DE-FOA-0003303 CIRCULAR FOA FAQ

QUESTIONS CAN BE SENT TO ARPA-E-CO@HQ.DOE.GOV

FIRST DEADLINE FOR QUESTIONS: 5 PM ET, MARCH 1, 2024

SECOND DEADLINE FOR QUESTIONS: TBD

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. THIS IS NOT DEFINITIVELY STATED IN THE FOA. CAN A SINGLE APPLICATION ADDRESS MULTIPLE TECHNICAL CATEGORIES?

ANSWER: Submissions may include technologies and approaches that are simultaneously applicable to multiple technical categories. Individual technical categories include specific technical and technoeconomic targets that are required to be met. If selected, negotiation of project scope, milestones, and deliverables will consider all technical categories within which the proposed technology resides.

Q2. I NOTICED THAT THE DEADLINE FOR CONCEPT PAPERS FOR THE CIRCULARITY DE-FOA-0003303 IS STATED AS MARCH 12TH ON PAGE 1 OF THE PDF AND MARCH 19TH ON PAGE 5 OF THE PDF.

WHICH DEADLINE FOR CONCEPT PAPER SUBMISSION IS CORRECT?

ANSWER: Concept papers should be submitted no later than 9:30 ET on March 19, 2024. ARPA-E eXCHANGE, Grants.gov and FedConnect have been updated to reflect this submission date.

Q3. FOR PROJECTS CONSIDERED UNDER CATEGORY B:

(A) ARE NON-LITHIUM CHEMISTRIES CONSIDERED?

ANSWER: The FOA does not encourage nor exclude any battery chemistries. Battery chemistries that can meet the objectives, targets, and deliverables of the CIRCULAR FOA are considered to be responsive according to Section E, Technical Performance Targets, "Battery chemistry is selected and disclosed by the applicant. Applicant should identify and, as appropriate, provide descriptions of the anode, cathode, and electrolyte (organic or aqueous liquid, solid-state, etc)."

(B) IF YES, IS THERE ANY STIPULATION REGARDING A MINIMUM SPECIFIC ENERGY OF THE CELL OR PACK?

ANSWER: According to Section I.E and Table 1, Technical Performance Targets, "Battery chemistries that have a pathway to achieving a cell-level specific energy at BOL ≥ 175 Wh/kg are appropriate options for Category A."

Q4. WE ARE INTERESTED IN SUPPLYING A CONCEPT PAPER FOR CATEGORY B OF THE DE-FOA-0003303 (CIRCULAR) PROGRAM AND HAVE A COUPLE OF QUESTIONS.

(A) OUR BATTERY PACKS CONSIST OF 5 TO 23 MODULES, AND WE COULD POTENTIALLY RECOVER MORE THAN 80% OF THE PACK BY REPLACING A MODULE. WOULD THE APPLICATION SUFFICE IF WE DEVELOP A CONCEPT TO DISASSEMBLE A PACK INTO MODULES, OR WOULD YOU ONLY TAKE A PROPOSAL THAT DISASSEMBLES A PACK INTO CELLS?

ANSWER: According to section I.D, Technical Categories of Interest, "Examples of technologies specifically of interest to the CIRCULAR program, either as standalone solutions of in combination include… robotic systems capable of disassembling battery packs, in parts or in full, with the ability to learn autonomously and/or cooperate with humans".

(B) SHOULD WE DEMONSTRATE BOTH THE AUTONOMOUS DISASSEMBLY ROBOTS AND A NEW BATTERY PACK DESIGN WITH NEW BONDING METHODS, OR CAN WE SELECT ONE?

ANSWER: ARPA-E does not comment on the technical merits of ideas or proposals. Multiple submissions are permitted assuming each is scientifically and technologically distinct.

(C) SHOULD DISASSEMBLY ROBOTS KEEP ALL CELLS PHYSICALLY INTACT FOR REUSE/SALVAGE? OR WOULD YOU ACCEPT CONCEPTS THAT MAY DAMAGE THE CELLS BUT STILL HELP WITH RECYCLABILITY?

ANSWER: Damaging the cells seems to contradict the FOA's vision and the objective to recover manufacturing value. Submission should include technologies that are both within technical scope and capable of meeting the program milestones and objectives.

