FOA.

Q10. ... We would like to request clarification of the definition of "all electric"? Does it mean battery powered? Or, does it also consider hybrid electric propulsion with turbogenerator?

ANSWER: The all-electric aircraft is defined as an aircraft with the thrust provided by propulsors driven by a fully-electric powertrain.

QUESTIONS AND ANSWERS

Q11. Please provide clarification on the requirements for Topic Q. Should the budget justification be provided by Budget periods (1,2,3) or by Phases (1,2) as defined by the Topic Q Program structure requirements?

ANSWER: Applicants may use the space provided for Budget Period 1 in the SF-424A/Budget Workbook to estimate costs for programmatic Phase 1 activities. The remaining space provided may be used for estimating costs for programmatic Phase 2 activities.