

**POWERING**  
the **BLUE ECONOMY™**

**Marine Energy  
Collegiate  
Competition**

U.S. DEPARTMENT OF ENERGY

# 2020 Rules & Requirements



## Preface

The U.S. Department of Energy Marine Energy Collegiate Competition: Powering the Blue Economy™ will be governed and adjudicated by this manual, which is intended to establish fair contest rules and requirements. In the case of a discrepancy with other competition materials or communication, this document takes precedence. The organizers reserve the right to change contest criteria, rules, and measurable outcomes as needed.

In addition, teams are encouraged to bring to our attention rules that are unclear, misguided, or in need of improvement. The organizers will seriously consider suggestions that are feasible and within our constraints and are intended to improve the competition, its rules, measurable outcomes, fairness, or precision.

# Table of Contents

<b>Revision History</b> .....	<b>1</b>
<b>1 Introduction</b> .....	<b>1</b>
1.1 Background .....	1
1.2 Purpose .....	2
1.3 Process .....	2
1.4 Roles and Responsibilities .....	3
1.5 Safety and Conduct .....	5
1.6 Dispute Resolution .....	6
<b>2 Competition, Contests, Products, and Awards</b> .....	<b>7</b>
<b>3 Overview of Products</b> .....	<b>8</b>
3.1 Products in Advance of Competition Event .....	8
3.2 Products at the Competition Event .....	8
<b>4 Written Report: Business Plan and Preliminary Design</b> .....	<b>9</b>
4.1 Cover Sheet .....	9
4.2 Executive Summary .....	9
4.3 Business Plan .....	10
4.4 Preliminary Technical Design .....	11
<b>5 Presentations: Business and Design</b> .....	<b>12</b>
5.1 Public Pitch .....	12
<b>Glossary</b> .....	<b>13</b>
<b>Appendix A. Timeline and Schedule</b> .....	<b>14</b>
Competition Timeline .....	14
Event Schedule .....	14
<b>Appendix B. Application Requirements</b> .....	<b>15</b>
<b>Appendix C. Rubrics</b> .....	<b>16</b>
Products .....	16
Written Report .....	16
Public Pitch .....	17
Poster and Model .....	17
<b>Appendix D. Communications and Business Operations</b> .....	<b>18</b>
External Communications .....	18
Internal Communications .....	18
Branding .....	18
Confidentiality and Intellectual Property .....	19
Judging and Scoring .....	19
Judging Rubrics .....	20
Team Feedback .....	20
<b>Appendix E. Product Submission Instructions</b> .....	<b>21</b>
Submission Locations .....	21
PDF Requirements .....	21
Audio Visual Presentation Requirements .....	21
Electronic File-Naming Instructions .....	21

## List of Tables

<b>Table 1. Roles and Responsibilities</b> .....	<b>3</b>
<b>Table 2. Contests and Products Overview</b> .....	<b>7</b>
<b>Table A-1. 2019–2020 Competition Timeline and Related Activities</b> .....	<b>14</b>
<b>Table C-1. Scoring Summary for the Competition Products (500 Points Total)</b> .....	<b>16</b>
<b>Table C-2. Scoring Rubric for the Written Report (250 Points Total)*, **</b> .....	<b>16</b>
<b>Table C-3. Scoring Rubric for the Public Pitch (125 Points Total)</b> .....	<b>17</b>
<b>Table C-4. Scoring Rubric for the Poster and Model (125 Points Total)</b> .....	<b>17</b>

# Revision History

This document is the first revision including an update to the application timeline, issued October 18, 2019.

## 1 Introduction

### 1.1 Background

According to the U.S. Department of Energy’s (DOE’s) *Powering the Blue Economy* report,<sup>1</sup> marine energy could provide significant near-term value as an enabler to advance the goals of other blue economy industries. Achieving the Water Power Technologies Office’s (WPTO’s) vision of predictable and affordable power from oceans and rivers will require people, port facilities, and testing R&D assets that leverage the knowledge and workforce associated with coastal industries. The term “blue economy” is gaining traction among government, industry, and nonprofit sectors as an organizing principle that captures the interplay between economic, social, and ecological sustainability of the ocean. Interest in the blue economy spans multiple U.S. agencies, institutions, and businesses and is part of a global network of initiatives.<sup>2</sup> This interest is fueling investment in next-generation maritime or “blue” technologies—autonomous vehicles to further ocean exploration, deeper-water offshore aquaculture, battery and fuel cell technology for marine transportation, desalination and water treatment to serve coastal and island communities, and increasingly, offshore renewable energy and alternative fuels, such as biofuels derived from marine algae and hydrogen from seawater. Given the numerous and tremendous values of the oceans, the ability for marine renewable energy technologies to contribute to the blue economy in a sustainable manner has important implications for a wide range of potential economic, societal, and environmental benefits.