Q5. I WAS WONDERING IF NEW BATTERY RECYCLING PROJECTS ARE OF INTEREST UNDER CATEGORY A IN DE-FOA-0003303.

ANSWER: Recycling strategies, processes, and solutions, including modification of traditional classes of recycling approaches, by themselves, are outside the primary scope of this FOA.

Q6. IN THIS FOA, RECYCLING IS REGARDED AS A FINAL RECOURSE. I AM CONTEMPLATING SUBMITTING A SOLUTION BASED ON THE RECOGNITION THAT FOR LOW-COST BATTERIES WITH LOW-VALUE CONTENT (SUCH AS LFP/NA-ION), THE VIABILITY OF REUSE OR REFURBISHMENT MAY DECREASE IN COMPARISON TO MANUFACTURING NEW BATTERIES, PARTICULARLY USING RECYCLED MATERIALS. AS A RESULT, RECYCLING AFTER INITIAL USE MAY BE IMPERATIVE FOR ACHIEVING THE CIRCULARITY GOALS OUTLINED IN THIS FOA, PROVIDED THAT RECYCLING AT ANY STAGE OF LIFE CYCLE CAN BE BOTH ECONOMICALLY VIABLE AND ENVIRONMENTALLY SUSTAINABLE. WE ARE THINKING OF SUBMITTING A CONCEPT PAPER BASED ON REIMAGINATION OF THIRTY YEAR OLD EV CELL DESIGN TO MAKE IT RECYCLABLE THAT HAS THE POTENTIAL TO BE DISRUPTIVE FOR ALL KINDS OF BATTERY CHEMISTRIES.
YOUR GUIDANCE ON APPLICABILITY OF A CONCEPT PAPER BASED ON THIS APPROACH WOULD BE GREATLY APPRECIATED.

ANSWER: Recycling strategies, processes, and solutions, including modification of traditional classes of recycling approaches, by themselves, are outside the primary scope of this FOA. However, redesigning battery cells or packs to facilitate regeneration, repair, reuse, and/or recycling could be responsive to Category A and/or B. See ARPA-E General FAQ 2.7 (https://arpa-e.energy.gov/faqs/general-questions).

Q7. WE HAVE TWO QUESTIONS ABOUT THIS FOA:

1. **IN RESPONSE TO THIS FOA, CAN APPLICANTS PROPOSE A RESEARCH PROGRAM TO ADDRESS MORE THAN ONE CATEGORY?**
2. **IF APPLICANTS DO NOT PROPOSE RESEARCH TO MEET THE FULL SCOPE OF CATEGORY D, CAN THEY INCLUDE COMPONENTS OF THEIR PROGRAM TO CARRY OUT TEA AND LCA OF THE TECHNOLOGIES WITHIN THE PROPOSED RESEARCH PORTFOLIO? THE TOOLS THAT WILL BE DEVELOPED IN CATEGORY D MAY NOT BE AVAILABLE AT THE OUTSET OF THE RESEARCH PROGRAM; IT WILL BE IMPORTANT FOR PROJECTS TO LAUNCH TEA AND LCA SOON AFTER PROJECT KICK-OFF.**

ANSWER:

1. Please, see response to FAQ 1 above.

2. Individual projects are expected to have both technical and technology-to-market development components, including TEA and LCA that are developed independent of Category D projects.

Q8. I AM THE FOUNDER OF A STARTUP LOOKING AT THE CIRCULAR FOAS (DE-FOA-0003324 AND DE-FOA-0003303). IT SEEMS LIKE THE ONLY DIFFERENCE IS ONE IS AN SBIR/STTR AND THE OTHER ISN'T, ALTHOUGH I AM NOT SURE WHAT THAT MEANS IN PRACTICE. DOES THIS MEAN ONE IS LIMITED TO SBIR-ELIGIBLE SMALL BUSINESSES AND THE OTHER IS OPEN TO LARGER BUSINESSES? IF SOMEONE COULD POINT OUT ANY CRITICAL DIFFERENCES BETWEEN THE TWO OPPORTUNITIES THAT WOULD BE MUCH APPRECIATED

ANSWER: For more information on SBIR/STTR program rules and guidelines pertaining to DE-FOA-0003324 (CIRCULAR SBIR/STTR) please refer to FOA Section III.A. (Eligible Applicants).

