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Prizes Sustain NREL Water Power Innovation

The National Renewable Energy Laboratory (NREL) administers several prizes designed to encourage and support innovation that could help the water power industry grow and improve. Funded and hosted by the U.S. Department of Energy's (DOE's) Water Power Technologies Office (WPTO), these competitions run throughout the year and tap into a diverse community of contributors who leverage prize money to craft and build solutions for targeted challenges.

Prizes empower a variety of innovators to tackle the challenges of climate change, incentivize rapid prototype development, spur the transition to a sustainable and equitable clean energy economy, and propel the creation of new, energy-related jobs and opportunities. By administering and advising these prizes, NREL supports the water power industry, advances clean energy, and inspires the next generation of scientists, engineers, and entrepreneurs. These opportunities encourage novel innovation and collaboration among disciplines, private companies, academia, and federal agencies. NREL is pivotal to the success of these competitions by providing competitors with comprehensive expertise as well as administrative support, which includes organizing mentorship, trainings, and industry connections for participants. All competitors receive ongoing incentives to continue working on their products, ultimately aiding in the advancement of hydropower and marine renewable energy.

NREL administered and managed several DOE American-Made prizes in Fiscal Year (FY) 2022, which contribute to a number of DOE initiatives and administration goals. NREL's contributions to the success of these prizes included preparing and disseminating communications materials to and between competitors, partners, supporting institutions, sponsors, and the public. Over the past year, this involved consultation on rules documents; updating websites; coordinating support and sponsorship; overseeing webinars and events (both virtual and in-person) with safety and logistics management; providing testing facilities and research expertise; and producing videos, news articles, social media promotion materials, and media coverage of the prizes' goals, schedules, teams, and winners.

AMERICAN MADE WATER PRIZE

U.S. DEPARTMENT OF ENERGY

Marine Energy Prizes

Two of the prizes NREL administered in FY 2022 supported the Powering the Blue Economy™ initiative and incentivized advancements in marine energy: the Ocean Observing Prize, and the Waves to Water Prize.

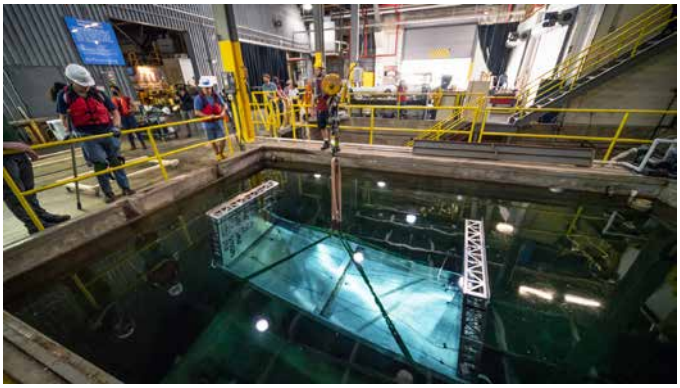
The Waves to Water Prize celebrated its DRINK Finale, marking the conclusion of the prize. The Ocean Observing Prize will continue into FY 2023, and NREL will continue to work with DOE, competitors, sponsors, and partners on this competition and future marine energy prizes.

Ocean Observing Prize

Oceans cover 71% of the planet, but more than 80% of those waters remain unexplored, partly because powering ocean observing devices at sea is challenging. The Powering the Blue Economy: Ocean Observing Prize is helping change that by asking innovators to unite marine energy-powered systems with ocean observing technologies. These innovations can revolutionize our ability to collect the data needed to understand, map, and monitor the ocean.

Prize teams have spent the last three years reimagining ways to power everything from weather buoys to uncrewed underwater vehicles. Ocean Observing Prize competitors are working to develop prototypes that have the potential to harness energy from waves to power their ocean observing systems, researching new ways to study the largest bodies of water on our planet, especially to forecast hurricanes.

Marine-energy-powered devices could eventually lengthen deployments at sea to provide more coverage, collecting higher-resolution data that forecasters can use to more accurately predict hurricane intensity and paths. With climate disasters costing the United States about $148.4 billion annually, these early-stage devices have the potential to save both lives and money.



In FY 2022, competitors successfully completed the BUILD Contest, the second contest in the DEVELOP Competition. Three winners shared a cash prize pool of $500,000.

In FY 2023, the Ocean Observing Prize will invite BUILD Contest winners to compete in the SPLASH-C Contest. The final contest aims to provide a pathway for continued technology development and focuses on direct laboratory mentorship for competitors, a customized testing campaign through the Testing Expertise and Access for Marine Energy Research (TEAMER) program, and a final cash prize for competitors that successfully leverage that mentorship and complete their testing.