To help facilitate this process, DOE and the National Renewable Energy Laboratory (NREL) are launching the Marine Energy Collegiate Competition: Powering the Blue Economy™ in 2020 (hereafter referred to as the Marine Energy Collegiate Competition or the competition). The competition directly aligns with DOE’s overall goals:

- Energy affordability
- Energy technology integration
- Energy storage.

Marine energy has the potential to provide reliable power to the blue economy, but we must continue to work to reduce costs. Specifically, the competition’s objectives are to bring together diverse groups of students from multiple disciplines to explore opportunities for marine energy technologies to benefit other existing maritime industries via real-world concept development experiences. Although few institutions offer marine-specific advanced degrees, having related experience is highly valuable for future prospects within a wide range of blue economy

---

<sup>1</sup> <https://www.energy.gov/eere/water/downloads/powering-blue-economy-report>

<sup>2</sup> For more information, please see *The Economist Intelligent Unit’s* “The blue economy” 2015 report: [https://www.woi.economist.com/content/uploads/2018/04/m1\\_EIU\\_The-Blue-Economy\\_2015.pdf](https://www.woi.economist.com/content/uploads/2018/04/m1_EIU_The-Blue-Economy_2015.pdf)

opportunities. Jobs across the blue economy include opportunities for researchers, scientists, engineers, educators, project managers, business and sales forces, and many others.

## 1.2 Purpose

The objective of the competition is to provide students with real-world experience in the marine energy industry and promote workforce development by identifying the most promising near-term markets for marine energy to serve the blue economy, and design an appropriate marine energy device to serve any market application that could have commercial value within the next five years.

The competition aims to support multidisciplinary undergraduate and/or graduate student-led teams, leveraging business expertise in combination with technical skills to build cases for how marine energy can serve the blue economy. The competition will culminate in a written submission and a pitch of teams' market assessment and preliminary technology design at the International Conference on Ocean Energy (ICOE) 2020 event in Washington, D.C., on May 19–20, 2020.<sup>3</sup>

## 1.3 Process

Competitors will identify a promising market within the blue economy (either a market identified in the WPTO *Powering the Blue Economy* report or another feasible market within the blue economy) and identify within that market the best marine energy application to address. Competitors will then evaluate the performance requirements for end users in that application by identifying those end users and talking with a minimum number of them. Teams will then complete a preliminary design of a marine energy-powered device to serve those end users. All the selected teams will be invited to the ICOE 2020 to pitch their assessments and solutions to the marine energy industry.

Specifically, participants will need to create:

- A 15–25 page market research-supported business plan and conceptual-level technical design of a marketable device powering any marine energy sector of the blue economy
- A 15-minute public pitch that will be presented during the competition event at the ICOE 2020
- A nonworking, yet visually representative, table-top scale model of the technology concept to be displayed at ICOE 2020, along with a poster summarizing the entire technical and business plan.

**Examples of the types of applications within selected *Powering the Blue Economy*<sup>™</sup> markets (teams are not limited to the applications listed here):**

*Desalination Market Applications*

- Disaster relief systems
- Large-scale desalination systems

---

<sup>3</sup> <https://www.icoe-conference.com/>

- Remote community systems

*Aquaculture Applications*

- Far offshore energy applications
- Sensors

*Ocean Observation Applications*

- Scientific observations
- Oil and gas monitoring
- Weather buoys.

## 1.4 Roles and Responsibilities

Table 1 shows the competition roles, the individuals assigned to each role, and what each role entails.

**Table 1. Roles and Responsibilities**

Role	Individual(s) Assigned	Definition
Collegiate Team	Multiple	Collegiate team members carry out work on the project within the rules and requirements of the competition, based on direction and advice from their fellow team members, Student Leader(s), and Faculty Advisor(s)/Technical Monitor. Teams may consist of any combination of undergraduate students and graduate students, but some undergraduate participation is required. Expected team size is 4–6 participants, but there is no limit to the number of participants per team. However, the number of students that teams may bring to the competition may be limited based on space requirements. Interdisciplinary teams are highly encouraged in the following areas of study: engineering, business, marketing, communications, policy, and social sciences. International institutions are welcome to apply, but no more than 25% of the final teams selected to participate will be led by an international institution. International teams will not be eligible to receive support funding from DOE/NREL and must provide their own support.

