



U.S. Department of Energy Collegiate Wind Competition

Spring 2023

National Renewable Energy Laboratory
Collegiate Wind Competition Organizing Team

Welcome

The purpose of this webinar is to share information about the [U.S. Department of Energy \(DOE\) Collegiate Wind Competition \(CWC\)](#) for those interested in applying to the 2024 competition.

Agenda

1. About the Collegiate Wind Competition
2. How to Apply and Review of Criteria
3. Prize Funding
4. Timeline for the 2024 Competition
5. Commitment, Resources, and Expectations
6. Q&A

About the Collegiate Wind Competition

The CWC is unlike any other undergraduate-level competition of its kind – it is the only competition focused exclusively on wind energy.

The CWC helps college students prepare for jobs in the wind and renewable energy workforce through real-world wind energy technology, project development, finance, communications, and outreach experience.

By participating in the competition, schools and students connect with wind energy experts and industry contacts, enhancing schools' curriculum offerings and strengthening students' professional networks.



Photo by Vern Slocum, NREL

About the Collegiate Wind Competition (Continued)

Interdisciplinary Collaboration

- The wind energy industry is not one-dimensional; the competition shouldn't be either.
- The CWC cultivates creative thinking and problem solving to formulate novel solutions. This requires teams comprised of diverse backgrounds.
- The CWC helps students see the comprehensive picture, not just one standalone piece of the puzzle.

Hands-On Work

- The CWC is a good platform for science, technology, engineering, and mathematics (STEM) education.
- The CWC is a learning experience that cannot be replicated in the classroom alone.

Real-World Experience

- This is highly sought after by hiring managers.
- This is the best preparation for a successful career.

Industry Interaction

- The CWC introduces the next-generation workforce to the wind energy industry.
- The CWC shows students the diverse opportunities in wind energy.
- The CWC supports the industry in locating highly qualified candidates.
- The CWC fosters information sharing between industry and academia for mutual benefit.

K–12 Partnerships

- One's own learning deepens when one invests in another's learning.
- The CWC provides role models to younger students and inspires them to pursue pathways to wind energy careers.

Testimonials From Students, Faculty, and Partners

“I loved the team-building aspect of our team. I came away from the experience being good friends with people I never would have met otherwise. I also got to learn a lot about leadership since I was the lead for our siting and business subteam.”

“Opportunities like CWC [the U.S. Department of Energy Collegiate Wind Competition] have allowed many of us to land our dream jobs. I am excited to see how the wind industry can be transformed in the coming years and the impact it can have on the energy industry!”

“...the networking, interactions, and experience of it all is really not comparable to anything the students can get in a classroom.”

“My personal measure of success emphasizes the learning experience of our students. From that perspective it was a great success, as the students from our institution were uniformly engaged and gained an experience that is impossible to replicate in a traditional classroom setting.”

“If it wasn't for this competition, our undergraduate programs wouldn't have such meaningful projects to work on related to wind energy.”

“This competition...has been my favorite part of my undergraduate experience and something I will reference for the rest of my career in developing me as an engineer.”



Photos by Vern Slocum, NREL

Why? Expanded Need for Workers in Wind Energy

Recent studies suggest that wind energy could supply 20% of the nation's electricity needs by 2030 and 35% by 2035. We need a highly qualified workforce to meet growing needs.

American Clean Power Association and DOE research demonstrates the need for trained workers to support expanded industry growth with great career potential for:

- Basic and skilled trades
- Applied and field scientists
- Power system engineers
- Design, research and field engineers
- Project managers, marketing, finance and business professionals
- Wind technicians
- Educators.

Research shows:

- Wind industry workers can earn high-paying salaries while working in an area that aligns with environmental and climate priorities
- The wind energy industry includes a wide range of careers requiring varying levels of education with many positions requiring at least a bachelor's degree
- Hands-on wind experience is of high importance to employers
- There is a need to focus on undergraduate programs, internships, and activities that offer cross-sector experience and knowledge in wind energy
- The industry most often uses online hiring websites, internship opportunities, and educational institutions to hire their workforces.

