POWERING THE BLUE ECONOMY™:
POWER AT SEA PRIZE

AMERICAN MADE CHALLENGES
U.S. DEPARTMENT OF ENERGY
NOAA

Rules

DEVELOP PHASE

November 2024–June 2025

Preface

This is the Official Rules document that establishes the rules and requirements for the U.S. Department of Energy (DOE) Powering the Blue Economy™: Power at Sea Prize, DEVELOP Phase, by which the competition will be governed and adjudicated. The Prize Administrator and DOE reserve the right to modify this Official Rules document if necessary and will publicly post any such notifications as well as notify registered prize competitors.

Date	Modification

Contents

1. Executive Summary

The U.S. Department of Energy's (DOE's) Water Power Technologies Office (WPTO), in partnership with the National Oceanic and Atmospheric Administration (NOAA)-led U.S. Integrated Ocean Observing System, NOAA National Sea Grant, NOAA Ocean Acidification Program, and NOAA Fisheries Office of Aquaculture, announced a two-phase, $1.7 million Powering the Blue Economy™: Power at Sea Prize. Through this prize, WPTO seeks to:

- Engage and cultivate a community of new and existing participants in marine energy to introduce new, creative minds to Powering the Blue Economy and the marine energy field, fostering the development of new concepts and lessons learned
- Identify new, innovative, and feasible marine energy concepts that have a high likelihood of providing power at sea in the near term to accelerate the commercialization of the nascent marine energy industry
- Introduce competitors to WPTO and government-funding mechanisms and prepare them to compete technically and financially for future funding opportunities both within and beyond DOE.

Through two phases—CONCEPT and DEVELOP—the Power at Sea Prize will provide winners with access to direct support, including trainings, testing assets, and new connections that aim to accelerate the advancement of concepts into real prototypes. In the CONCEPT Phase, competitors select a blue economy application that their proposed system, subsystem, or component would support and an integration challenge their solution intends to resolve. In the DEVELOP Phase, competitors will engage with the Power at Sea Prize team, power connectors, and their prize cohort as they further develop their ideas.

The Power at Sea Prize will award a total cash prize pool of $1.7 million.

Table 1. Anticipated Cash Prize Distributions for the Power at Sea Prize

Phase	Cash Prize Pool	Per Team
CONCEPT	$200,000	$10,000 each to 20 teams
DEVELOP	Up to $1.5 million	Up to $75,000 for up to 20 teams

1.1 Key Dates

- CONCEPT Phase Winner Announcement: Nov. 25, 2024
- DEVELOP Phase Open: Nov. 25, 2024
- DEVELOP Phase Submission Close: June 2, 2025, at 5 p.m. ET
- DEVELOP Phase Winner Announcement: June/July 2025

1.2 Applications of Interest

Submissions may be refined during the DEVELOP Phase but must continue to meet the following characteristics:

- The proposed solution is a tangible system, subsystem, or component that receives 50% or more of its energy needs from a minimum of one of the following marine energy resources to power

systems at sea: wave, tidal, ocean current, river, salinity gradients, or thermal gradients.
- The proposed solution is based on sound technical principles.
- The proposal either directly addresses a Power at Sea blue economy application and challenge area—selected from Table 2 and the list in Section 2.3.1, respectively—or provides a clear description and justification for pursuing an alternative application and/or challenge.
- The proposed solution does **not** involve the lobbying of any federal, state, or local government.
- The proposed solution **cannot** primarily consist of software, a regulatory toolkit, or a methodology for improving systems that are already commercial.

2. Background

2.1 The Blue Economy and Energy

During the CONCEPT Phase, competitors were introduced to WPTO's Powering the Blue Economy initiative (Appendix B) and the Powering the Blue Economy report, which details possible energy solutions that could be applied to markets in one of two thematic areas: power at sea and resilient coastal communities. Technologies that address these non-grid energy demands may prove to be economically viable opportunities in the near term for the marine energy industry. By pursuing such opportunities, a spillover effect is expected that leads to advances in marine energy technology readiness for more traditional utility-scale electrical grid markets and potentially other unforeseen opportunities.

With reliable and cost-effective renewable power at sea, we could realize a greater understanding of the world's oceans for sustainable and responsible use of ocean resources and better prediction and tracking of tropical storms; aquaculture could be better supported and poised for industry growth to ensure food security for coastal communities; and the ocean's role in climate change mitigation could be realized by using renewable energy to power carbon dioxide removal and account for the amount of carbon removed.

2.2 Blue Economy Applications

With this background in mind, the Power at Sea Prize aims to support the development of concepts that could provide power at sea to either the applications defined in Table 2 or other applications that could benefit from a source of renewable energy away from shore. In the CONCEPT Phase, prize competitors considered which applications could benefit from their marine energy concept as a part of their submission and identified how their solution will provide power to this application. In the DEVELOP Phase, prize competitors will narrow in on one primary blue economy application and further evaluate how their concept will provide value to the identified blue economy application and end user(s).

Table 2 identifies applications in the blue economy, including the order of magnitude of their power needs, which competitors used to define the power requirements of their concepts in the previous phase:

Table 2. Example At-Sea End Uses in the Blue Economy, Including the Order of Magnitude of Power Needs

Estimated Power at Sea Device Power Usage (Order of Magnitude)					
	Milliwatts (mW)	Watts (W)	Kilowatts (kW)	Megawatts (MW)	Gigawatts (GW)
mCDR (including monitoring)	•	•	•	•	•
Ocean observation and navigation	•	•	•	•	
Marine aquaculture (including monitoring)	•	•	•	•	
Underwater vehicle charging		•	•		
Subsea communications		•	•	•	•
Mining seawater minerals and gasses			•	•	•
Data centers			•	•	•
Hydrogen electrolysis			•	•	•
Marine restoration			•	•	•
Pollution remediation			•	•	•
Offshore fuels production				•	•

2.3 The Challenge for Power at Sea

During the CONCEPT Phase, competitors were required to choose one challenge area to address from the following list of specific blue economy integration challenges (listed in alphabetical order) that can be addressed by the marine energy concepts submitted to this prize competition:

- **Access:** How does your marine energy solution help to reduce the high cost or limited opportunities for service, maintenance, and/or intervention for at-sea blue economy applications?
- **Deployment duration:** How does your marine energy solution improve the deployment duration of at-sea blue economy applications?
- **Energy storage:** How does your marine energy solution improve the capabilities and duty cycles currently limited by battery capacity, especially considering that batteries may account for most of the sensor volume and weight?
- **Environmental/ecological impact:** How does your marine energy solution minimize the negative effects of interactions with local flora and fauna at the deployment site?
- **Harsh operational conditions:** How does your marine energy solution minimize or otherwise address operations under challenging conditions like violent storms, strong currents, strong pressure (i.e., for subsea applications), corrosive media, and unwanted growth of marine organisms?
- **Hybridization with other renewable energy resources:** How does your hybrid solution utilize marine energy to address power gaps caused by intermittency of other non-marine renewable energy resources like solar and wind due to seasonality and changing weather patterns?
- **Suitability of power:** Sensors, instrumentation, and automation require specific power at specific

times. How does your marine energy solution match power generation to power needs to maximize efficiency?