<b>Role</b>	<b>Individual(s) Assigned</b>	<b>Definition</b>
<b>Collegiate Team Faculty Advisor(s) (and Technical Monitor for the purposes of funding support)</b>	One per team	Serves as the lead faculty member and primary representative of a participating institution in the competition. This person also provides guidance to the team throughout the project and ensures that the Student Leader disseminates information received from the competition organizers. The Faculty Advisor advises and provides input and coaches the students on the skills necessary to compete in the various aspects of the competition. Some teams may specify multiple Faculty Co-Advisors who contribute to the team, but only one person should be identified as the Technical Monitor for contractual purposes.
<b>Collegiate Team Student Leader(s)</b>	Maximum of two per team	Attends informational sessions with the Faculty Advisor, represents the team when communicating with competition organizers, and disseminates information received from the competition organizers over the course of the entire project, including monitoring communications.
<b>Collegiate Team Co-Advisors(s) or Supporting Faculty</b>	Multiple	Supports the Faculty Advisor and Student Leader(s) in the above duties but typically does not directly engage with DOE/NREL competition staff.
<b>Competition Managers</b>	Allison Johnson, DOE Hoyt Battey, DOE	Represents DOE and has final decision-making authority in all aspects of the competition.
<b>Competition Operations Manager</b>	Arielle Cardinal, NREL	Leads correspondence with the collegiate teams regarding contracts, contest questions, and team expectations. During the competition, the Operations Manager is the primary point of contact for questions related to engagement with the judges, logistics, and protocol. Tasks include developing team schedules and coordinating/collating scores and team feedback from the contests in time for the awards ceremony; and supporting the collegiate teams, judges, Competition Managers, and Head Rules Official. Reports to the Competition Managers.
<b>Rules Panel</b>	See definition	Rules panel members, a subset of the competition organizers and/or contest judges, are solely authorized to interpret the rules. If there is any doubt or ambiguity as to the wording or intent of these rules, the decision of the rules panel shall prevail.
<b>Head Rules Official</b>	Elise DeGeorge, NREL	The Head Rules Official and chair of the rules panel. The only official authorized to write and modify the



Role	Individual(s) Assigned	Definition
		rules. This individual reports to the Competition Managers.
<b>Communications and Outreach Point of Contact</b>	Jenny Wiegele, NREL	Coordinates all aspects of media representation, website management, publications, signage, and outreach.
<b>Core Competition Staff</b>	Nathan Tom, NREL Caitlyn Clark, NREL Jeremy Stefek, NREL Alex Lemke, NREL	Performs all duties to ensure a safe, effectively communicated, and fair competition. The Competition Staff, including the Competition Managers and Operations Manager, will work to ensure a seamless event.
<b>Contest Judges</b>	To be announced prior to the competition.	Conduct and evaluate each individual contest at the competition.

### 1.5 Safety and Conduct

The competition is a forum for students with an interest in marine energy and related blue economy industries to showcase innovative ideas and develop and demonstrate knowledge. The event is designed to be safe, fair, and competitive, as well as a fun learning experience and a professional growth opportunity. Participants are expected to conduct themselves in the spirit of the competition by being team players both within their own teams and among competitor teams.

Each team is responsible for all necessary supplies and display components as well as for any damage to or loss of such items. Shipping information will be provided before the competition event.

There will be electrical outlets available in the bull pen area to allow students to access computers and other equipment that the teams deem necessary.

As part of the culture of DOE and NREL, renewable energy and sustainability go hand in hand—a common public perception as well. As a result, the competition is about renewable marine energy, and we expect that participants will embrace and showcase sustainability where possible during all aspects of the event (e.g., reducing waste in packaging for shipping, reusing packaging materials that were used in transporting items to the competition, and eliminating the use of nonrecyclable materials, such as foam packing peanuts). In addition, we encourage team members to engage in common sustainable activities, such as recycling paper and beverage containers. Team creativity to support this mission is encouraged.

## 1.6 Dispute Resolution

Disputes are a serious matter and will be treated as such. Disputes must:

- Be submitted to the Competition Operations Manager by the collegiate team Faculty Advisor
- Be submitted via email and be accompanied by an in-person notification of the email at the event
- Include a clear description of the action being protested, referencing the appropriate section of this rules document.

