

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. Concept Paper Phase Questions:

Q1. Can I speak or meet with the ARPA-E program director or other ARPA-E personnel about this funding opportunity announcement?

ANSWER: No. Upon the issuance of this Funding Opportunity Announcement (FOA), ARPA-E Program Directors and other ARPA-E personnel are prohibited from communicating (in writing or otherwise) with Applicants or potential Applicants regarding the FOA. This "quiet period" remains in effect until ARPA-E's public announcement of its project selections. During the "quiet period," Applicants may submit questions regarding the FOA to ARPA-E-CO@hq.doe.gov with the FOA name and number in the subject line. Applicants may also submit questions regarding ARPA-E's online application portal, ARPA-E eXCHANGE, to ExchangeHelp@hq.doe.gov with the FOA name and number in the subject line. ARPA-E will not accept or respond to communications received by other means (e.g., fax, telephone, mail, hand delivery). E-mails sent to other e-mail addresses will be disregarded.

Q2. Is there a difference between DE-FOA-0002625 HESTIA FOA and DE-FOA-0002626 HESTIA SBIR/STTR FOA, other than the latter being through the SBIR? (difference in terms of application content, etc.?)

ANSWER: No. However, note that small businesses that qualify as a "Small Business Concern", as defined in the SBA's "Guide to SBIR/STTR Program Eligibility" (http://sbir.gov/sites/default/files/elig_size_compliance_guide.pdf) may apply to only one of the two ARPA-E HESTIA FOAs: DE-FOA-0002626 (SBIR/STTR) or DE-FOA-0002625. Small businesses that qualify as "Small Business Concerns" are strongly encouraged to apply under the former (SBIR/STTR FOA). To determine eligibility as a "Small Business Concern" under DE-FOA-0002626 (SBIR/STTR), please review the eligibility requirements in Sections III.A – III.D of that FOA.

Q3. The HESTIA and HESTIA SBIR/STTR FOA's appear identical, apart from one apparently being administered as an ARPA-E award and the other being administered as a SBIR/STTR award.

Can you indicate what this distinction means in practice? All other technical narrative & administrative requirements appear the same.

ANSWER: The Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs are highly competitive programs that encourage domestic small businesses to engage in Federal Research/Research and Development (R/R&D) with the potential for commercialization. More information about SBIR/STTR awards can be found at <https://www.sbir.gov>.

Q4. I HAD A QUICK QUESTION ABOUT THE TEAM WE ARE FORMING FOR THE CALL. THE CALL SEEMED TO INDICATE THAT THE CO-PI WORKING ON THE LCA WILL BE FUNDED THROUGH A SEPARATE SOLICITATION. I WAS WONDERING IF IT MEANT WE SHOULD INCLUDE AN LCA EXPERT ON OUR TEAM, OR WILL THERE BE A MATCHING FROM ARPA-E TO JOIN US WITH A RELEVANT LCA COLLABORATOR?

ANSWER: As noted in Section I.G of the FOA, HESTIA Project Teams are “encouraged to include in-house LCA expertise wherever necessary in the development of the proposed technology”. A Co-PI serving as an in-house expert for a HESTIA Project Team will need to be included in the Team’s budget. Such in-house LCA expertise on a Team, however, is separate from the development of the LCA methodologies and frameworks for the HESTIA Program, as identified and funded through the separate solicitation (see DE-FOA-00001953, Appendix V “Life Cycle Assessment for Carbon Negative Buildings”). The teams funded under that separate solicitation will ensure consistency and transparency in LCA approaches and assumptions and develop new, needed tools across the Program.

Per Section I.G. of DE-0002625, HESTIA Project Teams “will be required to cooperate with one of awardee(s) selected through” DE-FOA-0001953; similarly, HESTIA Project Teams awarded through DE-0002626 are, per Section I.H., “encouraged to cooperate with one of the LCA awardee(s) selected through” DE-FOA-0001953. (The difference between “required” and “encouraged” is due to the SBIR/STTR FOA (DE-FOA-0002626) being administered in accordance with the Small Business Act and the SBIR and STTR Policy Directive issued by the U.S. Small Business Administration (SBA)).