During the DEVELOP Phase, competitors are expected to continue ideating in the same challenge area; however, they may choose to change areas. Competitors wishing to change challenge areas within the identified list should clearly describe why they are proposing to change to a different area and justify the decision as it relates to their concept.

Competitors wishing to change to a challenge area outside the identified list must provide a clear description of the proposed challenge area, including the background on why they are proposing to change to the new area, and justify the benefit of the identified challenge area to marine energy. Competitors should email the prize inbox requesting to make this change as close to the start of the DEVELOP competition as practicable to ensure that the concept will still be eligible.

2.4 Prize Structure

The Power at Sea Prize is structured to support competitors through the early stages of developing a new system, subsystem, or component, from original conception to teaming to a testable stage of initial development. The prize aims to provide a proving ground for ideas that have not yet had the opportunity to flourish and is structured so that competitors end the prize with concepts, materials, and media collateral to better position them for future technology development.

2.4.1 CONCEPT Phase

The Power at Sea CONCEPT Phase focused on forming a cohort of participants and ensuring that innovators engaged with the competitor support mechanisms. Concepts in early stages of development were welcome—from a system, subsystem, or component that has not yet been developed to those that have had some previous work completed up to the prototype stage.

As a part of their submission, competitors identified the challenge area they intended to work in and identified the end use they intended to support.

Twenty CONCEPT Phase winners were awarded $10,000 each from a cash prize pool of $200,000. Only those awarded in the CONCEPT Phase are eligible to participate in the DEVELOP Phase.

2.4.2 DEVELOP Phase

The Power at Sea DEVELOP Phase is focused on continued concept development. Competitor support will be tailored to meet competitor needs, depending on what stage of development their concept is in and what support competitors identify would be useful, including commercialization support through the OpenSeas Innovator Dojo. The DEVELOP Phase aims to better position competitors for continued technology development following the prize.

Specific submission requirements for the DEVELOP Phase are defined in this Rules document in Section 4. Up to 20 DEVELOP Phase winners will be awarded from a cash prize pool of up to $1.5 million.

2.4.3 Post-Prize Opportunities

The intent of the prize is to provide support for competitors developing innovative and novel systems, subsystems, or components from concept to ideation during the prize and better prepare competitors for continued technology development after the prize ends.

As a part of the prize structure, WPTO and other partnering organizations will share potential future

funding opportunities to introduce competitors to mechanisms for continued technology development. These mechanisms include but are not limited to the Small Business Innovation Research program, the NOAA Ocean-Based Climate Resilience Accelerators, and other green technology incubators or accelerators. More detailed information will be provided as the prize progresses.

3. Competitor Support Mechanisms

To better enable competitors to be successful in the Power at Sea Prize, the Prize Administrator provides access to a network of support for competing teams. The following mechanisms have been formalized for competitors to ensure they are able to develop a high-quality application or to support the execution of their proposed activities in the DEVELOP Phase of the prize.

During the prize, competitors may be asked for their input on the types of support that will be the most relevant to them. Updates on training sessions, mentorship contacts, and office hours will be posted on the HeroX platform, and competitors are encouraged to leverage these opportunities.

Table 3. Example Support That May Be Provided by Supporting Organizations

Planned Support Tasks	Details
Office Hours	• Provide feedback to competitors on their submissions in the DEVELOP Phase. This feedback is provided by a third party and does not represent the opinion of WPTO, Pacific Northwest National Laboratory, or the National Renewable Energy Laboratory. This support does not include writing submissions or directly redlining drafts.
Networking	• Host virtual networking meetings where competitors can introduce themselves to other competitors that may be interested in collaborating. • As the prize progresses, host virtual peer-to-peer workshops where DEVELOP Phase participants and other organizations can discuss challenges and make connections with potential partners.
Targeted Trainings	• Identify training session topics that would be the most impactful for winners. • Host seminars featuring experts on topics such as an introduction to marine energy, applications in the blue economy, commercialization best practices, or other topics of interest.

3.1 Power Connectors

Power Connectors are contracted by the Prize Administrator to support all competitors participating in the prize. The Power Connectors will provide equal, direct support, including webinars, training, and networking sessions for the benefit of all teams.

4. DEVELOP Phase Submission Requirements

4.1 How To Enter

Go to HeroX and follow the instructions for registering and submitting all required materials before the deadline in the Key Dates section and as displayed on the HeroX website.

4.2 What To Submit

The following items constitute the DEVELOP Phase submission package and must be submitted through the HeroX platform. Each item is described in more detail in the following sections.

Table 4. Submission Requirements and Scoring Guide

Item	Will Be Made Public[1]	Scored Item
Quad Chart	Yes	Yes
Technical Narrative	No	Yes
Early Design Document	No	Yes

4.2.1 Scored Submission Items

The scored items in the DEVELOP Phase submission package are the quad chart, technical narrative, and early design document.

Scored materials will be evaluated on how well they address scoring statements in the respective criterion; each statement (described below) will be scored from 0 to 5, as shown here.

0	1	2	3	4	5
Strongly Disagree/ Does Not Address	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree/Fully Addresses

Table 5 explains how the scores for each submission will be calculated.

[1] Competitors who do not want documents to be made public that are not already intended to be public-facing will need to mark them according to the instructions in Appendix A (Section A.10).