Once submitted, the Competition Operations Manager will meet with the Head Rules Official and initiate an internal review of the dispute. Disputes will be discussed among at least three judges and/or competition organizers who will gather appropriate information through interviews or other means and a final ruling will be issued. If it is concluded that the issue has a broader impact on the entire competition, the Head Rules Official will consult with all necessary members of the DOE/NREL organizing team to determine next steps.

If the Head Rules Official makes a decision that may directly or indirectly affect the strategies of some or all of the teams, the decision will be recorded in the “Decisions on the Rules” section of the Slack User Group channel (discussed further in Appendix D) within 24 hours. If the dispute is being handled during the competition event, an announcement at the next major address to teams (e.g., opening or closing remarks for the day, lunch) may be substituted for the Slack post.

In all cases, the Head Rules Official has the final say in all disputes.

## 2 Competition, Contests, Products, and Awards

The competition consists of all the aspects and activities leading up to, during, and following the event at ICOE 2020. It includes the subcontract project agreement between the competitively selected collegiate teams and NREL, as well as the contests, products, and event.

At the event, teams compete through their live concept pitch. Products (Table 2) receive points toward winning competition contests. An overview of which product contributes to the scoring of each of the contests is presented in Table 2. How many points a product contributes to the overall score is covered in Appendix C.

**Table 2. Contests and Products Overview**

<b>Products</b>				
<b>Competition Contests</b>	<b>Written Report</b>	<b>Public Pitch</b>	<b>Poster and Model</b>	<b>On-Site Activity TBD</b>
<b>Business Plan</b>	✓	✓	✓	
<b>Preliminary Technical Design</b>	✓	✓	✓	
<b>Bonus Challenge</b>				✓

This manual is arranged by product. Products include a single written report, one public pitch (PowerPoint and any other visual materials the team would like to use), and a poster and model.

While teams work on these products, Faculty Advisors and other partner companies/organizations secured by each team for support can provide feedback about the team’s plans or products so the students can identify flaws, improve technical rigor, or demonstrate certification of concept. However, only student team members may take an active role in any competition event or the production of the materials used in the competition.

Awards will be provided for, but not necessarily limited to, the following:

- Overall Winner: The team that earns the highest combined score.
- Second Place Winner: The team that earns the second highest combined score.
- Third Place Winner: The team that earns the third highest combined score.
- People’s Choice Award: The team that receives the most public support during the event, as measured via social platforms.<sup>4</sup>
- Individual Category Winners (Plan, Pitch, and Poster/Model) will be recognized as well.

---

<sup>4</sup> Specific details regarding the People’s Choice Award will be announced prior to the competition.

## 3 Overview of Products

This section gives an overview of when products should be delivered. Refer to each product section and the appendices for specific deadlines, format requirements, and submission instructions. Information on scoring and penalties can be found in Appendix C.

### 3.1 Products in Advance of Competition Event

Teams must submit a high-level summary of their concept by January 31, 2020, to allow the competition staff to select judges with the appropriate expertise. The written report must be completed and submitted two weeks prior to the competition (by May 3, 2020) so that the judges can review the submission prior to arriving on-site. See Section 4 for deadline information. See Appendix E for information on submission.

### 3.2 Products at the Competition Event

Teams must bring their:

- Public pitch presentation and other accompanying materials
- Poster and model
- Collegiate spirit and collegiate promotional materials (swag).

## 4 Written Report: Business Plan and Preliminary Design

Each team must compile a single written report covering the business plan and technical design that is due by May 3, 2020, by 11:59 p.m. Mountain Daylight Time.

The following format requirements apply to the written report:

- Length must not exceed 25 pages (including the cover and appendices); pages submitted beyond this limit will not be reviewed.
- Pages should be 8.5 x 11 inches, paginated, single-sided, and with 1-inch margins at a minimum.
- Content should be at a minimum single spaced.
- The body of the report must use at a minimum an 11-point font.
- Captions for figures and tables must be numbered for easy navigation.
- The final document must be packaged into a single, bookmarked PDF file (see Appendix E).

Each individual section as outlined below should—where relevant—reference other sections. The written report is the primary means for a team to provide detailed information about its project to the judges, given that the judges have a limited opportunity at the competition event to evaluate the preliminary design and hear about how the market research-supported business plan shaped the design. Cohesiveness of the report sections will be evaluated in the final score. At a minimum, the report must include the following sections:

- Cover sheet
- Executive summary
- Business plan with market assessment
- Preliminary technical design.

Scoring criteria for the written report is provided in Appendix C, Table C-2. At the conclusion of the competition, team reports will be posted to the competition website for reference during future events.