Q9. WE ARE SUBMITTING A CIRCULAR CONCEPT PAPER THAT DUE MARCH 12 - ARE REFERENCES INCLUDED IN THE 4 PAGE LIMIT? RIGHT NOW WE HAVE 4 PAGES OF CONCEPT PAPER AND ~2 PAGES OF REFERENCES TO TOTAL 6 PAGES. IS THIS OK, OR SHALL WE DELETE THE REFERENCES?

ANSWER: The CIRCULAR Concept Paper submission deadline is March 19, 2024, 9:30 AM ET. Please see the CIRCULAR FOA on ARPA-E eXCHANGE (https://arpa-e-foa.energy.gov/). Additionally, please see the ARPA-E General FAQ 6.21 at https://arpa-e.energy.gov/faqs/general-questions

Q10. WE ARE LOOKING TO APPLY FOR THE CIRCULAR OPPORTUNITY. I HAD A COUPLE OF QUESTIONS REGARDING THE OPPORTUNITY.

1. **THE FOA STATES THE REQUIREMENT OF THE 4-PAGE CONCEPT PAPER. ARE THE APPLICANTS EXPECTED TO SUBMIT ANY LETTERS OF SUPPORT FROM THE OTHER TEAMING PARTNERS? THE REQUIREMENTS FOR ANY LETTERS OF SUPPORT ARE NOT CLEAR IN THE FOA. IT WILL BE GREAT IF YOU CAN LET US KNOW.**
2. **THE UPDATED FOA (MODIFICATION 01) STATES THE UPDATED DEADLINE FOR THE CONCEPT PAPER TO BE 03/19/2024. HOWEVER, THE WEBPAGE STILL MENTIONS THE PREVIOUS DEADLINE OF 03/12/2024, 930AM ET. CAN YOU PLEASE CONFIRM WHICH ONE IS MORE ACCURATE?**

ANSWER:

1. Please, see the ARPA-E website FAQ page general question 6.5 at https://arpa-e.energy.gov/faqs/general-questions.

2. Concept papers are due no later than March 19, 2024 at 9:30 AM ET.

Q11. CAN WE SUBMIT A PROPOSAL ON A NEW BATTERY MATERIAL (CATEGORY A) AND ITS SUPPORTING TECHNOLOGIES IN CATEGORIES B AND C?

ANSWER: Please, see response to FAQ 1 above.

Q12. I HAVE A QUESTION REGARDING CATEGORY C TARGET. IS COMBINATION OF ONBOARD AND CLOUD (EDGE AND CLOUD) PROCESSING AND STORAGE ACCEPTABLE IF FLEET DATA CAN HELP BETTER DATA ANALYTICS?

ANSWER: Please, see Table 3 for the metrics of Category C reproduced below for your convenience with the relevant information highlighted in yellow.

METRIC DESCRIPTION	TARGET
HARDWARE	
Sensing Method and Variable(s) of Interest (e.g., State of charge (SOC), SOH, RUL)[a]	Reported by Applicant
Practical Implementation of Proposed Sensing Method[b]	Reported by Applicant
Sensor Technology Accuracy and Precision Compared to SOA Method(s)[c]	≥ 95%
Time for State Determination (Sensing + Algorithm)	≤ 10 minutes
Frequency of False Negative or False Positive Results	< 1/1000
Long-Term Chemical and Thermal Stability[d]	Pass
Sensor Lifetime[e]	Exceed Battery Lifetime
DATA ANALYTICS	
Hardware and/or Software Cost at Scale	≤ 1 % of Pack Cost
Location for Data Storage and Processing	Onboard
Number of Additional Cycles Compared with SOA without Sensor and Battery Management Software[f]	≥ 500
Data Management Protocol with BMS & Onboard Central Processing Unit (Privacy/Cybersecurity)	Reported by Applicant
Accuracy of Prediction of Catastrophic Failure	Reported by Applicant
Algorithm to Decide Cell Handling (Regenerate, Reuse, Recycle)	Reported by Applicant

Q13. WE WOULD BE GRATEFUL IF YOU COULD HELP US WITH THE QUESTIONS BELOW

1. SECTION I.E, TECHNICAL PERFORMANCE TARGETS, CATEGORY C, "TABLE 3. DESCRIPTION OF PRIMARY METRICS AND TARGETS FOR CATEGORY C."

