E² Energy to Educate SM

As part of our commitment to education, E2 Energy to Educate grant awards support projects that are team oriented, hands-on projects with specific results. E2 Energy to Educate projects enhance student understanding of the science and technology needed to address energy issues and reach and inspire students to think differently about energy.

2023 E² Energy to Educate – Highlights

- **24 projects awarded more than $500,000 across 12 states, reaching nearly 25,000 student nationwide**
- Projects include a hydrogen fuel cell training program, nuclear energy learning kits, wind and solar energy design build competitions, STEM learning innovation centers, and programs focused on preparing youth for careers in STEM and clean carbon free energy.

2023 E² Energy to Educate – Awardees

American Nuclear Society, Inc.
Downer's Grove, IL
Project Title: ANS Visualizing Radiation Cloud Chamber Kit Pilot

Description: The ANS Visualizing Radiation Cloud Chamber Kit will allow approximately 300 students in grades 6-12 to safely observe the paths of subatomic particles within a small cloud chamber, a jaw-dropping phenomenological experience for any student. Accompanying the kit will be a virtual training program that will equip educators to set up, oversee the experiment, and teach associated nuclear science concepts. The kit will be provided to classrooms free of charge, with our vision after this pilot to eventually reach all 50 states.

BakerRipley
Houston, TX
Project Title: BakerRipley's Learning and Innovation Centers Youth STEM Programs

Description: BakerRipley Learning and Innovation Centers were created to inspire underrepresented groups to learn, build, and invent. The Centers provide access to the latest STEM tools and resources, sparking curiosity and informing future education and career pathways. BakerRipley STEM programs are designed to support interest and exploration in STEM among K-12 students at its Learning and Innovation Centers in East Aldine, Gulfton, East End, and soon in Pasadena.BakerRipley helps young Neighbors develop the skills and knowledge needed to achieve economic stability and success through its programs, including:
The Young Makers Program is an 8-week STEM program that engages middle school students in interactive activities during the school year with abbreviated offerings during the Summer/Spring semesters. The program is designed to build on the interest young people hold towards STEM topics and skills with the goal of increasing their knowledge and maintaining their interest in related education and career opportunities. Through a safe and supportive environment, students build STEM skills through hands-on learning projects based on computational thinking. The program also emphasizes the development of interpersonal skills such as problem-solving, critical thinking, and teamwork.

Boston College Trustee
Chestnut Hill, MA
Project Title: Engaging Youth and their Families in learning about alternative energies through Food Justice

Description: Unfortunately, recent research (Vegas and Fowler (2020) has shown that despite increasing investments in computational science education, there remain limited opportunities for youth, particularly youth of color and in low-income communities, to be exposed to the concepts and practices of computing in most school curriculum. Thus, as noted by the national research council there is a critical need to better understand how and in what ways computational science can be infused into traditional content to engage and interest youth in learning about computation and the role it plays in the doing of science (Fields, Kafai, Nakajima, Goode, & Margolis, 2018). Yet, also noted by the National Research Council, most teachers in K12 teachers have little experience in supporting their students in learning drawing up on transdisciplinary traditions. Thus, as noted by the national research council there is a critical need to better understand how and in what ways computational science can be infused into traditional content to engage and interest youth in learning about computation and the role it plays in the doing of science (Fields, Kafai, Nakajima, Goode, & Margolis, 2018). Yet, also noted by the National Research Council, most teachers in K12 teachers have little experience in supporting their students in learning drawing up on transdisciplinary traditions. To address this challenge, we propose to broaden middle school youth's participation in STEM and computation (STEM+C) education by working with our partner teachers to co-design a new thermodynamic unit where youth are learning the foundations of thermodynamics (energy) while also learning and applying computational resources through the study and design of a desktop smart house that is powered via alternative energies.

Cal Ripken Sr. Foundation, Inc.
Baltimore, Md
Project Title: Ripken Foundation Middle School STEM Center

Description: With a grant from Constellation Energy, the Cal Ripken, Sr. Foundation will install a new STEM Center at a middle school or a community-based youth-serving organization in Baltimore, MD. This fully equipped STEM Center will include
educational STEM products, a custom-designed STEM curriculum, training for youth mentors to deliver the program, furniture, technology, and other resources. This new Center will impact approximately 350 youth with the help of dedicated mentors and bring STEM education and learning year-round to this underserved community center.