### 4.1 Cover Sheet

Teams should begin the report with a one-page cover sheet that includes their affiliation and contact information. Indicate the team roles/hierarchy and approximately how many students, faculty, and others (e.g., sponsors, volunteers, or family members) are involved in the project.

### 4.2 Executive Summary

The executive summary discusses components from all sections of the report and includes a short description of the team project (approximately 300 words). The information in the executive summary is important to many communications-related aspects of the competition and should:

- Provide essential content for the organizers to use while developing various event materials (e.g., the website, event program, media kit, and signage).
- Prepare teams to answer questions from visitors at the competition event.
- Help organizers and teams respond effectively to media inquiries.

The executive summary must not exceed two pages (including figures). It is recommended to write this section last to best capture the distinct and unique factors of the written report.

### 4.3 Business Plan

The business plan section of the written report should be readable, concise, and interesting. It is understood that this a new market and technology area and not all concepts will appear feasible after completing the business plan. Competitors must assume that the market could be addressed in under five years and have real actionable needs. Concepts will be judged mostly on whether teams completed a thorough market analysis and considered the potential shortfalls. At a minimum, it must include the following:

- **Concept Overview:** This section should include information about the concept, such as business model and vision, and a concise overview of the concept's value proposition (e.g., financial, social, and/or environmental).
- **Global Market Opportunity:** This section should characterize the overall market opportunity and explain how the concept will capture a portion of the relevant market. At a minimum, a definition of the problem or market gap should be included, along with an assessment of the specific market, market opportunity forecast, and potential solutions/competition analyses. It is critical that each team perform substantial market analysis that contains direct outreach to market stakeholders. Some specific questions this section may seek to answer include:
  - What specific market needs does the product meet and what segments will the product compete in? How does the team's particular concept meet the needs and desires of the indicated target market?
  - How will a price for the concept be determined? How will the value proposition from the customers' perspective be considered? How is the pricing of the competition factored into the concept's pricing? How do state, federal, or other incentives come into play?
- **Relevant Stakeholders:** This section should identify relevant stakeholders and end users. In addition, outreach and engagement should be conducted to understand the needs of the end users. This could include interviews, research, or surveys. The end result should be an identification of the power needs and any other technology considerations that can help to inform the design of a marine energy powered system.
- **Development and Operations:** This section should describe the development of the concept and associated activities. Preliminary designs that are presented within the technical design section of the written report should be referenced. Some specific questions this section may seek to answer include:

- How will research and development be accomplished? What are the considerations in the manufacturing and deployment process? What partnerships could be leveraged? What are the significant risks and what is the approach to managing them?
- Are there technical constraints to implementation? Teams should also include technical, social, and environmental impacts and/or opportunities here.
- Discuss maintenance intervals and how this concept is compared to one or more differing power sources (such as a diesel generator or cable-to-shore).
- **Financial and Benefits Analysis:** This section should outline the financial potential of the concept (including ancillary benefits), noting required capital, financing, and key assumptions (e.g., marginal costs, rate at which team wishes to scale up [or if they wish to scale up] their concept). Particularly important are expected operating expenses and associated assumptions (e.g. maintenance schedule, expected time to failure). Full pro formas (though required in traditional business plans) are not required here; however, it is recommended that higher-level, longer-term summaries be used in the business plan narrative to communicate the attractiveness of the concept for investment.

#### 4.4 Preliminary Technical Design

The preliminary technical design section of the written report explains the proposed system/concept from an engineering perspective. Teams should provide detail that is adequate for a preliminary review of the baseline and operating properties of the proposed system. At a minimum, the following topics should be included:

- A description of the design objective and how the design components support this objective, including the power production component, the load and related power needs, and any associated storage.
- A first-order performance analysis that contains the power conversion capture efficiency with an attempt toward optimization across available resource and converter efficiency. A time-domain analysis is not required, although detailed model development is encouraged, to quantify converter efficiency and power production per sea state. A constant converter power conversion efficiency can be used if adequate and appropriate technical or original equipment manufacturer specifications are cited to justify operational assumptions. This analysis can include other supplementary power sources in addition to marine energy, if applicable. It should include justification that the proposed power conversion technology is both cost-competitive at the location of the proposed market(s) and has a cost-optimal ratio of conversion capacity versus battery storage.
- An analysis of the expected forcing and power requirement and the profile of the load across time (and associated safety factors within the design, where applicable).
- Demonstration that proposed technology is designed to withstand standard operating forces and moments.
- A description of how the technical design addresses needs identified in the market analysis.
- Engineering diagrams with at least a basic mechanical drawing of all components.