Table 5. Scoring Criteria for DEVELOP Phase Submission Elements

Scoring Criteria	Number of Scored Statements	Total Possible Points	Weight
Quad Chart	**3**	**15**	**10%**
Technical Narrative	**13**	**65**	**43%**
Criterion 1: Concept Development and Viability	4	20	13%
Criterion 2: Blue Economy Application Evaluation	3	15	10%
Criterion 3: End User(s) Identification	3	15	10%
Criterion 4: Future Plans	3	15	10%
Early Design Document	**14**	**70**	**47%**
Criterion 1: Technical Capabilities and Merit	3	15	10%
Criterion 2: Qualitative Analysis	3	15	10%
Criterion 3: System Performance	4	20	13%
Criterion 4: Testing and Validation Planning	4	20	13%
Total	**30**	**150**	**100%**

4.2.1.1 Quad Chart

The quad chart will be made public. The purpose of the quad chart is to provide a high-level summary of the concept being explored for reviewers, competitors, and members of the public interested in learning more about these funded concepts. The quad chart is scored.

Though not required, we encourage the use of the template[2] available on the HeroX platform.

Competitors will provide basic information about their submission, enabling the Prize Administration team to assign appropriate reviewers. This information should not exceed a single page and should include:

- Title
- Competitor name(s), team name (if applicable), and organization
- Blue economy application from Table 2 in Section 2.2
- Primary end-use/intended deployment location and estimated power production
- Marine energy resource type(s)
- Short description of the concept and the activities undertaken during the DEVELOP competition
- Image that summarizes the technology visually.

[2] To assist teams, the Prize Administrator is providing an elective template to illustrate the information needed to evaluate whether teams meet minimum requirements for the associated critical success factors. Teams are not required to use this template and may submit using any form or format of their choosing. All submissions should address the substantive measures outlined in the template and described in this Rules document.

Table 6. Scoring Criteria for the Quad Chart

Quad Chart Scoring Criteria	
Suggested Content Competitor Provides • A bulleted list of achievements from the DEVELOP Phase • A bulleted list or table listing the blue economy application, primary end-use location, and resource type • A succinct summary of the concept • An image of the system, subsystem, or component alone or as part of an end-use application.	**Each Statement Scored on a 0–5 Scale** • The competitor has provided a quad chart that includes all the required information listed in the bullets above and is easy to read and understand. • The competitor has provided a sufficiently detailed summary of their proposed concept in an understandable and easy-to-read manner. • The included image clearly represents the proposed concept.

4.2.1.2 Technical Narrative

Competitors will write a detailed narrative describing efforts undertaken during the DEVELOP competition to advance their concept. Although not required, we encourage the use of the template[3] available on the HeroX platform. The technical narrative should describe long-term future planning for the concept, whereas the early design document should describe near-term planning, design considerations, and any results from testing or modeling.

The total page count of the technical narrative must not exceed **10 pages**. The document font size must be 10.5 or greater, with margins of no less than .25 inch on all sides. Acceptable fonts include Franklin Gothic, Helvetica, Times New Roman, Veranda, Tahoma, Gill Sans, Calibri, Palatino, Avante Garde, Arial, Roboto, Montserrat, Libre Franklin, Garamond, Open Sans, Lato, and Avenir. The narrative may also include up to **five** supporting visualizations or graphics.

The cover page, table of contents, list of team members, and references are excluded from the total page count.

The technical narrative must be submitted as a PDF onto the HeroX platform along with the other submission documents. Information contained in hyperlinks to external sources and any text or graphics beyond the designated limits will not be reviewed or considered.

Table 7 describes the content that the competitor should provide in the submission to successfully address each criterion. The right-hand column contains the scored statements the reviewers will use for each criterion. The left-hand column includes suggested content that addresses each statement. The suggested content provided is not mandatory. Rather, these are examples to help guide responses. Competitors are welcome to use other information as applicable, as long as it effectively addresses the scored statements listed on the right.

Table 7. Scoring Criteria for the Technical Narrative

[3] To assist teams, the Prize Administrator is providing an elective template to illustrate the information needed to evaluate whether teams meet minimum requirements for the associated critical success factors. Teams are not required to use this template and may submit using any form or format of their choosing. All submissions should address the substantive measures outlined in the template and described in this Rules document.

Technical Narrative Scoring Criterion 1—Concept Development and Viability	
Suggested Content Competitor Provides • A description of the system, subsystem, or component • A high-level summary of performance metrics such as the power matrix, power curve, and efficiency • Identification of relevant Power at Sea challenge area selected from the list in Section 2.3; please note any adherence or justification made for changes to the challenge area initially identified in the CONCEPT Phase of the prize • A clear description of how the proposed system, subsystem, or component will address the challenge area identified • A description of how the competitor has matured their concept during the DEVELOP Phase of the prize • A description of how the competitor has engaged with competitor support mechanisms provided in the DEVELOP Phase of the prize and how key takeaways have contributed to and/or impacted the development of their concept.	**Each Statement Scored on a 0–5 Scale** • The concept is clearly described in sufficient detail and with high-level performance metrics to determine viability. • The competitor demonstrates a deep understanding of how their concept is suited for the identified challenge area. • The competitor has matured their concept during the DEVELOP Phase of the prize. If the competitor has changed their concept, they have demonstrated why such a change was necessary and has matured their concept during the DEVELOP Phase of the prize. • The competitor clearly describes how they engaged with the competitor support mechanisms provided in the DEVELOP Phase of the prize and how key takeaways have contributed to and/or impacted the development of their concept.

Technical Narrative Scoring Criterion 2—Blue Economy Application Evaluation	
Suggested Content Competitor Provides • A list or table that demonstrates the competitor's depth of knowledge in their chosen primary blue economy application, with relevant information such as power needs for an end use and likely locations where the concept is most efficient and which have an end-use need in the blue economy application • A discussion on how the concept will meet the needs of the identified primary blue economy application	**Each Statement Scored on a 0–5 Scale** • The competitor has identified a primary blue economy application and demonstrated a deep understanding of the primary blue economy application. • The competitor has demonstrated that their concept will meaningfully meet the needs of the primary blue economy application. • The competitor has demonstrated that their technology is competitive compared to existing technologies within the primary blue economy application.

• A discussion of how competitive the technology is compared to existing technologies within the identified primary blue economy application.	