Q5. I'M WRITING TO ASK IF IT IS ACCEPTABLE TO PROPOSE THAT AN LCA PERSON WILL BE EMBEDDED WITH A PROJECT RESPONDING TO DE-FOA-0002625. WILL THIS MAKE US INELIGIBLE AND/OR DECREASE THE COMPETITIVENESS OF OUR PROPOSAL?

WE'VE READ BOTH SOLICITATIONS, DE-FOA-0002625 AND DE-FOA-0001953, AND WE UNDERSTAND THAT SEPARATELY FUNDED LCA TEAMS WILL WORK ON DEVELOPMENT OF GENERALIZABLE SOFTWARE AND OTHER TOOLS FOR LCA-BASED EVALUATION OF RESULTS GENERATED BY THE TECHNICAL TEAMS. HOWEVER, WE THINK IT WILL BE CRITICAL TO HAVE AN LCA PERSON ON THE TECHNICAL TEAM TO HELP GUIDE DECISION-MAKING AND DESIGN DURING THE EARLY PHASES OF THE TECHNICAL WORK. A SIGNIFICANT PART OF WHAT WE PROPOSE WILL BE RELATED TO MATERIAL FORMULATIONS (I.E., RECIPES, RATIOS OF CONSTITUENTS). WE THINK IT WILL BE VALUABLE TO HAVE AN LCA PERSON IN PLACE TO DO TEA CALCULATIONS UP FRONT, TO HELP ENSURE THAT THE FORMULATIONS THAT ARE CREATED AND TESTED ARE AS INHERENTLY LOW-CO2 AS POSSIBLE.

WE ALSO THINK THAT HAVING AN LCA PERSON EMBEDDED ON THE TECHNICAL TEAM WILL FACILITATE KNOWLEDGE TRANSFER AND COMMUNICATION TO THE ASSIGNED EXTERNAL LCA TEAM LATER ON, AS THE PROJECT MOVES TOWARDS THE LATTER STAGES.

ANSWER: Please refer to prior question.

Q6. I HAVE SEVERAL QUESTIONS ABOUT THE PROGRAM:

- 1) CAN A TEAM INCLUDE PRIMARY APPLICANT OF NON-PROFIT, BUT WORKING WITH A FOR-PROFIT WITH A PROMISING TECHNOLOGY ALONGSIDE A COLLEGE AND A NATIVE AMERICAN GROUP. THIS WOULD NOT BE A CO-APPLICANT SITUATION, JUST A SINGLE APPLICANT, BUT VARIOUS COMPONENTS WORKING IN TANDEM WITH DIFFERENT PARTNERS.**
- 2) CAN THE PROJECT EXAMINE THE CARBON SEQUESTRATION PROPERTIES OF A MATERIAL THAT IS ALREADY IN USE AND HAS SOME EVIDENCE POINTING TO ITS CARBON SEQUESTRATION PROPERTIES, BUT NOT ENOUGH HARD DATA ON THE MAXIMUM FORMULATION OF THE MATERIAL, AND TESTING TO DETERMINE QUANTITIES OF SEQUESTRATION.**
- 3) WHEN ANALYZING CARBON SEQUESTRATION, WE ASSUME THAT ALL APPLICANTS WOULD STUDY CARBON SEQUESTRATION (IF ANY) IN THE RAW INPUTS, IN THE MANUFACTURING PROCESS, AND IN THE PERFORMANCE ON-SITE IN SITU. IS THIS CORRECT?**

ANSWER: (1) Yes. Please refer to Sections III.A - III.B of the FOA for further information regarding eligible applicants and cost sharing.

(2) ARPA-E will not pre-assess an applicant's proposal. Prospective applicants must review the technical requirements of the FOA and independently determine whether their proposed concept warrants a submission. Kindly refer to DE-FOA-0002625 Section III.C.3. of the FOA for submissions specifically not of interest.

