



EnergyTech UP

FISCAL YEAR 2023 ANNUAL REPORT



OTT Office of Technology Transitions



Greetings,

The U.S. Department of Energy (DOE) Office of Technology Transitions (OTT) hosted its second year of the EnergyTech University Prize (EnergyTech UP) program in 2023 with growing success. This annual report presents the program's latest data and successes through 2023.

EnergyTech UP introduces collegiate students to commercialization best practices and empowers them to develop a business plan for a clean energy technology from their university or one of DOE's National Laboratories. Throughout the program, students work alongside industry and DOE experts to conduct market research and all students have the opportunity to pitch their ideas to an audience and panel of judges at one of 15 regional Explore Events. Select teams move on to the National Pitch Event for a chance to win cash prizes.

In 2023, OTT awarded \$345,000 in prizes to 23 exceptional student teams. Over 600 students from 124 collegiate institutions participated in the 2023 program. Following the 15 regional Explore Events, 16 teams moved on to compete at the National Pitch Event at Zpryme's Energy Thought Summit in Austin, Texas. Additionally, four bonus prize winners chose to attend and present their solutions to audience members. This was the first ever in-person competition event for EnergyTech UP, and the excitement from all of the student teams was palpable!

The array of innovative ideas was inspiring, and OTT ultimately awarded three national winners at the National Pitch Event. The first-place team, Team Heliotrope from New York University, was awarded \$50,000 for their business plan to produce efficiency-boosting coatings that increase solar panel efficiency by 10-15%.

The EnergyTech UP program is foundational to OTT's portfolio of offerings. It fosters vital skill-building in the next generation to set them up for success in tackling complex climate challenges.

Dr. Vanessa Z. Chan

Chief Commercialization Officer
U.S. Department of Energy Director
Office of Technology Transitions

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About the EnergyTech University Prize (EnergyTech UP)

EnergyTech UP Overview

The [Office of Technology Transitions](#) (OTT) [EnergyTech University Prize](#) (EnergyTech UP), launched in 2021, seeks to attract the talented students of today and help them develop into the engineers, policymakers, entrepreneurs, market analysts, and project developers of tomorrow. Commercialization and business skills are critical to the success of all clean energy solutions, and EnergyTech UP fosters that skillset in our next generation of experts.

EnergyTech UP is a U.S. Department of Energy (DOE) Office of Technology Transitions (OTT) program that is administered by the National Renewable Energy Lab and is part of the American Made Challenges (American-Made) portfolio. American-Made hosts a suite of DOE prizes.

In this program, multidisciplinary collegiate student teams develop and present a business plan that leverages DOE National Laboratory-developed or other high-potential energy technologies, including university-developed technologies or other technologies of interest. The student teams gain experience in viewing new technologies through a market-viability lens, learning how to conduct market research, and developing and presenting a business pitch. EnergyTech UP awards cash prizes to select teams that successfully identify an energy technology, assess its market potential, and propose a strategy for commercialization. In addition to OTT, various other technology offices within DOE contribute funds to bonus prize awards.

EnergyTech UP aims to build a foundation of next generation innovators that are trained in commercialization and familiar with the clean energy technology industry. The goals of the program are to:

- Build engagement between colleges, universities, the DOE, National Labs, and industry.
- Inspire students on the possibilities for leveraging energy technologies.
- Increase commercialization of energy technologies.
- Help launch careers.

Funding

OTT commits a portion of its annual funding to operate this program in support of its mission to advance the commercialization of energy technologies developed by DOE National Labs. Additionally, recognition of the need to host a collegiate business plan competition was included in funding designations made as part of the CHIPS Act. Additional funding for bonus prizes, intended to incentivize additional participation and increase sector-specific impacts, is provided by individual program offices across the Department of Energy. Those offices tailor their prize focus to align with their office's goals and priorities. As a result, 2023 prize pool totaled \$345,000.