Technical Narrative Scoring Criterion 3—End User(s) Identification	
Suggested Content Competitor Provides • Identification of end user(s) for the concept within the primary blue economy application • A discussion of what challenge(s) the concept might solve for the identified end user(s) • Details on any other value the concept may bring to the identified end user(s), such as cost benefits, ease of installation, and environmental benefits.	**Each Statement Scored on a 0–5 Scale** • The competitor has clearly identified end user(s) for their concept within the primary blue economy application. • The competitor understands what challenge(s) their concept might solve for their identified end user(s). • The competitor has clearly demonstrated that the concept has high potential to bring value to the identified end user(s).

Technical Narrative Scoring Criterion 4—Future Plans	
Suggested Content Competitor Provides • Identification of potential gaps within the concept team (e.g., knowledge, expertise, resources, and partners) and how the competitor will address these gaps • A discussion of future plans for advancement of the concept through iterative design, modeling, and/or testing • A list or table of next steps for furthering advancement of the concept, and cost estimates to achieve these steps • A discussion of future funding pathways to support further concept development post-prize, such as specific funding agencies or funding opportunities.	**Each Statement Scored on a 0–5 Scale** • The competitor has identified potential gaps within their team and project risks and has identified a reasonable path to address these gaps/risks in the future. • The competitor has planned for future advancement of their concept through iterative design, modeling, and/or testing. • The competitor has identified appropriate future funding pathways to support further concept development post-prize.

4.2.1.3 Early Design Document

Competitors will develop an early design document describing technical efforts undertaken during the DEVELOP competition to advance their concept. Although not required, we encourage the use of the

template[4] available on the HeroX platform. The early design document should describe near-term planning, design considerations, and results from any modeling or testing, whereas the technical narrative should describe long-term future planning for the concept.

The total page count of the early design document must not exceed **15 pages**. The document font size must be 10.5 or greater, with margins of no less than .25 inch on all sides. Acceptable fonts include Franklin Gothic, Helvetica, Times New Roman, Veranda, Tahoma, Gill Sans, Calibri, Palatino, Avante Garde, Arial, Roboto, Montserrat, Libre Franklin, Garamond, Open Sans, Lato, and Avenir. The early design document may also include a section for supporting visualizations, drawings, or graphics; this section does not count towards the overall page limit. However, competitors should note that files uploaded to HeroX cannot exceed 10 MB.

The early design document must be submitted as a PDF onto the HeroX platform along with the other submission documents. Information contained in hyperlinks to external sources and any text beyond the designated limits will not be reviewed or considered.

In Table 8, the right-hand column contains the scored statements the reviewers will use for each criterion, whereas the left-hand column contains suggested content that address each statement. As previously stated in this Rules document, the suggested content provided is not mandatory or comprehensive.

Table 8. Scoring Criteria for the Early Design Document

Early Design Document Scoring Criterion 1—Technical Capabilities and Merit	
Suggested Content Competitor Provides • A technical analysis of the concept • Calculations based on sound assumptions that support the intended technology benefits, such as calculations for power density, efficiency, or losses • Diagrams, figures, or graphics to support understanding of the concept • Inclusion of key (known or likely) design requirements to address the needs of the identified primary blue economy application, such as power requirements/needs.	**Each Statement Scored on a 0–5 Scale** • The competitor demonstrates a sound technical analysis of their concept based on reasonable and clearly defined assumptions. • The competitor adequately communicates key (known or likely) design requirements necessary to address the needs of their primary blue economy application. • The submission is technically feasible (0 or 5).

[4] To assist teams, the Prize Administrator is providing an elective template to illustrate the information needed to evaluate whether teams meet minimum requirements for the associated critical success factors. Teams are not required to use this template and may submit using any form or format of their choosing. All submissions should address the substantive measures outlined in the template and described in this Rules document.

Early Design Document Scoring Criterion 2—Quantitative Analysis	
Suggested Content Competitor Provides • A sound and detailed quantitative analysis of the concept with detailed explanations • Diagrams, figures, or graphics to support understanding of the concept • Identification of a deployment location for the quantitative analysis within the identified primary blue economy application • A description of the competitor's reasoning for selecting their primary deployment location • A resource assessment or characterization of the primary deployment location that supports the rationale for the site's selection • Images that demonstrate the iterative design process the competitor undertook during the DEVELOP Phase • A list of lessons learned with concrete examples of design changes that have been or will be incorporated based on these results.	**Each Statement Scored on a 0–5 Scale** • The competitor has provided a sound and detailed explanation of the quantitative analysis of their concept, including any assumptions made. • The competitor has identified the primary blue economy application deployment location used in their quantitative analysis and described their reasoning for selecting this location. • The competitor has sufficiently demonstrated how specific lessons learned have been or will be incorporated into their design.

Early Design Document Scoring Criterion 3—System Performance	
Suggested Content Competitor Provides • A table with the energy resource availability, primary deployment location, and resource harvested • Supporting visualizations, drawings, or graphics that convey the complexity of the concept • A justification of the method of power generation, and an explanation of principles of operation • Identification of peak and average resource intensity measured at the primary deployment location, with units of measurement included	**Each Statement Scored on a 0–5 Scale** • The competitor justifies the method of power generation and has sufficiently explained its principles of operation. • The competitor has provided thoughtful information that provides a clear description of the concept's overall system performance. • The competitor has included supporting visualizations, drawings, or graphics that convey the complexity of the concept. • The competitor has described the expected power efficiency and life expectancy of the system, subsystem, or component.

• Identification of expected power efficiency and life expectancy of the system, subsystem, or component.	

Early Design Document Scoring Criterion 4—Testing and Validation Planning	
Suggested Content Competitor Provides • A description of follow-on work for the next 12 months post-prize, including prototyping, testing, and validation plans • A Gantt chart for the next 12 months post-prize showing a timeline for the follow-on work described • A description of anticipated technical risks or roadblocks the team may encounter during prototyping, testing, and validation, and suggested mitigation strategies • An estimated budget for the follow-on testing prototyping, testing, and validation work; if the budget does not align with the prize funds, an explanation should be given for how the work may be funded through other funding channels.	**Each Statement Scored on a 0–5 Scale** • The competitor has adequately described follow-on work for the next 12 months post-prize. • The competitor has identified a sound prototyping, testing, and validation plan. • The competitor has identified anticipated technical risks or roadblocks and suggested mitigation strategies. • The competitor has identified an estimated budget for follow-on prototyping, testing, and validation post-prize that accounts for any funding shortfalls.