Carnegie Mellon Racing
Pittsburg, PA
Project Title: Carnegie Mellon Racing 24e & 22a

Description: Carnegie Mellon Racing is a student engineering team at Carnegie Mellon University that participates in the Formula SAE Electric competitions hosted by the Society of Automotive Engineering (SAE). The team has a long legacy as an internal combustion team and switched to an electric vehicle in 2014. As one of the first university teams in the United States to make this change, the team pioneered electric race car technology. This year, the team designed, manufactured, and tuned our fastest all electric, formula-style vehicle. At our first competition, Formula Hybrid+Electric in New Hampshire in May 2023, we placed 2nd overall and won 1st in the Design, Autocross, and Acceleration events, setting a record for the fastest acceleration time in the competition's history.
24e refers to this year's electric (e) competition racecar, which will compete in the summer of 2024. 22a is the name of our autonomous project, where we are converting our 2022 electric competition racecar to be fully autonomous (a).

Consumer Energy Education Foundation (CEEF)
Houston, TX
Project Title: Digital Transformation in Energy Sector

Description: In partnership with Constellation, the Consumer Energy Education Foundation (CEEF) respectfully requests a community investment to continue its successful week-long Energy Summer Camp series in 2024 for 150 underserved and underrepresented middle and high school youth in and around the Greater Houston, TX area. The goal of this investment is to create a highly engaging, equitable, and inspiring learning event that will connect at-risk youth with experiences and real-world opportunities in energy and to explore the evolving role of digital transformation in the Energy sector and how they might play a role in its future. The proposed Digital Transformation in Energy Summer Camp embraces a STEM hands-on active learning experience that is inquiry-based and grounded in real-world issues and authentic experiences. Components of the program include the development of hands-on activities and customized STEM kits, video programming, and interaction with subject matter experts in the energy industry.

Coppin State College
Baltimore, MD
Project Title: Engaging STEM Youth in Baltimore City and the Greater Baltimore Area to Explore the Biosynthesis and Characterization of Fluorescent Carbon Nanoparticles for Energy Conversion and Storage at Coppin State University

Description: Basic Education in Carbon Nanoparticle base Solar Cell Technology: Students will be introduced to several concepts associated with renewable energy. Students will be introduced to several concepts associated with renewable energy. Fluorescent carbon nanomaterials have gained considerable attention in recent times due to their unique properties, such as tunability in size, shape, excellent electron conductivity, fluorescence property, surface chemistry, and optical properties. These properties make them attractive for a variety of applications, including optoelectronic devices, supercapacitor, and solar cells. There are different methods for the synthesis of carbon nanoparticles. These different methods could either be the top-down or bottom-up approach of synthesizing carbon nanoparticles. Students will become familiar with various methods of synthesizing carbon nanoparticles. They will have the opportunity to make their own carbon nanoparticles with their choice of plant materials and subsequently use the carbon nanoparticles in creating solar cells.

EcoRise Youth Innovations
Austin, TX
Project Title: Energy Sustainability and Equity with EcoRise

Description: For three years, Constellation funds have helped EcoRise create an innovative energy education program. In year 1, funds helped us develop and pilot test curricular resources including an innovative technology tool, real-world challenges, lesson plans, and podcasts for high school students. In year 2, we brought the Decarbonizing the Electric Grid (DEG) program to classrooms to challenge students to use real-world modeling strategies, STEM, and 21st century skills to identify ways to design an electric grid that reduces carbon emissions by 90%. The program encouraged students to explore systematic ways to reduce carbon emissions and use critical thinking and innovation to address global climate change and other environmental issues. In year 3, we combined the DEG resources with our Sustainable Intelligence (SI) program to broaden its scope and increase the number of energy-focused resources interested teachers receive.

Fairfield University
Fairfield, CT
Project Title: suSTEMability

Description: The Fairfield University (Fairfield) School of Engineering (SOE) asks Constellation to consider a grant to continue critical support of SuSTEMability. This proven program trains over 20 undergraduate engineering and science students in mentoring 350 K-8 students and 4 STEM educators from urban, Connecticut schools including Cesar Batalla (CBS), Davenport Ridge Elementary (DRES), and Wakeman Boys and Girls Club (Wakeman), in STEM education and hands-on activities using real-world,

issues that surround environmentally sound and sustainable energy sources. SuSTEMability empowers K-8 students to become informed energy consumers as they participate in experiments that both align with Constellation's innovation themes and are relevant to energy issues facing the students' communities. 20 Fairfield undergraduate students (Fellows) and their faculty mentors will visit each community partner ten times between January and June 2024, for a total of 20 classroom sessions. Participants will unite at a day-long event on the Fairfield's campus in April, and the program will culminate with a teacher professional development workshop in May.