2023 Program

EnergyTech UP 2023 marked the second year of the program and was launched in May 2022 and concluded in April 2023. The competition was structured as three phases that provided student teams with industry connections, mentorship, and commercialization exposure.



Figure 1: The FY23 EnergyTech UP program was divided into three phases

The program offered students a total of \$370,000 in cash prizes. Teams first competed at the regional level for a share of \$45,000. Then, the top teams moved on and competed for a share of \$100,000 in prizes funded by OTT. In addition, eight DOE program offices offered up to \$25,000 each in bonus prizes for the best teams in their respective fields. The program also included the first ever OTT-funded National Lab Intellectual Property (IP) Licensing Bonus Prize to further incentivize and support teams who developed a business plan for a National Laboratory-developed technology.

Explore Phase

After the January 2023 submission deadline, 184 participating teams from 124 collegiate institutions were [announced](#) on Feb. 9, 2023. These teams comprised 635 student participants, a 22% increase from the 2022 inaugural program.

To promote maximum engagement across the country, the prize administrators divided applicants into 15 geographic regions. Each region held their own regional Explore Event, a virtual pitch event for all competing students, organized by an industry partner known as a “regional convener.” Regional conveners provided local connections, trusted outreach, and relevant judges for events. The 17 organizations, ranging from universities to incubators, supported the program as [regional conveners, listed here](#).

2023 EnergyTech UP Regional Explore Events Hosted

Date	Event
Feb 15, 2023	Southeast Texas Regional Explore Event hosted by the Rice Alliance for Technology and Entrepreneurship
Feb 15, 2023	Mountain West Regional Explore Event hosted by WY Ranch
Feb 16, 2023	Mid-Atlantic Regional Explore Event hosted by the Wilton E. Scott Institute for Energy Innovation at Carnegie Mellon University
Feb. 16, 2023	Northeast Regional Explore Event hosted by Cleantech Open Northeast, NECEC
Feb. 17, 2023	New York City Metro Area Regional Explore Event hosted by the Syracuse Center of Excellence and NYSERDA
Feb. 22, 2023	South Atlantic Regional Explore Event hosted by Research Triangle Cleantech Cluster
Feb. 23, 2023	Coastal Northwest Regional Explore Event hosted by the University of Washington Buerk Center for Entrepreneurship
Feb. 23, 2023	Great Lakes Regional Explore Event hosted by Evergreen Climate Innovations
Feb. 23, 2023	Southwest Regional Explore Event hosted by the University of Arizona Center for Innovation
Feb. 23, 2023	Southeast Regional Explore Event hosted by the University of Kentucky
Feb. 23, 2023	Southern California Regional Explore Event hosted by CleanTech San Diego/UC San Diego
Feb. 24, 2023	Northern Plains Regional Explore Event hosted by Grid Catalyst
Feb. 27, 2023	National Capital Region Regional Explore Event hosted by NREL
Feb. 28, 2023	Florida and Alabama Regional Explore Event hosted by Florida High Tech Corridor

At each Explore Event, up to 15 student teams pitched a 7-minute presentation to describe their initial idea and business plan for their chosen technology. A panel of industry judges evaluated the teams' presentations.

One overall Regional Winner was chosen at each event, as well as one Bonus Prize Finalist per technology area. Staff within each DOE program office then reviewed all finalists in their respective technology areas and selected one Bonus Prize Winner per category. Each Bonus Prize Winner was awarded \$25,000 and was invited to participate in the National Pitch Event, though they were ineligible for the national prize pool.