4.3 How We Determine Winners and Make Awards

The Prize Administrator screens all completed submissions and ensures that the competitors are eligible. Then, the Prize Administrator, in consultation with DOE and NOAA, assigns subject matter expert reviewers to independently score the content of each submission. The reviewers will comprise federal and nonfederal subject matter experts with expertise in areas relevant to the competition. They will review the 3-minute video pitch and the technical narrative submissions according to the evaluation criteria.

4.3.1 Reviewer Panel Scoring

The scoring of submissions will proceed as follows:

- Subject matter expert reviewers will review each submission individually and assess the response from the competitor in relation to each scoring statement on the right-hand side of the tables.
- Reviewers will score each statement from 0 to 5—aside from those noted as a binary scoring statement—depending on the degree to which the reviewer agrees that the submission reflects the statement. This review scale is defined in Section 4.2.1.
- Each statement score will be added together to generate a total score for the submission, as described in Table 5, Section 4.2.1.

- The total scores from each reviewer will be averaged to produce a final score for the competitor.
- Scores for each submission element and/or individual criterion may also be used in evaluating submissions' merit.
- The reviewer comments will be compiled and evaluated.
- The Prize Administrator may consult with additional subject matter experts should the reviewer comments indicate a need for additional expertise.
- The Prize Administrator will compile all scores and comments and, upon reviewing all submissions, will make recommendations to the judge based on the scores, ranks, comments, and program policy factors, as outlined in this document.

4.3.2 Interviews

DOE may decide to interview a subset of competitors. The interviews would be held before the announcement of the winners and would serve to help clarify questions the reviewers may have. Participating in interviews is not required, and interviews are not an indication of a competitor's likelihood to win.

4.3.3 Final Determination

The director of DOE's Water Power Technologies Office is the final judge of the competition and will make award determinations. Final determination of the winners will be based on the reviewers' feedback and scores, application of program policy factors, and the interview findings (if applicable).

4.3.4 Announcement

After the prize closes, the Prize Administrator will notify winners and request the necessary information to distribute cash prizes. The Prize Administrator will then publicly announce winners.

See Appendix A for additional requirements. COMPETITORS THAT DO NOT COMPLY WITH THE ADDITIONAL REQUIREMENTS IN APPENDIX A MAY BE DISQUALIFIED.

Appendix A: Additional Terms and Conditions

A.1 Requirements

Your submission for the prize is subject to the following terms and conditions:

- You must post the final content of your submission or upload the submission form online by 5 p.m. ET on June 2, 2025, before the submission period closes. Late submissions or any other form of submission may be rejected.
- All submissions that you wish to protect from public disclosure must be marked according to the instructions in Section A.10 of this appendix. Unmarked or improperly marked submissions will be deemed to have been provided with unlimited rights and may be used in any manner and for any purpose whatsoever.
- You must include all the required elements in your submission. The Prize Administrator may disqualify your submission after an initial screening if you fail to provide all required submission elements. Competitors may be given an opportunity to rectify submission errors due to technical challenges.
- Your submission must be in English and in a format readable by Microsoft Word or Adobe PDF. Scanned hand-written submissions will be disqualified.
- Submissions will be disqualified if they contain any matter that, in the sole discretion of the U.S. Department of Energy or the National Renewable Energy Laboratory (NREL), is indecent, obscene, defamatory, libelous, and/or lacking in professionalism, or demonstrates a lack of respect for people or life on this planet.
- If you click "Accept" on the HeroX platform and proceed to register for any of the prizes described in this document, these rules will form a valid and binding agreement between you and DOE and are in addition to the existing HeroX Terms of Use for all purposes relating to these contests. You should print and keep a copy of these rules. These provisions only apply to the prize described here and no other prize on the HeroX platform or anywhere else.
- The Prize Administrator, when feasible, may give competitors an opportunity to fix non-substantive mistakes or errors in their submission packages.
- Winners are expected to cover any travel costs with prize funds.
- As part of your submission to this prize, you will be required to sign the following statement:

  I am providing this submission package as part of my participation in this prize. I understand that the information contained in this submission will be relied on by the federal government to determine whether to issue a prize to the named competitor. I certify under penalty of perjury that the named competitor meets the eligibility requirements for this prize competition and complies with all other rules contained in the Official Rules document. I further represent that the information contained in the submission is true and contains no misrepresentations. I understand false statements or misrepresentations to the federal government may result in civil and/or criminal penalties under 18 U.S.C. § 1001 and § 287, and 31 U.S.C. §§ 3729-3733 and 3801-3812.

A.2 Verification for Payments

The Prize Administrator will verify the identity and role of all competitors before distributing any prizes. Receiving a prize payment is contingent upon fulfilling all requirements contained herein. The Prize Administrator will notify winning competitors using provided email contact information for the individual or entity that was responsible for the submission. Each competitor will be required to sign and return to the

Prize Administrator, within 30 days of the date on the notice, a completed NREL Request for ACH Banking Information form and a completed W9 form (https://www.irs.gov/pub/irs-pdf/fw9.pdf). In the sole discretion of the Prize Administrator, a winning competitor will be disqualified from the competition and receive no prize funds if: (i) the person/entity does not respond to notifications; (ii) the person/entity fails to sign and return the required documentation within the required time period; (iii) the notification is returned as undeliverable; (iv) the submission or person/entity is disqualified for any other reason.

In the event of a dispute as to any registration, the authorized account holder of the email address used to register will be deemed to be the competitor. The "authorized account holder" is the natural person or legal entity assigned an email address by an Internet access provider, online service provider, or other organization responsible for assigning email addresses for the domain associated with the submitted address. All competitors may be required to show proof of being the authorized account holder.

A.3 Teams and Single-Entity Awards

The Prize Administrator will award a single dollar amount to the designated primary submitter, whether consisting of a single or multiple entities. The primary submitter is solely responsible for allocating any prize funds among its member competitors or teammates as they deem appropriate. The Prize Administrator will not arbitrate, intervene, advise on, or resolve any matters or disputes between team members or competitors.

