

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. Full Application Phase Questions:

Q1. I would like to know if we could use a catalytic pyrolysis process in response to [Topic] K: Recycle Underutilized Solids to Energy. The FOA specifically [identifies the] following in [Part C] Areas Specifically Not of Interest:

Torrefaction/Pyrolysis/Solvolytic/Hydrothermal liquefaction, per note in Process Technology section.

ANSWER: Per the FOA, ARPA-E is not encouraging submissions for these processes, unless the Applicants can demonstrate a disruptive aspect of their technology, and/or a significant techno-economic breakthrough compared to current state of art.

Q2. We have a unique, patented, third generation, multireactor oxygen-free pyrolysis technology, The uniqueness comes in two ways: that converts all the tars and oils into more syngas and it utilizes multiple reactors to ensure complete reaction. The process is tolerant of halogens (e.g. PVC and BFRs), disposing of them as simple salts. Plant size is up to 100 tons/day of feedstock. This technology operates on its own syngas and is designed for 24/7 self-supported operation. It has successfully converted all seven grades of plastics into the clean syngas (that is approved for direct use in Siemens or Solar turbines) and clean salable byproducts (Biochar). It has done the same with tires (carbon black and steel byproducts), wind turbine blade composites (carbon and glass fibers), electronic plastics and e-waste boards (collecting all the precious and electronic metals). It has been permitted in Germany to convert auto shredder residue into energy. It also is economically successful and can produce electricity competitively for many applications. With the addition of byproducts, this process produces less CO₂ than a natgas power plant. With this explanatory background, I believe this would qualify as a disruptive pyrolysis technology that has a significant techno-economic breakthrough compared to current OA of pyrolysis systems (and many others), because the clean syngas is rich in H₂ which can be extracted and converted into NH₃ or simply stored, and with simple subsequent processing steps deliver a myriad of liquid chemicals (due to its cleanliness and no tar or oil contaminants).

I have the following questions:

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Q.2.1 Would this technology qualify as disruptive with a significant techno-economic breakthrough and eliminate this restriction --

Torrefaction/Pyrolysis/Solvolysis/Hydrothermal liquefaction, per note in Process Technology section?

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.

Q2.2 If so, would you consider eliminating the following two "Areas Specifically Not of Interest", or giving special dispensation to propose despite these limitations:

- a. Gasification processes in which light gases (H₂, CO, methane, C₂ and C₃ hydrocarbons) account for more than 20% of the heating value of the products
- b. Processes that require multiple conversion steps to produce a liquid product, ie gasification + Fischer-Tropsch

ANSWER: The limitations set forth at Topic K, Part 4 remain unchanged.

Q3. [We are] working thru the process and looking for some stats on the size of the plastics problem. You quoted some great ones before do you have some links we can use please.

ANSWER: Prospective applicants are responsible for the content of their Full Applications.

Q4. I would like to know what is the best choice(all of the below are on the table):

- a. A direct, one step, solids to liquid fuels (diesels) pathway proposal would have a chance for award ...
- b. If production of liquid fuels from a single type of plastic is favorable. I.e. PP or PS or PA
- c. Focus on technologies that are scalable but can process only up to 100lbs/day today (100T/day targeted by 2024)
- d. Cooperative efforts by small SBIR companies and larger entities ... is favored.

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.

Q5. Could ARPA-E clarify the maximum funding for Appendix K – Recycle Underutilized Solids to Energy?

ANSWER: As set forth in the introductory table in Appendix K: Awards may vary between \$100,000 to \$1,000,000. These amounts do not include cost sharing required by FOA Section III.B.

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Q6.1 We understand that ARPA-E envisions small-scale as being 100-500 tons per day. In our market survey, we found it rare for US MRFs or Ag waste and manufacturing sites to have over 10 tons per day of low value plastic waste cited as REUSE target feeds. Would ARPA-E consider economic 10 ton per day modules, or is the scope limited to a 250 ton per day feed facility?

ANSWER: REUSE is targeting facilities in the 100-500 ton per day range. Applicants can propose technologies that operate outside this range, but they will be assessed in the 100-500 ton per day range.

Q6.2 We understand that ARPA-E is not necessarily looking for the end product to be a highly refined liquid meeting tight specifications. Is ARPA-E interested in processes aimed at making refined chemical feedstocks such as benzene, toluene, and xylene?

ANSWER: Per discussion in Section B of the FOA, REUSE is open to chemical feedstocks, including benzene, toluene, and xylene.

Q6.3 We understand that ARPA-E is not necessarily looking for pyrolysis. Would catalytic pyrolysis be considered or a process that uses pyrolysis as just one of its steps?

ANSWER: Refer to REUSE FAQ 1.

Q6.4 We understand that ARPA-E is interested in liquid products as the target end product. Would ARPA-E be interested in an approach which was able to convert 70-80% of the incoming plastics into primarily a liquid product, but 20-30% of the incoming off-spec waste into an RDF pellet? This would be during the pre-treatment phase.

ANSWER: Per Targeted Topic K, Section C, Other Processes:

ARPA-E is interested in other novel and disruptive processes that can convert plastics and paper to a stable, easily transportable liquid product, ideally with high energy yield and minimal production of light gases and/or char.

Q7. Can someone please confirm whether indirect costs associated with TT&O count towards the 5% requirement?

ANSWER: Refer to General FAQ 10.17. Allowable TT&O expenditures include allocable indirect costs.

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Q8. ARPA-E requests “Personal Qualification Summaries [for each PI/Senior Person] (each PQS limited to 3 pages in length, no cumulative page limit)”. Does ARPA-E have any preference on what information goes into these PQSs files (e.g. Education, Training, Employment History, Publications, etc.), or should each applicant make that determination for themselves?

ANSWER: ARPA-E will not pre-assess an applicant’s proposal. Refer to the Technical Volume Template for Targeted Topic K, Item 9, for guidance on the content of Personal Qualification Summaries.