## 5 Presentations: Business and Design

### 5.1 Public Pitch

In addition to the written report, each team will make a presentation on the market assessment, technology innovations being pursued, and business model of their project to a panel of judges, participating as mock project investors, via a live presentation on the ICOE 2020 convention floor. This public pitch challenges teams to convince the panel of experts of the technical underpinnings, business case, and feasibility of commercialization of their system. The presentation should focus on the business plan, including the conceptual-level design parameters of the team's device. Teams should be prepared to discuss the extent of their market analysis and validation in their presentation to defend their concept.

Presentations are limited to 15 minutes, followed by up to 15 minutes for questions from the panel of judges. A number of advance questions will also be provided to all teams one week in advance of their pitches, based on national laboratory review of their written reports. When pitching their marine energy project to prospective investors, teams should use their presentation to showcase maximum creativity and salesmanship, highlighting the team strengths and unique approach. Such an approach will naturally involve a professional appearance and manner. Presenters should highlight their concept prototype and may use high-quality posters, maps, charts, or other visual aids and props to enhance their PowerPoint-based presentation. A laptop computer will be provided for digital presentations.

The public pitch deliverable comprises a slideshow with optional additional digital material packaged into a single zipped file (see Appendix E). These materials should be submitted on a USB flash drive to the event organizers during check-in along with any drivers needed to support presentation animation. USB drives should be clearly marked with the team, Faculty Advisor, and Student Lead(s) name. Competition officials will make an effort to return the USB devices at the end of the competition, but this is not guaranteed.

The scoring criteria is provided in Appendix C, Table C-3. Penalties for late submission are also detailed in Appendix C.



## Glossary

Bull pen	Each team is provided an assigned area, known as a bull pen, to use as a central location throughout the competition to practice their presentation, regroup, and showcase their hard work throughout the year to the public.
Competition	The competition is all aspects and activities leading up to, through, and following the event. It is the subcontract project agreement between the competitively selected collegiate teams and NREL; and it is the contests, products, and event, collectively referred to for a given year as the U.S. Department of Energy Marine Energy Collegiate Competition: Powering the Blue Economy™.
Event	The event is when and where the teams compete in the business pitch and presentation of their posters and models. This will take place at the ICOE 2020 conference in Washington, D.C. on May 19–20, 2020.
Products	Products are what the team builds, writes, submits, and brings to compete in the competition. These include a written report, public pitch, and poster and model.

## Appendix A. Timeline and Schedule

### Competition Timeline

The 2019–2020 competition timeline is shown in Table A-1.

**Table A-1. 2019–2020 Competition Timeline and Related Activities**

Month/Year	Competition Activity
August 2019	Release of competition rules and requirements
<b><u>November 1, 2019</u></b>	<b><u>Applications to participate are due</u></b>
November 15, 2019	Selection notification
November 2019–May 2020	Concept development
<b><u>January 31, 2020</u></b>	<b><u>High-level concept summary due</u></b>
<b><u>May 3, 2020</u></b>	<b><u>Written business plans due</u></b>
May 17–18, 2020	Dry run presentations (optional)
<b><u>May 19–20, 2020</u></b>	<b><u>Competition takes place at ICOE 2020 in Washington, D.C.</u></b>
July 2020	A review meeting/conference call is held to review the competition and make recommendations for a possible next event.

### Event Schedule

The event schedule is currently evolving, but teams will be required to participate in the following:

- Live business pitches
- Poster and model presentation session
- Announcement of winners (with additional live pitch of the winning team to be made at an ICOE 2020 conference session).

An optional onsite bonus challenge will also be held during the conference. Interested teams can sign up during the conference.

## Appendix B. Application Requirements

Interested teams must submit an application to participate in the competition to the competition's email address ([Water.Competition@nrel.gov](mailto:Water.Competition@nrel.gov)) by October 18, 2019 by 11:59 p.m. Mountain Daylight Time. Teams will not be eligible to compete if an application is not submitted by the deadline. Applications will be reviewed and judged by national laboratory researchers using the following criteria:

- Educational Objective and Integration (25%)
- Organization and Project Planning (25%)
- Team Configuration and Inclusivity (15%)
- Budget Management and Institutional Support (20%)
- Communication and Outreach (15%).

More application details and a template for the application can be found on the [competition website](#).

