



CHANGING WHAT'S POSSIBLE

## DE-FOA-0002051 - ATLANTIS

Questions can be sent to [ARPA-E-CO@hq.doe.gov](mailto:ARPA-E-CO@hq.doe.gov)

FIRST DEADLINE FOR QUESTIONS TO ARPA-E-CO@HQ.DOE.GOV:

5 PM ET, FRIDAY, MARCH 8, 2019

SECOND DEADLINE FOR QUESTIONS TO ARPA-E-CO@HQ.DOE.GOV: 5 PM ET, FRIDAY, JUNE 14, 2019

### 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. I am part of a team working on a New Design (Area 1) submission for ATLANTIS. We see the language in the FOA on pages 31 and 46 that projects addressing Area 1 must be independent and not include the other two fundamental areas. Since existing computational tools have been designed to simulate conventional turbine systems, in order to simulate and refine our new design concept we will need to perform some computational tool augmentation. Without these refinements, it will be difficult to demonstrate that our co-design process leads to accurate results. Can you clarify whether an Area 1 submission can include some budget and time for the necessary and specific computational tool augmentation required for the co-design of the new concept (without being a full Area 2 submission, which we understand is not allowed)? Or, does any computational tool augmentation at all disqualify an Area 1 submission?**

**ANSWER:** Area 1 submissions can include some budget and time for necessary and specific computational tool augmentation required for the control co-design of the new floating offshore wind turbine concepts, without being a full Area 2 submission.

**Q2. Is the ATLANTIS program only focusing on horizontal axis wind turbines (HAWT)?**

**ANSWER:** No. The ATLANTIS Program is seeking new floating offshore wind turbine (FOWT) designs, including horizontal axis wind turbines (HAWT), vertical axis wind turbines (VAWT), airborne wind energy systems (AWES) and any other type of solution that by applying control co-design concepts make FOWT economically competitive.

**Q3. I am interested your announcement of the ATLANTIS project, Funding Opportunity No. DE-FOA-0002051. My research tools are [description omitted]. Specifically the questions I have for the upcoming concept paper submission are:**

**Q3.a Are my theoretical approaches appropriate for this solicitation or is there another DOE program/solicitation that would be more appropriate?**

**ANSWER:** Refer to General FAQ 6.19.

**Q3.b Could you please clarify that the Metric Space Workbook has to be submitted only if my proposal falls under Area 1 'New Designs'? ...**

**ANSWER:** Correct, refer to FOA Section IV.C.2, p.52.

## QUESTIONS AND ANSWERS

**Q4. I would like to know if drawings, or pictures could be included in the abstract of the application.**

**ANSWER:** No, the abstract field in the ARPA-E Funding Opportunity Exchange website submission form is a text only field limited to 4,000 characters including spaces.

**Q5. If possible, please advise where can I get information on the following;  
1- On ATLANTIS DE-FOA-0002051 CP FOA, page 26, TECHNICAL PERFORMANCE TARGET, equation (10).**

..... M1 and M2 , and for the polinomials and inequalities was defined by the dollowing expressions (for example 1):

Polynomials,  $a_{11} = -45900.51$ ,  $a_{10} = 192532.82$  .....and  $0.15 < M1 < 0.593$ .

**Also, I would like to know where I can [get] further information about Example 1, 2, 3.**

**ANSWER:** Equation (10) is an inequality that says that the (M1,M2) point for the proposed FOWT has to be above the LCOE front to meet the Program objectives. This is also shown in Figure 11 (see page 27). The parameters of the polynomial in Equation (10) have been calculated from the conditions defined in Example 1 (see page 24). Additionally, this Example 1 is also presented in Figures 14 and 15 (see page 54). Finally, the sheets 1a and 1b of the ATLANTIS Metric Space Excel Workbook, provided with the FOA, present also this Example 1, including the LCOE front calculation, parameters, equations and plot.