A.4 Submission Rights

By making a submission and consenting to the rules of the contest, a competitor is granting to DOE, the Prize Administrator, and any other third parties supporting DOE in the contest, a license to display publicly and use the parts of the submission that are designated as “public” for government purposes. This license includes posting or linking to the public portions of the submission on the Prize Administrator or HeroX applications, including the contest website, DOE websites, and partner websites, and the inclusion of the submission in any other media worldwide. The submission may be viewed by DOE, Prize Administrator, and judges and reviewers for purposes of the contests, including but not limited to screening and evaluation purposes. The Prize Administrator and any third parties acting on their behalf will also have the right to publicize competitors’ names and, as applicable, the names of competitors’ team members and organization, which participated in the submission on the contest website indefinitely. By entering, the competitor represents and warrants that:

1. The competitor’s entire submission is an original work by the competitor and the competitor has not included third-party content (such as writing, text, graphics, artwork, logos, photographs, likeness of any third party, musical recordings, clips of videos, television programs, or motion pictures) in or in connection with the submission, unless (i) otherwise requested by the Prize Administrator and/or disclosed by the competitor in the submission, and (ii) competitor has either obtained the rights to use such third-party content or the content of the submission is considered in the public domain without any limitations on use.
2. Unless otherwise disclosed in the submission, the use thereof by Prize Administrator, or the exercise by Prize Administrator of any of the rights granted by competitor under these rules, does not and will not infringe or violate any rights of any third party or entity, including, without limitation, patent, copyright, trademark, trade secret, defamation, privacy, publicity, false light, misappropriation, intentional or negligent infliction of emotional distress, confidentiality, or any contractual or other rights.
3. All persons who were engaged by the competitor to work on the submission or who appear in the submission in any manner have:

a. Given the competitor their express written consent to submit the submission for exhibition and other exploitation in any manner and in any and all media, whether now existing or hereafter discovered, throughout the world;
b. Provided written permission to include their name, image, or pictures in or with the submission (or, if a minor who is not competitor's child, competitor must have the permission of the minor's parent or legal guardian) and the competitor may be asked by the Prize Administrator to provide permission in writing; and
c. Not been and are not currently under any union or guild agreement that results in any ongoing obligations resulting from the use, exhibition, or other exploitation of the submission.

A.5 Copyright

Each competitor represents and warrants that the competitor is the sole author and copyright owner of the submission; that the submission is an original work of the competitor or that the competitor has acquired sufficient rights to use and to authorize others, including DOE, to use the submission, as specified throughout the rules; that the submission does not infringe upon any copyright or any other third-party rights of which the competitor is aware; and that the submission is free of malware.

A.6 Contest Subject to Applicable Law

All contests are subject to all applicable federal laws and regulations. Participation constitutes each participant's full and unconditional agreement to these Official Rules and administrative decisions, which are final and binding in all matters related to the contest. This notice is not an obligation of funds; the final award is contingent upon the availability of appropriations.

A.7 Resolution of Disputes

DOE is solely responsible for administrative decisions, which are final and binding in all matters related to the contest. Neither DOE nor the Prize Administrator will arbitrate, intervene, advise on, or resolve any matters between team members or among competitors.

A.8 Publicity

The winners of these prizes (collectively, "winners") will be featured on DOE, NREL, and other DOE National Laboratory websites. Except where prohibited, participation in the contest constitutes each winner's consent to DOE's and its agents' use of each winner's name, likeness, photograph, voice, opinions, and/or hometown and state information for promotional purposes through any form of media worldwide, without further permission, payment, or consideration.

A.9 Liability

Upon registration, all participants agree to assume any and all risks of injury or loss in connection with or in any way arising from participation in this contest. Upon registration, except in the case of willful misconduct, all participants agree to and, thereby, do waive and release any and all claims or causes of action against the Federal Government and its officers, employees, and agents for any and all injury and damage of any nature whatsoever (whether existing or thereafter arising, whether direct, indirect, or

consequential, and whether foreseeable or not), arising from their participation in the contest, whether the claim or cause of action arises under contract or tort.

In accordance with the delegation of authority to run this contest delegated to the judge responsible for this prize, the judge has determined that no liability insurance naming DOE as an insured will be required of competitors to compete in this competition per 15 U.S.C. § 3719(i)(2). Competitors should assess the risks associated with their proposed activities and adequately insure themselves against possible losses.

A.10 Records Retention and Freedom of Information Act

All materials submitted to DOE as part of a submission become DOE records and are subject to the Freedom of Information Act. The following applies only to portions of the submission not designated as public information in the instructions for submission. If a submission includes trade secrets or information that is commercial or financial, or information that is confidential or privileged, it is furnished to the Government in confidence with the understanding that the information shall be used or disclosed only for evaluation of the application. Such information will be withheld from public disclosure to the extent permitted by law, including the Freedom of Information Act. Without assuming any liability for inadvertent disclosure, DOE will seek to limit disclosure of such information to its employees and to outside reviewers when necessary for review of the application or as otherwise authorized by law. This restriction does not limit the Government's right to use the information if it is obtained from another source.

Submissions containing confidential, proprietary, or privileged information must be marked as described below. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under the Freedom of Information Act or otherwise. The U.S. Government is not liable for the disclosure or use of unmarked information and may use or disclose such information for any purpose. The submission must be marked as follows and identify the specific pages containing trade secrets, confidential, proprietary, or privileged information: "Notice of Restriction on Disclosure and Use of Data: Pages [list applicable pages] of this document may contain trade secrets, confidential, proprietary, or privileged information that is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes. [End of Notice]"
The header and footer of every page that contains confidential, proprietary, or privileged information must be marked as follows: "Contains Trade Secrets, Confidential, Proprietary, or Privileged Information Exempt from Public Disclosure." In addition, each line or paragraph containing proprietary, privileged, or trade secret information must be clearly marked with double brackets.

Competitors will be notified of any Freedom of Information Act requests for their submissions in accordance with 29 C.F.R. § 70.26. Competitors may then have the opportunity to review materials and work with a Freedom of Information Act representative prior to the release of materials. DOE does intend to keep all submission materials private except for those materials designated as "will be made public."

A.11 Privacy

If you choose to provide HeroX with personal information by registering or completing the submission package through the contest website, you understand that such information will be transmitted to DOE and may be kept in a system of records. Such information will be used only to respond to you in matters regarding your submission and/or the contest unless you choose to receive updates or notifications about other contests or programs from DOE on an opt-in basis. DOE and NREL are not collecting any information for commercial marketing.

