Wind and Water Power Technologies Office

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Wave Energy Converter Prize Administration Webinar

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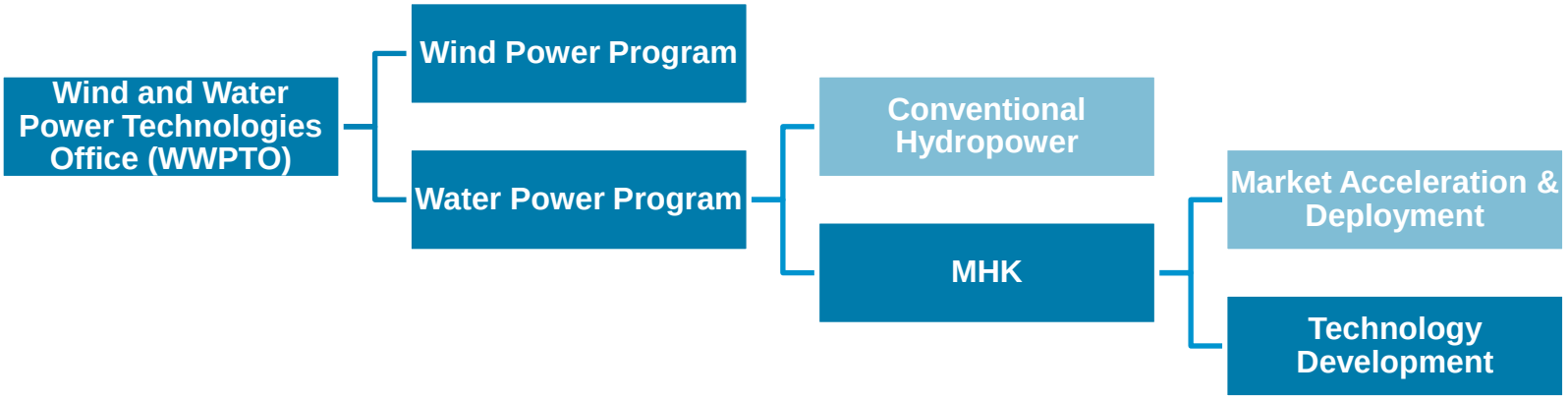
Overview

- Welcome (Alison LaBonte)
- Webinar Purpose (Alison LaBonte)
- Program Introduction (Alison LaBonte)
- Wave Energy Converter Prize Initiative (Alison LaBonte)
- Facilitated Discussion (Michael Hahn)
- Next Steps (Michael Hahn)

- Webinar purpose is to gain public input regarding the potential development and implementation of a prize challenge for wave energy converters (WEC).

- The information collected by the webinar and this notice will be used for internal DOE planning including the potential development of a Funding Opportunity Announcement (FOA).

Program Introduction



- **Water Power Mission**
  - Identify and undertake research, development, demonstration and deployment to assess the potential extractable energy from water resources and to facilitate the development and deployment of renewable, environmentally sound, and cost effective energy from domestic rivers, estuaries, and marine waters.

- **Marine and Hydrokinetic (MHK) Technologies**
  - Wave, tidal, ocean current, ocean thermal energy conversion, in-stream hydrokinetic

Wave Energy Converter Prize Initiative

- **Wave Energy Converter Prize Goal**
  - Set a high technical bar for competitors to be eligible for a prize, and offer an attractive prize purse to the winner, thus facilitating rapid advancements through technical innovation
  - Quickly yield a number of viable solutions to increase the performance of WEC technologies above an aggressive but achievable performance threshold
  - Spur game changing innovations for next generation WEC technologies to drastically increase WEC performance

- DOE anticipates conducting Prize Competition in accordance with the prize authority established in the America COMPETES Reauthorization Act of 2010 (15 U.S.C. 3719)

Wave Energy Converter Prize Initiative: Stage Gates and Criteria for Evaluation

- There could be many ways to formulate the challenge structure (i.e. number of stages and stage gates) for the WEC Prize. The WWPTO encourages commenters to provide alternative strategies and approaches for the prize administration.

- Multi stage-gate challenge structure requires competitors to pass through a series of stage gates based on various criteria. The criteria to be designed should ensure that the prize winner holds the most commercially viable technology and has the highest potential for success in the actual open-ocean wave energy harvesting environment.

- Quantitative performance threshold for the final tank test is anticipated to be a function of absorbed energy; characteristic mass; surface area; and/or power take-off force.

Wave Energy Converter Prize Initiative: Example Challenge Structure

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Stage	Scope	Stage Gate
Full Proposal	WEC prize competitors would initially submit full applications with proposed design concepts which would be evaluated against WEC prize performance goals. The applications could include numerical simulation performance calculations, levelized cost of energy calculations demonstrating techno-economic viability of the concept at a commercial stage, and engineering justification to support concept design reliability and survivability at commercial scale.	Judging panel would evaluate and select proposals based on pre-published criteria. Selected proposals would advance to a detailed design phase.
Design	Proposals selected to advance to the design stage would develop a detailed design demonstrating proof-of-concept via prototype bench top testing; WEC numerical modeling, validation, and refinement; and any design stage wave tank testing results.	Judging panel would conduct a critical design review and select up to 10 competitors to advance to the "build stage." Those selected at this stage would receive a monetary award (e.g., $350,000) to support scaled prototype fabrication.
Build	The selected competitors would proceed to the build stage and would be responsible for the procurement and construction of a scaled prototype WEC device ready for tank testing.	*All competitors would advance to the Test and Evaluate Phase*
Test and Evaluate	The selected competitors would test their scaled prototype in a wave tank to quantitatively measure performance of the WEC device against performance criteria.	Judging panel would evaluate the tank test results against pre-determined performance criteria to select 1 winner to receive the prize purse. WWPTO is considering $1 million purse prize.