**Q6. Our team conduct [*sic*] magnetic materials design and development as part of our research. Recently we have [description omitted]. If this part is of interest and within the scope you are looking for, I will try to submit a small concept paper.**

**ANSWER:** Refer to General FAQ 6.19.

**Q7. ... [I] am writing to obtain some clarifications to the below questions:**

**Q7.a Can folks on our proposal team also submit proposal on other teams?**

**ANSWER:** Refer to General FAQ 7.39.

**Q7.b What are the mechanisms which can be used to support the addition of a researcher from [a foreign entity] to our team?**

**ANSWER:** Refer to General FAQ 3.1.

**Q7.c We have submitted a provisional patent application on many of the ideas we are proposing to ARPA-E. Can you let me know if this affects our proposal in any way?**

**ANSWER:** ARPA-E will not make a pre-submission assessment on any aspect of a prospective applicant's submission. Refer to FOA Section V, Application Review Information, for guidance on how ARPA-E will review Concept Paper submissions to this Funding Opportunity.

## QUESTIONS AND ANSWERS

**Q8. For DE-FOA-0002051, ATLANTIS, one of the fundamental areas of focus (Section 4) is New Designs (Subsection a). Are applicants allowed to propose only a new floating foundation design, or do applicants need to team with a turbine designer in order to propose a combined turbine and floating foundation new design?**

**ANSWER:** The ATLANTIS Program seeks to develop new technical pathways for the design of economically competitive Floating Offshore Wind Turbines (FOWT). The program urges the application of Control Co-Design (CCD) methodologies that (1) bring together engineering disciplines to work concurrently, as opposed to sequentially, and (2) consider control-engineering principles from the start of the design process. By analyzing the numerous sub-system dynamic interactions that comprise the FOWTs, CCD methodologies can propose control solutions that enable optimal FOWT designs that are not achievable otherwise. This means that a concept for a novel floating foundation alone is not enough, as this does not include the sub-system dynamic interactions and control co-design approach. If the novel floating platform is the key component that allows the designer to find an economically competitive FOWT, we encourage the applicants to find an appropriate wind turbine solution for the system.

**Q9. The FOA in section E.1 specifies that programs in the area of New designs must at a minimum include (b) calculations for the design of a small-scale prototype.**

**Figure 12, in note 2 however highlights that FOWT designs projects include two parts: 'New designs and design of scale-prototype'.**

**Completing a design of a scale-prototype is a significantly more involved task than performing 'calculations of a design'. Can you please specify more precisely the expected level of design completion that is required as part of a FOWT design project?**

**ANSWER:** Based on the results achieved in the first phase, a second phase, subject to the availability of appropriated funds, is tentatively planned to be announced for another two years, with additional funds to continue the research in the three fundamental areas and with more emphasis on experimental testing. Only Phase I awardees will be eligible to apply for anticipated funding under Phase II. Projects in the first fundamental area (New designs) must include the calculations for the design of a small-scale prototype(s), to be potentially developed and experimentally tested in the planned Phase II of the program, if selected. The objective of this small-scale prototype(s) would be to prove experimentally the main concepts of the new design, in order to achieve the program targets at full-scale. It is not necessary to have a final design for the scale-prototype at the end of Phase I. However, a pre-design that includes (1) the description of the main components and control systems of the scale-prototype, (2) desired technical specifications, (3) description of the methodology applied to scale-down the FOWT, (4) test plan, and (5) cost is required.

**Q10. For Area of interest 1, is some level of hardware demonstration expected within the 24 months?**

**ANSWER:** Limited experimental work to support the proposed concept and inform continued design and development is allowed during Phase I of the program. However, Area 1 submissions can include some budget and time for necessary and specific hardware demonstration within the 24 months.