The 2024 Collegiate Wind Competition Theme and Contests

The theme for the 2024 CWC is offshore wind energy and requires participants to compete simultaneously in four contests:

- **Turbine Prototype Contest:** Design, build, and present a unique, wind-driven power system based on market research.
- **Turbine Testing Contest:** Test the wind turbine in a competition wind tunnel at the final event.
- **Project Development Contest:** Research wind resource data, transmission infrastructure, and environmental factors to create a site plan and financial analysis for a hypothetical wind farm.
- **Connection Creation Contest:** Partner with wind industry professionals, raise awareness of wind energy in your local community, and work with local media to promote your team's accomplishments.



Photo by Dennis Schroeder, NREL

More about the contests will be shared in August 2023.

The Collegiate Wind Competition's History

2014 Inaugural Competition	AWEA WINDPOWER – Las Vegas, Nevada <ul style="list-style-type: none">• Teams designed and built a lightweight, transportable wind turbine to power small electronic devices.• The 2014 CWC featured a contest a contest focused on wind deployment issues and challenges along with a business plan contest.
2015 Engineering Contest	National Wind Technology Center – Golden, Colorado <ul style="list-style-type: none">• The 2015 CWC emphasized analytical modeling and validation together with electronics and turbine control skills.
2016 Full Competition	AWEA WINDPOWER – New Orleans, Louisiana <ul style="list-style-type: none">• Teams focused on the design and construction of a wind-driven power system that can supply electricity to non-grid-connected device(s) with a load system that visually indicated the power being generated.• This competition also included a deployment contest.
2017 Technical Challenge	National Wind Technology Center – Golden, Colorado <ul style="list-style-type: none">• The 2017 CWC introduced yaw to the turbine testing contest and piloted a siting contest as a bonus challenge.
2018 Full Competition	AWEA WINDPOWER – Chicago, Illinois <ul style="list-style-type: none">• Teams researched and designed a turbine for a grid scenario with a high contribution of renewables and that could operate in an islanded mode.• The 2018 CWC included a siting contest and business plan contest.
2019 Technical Challenge	National Wind Technology Center – Golden, Colorado <ul style="list-style-type: none">• The 2019 CWC focused on turbine design and testing along, as well as wind energy project siting and development.

The Collegiate Wind Competition's History (Continued)

2020 Full Competition	First Virtual Competition – Online <ul style="list-style-type: none">• Teams presented their designs for a turbine to function in a high-wind environment.• This competition included the Turbine Design and Project Development contests.• The CWC organizers removed turbine build and test elements from the competition.
2021 Full Competition	Second Virtual Competition – Online <ul style="list-style-type: none">• Teams presented their designs for a turbine to function in a high-wind environment.• Included the Turbine Design and Project Development Contests, as well as the new Connection Creation Contest.• The CWC organizers included the build and test elements as optional activities.• Included two learn-along teams.
2022 Full Competition	American Clean Power Association CLEANPOWER Conference & Exhibition – San Antonio, Texas <ul style="list-style-type: none">• Teams designed, built and tested a fixed-bottom offshore wind turbine using a tank underneath a wind tunnel.• This competition featured Turbine Prototype, Turbine Testing, Project Development, and Connection Creation contests.• The 2022 CWC included four learn-along teams.
2023 Full Competition	University of Colorado Boulder – Boulder, Colorado <ul style="list-style-type: none">• Teams will design, build, and test a fixed-bottom offshore wind turbine using a tank underneath a wind tunnel.• This competition features Turbine Prototype, Turbine Testing, Project Development, and Connection Creation contests.• The 2023 CWC includes seven learn-along teams.

Why This Application Process Is Different

Historically, the CWC organizers released a request for proposals each fall semester inviting interested teams to apply. Selected teams would be announced in February or March of that same school year.