Wave Energy Converter Prize Initiative

- WWPTO encourages commenters to provide alternative strategies and approaches for the prize administration.
- Three potential groups whose roles/interactions need to be defined prior to implementation of any prize initiative:
  - **Administrative entity** to structure challenge and stage gates
  - **Technical expert***, possibly from a DOE National Laboratory, to develop practical criteria for testing and evaluation and device scales for tank conditions
  - **Test facility***, possibly the Naval Surface Warfare Center, Carderock Division, Maneuvering and Seakeeping Basin, to determine wave condition limitations during testing and evaluation phase.

* Technical expert and test facility will be determined outside the anticipated "Wave Energy Converter Prize" FOA

Wave Energy Converter Prize Initiative: Scope for Administration Entity

- The anticipated scope for the administrative entity may include, but may not be limited to, the following:
  1. Work with the WWPTO to refine WEC Prize and to develop challenge strategy, including rule development, structure, planning, judging and evaluations, to meet those objectives.
  2. Collaborate with the technical expert as identified by the WWPTO to finalize testing and evaluation criteria for rule development.
  3. Coordinate with the tank test facility identified by the WWPTO for planning, scheduling, and executing the test and evaluate stage of the challenge.
  4. Promote the challenge to attract competitors to apply.
  5. Publish challenge rules and implement the challenge strategy to accomplish the objectives.
  6. Increase the awareness of MHK technology through the WEC Prize challenge with marketing and public relations.

Wave Energy Converter Prize Initiative: Scope for Administration Entity

- Continued anticipated scope for the administrative entity
  7. Provide the necessary qualified personnel, facilities, equipment, supplies, services, subcontractors, and related administrative and information technology support to accomplish the objectives.
  8. Coordinate and compensate judging panels, as applicable.
  9. Provide on-site coordination and logistics for judging panels and tank testing.
  10. Ensure the tank testing is in accordance to the rules of the prize.
  11. Provide the WWPTO access to the observation of all test and evaluation activities.
  12. Allow WWPTO access to records, files, and other data derived from this work.

Wave Energy Converter Prize Initiative:
Technical Expert Scope Outside Anticipated FOA

- DOE envisions funding technical experts directly to assist the administrative entity in the following areas:
  - Assist the administration entity with the development of quantitative performance threshold and other criteria the competitors will be evaluated against throughout the various stages of the challenge
  - Collaborate with the tank test facility operators to determine tank test conditions for the testing and evaluation phase to ensure the conditions are consistent for WEC device competitors
  - Provide technical direction to the administrative entity developing the challenge rules
  - Provide technical direction to the administrative entity in selecting experts for judging panels
  - Development of the tank test instrumentation and data acquisition interface (in conjunction with the tank test facility)

Wave Energy Converter Prize Initiative:
Test Facility Outside Anticipated FOA

- WWPTO envisions funding a test facility directly for the final testing and evaluation phase.
- WWPTO is considering arranging an agreement with the Naval Surface Warfare Center, Carderock Division, Maneuvering and Seakeeping Basin in West Bethesda, Maryland.
- Basin Description:
  - 216 independently controlled wave paddles capable of producing model sea state spectra of any distribution
  - 110 m (360 ft) basin overall length
  - 73 m (240 ft) overall width
  - 6.1 (20 ft) depth with a 10.7 m (35 ft) deep by 15.2 m (50 ft) wide trench

Facilitated Discussion

- Structure of a potential prize competition
  - What administrative resources are required to design, promote, and implement a prize challenge?
  - How could a challenge be structured to efficiently, timely, and adequately allow comparison of the various technologies and techniques that may be applied to WEC?
  - How can a judging panel be secured for multiple phases?
  - Is the sample challenge structure, with multiple stages, too lengthy or complex that some potential competitors may not participate? Does offering seed funding at an early stage incentivize competitors where they otherwise would not compete?
  - What distribution of funding is appropriate for administrative costs, seed funding, and prize? Should seed funding be given, or should there instead be a larger winning prize, or first, second and third place prizes?

Facilitated Discussion

- Technical criteria
  - What criteria should be used to evaluate proposed WEC designs and WEC performance?

- Other topics relevant to a WEC Prize

Next Steps: Comment Instructions

- Provide written response/comments
  - Five pages or less
  - Include company name, individual contact area, and expertise area
- Submit comments
  - E-mail: WECworkshopweb@go.doe.gov
  - Postal Mail:

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- Comments accepted through Thursday, July 25, 2013
- Webinar minutes and recording will be made available at http://water.energy.gov.