

## 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 Questions:

**Q1. I HAVE A QUESTION REGARDING THE PERFORMANCE METRICS FOR CATEGORY 1, FAST TRIGGERING FOR IMPROVED PROTECTION. THE FOA SEEKS DEVICES FOR "...VERY FAST BY-PASS, SHUNT, OR INTERRUPT CAPABILITY..." (PAGE 5) TO PROTECT AGAINST, FOR INSTANCE, "...EMERGING THREATS, SUCH AS ELECTROMAGNETIC PULSES AND SPACE WEATHER EVENTS ..." (PAGE 6). YET, IN THE "CATEGORY 1 PROGRAM PERFORMANCE METRICS SUMMARY" (PAGE 22), A CURRENT RATING (CONTINUOUS) OF >250 A IS REQUIRED. COULD YOU PLEASE EXPLAIN THE NECESSITY OF SUCH A HIGH CONTINUOUS CURRENT RATING FOR SHUNT PROTECTION DEVICES?**

**ANSWER:** The performance metrics table for protection devices specifies peak and continuous rating of a device/module and were determined after an in-depth analysis of the required performance for many possible converter topologies and structures. Applicants may choose to propose advancements related to in-line protection, shunt protection, or both at the same time (reconfigurable, multifunctional devices). Applicants should justify the performance metrics according to the specific application/technology they are proposing. Applicants should provide an explanation if performance metrics do not apply to the proposed technology.

**Q2. DOES ULTRAFAST COVER PROJECTS THAT WOULD RESEARCH WAYS TO DO THE HIGH VOLTAGE ISOLATION REQUESTED BUT WITH EXISTING SEMICONDUCTOR TECHNOLOGY? OR PUT ANOTHER WAY, WOULD THESE FUNDS BE APPLICABLE TO DEVELOPING A NOVEL CONTROL SYSTEM THAT WOULD WORK WITH EXISTING SEMICONDUCTOR TECHNOLOGY IF WE BELIEVE THE CONTROL SYSTEM ADVANCEMENTS WOULD ALLOW US TO MEET THE PERFORMANCE REQUIREMENTS IN THE FOA?**

**ANSWER:** Proposals addressing improvements with existing/COTS technology using wireless means of control and/or triggering (possibly optical, but other methods may be considered) of power

electronic devices/modules are of interest. However, as specified in the FOA, system-level control schemes and algorithms that do not include advances in device/module technologies are not of interest to ARPA-E under this FOA.

**Q3. WOULD A PROPOSAL BE CONSIDERED RESPONSIVE IF IT ONLY FOCUSED ON MATERIALS DEVELOPMENT THAT ENABLED CATEGORY 1 AND 2 DEVICE METRICS, BUT DID NOT ALLOCATE FUNDING TO DEMONSTRATING THE ACTUAL DEVICE? FOR EXAMPLE, DEVELOPMENT OF GAN VERTICAL POWER DEVICE DRIFT LAYERS WITH THICKNESS AND DOPING SUITABLE FOR 20 KV DEVICES.**

**ANSWER:** Experimental validation of developed device and/or module technology is expected for all technical categories under this FOA.

**Q4. WHAT IS THE PRACTICAL DIFFERENCE AMONG THE PROGRAM OBJECTIVES BETWEEN FOA 0002998 (ULTRAFAST) AND FOA 0002999 (ULTRAFAST SBIR/STTR)?**

**ANSWER:** Please refer to the DE-FOA-0002999 ULTRAFAST SBIR/STTR Funding Opportunity Announcement section 1.B. SBIR/STTR PROGRAM OVERVIEW.