Waves to Water Prize

In FY 2022, NREL celebrated the finale of the Waves to Water Prize—a competition designed to accelerate the development of small, modular, wave-energy-powered desalination systems. The Waves to Water Prize enabled teams to design and build systems that have the potential to address coastal resiliency challenges, like providing clean water in disaster and recovery scenarios and in water-scarce coastal and island locations. The prize awarded a total of $1 million to the four teams that competed in the DRINK Stage and represents the first time DOE and NREL supported a competition to develop and test devices that can turn ocean water into drinking water using the natural energy in the ocean itself.

This multidisciplinary project also opened new pathways for NREL. By way of the prize, NREL was able to design, build, and test the hydraulic and electric reverse osmosis (HERO) wave energy converter (WEC) device. Both the HERO WEC and prize competitors' devices emphasized early-stage marine energy research and development while producing some of the first wave-powered desalination prototypes to ever be deployed. These novel prototypes illustrated concrete opportunities for future marine energy desalination research, like flexible and resilient mooring systems to anchor devices in place.

Additionally, the Waves to Water project presented new possibilities for NREL partnerships, proving why expertise from partners like East Carolina University's Coastal Studies Institute is so crucial to early-stage research and development. Beginning with this prize, NREL can now engage external organizations through the sponsorship mechanism—providing industry connections, mentorship, direct cash, and additional support to marine energy entrepreneurs. The prize also reimagined educational outreach efforts. NREL team members helped develop a marine energy-focused comic book to teach the next generation of researchers about wave power.

Hydropower Prizes

Over the last three years, NREL has administered four prizes to incentivize advancements in hydropower: the Groundbreaking Hydro Prize, the I AM Hydro Prize, the Fish Protection Prize, and the FAST Commissioning for Pumped Storage Hydropower Prize. Each aimed to address different challenges and areas of interest for hydropower research and growth. In addition to documenting the progress of both the Fish Protection and FAST Prize winners in FY 2022, NREL launched a new prize that addresses another challenge in the hydropower sector: hydropower's ability to support grid reliability and resilience.

NREL opened and administered the Hydropower Operations Optimization (H2Os) Prize, which supports WPTO's Hydropower and Water Innovation for a Resilient Electricity System (HydroWIRES) Initiative by focusing on hydropower's complementary role as an integrator of variable renewables, like wind and solar, and best leveraging hydropower's benefits for planning daily grid operations.

Hydropower Operations Optimization (H2Os) Prize

As the United States works to decarbonize the power grid by 2035, hydropower's evolving role will be crucial to improving the grid's reliability, resilience, and overall performance. Hydropower technologies are versatile and dependable and can be dispatched quickly. However, grid operators often limit existing hydropower resources based on conservative estimates of hydropower availability and water management practices. To help address these challenges, WPTO and NREL launched the Hydropower Operations Optimization (H2Os) Prize.

The three-stage, $75,000 prize challenges innovators to upgrade well-established hydropower technologies using twenty-first century solutions. Prize competitors are applying modeling, data analytics, and machine learning to create new ways for hydropower systems to plan daily grid operations and meet water management needs, such as water supply, environmental flow requirements, and flood management. Through the H2Os Prize, competing teams are leveraging hydropower's benefits to improve the nation's energy infrastructure, helping it become more flexible, sustainable, and modern—ultimately developing unique solutions that better position hydropower to enable a 100% renewable energy grid.

In FY 2022, NREL administered the first and second phases of the prize and launched Phase Three. The prize awarded eight Phase One winners from a $10,000 prize pool, and six Phase Two winners from a $15,000 prize pool.

Cross-Cutting Prizes

Inclusive Energy Innovation Prize

The Inclusive Energy Innovation Prize fosters grassroots innovation, community-centric networks, and ground-up solutions to accelerate climate and clean energy technology advancement within disadvantaged communities. Launched by DOE's Office of Energy Efficiency and Renewable Energy and the Office of Economic Impact and Diversity in FY 2021, the prize centers on climate and environmental justice as part of the transition to a net-zero-carbon economy by 2050. DOE's community-centric competition awards organizations that advance the Justice40 Initiative by identifying activities related to climate and clean energy that support, build trust, and strengthen relationships and partnerships with disadvantaged communities.

In FY 2022, the NREL-administered prize announced the Phase One winners and awarded $3.6 million to these 18 organizations working to enable and enhance business and technology incubation, acceleration, workforce development, and other community- and university-based entrepreneurship and innovation in climate and clean energy technologies. With more than 200 applications, this prize has attracted the most applicants and followers of any EERE prize to date. Of those submissions, 85% were first-time applicants, and 54% of applications were submitted by businesses owned by women, minorities, or disadvantaged persons.

Over the next year, the 18 teams will participate in Phase Two of the competition, implementing their proposed programs and related activities. Phase Two of the Inclusive Energy Innovation Prize is anticipated to close in May 2023. Up to six teams will receive awards from a prize pool of $1.5 million based on their performance in this second phase.

More information

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