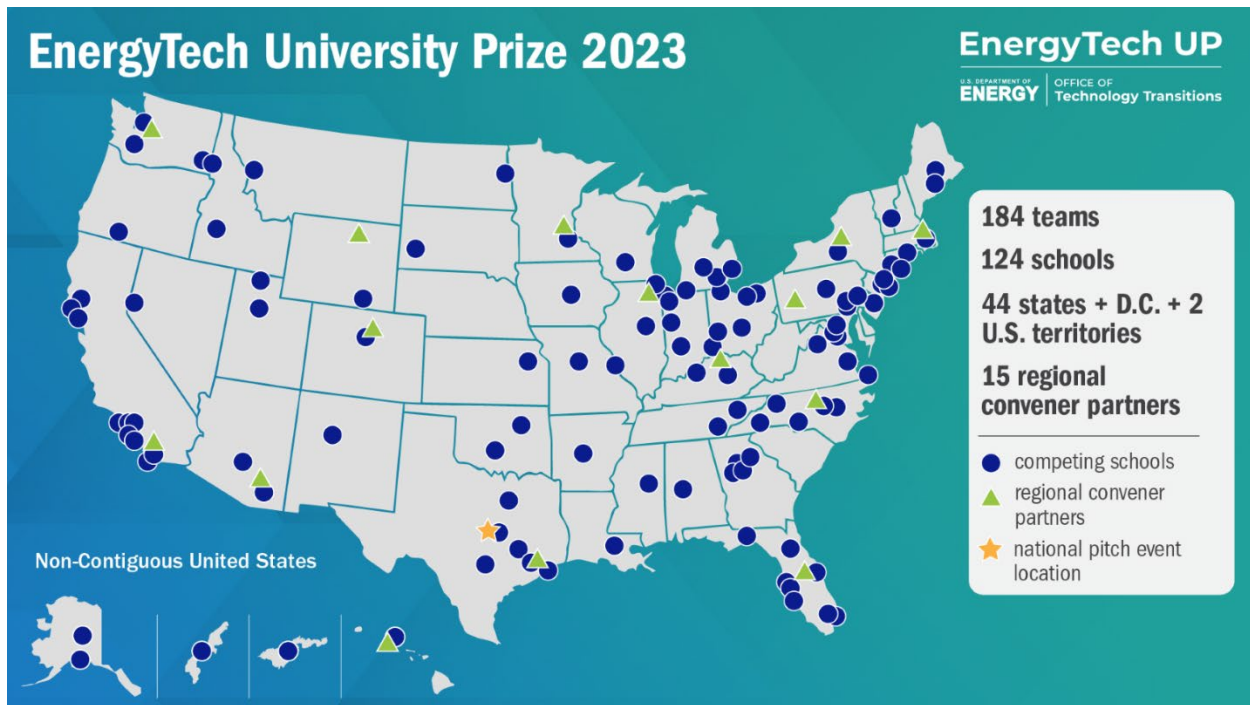


Figure 2: Geography of Participation in EnergyTech UP 2023

Refine Phase

After the Explore Events concluded, Regional Winners moved forward to the next Refine Phase. In addition to refining their pitches, student teams were connected to industry mentors to further train the students in viewing technologies through a market-needs lens. They engaged in networking opportunities and attended educational presentations with DOE leadership and organizations such as the Collegiate Entrepreneurs' Organization (C-E-O). With this phase focusing on refining business plans and pitches, no deliverables or public events took place during this phase.

Pitch Phase

After five weeks refining their business plan, the 15 Regional Winners, plus the one National Lab IP Licensing Bonus Prize Winner, gathered in Austin, Texas, to attend Zpryme's Energy Thought Summit on April 3, 2023, for the EnergyTech UP 2023 National Pitch Event. Each student gave 10-minute pitches, followed by up to 5 minutes of questions from a panel of industry reviewers, who scored the pitches based on their technology identification, market assessment, economic feasibility assessment, potential impact, and strength of the overall business plan.

Additionally, four Technology Bonus Prize Winners joined the event to share their pitches during an optional lunchtime presentation. Although these teams were not eligible to win national prizes, teams took advantage of the opportunity to join the event.

At the end of the event, OTT leadership announced the winners live on stage. The national first-place winner was awarded \$50,000; the national second place winner was awarded \$30,000; and the national third-place winner was awarded \$20,000 for a total of \$100,000 ([National Winners of EnergyTech University Prize 2023 Announced](#)).