(3) Carbon storage will be assessed on a life cycle basis. Please refer to the FOA for specifics on the life cycle analysis, including definitions in Section I.B. of the FOA (e.g., "Cradle-to-gate" and "Cradle-to-grave").

Q7. IT WOULD BE GREAT IF YOU CAN HELP WITH THE FOLLOWING TWO QUESTIONS.

- 1. DO WE NEED TO ACTUALLY HAVE DONE THE LCA FOR THE FULL SYSTEM OR AN APPROXIMATE QUALITATIVE RATIONALIZATION FOR CARBON NEGATIVE TECHNOLOGY WILL BE ACCEPTABLE?**
- 2. DO WE NEED TO APPLY FOR THE LCA SOLICITATION SEPARATELY TO BE CONSIDERED FOR THIS SOLICITATION?**

ANSWER: (1) Please refer to DE-FOA-0002625 Section I.G/DE-FOA-0002626 Section I.H for details of the LCA requirement. Of note, applicants must include a "high level, semi-quantitative description of how and why proposed building materials for Category A and building designs for Category B can be defined as carbon negative at their cradle-to-gate (i.e., A1-A3) and cradle-to-grave stages, respectively, as well as why the technology proposed has a lower GHG footprint than the incumbent.". A more

rigorous assessment will occur during the Program itself, following the selection of applications for funding.

(2) No. According to DE-FOA-0002625 Section I.G/DE-FOA-0002626 Section I.H, “entities are open to apply to both solicitations” but applying to both is not required. Please see Q4 for more information.

Q8. FOR TECHNOLOGY CATEGORY A, PROVIDE THE INFORMATION REQUESTED IN SECTION I.F.I OF THE FOA AND TABLE I.F.I.1.....DO WE NEED TO HAVE THE WHOLE TABLE FORMATTED IN THE PAPER OR JUST ANSWER THE QUESTIONS IN A WRITTEN SUMMARY FORMAT?

ANSWER: Per the FOAs, the information must be provided in summary form; you need not replicate the table as formatted.

Q9. I'M WRITING TO LEARN MORE ABOUT PROJECT ELIGIBILITY TO THE HESTIA PROGRAM SO AS TO DETERMINE WHETHER ONE OR BOTH OF OUR COMPANIES' PROCESSES ARE ELIGIBLE. IN THE BASELINE SETUP, OUR TECHNOLOGY PRODUCES CEMENTITIOUS SILICA AND MAGNESIUM COMPOUNDS CAPABLE OF ATMOSPHERIC DIOXIDE REMOVAL FROM MAFIC ROCKS. IN OTHER WORDS, WE ARE MAKING A CARBON NEGATIVE CEMENT COMPONENT WITH THE CARBON DIOXIDE REMOVAL BEING DONE WITH THE CO-PRODUCT OF THIS CEMENT. ARE WE ELIGIBLE TO APPLY TO THE HESTIA PROGRAM EVEN IF WE DON'T STORE ATMOSPHERIC CO2 IN THE BUILDING ITSELF ?

IN AN ALTERNATIVE SETUP, OUR TECHNOLOGY INCLUDES AN ADDITIONAL DAC COMPONENT WHICH CAPTURES ATMOSPHERIC CO2 AND MINERALISES IT AS MGCO3 TO BE USED AS A CONSTRUCTION FILLER OR AGGREGATE. HERE, THE ATMOSPHERIC CO2 IS STORED IN THE BUILDING ITSELF. CAN YOU PLEASE CONFIRM THIS TECHNOLOGY IS WITHIN THE SCOPE OF THE HESTIA PROGRAM ?

ANSWER: ARPA-E will not pre-assess an applicant’s proposal. Prospective applicants must review the technical requirements of the FOA and independently determine whether their proposed concept warrants a submission. Kindly refer to DE-FOA-0002625 Section III.C.3. of the FOA for submissions specifically not of interest.

Q10. WE ARE INTERESTED IN SUBMITTING A TOPIC TO THE HESTIA CALL, BUT HAVE A QUICK QUESTION FOR YOU.