PLEASE CLARIFY THE MEANING OF THE METRIC "SENSOR TECHNOLOGY ACCURACY AND PRECISION COMPARED TO SOA METHOD(S) >= 95%"

DOES IT MEAN THAT THE SENSOR RESULTS SHALL NEED TO BE REPRODUCIBLE GREATER THAN OR EQUAL TO 95%? FOR EXAMPLE, IF ACTUAL SOH IS 70% AND THE SOA IS +/-5% ACCURACY (65% - 75%) THE PROPOSED TECHNOLOGY SHALL REPORT SOH WITHIN +/-4.75% (65.25% - 74.75%).

2. SECTION I.E, TECHNICAL PERFORMANCE TARGETS, CATEGORY C, "TABLE 3. DESCRIPTION OF PRIMARY METRICS AND TARGETS FOR CATEGORY C."

FOR THE COST METRIC

"HARDWARE AND/OR SOFTWARE COST AT SCALE ≤ 1 % OF PACK COST"

WE WOULD NOT BE ABLE TO SHARE BATTERY PACK COST ESTIMATES EXTERNALLY. WOULD IT BE SUFFICIENT TO PROVIDE PERCENTAGE CHANGE IN COSTS WITHOUT DISCLOSING THE ACTUAL COST AMOUNTS?

ANSWER:

1. The target is to exceed 95% of the performance of the state-of-the-art (SOA) sensing method. The latter should be clearly identified. We do not require that sensor performance exceed the SOA.

2. What information to share is at the discretion of the applicant. ARPA-E reserves the right to assess whether the information provided is sufficient and responsive. Additionally, please reference CIRCULAR FOA Section VIII.I. (Marking of Confidential Information).

Q14. WE HAD A COUPLE OF QUESTIONS ABOUT THE CIRCULAR CALL (DE-FOA- 0003303). IN THE METRICS TABLE (TABLE 1), WHAT IS THE DEFINITION OF "NEW CELL" UNDER "NEW CELL—BASELINE PERFORMANCE"? IS THAT THE CELL AFTER MAKING MODIFICATIONS TO EXTEND THE LIFE?

GOING ALONG WITH THAT, IF WE ARE TARGETING ONE STRATEGY IN CATEGORY A (FOR EXAMPLE AN EOL REGENERATION METHOD OR A NEW ELECTRODE DESIGN THAT WILL EXTEND THE LIFETIME), DO WE NEED TO MEET ALL OF THE METRICS IN TABLE 1, OR JUST THE ONES THAT WOULD CORRESPOND TO WHAT WE ARE TARGETING? (FOR EXAMPLE, "LIFE-PROLONGING METHODS" METRICS FOR AN EOL REGENERATION METHOD AND "NEW CELLS—BASELINE PERFORMANCE" METRICS FOR ELECTRODE DESIGN THAT EXTENDS THE LIFETIME OF THE ORIGINAL CELL FROM THE BEGINNING).

ANSWER: A "new" cell refers to a fully functional battery cell that contains pristine materials and has not been previously cycled. This cell contains all enabling components (anode, cathode, electrolyte, packaging, etc.) and is used to generate experimental test data that is representative of "baseline" performance for the cell chemistry and type. The "new" cell will serve as a "control" cell and provide performance and data sets that are directly used to quantify the efficacy of cell regeneration methods, new cell-level designs, etc.

Q15. AS THE LEAD OF THE BATTERY MODELING TEAM AT*REDACTED***, I AM VERY INTERESTED IN SUBMITTING A PROPOSAL FOR THIS ARPA-E GRANT. THE PURPOSE OF OUR TECHNOLOGY IS TO BUILD DATA ANALYTICS AND BATTERY INTELLIGENCE SYSTEMS WHICH CAN CREATE MORE VALUE FROM ELECTRIC VEHICLES, WHICH IS VERY WELL ALIGNED WITH THE TARGET OUTCOMES OF THIS PROJECT.**

I HAD A FEW QUESTIONS ABOUT THE FOA THAT I WAS HOPING YOU WOULD BE ABLE TO CLARIFY.