# Appendix C. Rubrics

## Products

**Table C-1. Scoring Summary for the Competition Products (500 Points Total)**

Competition Contests	Total Scores	Products		
		Written Report (250)	Public Pitch (125)	Poster and Model (125)
Business Plan	275	150	75	50
Preliminary Technical Design	225	100	50	75

## Written Report

**Table C-2. Scoring Rubric for the Written Report (250 Points Total)\*, \*\***

Description	Possible Points	Score
<b>Business Plan (150 points)</b>		
Market deployment feasibility (marketability, buildability, public/market acceptance, identification of stakeholders and end users, cost competitiveness in comparison to other energy sources)	60	
Risk recognition and management (e.g., recognition of failure maintenance, operational expenses, and so on)	35	
Innovation, creativity, and originality and presentation (i.e., how well the plan is presented in writing)	15	
Number of end-user interviews/surveys and quality of inputs received	20	
Financial analysis and documentation	20	
Subtotal	150	
<b>Preliminary Technical Design (100 points)</b>		
Design objective description	15	
First-order performance analysis	15	
Mechanical and electrical loads analysis and associated safety factors	15	
Optimization of system (e.g., power/storage capacity to overcome resource intermittency issues)	15	
Engineering diagrams, including mechanical and electrical drawings	20	
Incorporation of environmental and sustainability factors	10	
Incorporation of user needs as part of the design system	10	
Subtotal	100	
Total	250	

\* 5% of total allowable points, distributed evenly across each contest section, will be deducted for each day the report is late.

\*\*Formatting requirements are in place to ensure an equal amount of space for all teams to tell their stories to the judges. Reports not formatted to the requirements in Section 4 that are deemed to be utilizing more than the allotted space will be penalized at the discretion of the judges proportional to the infraction. Furthermore, extra pages will be ignored.

## Public Pitch

**Table C-3. Scoring Rubric for the Public Pitch (125 Points Total)**

Description	Possible Points	Score
Compelling narrative of inspiration and purpose behind the business plan	40	
Demonstrates thorough market analysis and triple bottom line risk assessment	35	
Demonstrates consideration of risks, issues, and challenges along with design assumptions	20	
Practiced and polished presentation style, professional appearance and manner, clear communication of technical topics to broader energy community	15	
High-quality graphics, media, and props to support presentation	15	
	Total	

## Poster and Model

**Table C-4. Scoring Rubric for the Poster and Model (125 Points Total)**

Description	Possible Points	Score
Poster and model are visually appealing	25	
The concept is clearly understood	50	
Important elements of business plan and preliminary technical design are represented on poster	50	
	Total	

# Appendix D. Communications and Business Operations

## External Communications

The [website](#) will showcase the various elements of the competition, ongoing collegiate team engagement, and information about how to participate in future competitions. The website will also feature important documents such as this manual and the Marine Energy Collegiate Competition application template.

## Internal Communications

It is each team's responsibility to stay abreast of the latest competition communications from the organizers. Communication between the teams and the organizers occurs via one or more of the following:

- **Slack User Group:** Official communications suitable for viewing by all team members and organizers will be posted on the Slack User Group channel. Instructions for joining the Slack User Group will be provided by NREL to the teams following each team's commitment to participate.
- **Dropbox:** This tool is used by the organizers and teams to transfer large files such as competition products. Notification of, or requests for, file transfers are made via the Slack User Group or email.
- **Conference calls:** Teams are strongly encouraged to participate in scheduled conference calls with the organizers. Invitations and instructions for participation in conference calls are provided by the Competition Operations Manager via email until the Slack User Group has been established; then provided via the Slack User Group thereafter.
- **Meetings during event:** Meetings will be held each day competition events are scheduled during the conference.
- **Email:** The official email address for the competition is [Water.Competition@nrel.gov](mailto:Water.Competition@nrel.gov); questions should be sent directly to this email address and answers will be posted on the Slack User Group. For expediency, and to protect confidentiality, the organizers may choose to communicate with teams via team members' email addresses as listed in the Slack User Group database; however, most official communications occur via the Slack User Group channel.

## Branding

Teams are encouraged to develop an online presence and branding platform for their team to showcase their work throughout the year. This platform may include web pages, social media, outreach material, and team T-shirts. Regular updates and engagement with school and external media are recommended, and efforts will be shared by NREL and DOE channels as allowed. Teams must receive permission in order to use the competition logo or name as part of individual school/team branding and platform; requests should be sent to [Water.Competition@nrel.gov](mailto:Water.Competition@nrel.gov).

Teams are expected to set up a professional space in their bull pens to highlight the team's branding. This can include the concept design, posters, team logo, and school information. The

bull pens are the teams' chance to showcase all the work they have put into their project over the course of the year and the best way to communicate their efforts to the industry, especially at a final industry networking event such as ICOE 2020.