**Q5. WE APPRECIATE IF YOU COULD ANSWER THE FOLLOWING QUESTION:**

**WE ARE PLANNING TO PROPOSE A SOLID-STATE CIRCUIT BREAKER UNDER CATEGORY 1 FOR IN-LINE PROTECTION DEVICE. HOWEVER, UNDER " PROGRAM PERFORMANCE METRICS SUMMARY" DESCRIBED IN PAGE 21, VOLTAGE SLEW-RATE > 500V/NS AND CURRENT SLEW RATE > 200A/NS ARE LISTED. ARE THESE TWO REQUIREMENTS FOR SHUNT PROTECTIVE DEVICE ( I.E SOLID STATE SURGE ARRESTER) AND NOT FOR IN-LINE PROTECTION DEVICE? SPECIFIED VOLTAGE SLEW- RATE IS EVEN ABOUT 5 TIMES FASTER THAN STANDARD LIGHTNING BIL WAVEFORM FOR 15KV CLASS SYSTEM AND IT IS NOT CLEAR WHY THIS REQUIREMENT IS NEEDED FOR IN-LINE PROTECTIVE DEVICE.**

**ANSWER:** The performance metrics table for protection devices were determined after a detailed analysis of numerous possible implementations of in-line, shunt, and reconfigurable/multifunctional protection devices for power electronics converters and systems. Depending on the application/technology proposed, trading between metrics is possible. However, applicants should provide an explanation and justify trading between performance metrics according to the specific application/technology they are proposing.

**Q6. I PLAN TO SUBMIT A CONCEPT PAPER TO ADDRESS CATEGORIES 2 AND 3 AND A PART OF 1. I HAVE TWO QUESTIONS WITH RESPECT TO THE ULTRAFAST FOA.**

- 1. IS PCSS REQUIRED FOR PROPOSALS THAT ADDRESS CATEGORY 1 OR 2? OR ARE ANY POWER SEMICONDUCTOR TECHNOLOGIES ACCEPTABLE AS LONG AS THEY CAN MEET THE SPECS IN CATEGORY 1 OR 2?**
- 2. – REDACTED --**

**ANSWER:** PCSS is not a required technology for this FOA. ARPA-E is interested in submissions that propose innovations on the device concepts that promise performance at the required levels. Novel device concepts that span across categories are encouraged, as are ideas that allow incorporation of protection functions within a device or module.

**II. Full Application Phase Questions:**

**Q7. I AM WONDERING IF THERE COULD BE A POTENTIAL EXTENSION OF THE ULTRAFAST FULL PROPOSAL? A LOT OF US ARE ON MULTIPLE TEAMS WHILE THE UNIVERSITY OSP IS NOT EFFICIENT AT THE END OF SEMESTER.....THANK YOU FOR YOUR CONSIDERATION.**

**ANSWER:** No, ARPA-E does not anticipate any changes to the Full Application submission deadline for the ULTRAFAST FOA.

**Q8. I AM PREPARING A PROPOSAL WITH THREE ADDITIONAL PERFORMERS. IF SUCCESSFUL, WILL ARPAE FUND THEM DIRECTLY TO AVOID ADDITIONAL COST, OR DO I NEED TO ACCOUNT FOR OVERHEAD OF AWARDED SUB-CONTRACTS FROM MY INSTITUTION?**

**ANSWER:** ARPA-E will award funds directly to the Prime Recipient of the award. See Section IV.D.3 of the FOA.

**Q9. ARE FFRDCS REQUIRED TO SUBMIT AN FWP FOR THE PROPOSAL?**

**ANSWER:** Yes, if they are a part of a project team. See Section IV.D. 6 of the FOA.

**Q10. IS IT MANDATORY FOR APPLICANTS TO INCLUDE TT&O ACTIVITIES?**

**ANSWER:** Yes, See Section IV.G.8 of the FOA.

**Q11. OUR CONCEPT PAPER LISTED 10% COST SHARE. HOWEVER, WE WOULD ACTUALLY BE ELIGIBLE FOR 5% COST SHARE. ARE WE BOUND TO THE 10% SUBMITTED PER THE CONCEPT PAPER OR CAN IT BE ADJUSTED TO 5% FOR THE FULL PROPOSAL?**

**ANSWER:** Applicants can update their Cost Share contributions in the Full Application phase of the submission process.