A.12 General Conditions

DOE reserves the right to cancel, suspend, and/or modify the contest, or any part of it, at any time. If any fraud, technical failure, or any other factor beyond DOE's reasonable control impairs the integrity or proper functioning of the contests, as determined by DOE in its sole discretion, DOE may cancel the contest. Any performance toward contest goals is conducted entirely at the risk of the competitor, and DOE shall not compensate any competitors for any activities performed in furtherance of this prize.

Although DOE may indicate that it will select up to several winners for each contest, DOE reserves the right to only select competitors that are likely to achieve the goals of the program. If, in DOE's determination, no competitors are likely to achieve the goals of the program, DOE will select no competitors to be winners and will award no prize money.

DOE may conduct a risk review, using Government resources, of the competitor and project personnel for potential risks of foreign interference. The outcomes of the risk review may result in the submission being eliminated from the prize competition. This risk review, and potential elimination, can occur at any time during the prize competition. An elimination based on a risk review is not appealable.

A.13 Program Policy Factors

While the scores of the expert reviewers will be carefully considered, it is the role of the prize judge to maximize the impact of prize funds. Some factors outside the control of competitors and beyond the independent expert reviewer scope of review may need to be considered to accomplish this goal. The following is a list of such factors. In addition to the reviewers' scores, the below program policy factors may be considered in determining winners:

- Geographic diversity and potential economic impact of projects.
- Whether the use of additional DOE funds and provided resources are non-duplicative and compatible with the stated goals of this program and the DOE mission generally.
- Whether application is not significantly different from applications previously submitted to other Powering the Blue Economy Prizes (e.g., the Ocean Observing Prize).
- The degree to which the submission exhibits technological or programmatic diversity when compared to the existing DOE project portfolio and other competitors.
- The degree to which the submission is likely to lead to increased employment and manufacturing in the United States or provide other economic benefits to U.S. taxpayers.
- The degree to which the submission will accelerate transformational technological, financial, or workforce advances in areas that industry by itself is not likely to undertake because of technical or financial uncertainty.
- The degree to which the submission supports complementary DOE-funded efforts or projects, which, when taken together, will best achieve the goals and objectives of DOE.
- The degree to which the submission expands DOE's funding to new competitors and recipients who have not been supported by DOE in the past.
- The degree to which the submission enables new and expanding market segments.

A.14 National Environmental Policy Act Compliance

This prize is subject to the National Environmental Policy Act (NEPA) (42 U.S.C. § 4321, et seq.). NEPA requires federal agencies to integrate environmental values into their decision-making processes by considering the potential environmental impacts of their proposed actions. For additional background on NEPA, please see DOE's NEPA website at http://nepa.energy.gov/.

While NEPA compliance is a federal agency responsibility and the ultimate decisions remain with the federal agency, all participants in the Energizing Rural Communities Prize will be required to assist in the timely and effective completion of the NEPA process in the manner most pertinent to their participation in the prize competition. Participants may be asked to provide DOE with additional information on the proposed activities such that DOE can conduct a meaningful evaluation of the potential environmental impacts.

A.15 Definitions

Prize Administrator means both the Alliance for Sustainable Energy operating in its capacity under the Management and Operating Contract for NREL and WPTO. When the Prize Administrator is referenced in this document, it refers to staff from NREL, PNNL, and WPTO. Ultimate decision-making authority regarding prize matters rests with the director of WPTO.

A.16 Return of Funds

As a condition of receiving a prize, competitors agree that if the prize was made based on fraudulent or inaccurate information provided by the competitor to DOE, DOE has the right to demand that any prize funds or the value of other non-cash prizes be returned to the government.

ALL DECISIONS BY DOE ARE FINAL AND BINDING IN ALL MATTERS RELATED TO THE PRIZE.

A.17 Eligibility and Competitors

Only winners of the CONCEPT Phase are eligible to participate in DEVELOP. The following criteria that applied to CONCEPT competitors still applies to DEVELOP competitors. Only submissions relevant to the technical areas laid out in Section 1 of this document will be considered. The Prize Administrator has the right to refuse any submission for incompleteness or unresponsiveness to the technical topic areas.

The competition is open only to individuals; private entities (for-profits and nonprofits); non-federal government entities such as states, counties, tribes, and municipalities; and academic institutions; subject to the following requirements:

- An individual prize competitor (who is not competing as a member of a group) must be a U.S. citizen or permanent resident.
- A group of individuals competing as one team may win, provided that the online account holder of the submission is a U.S. citizen or permanent resident. Individuals competing as part of a team may participate if they are legally authorized to work in the United States.
- Private entities must be incorporated in and maintain a primary place of business in the United States.
- Academic institutions must be based in the United States.
- DOE employees, employees of sponsoring organizations, members of their immediate families (e.g., spouses, children, siblings, or parents), and persons living in the same household as such persons, whether or not related, are not eligible to participate in the prize.
- Individuals who worked at DOE (federal employees or support service contractors) within six months prior to the submission deadline of any contest are not eligible to participate in any prize contests in this program.
- Federal entities and federal employees are not eligible to participate in any portion of the prize.

- DOE national laboratory employees cannot compete in the prize.
- Entities and individuals publicly banned from doing business with the U.S. government such as entities and individuals debarred, suspended, or otherwise excluded from or ineligible for participating in Federal programs are not eligible to compete.
- Entities identified in Department of Homeland Security (DHS) Binding Operational Directives (BOD) as publicly banned from doing business with the U.S. government are not eligible to compete. See https://cyber.dhs.gov/directives/.
- Entities and individuals identified as restricted parties on one or more screening lists of Department of Commerce, State or the Treasury are not eligible to compete. See Consolidated Screening List. https://2016.export.gov/ecr/eg_main_023148.asp.
- Individuals participating in a foreign government talent recruitment program[5] sponsored by a country of risk[6] and teams that include such individuals are not eligible to compete.
- Entities owned by, controlled by, or subject to the jurisdiction or direction of a government of a country of risk.
- To be eligible, an individual authorized to represent the competitor must agree to and sign the following statement upon registration with HeroX:

  I am providing this submission package as part of my participation in this prize. I understand that the information contained in this submission will be relied on by the federal government to determine whether to issue a prize to the named competitor. I certify under penalty of perjury that the named competitor meets the eligibility requirements for this prize competition and complies with all other rules contained in the Official Rules document. I further represent that the information contained in the submission is true and contains no misrepresentations. I understand false statements or misrepresentations to the federal government may result in civil and/or criminal penalties under 18 U.S.C. § 1001 and § 287, and 31 U.S.C. §§ 3729-3733 and 3801-3812.

