Questions can be sent to ARPA-E-CO@hq.doe.gov

FIRST DEADLINE FOR QUESTIONS TO ARPA-E-CO@HQ.DOE.GOV: 5 PM ET, TUESDAY, JANUARY 21
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QUESTIONS AND ANSWERS
PLEASE REFER TO THE GENERAL FAQS SECTION OF ARPA-E’S WEBSITE (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. Concept Paper Phase Questions:

Q1. For the subject FOA will you consider proposals for development in specific technology areas such as those described in [S]ection I.C (motor topologies, insulating materials, etc.), or are you interested only in proposals for the whole motor/drive/TMS subsystem?

   **Answer:** As stated in the ASCEND FOA Section III.C.3, responsive proposals must propose the development of the whole all-electric integrated powertrain (motor/drive/TMS system) as the final deliverable. Electric motors, or thermal management systems or motor drive/power electronics development alone without integration into the targeted system or sub-system(s) are NOT of interest and will not be merit reviewed or considered.

Q2. Question regarding DE-FOA-0002238 ASCEND and DE-FOA-0002240 REEACH ASCEND and REEACH both call for the use of Carbon Neutral Liquid Fuels (CNLF). REACH has a list of CNLF fuels. On the list is liquid hydrogen as a CNLF. However, the REEACH solicitation, it says not of interest (for combustion generators or fuel cells) are proposals that would use liquid hydrogen as a CNLF fuel. However, in ASCEND, there is no mention of liquid hydrogen fuels (CNLF) not being of interest.

   **Question?** For ASCEND solicitation, is it responsive to submit a superconducting motor and drive proposal, and use liquid hydrogen fuel for thermal management of the motor and drive. There would be the assumption that the electricity feeding the drive and motor would be coming from a turbo generator (not part of the ASCEND program) that is running on liquid hydrogen fuel for the liquid hydrogen to be available to use for thermal management (in the ASCEND drive and motor program proposal) before the hydrogen gas would be consumed in gaseous form in the combustion process for the turbine generator.

   **Answer:** The ASCEND FOA does not limit the choice of cooling fluids. However, if a design relies on use of a fuel that is used in the REEACH FOA, then that fuel needs to meet the requirements of the REEACH FOA, because the two FOAs (ASCEND and REEACH) are complementary in support of a larger integrated system for decarbonized electric powertrain for aviation.
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Q3. Please consider the following questions specific to the ASCEND FOA.

Q3.a Shall the Concept Paper including the technical scope and budget, be written exclusive to Phase 1 only, or inclusive of Phase 1 and 2?

**ANSWER:** As stated in Section I.D.3, applicants will need to provide detailed budgets and task descriptions that cover both Phase I and Phase II. As such, concept papers must also address both Phase I and Phase II.

Q3.b P. 16 [refer to Section I.D.2 under the heading *Metrics definitions – Cost*] in the FOA reads, “Applicants will provide a high-level Bill of Materials (BOM) for their proposed technology.” Is the BOM required for the concept paper, or only the full application?

**ANSWER:** The BOM is required only at the full application phase. However, at the Concept Paper stage applicants are expected to include an estimate of the projected cost at 5,000 units/year for the complete powertrain (motor, drive, and TMS), expressed in $/kW in their submission – see Table 2.a.

Q3.c P. 18 [refer to Section I.D.3, Table 2a] of the FOA shows a table to be provided. Specifically, the TMS COP is a required line item for the motor drive. Is the TMS COP also required for the electric motor even though it is not shown in this chart?

**ANSWER:** For the Concept Paper phase, only the TMS COP for the motor drive is required.

Q4. I’m contacting you to ask about the funding opportunity “AVIATION-CLASS SYNERGISTICALLY COOLED ELECTRIC-MOTORS WITH INTEGRATED DRIVES (ASCEND).” Program boundary shows development and testing of a ≥ 250 kW-scale, integrated motor and drive system [refer to Section I.D.3, Figure 3]. I have questions about this program’s scope.

Q4.1 Can I apply only for the motor drive?

**ANSWER:** Refer to FAQ 1.

Q4.2 Is 25kW-scale acceptable in this program?

**ANSWER:** As stated in Table 1 ID 1.1, Mechanical Power output of the proposed system should be greater than or equal to 250kW.