Teams will be expected to utilize their established platform for outreach during the competition. Although branding and platform will not be included in the overall scoring, the team that can garner the most public support via social platforms will be honored with a People's Choice Award.

## Confidentiality and Intellectual Property

There are portions of the competition that are decidedly open to the public for purposes of generating interest and providing general information. In addition, team members should keep in mind that various media outlets may be present during the competition. Any information made known and/or discussed should be expected to receive widespread and uncontrolled dissemination. Teams should consider in advance what level of information regarding all aspects of their concept they desire to have publicly available versus information that provides a competitive advantage, is critical to their performance in the competition, or is of a "proprietary" nature and essential to potential future business endeavors.

Team members agree to the use of their names, likenesses, content, graphics, and photos in any communication materials issued by the organizers and event sponsors.

Content and images (graphics and photos) as well as any publications in which the content and images appear may be viewed and made available to the general public via the websites of DOE, NREL, and event sponsors with unrestricted use.

The organizers and event sponsors will make all reasonable efforts to credit the sources of content and images, although they may be published without. To ensure proper usage of and credit for images, teams should submit photos and graphics through the competition Dropbox.

## Judging and Scoring

A panel of judges is responsible for scoring team performance in each contest (e.g., preliminary technical design, business plan, and so on). The judges will have detailed expertise related to the content they are responsible for evaluating. The panel will include diverse backgrounds that allow the judges to evaluate performance from a variety of angles.

Competition organizers will ensure that, to the extent possible, judges will not:

- Have personal or financial interests in, or be an employee, officer, director, or agent of any entity that is a registered participant in the competition.
- Have a familial or financial relationship with an individual who is a registered participant.
- Provide advice to teams, although they can provide clarification on the judging process.
- Discuss team performance with other teams or their advisors.

Names of the selected judges will be announced prior to the Marine Energy Collegiate Competition.

### ***Judging Rubrics***

Judges will use detailed scoring rubrics to evaluate team performance in each of the categories. These rubrics give all participants a clear idea of what they will be evaluated on in each contest.

Products submitted prior to the event will be thoroughly reviewed and evaluated by the judges. Each judge will complete a rubric independently after the team's presentation or based on the review of submitted products. At the completion of each event segment, judges will discuss each team's performance before finalizing the rubrics. The team of judges will submit one unified rubric to the Head Rules Official for scoring purposes.

### ***Team Feedback***

In an effort to provide as much feedback as possible, teams will receive copies of the scored rubrics, which will be provided following completion of the competition. Teams will also receive a short narrative that is derived from the judges' deliberations after each team's presentation. Teams will also receive copies of notes judges may have written on the individual rubric forms.



## Appendix E. Product Submission Instructions

Submittals are considered on time if they are received by the Competition Managers by the respective due date stated in this document.

All products must be saved in the formats indicated (see each product section) and submitted to organizers packaged as a single .zip file.

### Submission Locations

Products due ahead of competition must be delivered to the competition Dropbox (a link will be provided in the Slack User Group channel). A folder for each team will be created, and it will be the team's responsibility to provide email addresses for each student that needs upload access to the account.

Teams can submit early copies and updated revisions until the deadline. Each folder will be closed, or "unshared," after the submission deadline. If a report is submitted after the deadline, 5% of total allowable points, distributed evenly across each contest section, will be deducted for each day the report is late.

### PDF Requirements

PDFs must meet the following criteria:

- Embedded fonts
- A minimum resolution of 300 dpi on all images.

Points to remember:

- Creating a PDF from scans, or by outputting the content into a raster image format (e.g., .jpg, .tiff, .png, or .gif) and then creating a PDF from the images is not acceptable.
- All-raster PDFs are large files at 300 dpi but are of unacceptable quality at lower resolutions and are not scalable without degradation. These types of PDFs should be avoided.

### Audio Visual Presentation Requirements

Audio visual presentation format requirements include the following:

- If used, videos should be of a .MOV or H.264 compressed.MP4 (MPEG-4) file type with a resolution of 720 x 480.
- Presentations should be of 16:9 aspect ratio.
- No background music that violates U.S. copyright laws; all incorporated music must be an original or royalty-free composition and proof of licensing must be submitted with the final file and transcript.

### Electronic File-Naming Instructions

The required file-naming convention for all electronic files is:

**[TEAM ABBREVIATION]\_[PRODUCT ABBREVIATION]\_[SUBMISSION DATE  
(YYYY-MM-DD)].[EXTENSION]**