For the 2023 CWC, to broaden the reach and impact of the CWC, they moved to a [new application process](#) to make the competition more accessible to schools that have not participated in the past.

This new process also rewards the students who show the most dedication and success in the first half of the academic year.

For the 2024 CWC, organizers are strengthening the application process by moving over to the American-Made Challenges platform.

Who Can Apply?

To be an eligible application submission:

- Applications can be submitted by one student, multiple students, and/or a faculty advisor.
- Teams do not have to be fully formed to submit an application. Faculty can still submit the application if students and team leads have not been identified, and students can apply if they have not yet identified a faculty advisor.
- In either case, in their application, the students should describe how they intend to recruit their faculty advisor, and faculty should describe how they intend to recruit students.
- Teams must be led by undergraduate students from a single 4-year college or university in the United States. This lead institution may partner with:
 - A 2-year institution in the United States, such as a community college
 - Another 4-year institution in the United States
 - An international institution.

Application Questions

Applicants must provide their:

- Lead university name.
- Partner university name (if applicable).
- Faculty advisor(s) name, email(s), and title(s)/department(s).
 - If a faculty advisor(s) has not yet been identified, how will you seek to get the mentorship you need to be successful?
- Student lead(s) name(s) and email(s).
 - If a student lead has not yet been identified, how will you identify the team lead(s)?

Introduction (10%)

Teams should provide a brief introduction of their team, why they are interested in participating in this competition, and their commitment to engage in the CWC educational opportunities (e.g., educational webinars and networking opportunities). Teams should also describe:

- How the team will gain the faculty and departmental support across the institution (e.g., engineering, finance, economics) if representative faculty are not part of this initial submission.
- How the team will recruit student team leads from both the business and engineering schools if representative students from those departments are not part of this initial submission.

The application document is limited to **1,500 words maximum**. Applications for the 2024 CWC must be submitted as a PDF document to www.herox.com/collegiate-wind-competition

Application Questions (Continued)

Educational Objectives and Integration (25%)

Teams should explain:

- How the competition would be integrated into the team's academic experiences (e.g., courses that integrate competition elements or other programs that otherwise support competition-related work, scholarships, independent-study projects, or research assistantships designed to support successful student participation in the competition).
- Alternatively, the plan to cultivate knowledge through other means (e.g., remote learning, industry partnerships, informal independent-study projects, industry mentorships, and clubs).

Organization and Project Planning (25%)

Teams should describe:

- How the team will execute elements of the competition, including how unique obstacles, such as academic calendars or virtual collaboration challenges, will be overcome (if applicable, noting previous participation in similar competitions).
- How the team will be supported by faculty and staff to ensure that students can be successful in achieving the competition objectives (e.g., listing faculty, staff, and other mentors and how they will advise students throughout the competition).

Application Questions (Continued Again)

Team Diversity and Inclusivity (25%)

Teams should describe efforts to ensure that the team makeup will be consistent with DOE's and the National Renewable Energy Laboratory's efforts to cultivate a wind energy workforce comprising diverse backgrounds, skill sets, and educational training. For example, the team should describe how:

- The team has created ambitious yet achievable diversity, equity, and inclusion objectives that will be incorporated into the competition and are applicable across multiple academic disciplines. These objectives should include specific, measurable, assignable, realistic, and time-related (often called SMART) submissions supported by metrics to measure the success of the proposed actions.
- The team has a clear plan to measure the success of the proposed diversity, equity, and inclusivity objectives.
- The team is likely to be successful in achieving the objectives they have defined, engaging team members of diverse or unique backgrounds.

Institutional Support and Fundraising (15%)

Prize funds may not cover the full expenses of this project or participation for all students. Teams should:

- Describe what level of funding they expect their team will need and how the team plans to cover any funding deficit they will need to compete in the full competition.
- Describe what the team will do with the initial Phase 1 funding.
- Describe any additional resources (e.g., software, educational materials, and project planning tools) the team anticipates needing as part of the competition that the organizers may be able to provide.