CAN WE SUBMIT A DESIGN TO CATEGORY B USING KEY MATERIALS THAT HAVE BEEN USED TO PRINT A BUILDING, BUT ARE NOT CERTIFIED BUILDING MATERIALS? IT WAS NOT CLEAR TO US HOW DEVELOPED THE KEY MATERIALS IN THE DESIGN MUST BE TO BE CONSIDERED WITHIN THE SCOPE OF CATEGORY B.

ANSWER: Per the FOA section on “Technical Categories of Interest”, architectural designs proposed “will need to incorporate at least one carbon negative building material that has been sufficiently developed to have been previously used in a full-scale prototype. Note that DE-FOA-0002625 Section

I.F/DE-FOA-0002626 Section I.G requires that an overview description of the proposed design includes the current stage of development for the material(s).

Q11. OUR TEAM HAS THE EXPERTISE TO ADDRESS CATEGORY A. BUILDING MATERIALS AND CATEGORY B. BUILDING DESIGNS. IS IT ACCEPTABLE TO PROPOSE TO WORK ON TOPICS THAT INTEGRATE BOTH CATEGORIES?

ANSWER: Per DE-FOA-0002625 Section III.C.4/DE-FOA-0002626 Section III.G.4, Applicants may submit multiple applications. Per DE-FOA-0002625 Section I.E/DE-FOA-0002626 Section I.F, each application must indicate which one of the categories it is an application for. A single application that addresses both categories will therefore fall outside the technical parameters specified in the FOA and be considered non-responsive.

Q12. I WORK ON CO2 MINERALIZATION AND I AM INTERESTED TO APPLY TO THIS FUNDING OPPORTUNITY.

BUT I WOULD LIKE TO KNOW IF THE CO2 MINERALIZATION IS OF INTEREST.

WE WORK ON A PROCESS TO CREATE HIGH-PURITY CA- AND MG-CARBONATES FROM SILICATES AND BRINES WHERE IN ADDITION TO THE CARBONATES WE CAN ALSO RECOVER VALUABLE ELEMENTS.

WE ARE A TEAM MADE OF A COMPANY THAT CAN PROVIDE THE BRINES AND THE MINERALS, AND CHEMICAL AND PROCESS ENGINEERS IN ACADEMIA THAT CAN DESIGN, OPTIMIZE, AND BUILD THE PROCESS.

IS THIS OF INTEREST TO ARPA-E WITHIN THIS CALL?

AND WOULD WE NEED A CONSTRUCTION COMPANY IN THE TEAM OR THE FORMATION OF HIGH-PURITY CA- AND MG-CARBONATES IS ENOUGH?

ALSO, WHICH IS THE MAXIMUM BUDGET WE COULD AIM TO?

ANSWER: ARPA-E will not pre-assess an applicant's proposal. Prospective applicants must review the technical requirements of the FOA and independently determine whether their proposed concept warrants a submission. Kindly refer to DE-FOA-0002625 Section III.C.3. of the FOA for submissions specifically not of interest.

Regarding the maximum budget, per the FOAs, for awardees selected under DE-FOA-0002626 (note the eligibility information in Section III), ARPA-E may issue awards varying between \$259,613 and \$3,721,115; for awardees selected under DE-FOA-0002625 (note the eligibility information in Section III), ARPA-E may issue awards varying between \$500,000 and \$10,000,000. For DE-FOA-0002625, please review carefully the cost share requirement information in Section III.B. DE-FOA-0002626 does not require cost share; see Section III.F.

Q13. PLEASE FIND IN THIS EMAIL OUR QUESTIONS REGARDING THE FOA FOR THE HESTIA PROGRAM.

- THE PROJECT OVERVIEW MENTIONS THE HESTIA PROGRAM WILL DEVELOP “BUILDING MATERIALS AND WHOLE-BUILDING DESIGNS THAT ARE NET CARBON NEGATIVE ON A LIFE CYCLE BASIS BY UTILIZING ATMOSPHERIC CO₂ OR CH₄ FROM A WIDE RANGE OF POTENTIAL FEEDSTOCKS (E.G., FORESTRY AND PURPOSE-GROWN PRODUCTS, AGRICULTURAL RESIDUES, MARINE DERIVED, DIRECT CARBON UTILIZATION) IN THE PRODUCTION PROCESS”.