Image 1: 2023 EnergyTech UP National Winners

The three National Winners were:

- First Place, awarded \$50,000: Team Heliotrope from New York University. This team is developing efficiency-boosting coatings that increase solar panel efficiency by 10-15%.
- Second Place, awarded \$30,000: Team ReLi from the University of Virginia. This team aims to recycle all forms of lithium-ion batteries to recover critical materials and reintroduce them back into the supply chain by leveraging DOE National Laboratory technologies.
- Third Place, awarded \$20,000: Team Icorium from the University of Kansas. This team is utilizing membrane technology and extractive distillation to separate and recycle complex refrigerant mixtures at the end of their life.

Program Outcomes

EnergyTech UP's 2023 outcomes were far-reaching. The table below outlines key outcomes and successes of the program since it was launched in 2021.

EnergyTech University Prize Key Outcomes

Metric	2023 Program Outcomes	Cumulative Program Outcomes to date (since program launch in 2021)
Total student participants	635	1,100+
Participating collegiate institutions	124	177
Total percent of schools that were MSIs	23%	22% average
Number of states represented	44 states, Washington DC, and 2 U.S. territories	48 states, Washington DC, and 3 U.S. territories
Number of regional conveners.	17	22 Distinct Organizations
Number of Regional Explore Events	15	26
Amount awarded (includes National prizes, bonus prizes and regional awards)	\$345,000	\$604,500
Number of unique DOE offices that contributed funding to EnergyTech UP	8 (Building Technologies Office, Office of Electricity*, Office of Fossil Energy and Carbon Management, Geothermal Technologies Office, Office of Nuclear Energy, Office of Technology Transitions*, Solar Energy Technologies Office, Water Power Technologies Office) * Denotes new in 2023	8 (Building Technologies Office, Office of Electricity, Office of Fossil Energy and Carbon Management, Geothermal Technologies Office, Office of Nuclear Energy, Office of Technology Transitions, Solar Energy Technologies Office, Water Power Technologies Office)
Number of teams awarded prize funds	23	40
Number of Regional & National Convener Partners	19	23
Competitors who reported an increased interest in an energy career	84%	80% average
Competitors who reported increased knowledge of the skills required for technology commercialization	90%	83% average

Programmatic Impacts



Image 2: Liquidium team presenting their technology at the National Pitch Event

Tonisha Bloomingberg, a participating student from Prairie View A&M University's H2 Ceramic Solutions team, noted, the “great energy” in the air. “My efforts come from my heart and years of dedication that I have put into the Houston and Prairie View area in building up the environment. In the future, I hope to be sitting on the other side of the pitch board giving opportunities to future entrepreneurs,” Bloomingberg shared.

Students spoke positively about the impact of EnergyTech UP 2023 describing the program as “rewarding,” “innovative,” and “creative.” Others acknowledged the event as an opportunity to gain pitching experience, product exposure, and quality feedback from industry leaders. One student noted, “My favorite part of EnergyTech UP was learning how to frame my research in the perspective of a business model.” Another student acknowledged the value of networking, stating, “I enjoyed learning about other technologies and ideas from other teams.”

The 2023 program was a success with 23 teams awarded a total of \$345,000 in prizes, up from 17 teams awarded \$259,500 in the inaugural program year, a 35% and 33% increase, respectively. See all awardees [here](#). Further demonstrating the year’s success was the involvement of eight program offices that offered technology-specific bonus prizes, including the [Building Technologies Office](#), [Office of Electricity](#), [Office of Fossil Energy and Carbon Management](#), [Geothermal Technologies Office](#), [Office of Nuclear Energy](#), [Office of Technology Transitions](#), [Solar Energy Technologies Office](#), and [Water Power Technologies Office](#).