Q5. I have following questions regarding DE-FOA-0002238. Would you please let me know:
**QUESTIONS AND ANSWERS**

Q5.1 Whether the announced $35 million funding is for both phase 1 and phase 2 together? Or is it only for phase 1? If phase 1 and phase 2 together, is it decided how much of funding allocated for phase 1 and phase 2?

**ANSWER:** $35 million is available for Phase I awards. Monies for Phase II are subject to the availability of appropriated funds (refer to FOA Section I.D.3).

Q5.2 Whether we should specify how much budget is requested for each of phase 1 and phase 2? If so, what weighting factor we should consider for phase 1 and phase 2 funding?

**ANSWER:** As set forth at FOA Section I.D.3, applicants must provide detailed budgets and task descriptions that cover both Phase I and Phase II.

Q6. Does the power density technical performance target include the entire thermal management loop (coolant pump, heat exchanger, filter, coolant lines, valves and fluid)?

**ANSWER:** As stated in FOA Section I.D.1 (p.14) – *the specific power of the electric motor and motor drive components should account for the mass of their respective or shared TMS, including the associated coolant weight, as applicable*. Therefore, the specific power should include the entire thermal management loop.

Q7. If the Prime awardee receives a [Cooperative] Agreement, can a Sub-Recipient thereunder receive a sub award if its cost match contribution is based on its use of IR&D rates for the cost share contribution portion of its effort?

**ANSWER:** As set forth at FOA Section III.B.6, Project Teams may not use independent research and development (IR&D) funds to meet their cost share obligations under Cooperative Agreements. The term “Project Teams,” as defined in FOA Section IX, includes subrecipients.

Q8. Is the ~$35M budget for FOAs DE-FOA-0002238 and DE-FOA-0002239 the total for all Phases of each of the programs? In other words, if $x is for DE-FOA-0002238 would that amount be for both Phase 1 and 2?

**ANSWER:** $35 million is the total available for Phase I awards under the two FOAs, combined. Funding for Phase II of the ASCEND Program would be in addition to this $35 million and is subject to the availability of appropriated funds.

Q9.1 We have substantial or disruptive technological improvements in each of the following electric motor areas [description omitted]:

**ANSWER:** No. Refer to General FAQ 6.4. ARPA-E will accept multiple Concept Papers from the same applicant; however, each Concept Paper’s subject matter must be scientifically distinct as set forth at FOA Section III,C.4. Submissions that are not scientifically distinct from applications submitted...
Q9.2 We have patents and patent pending status with prototype proof of concept in each of the above areas [corresponding descriptions omitted from Q9.1] or will have prior to the award of any grant under this program. By utilizing this technology in the grant program do we in turn grant the Government the right to use our patented or patent pending technology or is such right on the part of the government related solely to the concepts developed and patented under the grant program.

**ANSWER:** Refer to FOA Section VIII for a discussion on Government Rights in Subject Inventions and the definition of “subject invention” in FOA Section IX.

Q9.3 If the government receives a right to use the technology used in the grant, when does that right begin? On submission of the Concept Papers, the submission of the final proposal or the award of the grant?

**ANSWER:** Refer to Q9.2 above. The Government retains certain rights to “subject inventions.” A subject invention, as defined in FOA Section IX, is “any invention conceived or first actually reduced to practice under an ARPA-E funding agreement.”

Q9.4 What do you mean by TMS?

**ANSWER:** Thermal Management System. Refer to FOA Section I.B.1 (p.4).

Q10. Regarding the Concept Paper for FOA DE-FOA-0002238 (ASCEND), can any additional information be provided about citations? Are they part of the 4 page limit, and is there any specific format that should be used?

**ANSWER:** Refer to General FAQ 6.21.

Q11. Table 1, ID 1.2 lists the maximum rotational speed at take-off as 5000rpm. Is the maximum speed 5000rpm or less? Or shall the concept be capable of 5000rpm, but not less?

**ANSWER:** Per Table 1, ID 1.2, the rotational speed at takeoff is 5000 rpm, and ID 1.6, the cruise rotational speed is 3,500 rpm – 4,500 rpm. As stated in FOA Section I.D.1 (p.13), "the projected specific power for the electric motor subsystem should include any necessary torque amplifier or speed reducer, such as a gearbox, to keep the propulsor speed below 5,000 RPM."