Georgia Tech Foundation, Inc.
Atlanta, GA
Project Title: K-12 InVenture Prize Traveling Solar Cars and Curriculum for Rural STEM Education

Description: 24,000 students in 40 counties in Georgia have participated in K-12 InVenture Prize over the course of its 10-year existence. K-12 InVenture Prize students receiving a specialized STEAM curriculum focused on cultivating problem-solving skills, the invention process, and entrepreneurship. The students select an idea and pitch their final projects in a competition format. The E2 Energy to Educate grant will foster solar energy and sustainability interest in K-12 InVenture Prize's project selection via a traveling solar car curriculum, including kits for hands-on car assembly, team competition, and activities and games to promote sustainability and solar/renewable energy education. Lastly, we also propose to use the funds to provide an energy saving/environmentally friendly award at State Finals. We will award the team whose project pitch embodies helping the environment and clean energy. With your permission, we would love to call this the Constellation Energy Award.

Girl Scouts of San Gorgonio Council
Redlands, CA
Project Title: Girl Scout Leadership Experience

Description: The Girl Scout Leadership Experience serves introduces STEM and nontraditional career pathways and post-secondary education/training to middle and schoolgirls in California's Riverside and San Bernardino Counties. We primarily focus on reaching girls in sixth grade to increase their exposure and interest to these careers prior to choosing their high school pathways. We collaborate with local educators and businesses to ensure program components align with the community's workforce pipeline needs and California's Career Technical Education Roadmap. The program bridges an educational and vocational gap for underserved girls in our region struggling with poverty and upward mobility. We collaborate with schools who have a higher percentage of students who qualify for the Federal Free and Reduced Meal Plan to help reach girls from low-income families.

Girls Incorporated of New York City
New York, NY
Project Title: Girls Inc New York City G3 Program: “Environmental Justice Unit”

Description: Girls Inc. of New York (GINYC) respectfully requests funding from Constellation Energy to engage underserved New York City girls in an innovative STEM curriculum that will inspire them to think about energy as it affects their lives and communities. With your support, GINYC will create a new Environmental Justice Unit to be incorporated in our pre-existing STEM program, Generation Giga Girls, and piloted during our spring break camp, focusing on Energy Careers & Workforce Development, and Energy Projects for Underserved.Our groundbreaking Generation Giga Girls (G3) program aims to increase the number of girls who have the academic and math skills necessary to pursue STEM coursework and, eventually, careers. The program introduces middle and high school students from underserved communities to the field of Data Analytics, building their skills in mathematics, critical thinking, and technology using a fully digitized, interactive, online platform. The signature curriculum is delivered year-round as part of in-school programming, school break camps, and a Data Analytics Expo. In recent years, GINYC has also integrated the G3 curriculum into our Girl Boss entrepreneurship program to help position the core concepts in data analytics in a way that is approachable and exciting for middle school students.

Let's Go Boys & Girls
Severna Park, MD
Project Title: Transforming Dreams Into Reality Through Equitable Access to STEM Education

Description: Educational and employment inequity hinders underrepresented groups, notably people of color and women, reducing the number of STEM role models and interest in marginalized communities. LET'S GO aims to provide equitable STEM access, cultivate a diverse 21st-century workforce, and foster critical thinking, problem-solving, and teamwork skills.
We seek a Constellation E2E grant to expand STEM access for 1,000 Maryland students to address racial, gender, and socioeconomic disparities. Our goals include increasing student engagement, creating high school certification pathways, expanding STEM awareness for middle school students, and assisting community-based organizations to establish STEM education and workforce programs.