## QUESTIONS AND ANSWERS

**Q11. We have a few questions about the FOA. We have organized our questions as they relate to I. the Metric Space Workbook and II. the FOA document.**

**Questions about the Metric Space Workbook:**

**11.1. As the spreadsheet is now programmed, changing Cell O4 automatically adjusts cell T12. If applicants propose carbon steels, on the Worksheet, do applicants only adjust the reference cost, cell O4, or do applicants also get to claim a reduction in the material factor, cell T12, based on the experience that working with carbon steels is less labor intensive than working with stainless steels?**

**11.2. For the floating foundation, does the manufacturing factor take into account fabrication variances due to differences in steel structural framing design? If so, can ARPA-E provide the basis used so that applicants can propose a suitable manufacturing factor in their M1 / M2 calculation?**

**11.3. For the tower installation factor given, 0.10, what is the assumed installation site for the tower? Is it quayside, near shore or offshore at site?**

**11.4. Are applicants to assume that drag embedded anchors will suffice at this time, or can ARPA provide more information about soil conditions and properties for anchoring?**

**11.5. Can ARPA-E confirm whether FCR is fixed for all applicants or whether applicants can propose an FCR for their concept?**

**11.6. Do applicants wanting to submit a concept for a novel floating foundation, need to partner with a turbine supplier or can applicants submit a proposal for just a novel floating foundation concept that can be used to support turbines from many different suppliers? (A turbine agnostic floating foundation).**

**11.7. If the applicant's proposed design can meet all design and operational cases using only passive systems, does the applicant still need to incorporate active or semi-active control systems?**

**11.8. Can ARPA provide a definition of the extent of prototype calculations required for New Designs? For example, are design drawings also required to be submitted or will design model analysis reports suffice?**

**ANSWER: 11.1.** Cell O4 is the cost of the steel of reference (Csref). In the Workbook ARPA-E has selected a steel of reference with a cost of \$2/kg.

The material factors ft, Cells T3 to T12, depend on Cell O4, Csref. They are the ratio cost of every specific material over Csref. Please, do not change these expressions.

## QUESTIONS AND ANSWERS

However, it is possible to use other materials, with other ft. For that, you can add new cells in T13, T14, etc.

In these cases, please provide the rationale for these changes in Sheet 2c.

**11.2.** Manufacturing factors fm are included in column T, rows 16 on. It is possible to use other manufacturing factor for a specific component if necessary. In these cases, please provide the rationale for these changes in Sheet 2c.

**11.3.** This installation factor assumes that you install the tower at the port and then tow the FOWT to the offshore site. Again, it is possible to use other installation factor for a specific component if necessary. In these cases, please provide the rationale for these changes in Sheet 2c.

**11.4.** You can select the appropriate soil conditions for your design. Just, please provide the rationale, pros and limitations of your approach.

**11.5.** FCR is fixed for this FOA.

**11.6.** See Q8.

**11.7.** The Control Co-Design methodologies analyze the sub-system dynamic interactions that comprise the system, and design the FOWT according to them. Passive, semi-active and active control systems are part of the dynamics.

The FOA allows the use of passive, semi-active or active control solutions.

**11.8.** See answer to question Q9.

### **Q12. We would like to ask the following questions:**

**12.1. As we are working with centres of excellence for both wind turbine manufacturers and foundation manufacturers overseas, to what extent can we engage such companies for the work our US company will undertake?**

**12.2 Can such staff be engaged to work as consultant[s] in our US offices and alongside our own staff, to deliver the agreed scope?**

**12.3 Is it possible to apply for the program and work on integration and optimization program containing 2 bladed turbines as well as 3 bladed turbines against two different foundation types?**

**12.4. As we are looking at technology optimization and integration of both turbine technology and foundation technology as well as certain sub systems and controls, how can we assure that we can deliver on this wider scope without being chopped up in several components and divided up?**