**Q12. HOW WILL THE DUE DATE OF PROPOSALS TO ULTRAFast BE HANDLED IN THE CASE OF A DEBT CEILING BREACH, ESPECIALLY IN THE CASE OF A PROLONGED SHUTDOWN? AS FEDERAL CONTRACTORS, WE ARE ANTICIPATING GOING ON LEAVE WITHOUT PAY AND BEING INSTRUCTED TO NOT PERFORM ANY WORK OR USE OUR GOVERNMENT ISSUED COMPUTERS AND PHONES. THIS IS ESPECIALLY TROUBLESOME DUE TO THE DUE DATE, WHICH CAN COINCIDE WITH VACATIONS. IF THE DEBT CEILING IS BREACHED AND FFRDCS CLOSE AND DO NOT RE-OPEN IN TIME, I WILL NOT BE ABLE TO SUBMIT THE PROPOSAL EVEN IF IT IS FINISHED AS I HAVE A PLANNED VACATION JUNE 9-20.**

**ANSWER:** Currently, ARPA-E does not anticipate any changes to the Full Application submission deadline. If that changes, ARPA-E will modify the FOA and promptly notify all potential applicants.

**Q13. GOOD AFTERNOON. THANK YOU FOR YOUR EFFORT IN ARPA-E. WOULD YOU HELP TO ANSWER OUR QUESTIONS BELOW? THANKS.**

- 1) FOR THE FULL PROPOSAL SUBMISSION, IN THE TECHNOLOGY-TO-MARKET PLAN, ARE THE COMMITMENT LETTERS FROM THE INDUSTRY COMPANIES REQUIRED OR JUST MENTIONING THE INVOLVEMENT OF THE COMPANY IN THE PROJECT IS ENOUGH? THANKS.**
- 2) IF ALL RESEARCHERS IN THE TEAM COME FROM UNIVERSITIES, AND THE INDUSTRY COMPANIES ONLY INVOLVE IN THE TECHNOLOGY TO MARKET PLAN, WILL IT BE APPROPRIATE?**

**ANSWER:** 1. The Technology-To-Market Plan is not required until award negotiations. See Section VI.B.6. of the FOA. 2. ARPA-E cannot provide guidance on the applicants' team make up.

**Q14. I NOTICED THAT BUSINESS ASSURANCES & DISCLOSURES FORM HAS CHANGED, CAN I STILL USE THE PREVIOUS VERSION(S) FOR MY FULL APPLICATION SUBMISSION?**

**ANSWER:** No, the updated version posted on ARPA-E eXCHANGE under the ULTRAFast FOA Application Forms and Templates must be used for the final application submission. This form now requires additional information to be entered, and may take more time to complete. Please plan accordingly.

**Q15. FOR THE TARGETED METRICS OF VOLTAGE AND CURRENT SLEW RATES IN CATEGORY 2 TABLE ON PAGE 27, DEPENDING ON POWER MODULE RATINGS, 250V/NS AND 100A/NS MAY NOT BE MET AT THE SAME TIME THEORETICALLY. FOR EXAMPLE, FOR 3.3KV /200A SIC POWER MODULES, 250V/NS MEANS THE SWITCHING TRANSITION TIME WOULD BE AROUND 13NS. ON THE OTHER HAND, WITH 13 NS TRANSITION TIME, FOR 200A CURRENT, THE SLEW RATE WOULD BE 15A/NS ONLY. SO, IT CANNOT REACH 100A/NS UNLESS THE VOLTAGE SLEW RATE IS 1650V/NS WHICH IS IMPOSSIBLE. PLEASE CLARIFY THE SLEW RATE REQUIREMENTS.**

**ANSWER:** Depending on the application/technology proposed, trading between metrics is possible. However, applicants should provide an explanation and justify trading between performance metrics according to the specific application/technology they are proposing.