Prize Funding

Competitors will have a chance to win prizes at each phase (there are three phases), for a total prize pool of up to \$280,000, including:

- Phase 1: Initial Team Selection with up to \$2,000 provided to each team from a total cash prize pool of up to \$70,000. Selection criteria was described on previous slides.
- Phase 2: Competitor Selection with up to \$15,000 provided to each team from a total cash prize pool of up to \$180,000. This phase:
 - Is the chance for students to demonstrate their skill sets in achieving competition objectives. Submissions, structured as written reports, have been designed to evaluate how likely the team is to be successful in competing in the rest of the competition.
 - Teams will complete submissions during the fall semester for three of the four contests (Turbine Prototype, Turbine Testing, Project Development, and Connection Creation). The CWC organizers will use those submissions to determine the 12 teams that will earn a cash prize and compete in Phase 3 during the spring 2024 semester.
 - Details on submission requirements, how the submissions will be evaluated, and when they are due will be included in a separate Phase 2–3 rules document.

Grand Prizes

- Phase 3: Grand Prize with up to \$30,000 prize pool for winners in a variety of categories. This phase:
 - Includes multiple submissions for each of the four contests. The final submissions will be evaluated at a final event, which includes the chance to present to industry experts, test the model turbines in the competition wind tunnels, network with industry professionals, and get a preview into what the wind energy industry looks like.
 - Teams will compete throughout the spring semester for a chance to win a portion of the prize pool.

Awards will include but not necessarily be limited to:

- A first-place winner
- A second-place winner
- A third-place winner
- A Turbine Prototype Contest winner
- A Turbine Testing Contest winner
- A Project Development Contest winner
- A Connection Creation Contest winner.

The Application Period Will Follow This Timeline

- **May 1, 2023:** The CWC organizers released the new application process.
- **By June 15, 2023:** by 4:59 p.m. MT, all interested teams should submit an application to compete in the 2023–2024 academic year.
- **July 2023:** The CWC organizers will select Phase 1 teams and alert teams.
- **July/August 2023:** The CWC organizers will supply additional information about Phases 2 and 3 of the competition.
- **Date To Be Determined:** Participating teams are awarded project funds in the 2023–2024 academic year.

Commitment From Organizers

The CWC organizers will:

- Host full service collegiate competition at American Clean Power Association's CLEANPOWER Conference & Exhibition or a similar venue
- Ensure fair and unbiased competition environment with expert judging
- Provide wind energy educational opportunities
- Provide inclusion in alumni group
- Provide opportunities to engage with the wind industry professionals
- Provide opportunities to engage with K–12 STEM education efforts.



Photo by Vern Slocum, NREL

Available Resources

Additional resources for teams include:

- Industry partnerships that can offer software and technical assistance
- Connections to seasoned faculty advisors
- A curated list from the CWC organizers, including:
 - Previous design reports
 - Intro to project development video
 - Wind energy basics video.

Expectations From Teams

Teams will be expected to:

- Compete in the competition in a professional and collegial atmosphere
- Develop and submit contest products throughout the year
- Bring wind energy education into the classroom
- Further seed funding through fundraising
- Spread the CWC message through outreach and local impact
- Take advantage of educational opportunities provided
- Participate in All Team calls.



Photos by Vern Slocum, NREL

How to Submit Questions

Submit questions to collegiate.wind@nrel.gov

Important Links and Tips

- Applications for the 2024 CWC must be submitted onto HeroX by 4:59 p.m. MT on **June 15, 2023.**
- [2024 Phase 1 Rules and Requirements](#) and [past competitions](#) are important to reference to get a better understanding of what the competition entails.
- To see reports from previous years, go to [Past Competitions](#), then click on the year you want to view.
- It is never too early to start looking for potential team mentors and sponsors!

Learn more at energy.gov/CWC.

Thank you for joining us today for this informational webinar!

We will post the webinar recording and transcripts on energy.gov/CWC and share them with all registrants.