**12.5. Are there any recommendations of how to formulate [our application] technically?**

**ANSWER:** 12.1. Refer to General FAQ 3.1.



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**12.2.** Applicants are responsible for personnel staffing decisions concerning their proposal, including for foreign researchers working on ARPA-E awards. Principal Investigators and other researchers are not necessarily required to be U.S. citizens or permanent residents. Hiring/work assignment decisions for ARPA-E research should consider that ARPA-E awards normally involve technology or software - including any manufacturing know - how - that is “restricted or proprietary” as cited in export control regulations (at 15 C.F.R Section 734.8(a)). This includes when a university awardee partners with/licenses to a for - profit team entity, or if the university awardee seeks ARPA-E approval of “protected data” resulting from the research. Also, awardees’ inventions resulting from ARPA-E research must be reported and protected, and are subject to U.S. manufacturing requirements.

Refer to Attachment 1, Clauses 4 and 12, and Attachment 2 of the ARPA-E Model Cooperative Agreement for awardee immigration and export control obligations.

**12.3.** ARPA-E welcomes all designs that can meet or exceed the technical targets as specified in I.D.2 “Technical Performance Targets

**12.4.** Refer to Q 7.c above and General FAQ 6.19.

**12.5** Refer to General FAQ 6.19.

**Q13. What is the definition of “inventive supportive work” as used in the “Project Team: A Project Team consists of the Prime Recipient, Subrecipients, and others performing inventive supportive work that is part of an ARPA-E project.”**

**Does inventive supportive work include a company’s participation on an industry advisory board as described in FOA Page 33 Section E.2.: “Participation of wind turbine manufacturers and floating platform manufacturers is highly encouraged, either as team members or in industry advisory boards.”**

**ANSWER:** Inventive supportive work”, as used in describing members of a project team, refers to those team members who are performing any of the R&D required under the award, defined in the project tasks and milestones. Participation on an advisory board does not necessarily qualify as performing the R&D required by the award.

## QUESTIONS AND ANSWERS

### II. Full Application Phase Questions:

**Q14. This is a question regarding some ambiguous language in the FOA/Full application template regarding the performance target in section 1.3 (Innovativeness):**

*For Projects in Area 1 (New Designs), include the variables in M1, M2 and LCOE that are expected to be most significantly affected by the new design, an estimate of how much each will change, and a brief justification for each. In addition, include one page with the plot of Metric Space from Tab: "2b. Proposed Design Plot", in the ATLANTIS Metric Space Workbook named ATLANTIS\_MetricSpaceWorkbook.xlsx, which is available on ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov/>). Also, include the description and justification for the parameters used to calculate M1, M2 and LCOE using the Tab: "2c. Summary of Changes" (See Appendix 1).*

The text above refers to the Appendix 1, and therefore suggests that this 'one page' is to be included as appendix, and not within section 1 itself. However, appendix 1 itself says the page budget is 2 pages.

Can you please confirm that the Design Plot and the description are only included as appendix with a page budget of 2 pages, and that there is not a requirement to also insert this in section 1 itself?

**ANSWER:** ARPA-E confirms that the interpretation set forth in the immediately preceding paragraph is correct.

**Q15. I have a question related to reduced cost share requirement: Sec III.B.3, bullet point 5. I am wondering if the following insertion of text is legitimate as it seems that most federal entities are treated similarly in the calculation of reduced cost share eligibility (see bullet point 2, for instance):**

*Project Teams where domestic educational institutions, domestic nonprofits, small businesses, and/or FFRDCs/DOE Labs/Federal agencies and instrumentalities (other than DOE) (emphasis added to identify text inserted by the questioner) perform greater than or equal to 80% of the total work under the funding agreement (as measured by the Total Project Cost) are required to provide at least 10% of the Total Project Cost as cost share ...*

**ANSWER:** For purposes of determining project cost-sharing requirements, non-DOE Government-owned, Government-operated laboratories and Federal agencies and instrumentalities are afforded



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the same treatment as DOE laboratories/Federally Funded Research and Development Centers (FFRDCs).