ARE MATERIALS THAT USE CO₂ FROM OTHER INDUSTRIAL PROCESSES TO MAKE A BUILDING PRODUCT, AVOIDING THAT CO₂ ENDING UP IN THE ATMOSPHERE, ELIGIBLE?

- WOULD PRODUCING A SUPPLEMENTARY CEMENTITIOUS MATERIAL BY UTILIZING THE HEAT FROM AN OPERATING CEMENT KILN, RESULTING IN ZERO EMISSIONS IN THE PRODUCTION PROCESS OF SAID MATERIAL BE CONSIDERED AS ELIGIBLE?

- CAN YOU CLARIFY HOW THE MONEY WOULD BE INVESTED (RESEARCH, CAPITAL) AND IS THE WINNER OF THESE FUNDS COMMITTED TO INVEST AS WELL? IT IS NOT CLEAR TO US FROM THE FOA.

ANSWER: (1) and (2): ARPA-E will not pre-assess an applicant’s proposal. Prospective applicants must review the technical requirements of the FOA and independently determine whether their proposed concept warrants a submission. Kindly refer to DE-FOA-0002625 Section III.C.3. of the FOA for submissions specifically not of interest.

(3) For DE-FOA-0002625, please review carefully the cost share requirement information in Section III.B. DE-FOA-0002626 does not require cost share; see Section III.F. Cost share contributions must be specified in the project budget. You may review the forms that are required for the Full Application stage, available on ARPA-E eXCHANGE (<https://arpa-e-foa-energy.gov>), including the Budget Justification Workbook/SF-424A; such forms for HESTIA are not yet posted, but you may review substantially similar forms under older FOAS by navigating to an older FOA, e.g., DE-FOA-0002531, and selecting “View Template Application Documents”.

Q14. WE HAVE TWO QUESTIONS ABOUT ELIGIBILITY FOR THE HESTIA FOA (DE-FOA-0002625).

- 1. SECTION III.A.3 STATES: "ALL WORK UNDER THE ARPA-E AWARD MUST BE PERFORMED IN THE UNITED STATES." OUR UNDERSTANDING IS THAT THIS SECTION IS REFERRING TO A FOREIGN ENTITY WORKING WITH A US-BASED SUBSIDIARY.**

OUR OWN SITUATION IS THAT WE ARE A US-INCORPORATED ENTITY WITH SOME DOMESTIC EMPLOYEES AND SOME FOREIGN EMPLOYEES WORKING REMOTELY. WOULD THIS FUNDING BE ELIGIBLE TO SUPPORT THOSE FOREIGN EMPLOYEES' WORK ON THE PROJECT, OR MUST ALL WORK BE PERFORMED WITHIN THE US EVEN FOR ORGANIZATIONS THAT QUALIFY AS DOMESTIC ENTITIES UNDER SECTION III.A.2?

ANSWER: Please refer to the ARPA-E website <http://ARPA-E.energy.gov> FAQ page General Question 3.1.

- 2. WE ARE ALSO CONSIDERING FOLLOWING THE CONSORTIUM PATH DESCRIBED IN SECTION III.A.4, WHICH WILL INCLUDE ONE FOREIGN-INCORPORATED MEMBER, A UK-BASED ARCHITECTURE FIRM. IS THIS ALLOWABLE UNDER HESTIA OR MUST ALL MEMBERS OF THE CONSORTIA BE US-BASED?**

ANSWER: Per the FOA, for consortia Applicants, the consortium representative must be incorporated in the United States. Any work performed outside of the United States requires a foreign work waiver, which is rarely granted. Any proposed cost share that will be contributed by a non-U.S. collaborator performing project work would also be subject to this foreign work waiver requirement and also subject to a determination by the Contracting Officer that the proposed cost share contribution is allowable.