Success Stories

LightbulbML, 2022 First Place National Winner: Mechanochemical Recycling of LCO Batteries (Stanford University)

Lyna Kim's team LightbulbML became the first place National Winner in the EnergyTech UP 2022 program, earning \$50,000. She developed a business model for Ames National Laboratory-developed technologies that improve the mechanochemical recycling of Layered Cobalt Oxide Cathode (LCO) batteries. After reading a press release about EnergyTech UP, a contact at Redwood Materials reached out directly to Kim and ultimately offered her an internship.

Redwood Materials is transforming the battery supply chain by offering large-scale sources of domestic anode and cathode materials produced from an increasing number of recycled batteries that directly go back to U.S. cell manufacturers. Kim could see and feel the passion that Redwood Materials employees had for their jobs, and how they were working toward a shared mission. As a third-year university student, Kim took a semester off to pursue the internship. This turn of events motivated her to take another leave of absence during the 2023 fall semester to launch her own startup, LightbulbML, which focuses on artificial intelligence climate solutions. Kim has already demonstrated promising success with LightbulbML, having already solidified venture capital.

Prior to participating in EnergyTech UP, Kim never considered launching her own startup company in the clean energy space.

Alpha Nur, 2022 Nuclear Energy Bonus Prize Winner: Leasing Very Small Nuclear Reactors (The University of Chicago and University of Illinois Urbana-Champaign)

Mason Rodriguez Rand and Kevin O'Sullivan won the EnergyTechUP 2022 Nuclear Energy Bonus Prize and have since gone on to launch their own startup company, [Alpha Nur](#), as highlighted in a story by OTT. Alpha Nur's mission is to modernize nuclear energy and power a safe, clean, affordable, and secure energy future for the country.

When they applied to EnergyTech UP, the team indicated they were not officially incorporated as a business but were participating as an elective or independent study course credit. Since then, Alpha Nur's cofounders have:

- Been [selected to join](#) the DOE Technology Commercialization Fund-awarded Cradle to Commerce program, led by Lawrence Berkeley National Laboratory.
- Participated in the DOE Lab Embedded Entrepreneurship Program's (LEEP) Chain Reaction Innovations finals, hosted by Argonne National Laboratory.
- Been identified as Chicago Inno's "[Inno Under 25.](#)"

KLAW Industries, 2022 Fossil Energy and Carbon Management Bonus Prize Winner: Carbon-Negative Cement Replacement (The State University of New York at Binghamton)

KLAW Industries, founded in 2019 by Jacob Kumpon and Jack Lamuraglia, won the EnergyTech UP 2022 Fossil Energy and Carbon Management Bonus Prize. The team developed a raw material called Pantheon™, which is a carbon-negative replacement for cement in concrete made from waste glass diverted from landfills. They started the company as sophomores in college and have since graduated to work full-time on the business.

They have raised \$1.36 million in non-dilutive funding, including the \$25,000 from EnergyTech UP and a \$400,000 Phase II [Small Business Innovation Research](#) award from the Environmental Protection Agency. In July 2023, KLAW Industries won first place at OTT's [Energy Program for Innovation Clusters](#) (EPIC) Prize pitch competition, taking home \$100,000 to help them purchase a new truck and trailer for operations.

“The biggest impact of doing EnergyTech UP was that it put us on the path of being able to do this full time when we got out of college, which was a goal for my team from the start,” said Kumpon.

Today, KLAW has completed over 60 pilot projects and sold close to 50 tons of their Pantheon™ material. In 2024, the cement product that KLAW sells - Pantheon™ - was approved by the New York State Department of Transportation for use on a \$21.2M bridge project in Whitney Point, NY. <https://www.clarkson.edu/news-events/clarkson-university-startup-earns-nysdot-approval>

Stay Tuned on the Latest EnergyTech University Prize Updates

Learn more about EnergyTech UP by visiting the [OTT program webpage](#). To see the latest prize details or to apply to participate, visit the [EnergyTech UP HeroX webpage](#). You can also learn more about the teams that participated in the [2022 edition](#) of the competition.

To get the latest OTT program updates and opportunities, [sign up for the OTT newsletter](#).