In keeping with the goal of growing a community of innovators, competitors are encouraged to form multidisciplinary teams while developing their concept. The HeroX platform provides a space where parties interested in collaboration can post information about themselves and learn about others who are also interested in competing in this contest.

[5] Foreign Government-Sponsored Talent Recruitment Program is defined as an effort directly or indirectly organized, managed, or funded by a foreign government, or a foreign government instrumentality or entity, to recruit science and technology professionals or students (regardless of citizenship or national origin, or whether having a full-time or part-time position). Some foreign government-sponsored talent recruitment programs operate with the intent to import or otherwise acquire from abroad, sometimes through illicit means, proprietary technology or software, unpublished data and methods, and intellectual property to further the military modernization goals and/or economic goals of a foreign government. Many, but not all, programs aim to incentivize the targeted individual to relocate physically to the foreign state for the above purpose. Some programs allow for or encourage continued employment at United States research facilities or receipt of federal research funds while concurrently working at and/or receiving compensation from a foreign institution, and some direct participants not to disclose their participation to U.S. entities. Compensation could take many forms including cash, research funding, complimentary foreign travel, honorific titles, career advancement opportunities, promised future compensation, or other types of remuneration or consideration, including in-kind compensation.

[6] DOE has designated the following countries as foreign countries of risk: Iran, North Korea, Russia, and China. This list is subject to change.

Appendix B: The Blue Economy and Energy

Our oceans are a crucial asset—a precious habitat to millions of species, a vital carbon sink, and a key determinant of environmental and human health. The oceans also provide an essential source of food and act as an enabler of global trade—the blue economy. The World Bank defines the blue economy as "the sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystems."

Society's growing need for ocean-derived food, materials, energy, and knowledge is fueling growth in next-generation maritime or "blue" technologies. Industries such as ocean observation, for example, are moving further offshore to take advantage of and capture data across the vast scale of the ocean. This effort requires access to consistent, renewable power untethered to land-based power grids.

WPTO's Powering the Blue Economy initiative is a meaningful first step toward protecting, understanding, and leveraging the immense power and promise of the oceans to help us achieve our collective economic, social, and environmental goals. Collaboration and engagement are central to efforts supporting communities and marine life while sustainably providing power to the blue economy.

In 2017, WPTO began investigating the potential for blue economy activities to serve as markets for marine energy technologies. The potential markets were found to align with two themes:

1. Providing power at sea to support offshore industries, science, and security activities
2. Meeting the energy and water needs of coastal and rural island stakeholders in support of resilient coastal communities.

The Powering the Blue Economy report detailed possible energy solutions that could be applied to either of these two themes. Technologies that address these non-grid energy demands may prove to be economically viable opportunities in the near term for the marine energy industry. By pursuing such opportunities, a spillover effect is expected that leads to advances in marine energy technology readiness for more traditional utility-scale electrical grid markets and potentially other unforeseen opportunities.

With reliable and cost-effective renewable power at sea, we could realize a greater understanding of the world's oceans for sustainable and responsible use of ocean resources and better prediction and tracking of tropical storms; aquaculture could be better supported and poised for industry growth to ensure food security for coastal communities; and the ocean's role in climate change mitigation could be realized by using renewable energy to power carbon dioxide removal and account for the amount of carbon removed.

B.1 Blue Economy Applications

The Power at Sea Prize aims to support the development of concepts that could provide power at sea to either the applications defined in Table B-1 or other applications that could benefit from a source of renewable energy away from shore. Prize competitors must consider which applications could benefit from their marine energy concept as a part of their submission and identify how their solution will provide power to this application. The following table identifies applications in the blue economy, including the order of magnitude of their power needs:

Table B-1. Example At-Sea End Uses in the Blue Economy, Including the Order of Magnitude of Power Needs

	Estimated Power at Sea Device Power Usage (Order of Magnitude)				
	Milliwatts (mW)	Watts (W)	Kilowatts (kW)	Megawatts (MW)	Gigawatts (GW)
mCDR (including monitoring)	•	•	•	•	•
Ocean observation and navigation	•	•	•	•	
Marine aquaculture (including monitoring)	•	•	•	•	
Underwater vehicle charging		•	•		
Subsea communications		•	•	•	•
Mining seawater minerals and gasses			•	•	•
Data centers			•	•	•
Hydrogen electrolysis			•	•	•
Marine restoration			•	•	•
Pollution remediation			•	•	•
Offshore fuels production				•	•

B.2 The Challenge for Power at Sea

Significant scientific, engineering, and financial challenges exist for applications requiring power while at sea. Addressing these challenges, particularly concurrently, has the potential to unlock advances for a variety of applications, as described in Section 2.2. This prize seeks innovative solutions to one or more of the following key challenges to provide power at sea for one of those applications, and competitors will be required to identify the challenge their solution aims to solve as a part of their submission:

B.2.1 Challenge Areas

Competitors will be required to choose one challenge area to address from the following list of specific blue economy integration challenges (listed in alphabetical order) that can be addressed by the marine energy concepts submitted to this prize:

- **Access:** How does your marine energy solution help to reduce the high cost or limited opportunities for service, maintenance, and/or intervention for at-sea blue economy applications?
- **Deployment duration:** How does your marine energy solution improve the deployment duration of at-sea blue economy applications?
- **Energy storage:** How does your marine energy solution improve the capabilities and duty cycles currently limited by battery capacity, especially considering that batteries may account for most of the sensor volume and weight?

- **Environmental/ecological impact:** How does your marine energy solution minimize the negative effects of interactions with local flora and fauna at the deployment site?
- **Harsh operational conditions:** How does your marine energy solution minimize or otherwise address operations under challenging conditions like violent storms, strong currents, strong pressure (i.e., for subsea applications), corrosive media, and unwanted growth of marine organisms?
- **Hybridization with other renewable energy resources:** How does your hybrid solution utilize marine energy to address power gaps caused by intermittency of other non-marine renewable energy resources like solar and wind due to seasonality and changing weather patterns?
- **Suitability of power:** Sensors, instrumentation, and automation require specific power at specific times. How does your marine energy solution match power generation to power needs to maximize efficiency?