REGARDING CATEGORY C: "SENSING, DATA ANALYTICS, BATTERY INTELLIGENCE SYSTEMS":

SOME OF THE PHRASING WITHIN THE FOA IMPLIES THAT THE DESIRED OUTCOME FOR CATEGORY C IS A NOVEL SENSOR, AND THE DATA ANALYTICS AND INTELLIGENCE SYSTEMS ARE MERELY LEVERAGING THIS NEW SENSOR. THIS INCLUDES MANY OF THE TEXTUAL DESCRIPTIONS, AS WELL AS THE HEAVY FOCUS ON HARDWARE IN THE TARGET METRICS. WOULD A SOFTWARE-DRIVEN SOLUTION USING STANDARD VOLTAGE / CURRENT / TEMPERATURE SENSORS QUALIFY FOR THIS CATEGORY? WITHIN THE DATA ANALYTICS METRICS IN TABLE 3 OF THE FOA, THE TARGET FOR THE LOCATION OF DATA STORAGE AND PROCESSING IS ONBOARD. SOME OF THESE TARGETS RELY ON LONG-TERM PREDICTIONS, WHICH MAY REQUIRE MORE DATA THEN MOST ONBOARD SYSTEMS HAVE AVAILABLE. WOULD A MODEL TRAINED IN THE CLOUD, BUT DEPLOYED TO THE EDGE DEVICE, QUALIFY FOR THIS TARGET?

THE FOA ALSO REQUESTS THAT IF AN INITIAL PROOF-OF-CONCEPT EXISTS, DATA SHOULD BE PROVIDED TO SUPPORT THE APPLICATION. THIS INFORMATION COULD POTENTIALLY BE VERY FAR REMOVED FROM THE FINAL APPLICATION. FOR EXAMPLE, DATA THAT THE SENSOR CAN RECEIVE A SIGNAL I IMAGINE IS TOO ABSTRACT TO BE WORTH INCLUDING. WHAT WOULD BE VALUABLE IS WHETHER THE SIGNAL RECEIVED FROM THE SENSOR CAN BE USED FOR THE TARGETS LISTED (SOH, RUL, PREDICTIVE MAINTENANCE, ETC). WHAT IS THE THRESHOLD FOR INCLUDING SUPPORTING DATA IN THE INITIAL PROPOSAL?

ANSWER: Hardware and software are both important and the statement “heavy focus on hardware” is a misinterpretation. ARPA-E does not comment on the technical merits of ideas or proposals.

Q16. I HAVE A FEW QUESTIONS ABOUT THE CIRCULAR FOA:

1. **WOULD A COVER LETTER MENTIONING THE PAGES WITH CONFIDENTIAL INFORMATION COUNT TOWARD THE 4-PAGE LIMIT OF THE CONCEPT PAPER?**
2. **WHAT IS THE PROCESS FOR OBTAINING PATENT WAIVERS? WHEN WOULD ARPA-E ISSUE 'CLASS PATENT WAIVERS'? IS THIS SOMETHING LARGE BUSINESSES APPLY FOR, AND IF SO, BY WHEN MUST THE WAIVER APPLICATION BE COMPLETED? WHERE CAN I READ ABOUT THE SPECIFIC REQUIREMENTS AND APPLICATION PROCESS?**
3. **WILL THE 2ND DEADLINE FOR QUESTIONS HAPPEN PRIOR TO THE CONCEPT PAPER SUBMISSION DEADLINE?**
4. **IN SECTION VI.B.1, THE FOA LISTS THE NECESSARY REGISTRATIONS (E.G., UEI, SAM, ETC). BESIDES REGISTERING ON ARPA-E EXCHANGE ARE THERE ANY REQUIRED REGISTRATIONS FOR CONCEPT PAPER SUBMISSION?**

ANSWER:

1. Please see the answers to questions 6.29 and 6.31 on the ARPA-E "General Questions" webpage for more information on cover pages and marking proprietary information.
2. Please see the answer to question 4.23 on the ARPA-E "General Questions" webpage for more information on patent class waivers. You may also refer to federal regulations on intangible property in the Uniform Guidance at 2 CFR 200.315.
3. The second set of FAQs will be published prior to the concept paper deadline.
4. Please see the answer to question 7.29 on the ARPA-E "General Questions" webpage for more information on SAM registration requirements.