Montclair State University
Montclair, NJ
Project Title: Green Teams

Description: The Green Teams Program prepares students for STEM careers by engaging low-income, first-generation college and traditionally underrepresented undergraduates (URGs) in a paid transdisciplinary, sustainability internship program. The program helps diverse students develop skills that make them highly desirable job candidates. Students work in collaborative teams to produce actionable recommendations for organizations to improve sustainability, reduce emissions, and explore clean energy options, leading to a greener, healthier planet. The Green Teams builds corporate academic-community partnerships that engage students in real world solutions, bridging classroom experiences to career skills.

Nature Forward, Inc
Chevy Chase, MD
Project Title: POWERing Energy Education with Climate Ambassadors

Description: POWER (Peer Outreach With Energy Resources), a successful program that trains local high school students to educate residents about energy use and conservation, will shift its focus to include community LED light bulb exchanges at public libraries, presentations at STEM fairs at schools and energy audits. POWER is a collaboration between Nature Forward, Montgomery County Department of Environmental Protection (DEP), Montgomery County Public Schools (MCPS) and Montgomery County Public Libraries that will reach 900 or more county residents through the work of 24 Climate Ambassadors. Climate Ambassadors will use short-wave infrared (SWIR) cameras previously purchased with Constellation funds to record the infrared signatures of light fixtures and identify how efficiently homes, schools and businesses are lit. Teams of 2-3 students will visit 18 locations and share their findings at outreach events. The LED light bulb exchanges will take place at libraries with bulbs from the DEP and handouts by the students.

Rochester Institute of Technology
Rochester, NY
Project Title: Clean Energy/Hydrogen Fuel Cells Training Sessions for High School Teachers and Students

Description: With growing concern about climate change, renewable energy sources, and solutions to the ever-increasing demand for energy, RIT has developed programs to educate undergraduate students, high school teachers, and high school students in the field of "Clean Energy Generation Using Hydrogen Fuel Cells." The hydrogen economy is one of the fastest growing industries in Rochester, NY. Since 2008, our team has developed, refined, and delivered undergraduate courses on hydrogen fuel cells, as well as a laboratory course consisting of eight experiments related to hydrogen fuel cell technology. With previous support from Constellation Energy, we have expanded this program to train high school teachers and students, broadening access to education on this important technology.

Saint Joseph's University
Philadelphia, PA
Project Title: The Physics Wonder Girls Program

Description: The Physics Wonder Girls Program has expanded to become a comprehensive equity-focused initiative encompassing K-12 and university audiences. It includes a summer camp for middle and high school girls of diverse backgrounds who are mentored by Saint Joseph's University (SJU) undergraduate students. Building on our successes, this year we have grown to have three principal target audiences. The first audience, middle-school participants, will comprise 2 camp cohorts totaling 30 students recruited from the Greater Philadelphia region based on grades, science teacher recommendations and an essay. The second audience is high-school camp graduates who will be mentored directly by the PI and other SJU STEM faculty to work together with undergraduate students on STEM-themed research projects throughout the year. They will receive science leadership opportunities such as mentoring camp's middle-school students, presenting research at local and regional STEM fairs and conferences, STEM career seminars at SJU, and free professional student membership in the National Society of Physics Students. The third audience, SJU undergraduates trained in fundamentals and applications of renewable energies, will serve as campers' mentors and will continue renewable energy research in the fall. Additionally, camp alumnae from other colleges have returned to the camp as speakers.

Salvadori Center, LTD
New York, NY
Project Title: Building Green: Collaborative, Hands-on, Environmental STEM Education for Under resourced Students

Description: The Salvadori Center's Building Green curriculum introduces students to energy efficiency, active and passive solar, energy transfer, and sustainable design and construction. Building Green includes multiple collaborative experiments that build toward a culminating activity. Individual sessions start with a re-cap activity that explores the previous week's session on a higher level. This reminds students where they left off and enables those who missed the previous session to catch up. The primary activity reinforces concepts with hands-on, project-based experiments. Sessions end in a brief wrap-up activity, often a "cliff hanger" that motivates students to engage in future sessions. Students combine the design approach to problem solving with the scientific method of experimentation to explore new concepts and solve real world problems.

Tech Belt Energy Innovation Center
Warren, OH
Project Title: BRITE Clean Energy Education & Outreach Program

Description: BRITE seeks funding to expand its STEM education and outreach programming in the Mahoning Valley, in Northeast Ohio. The primary objective of the BRITE Clean Energy Education & Outreach Program is to inspire low-income and youth of color in Youngstown and Warren to consider future opportunities in STEM, while developing a diverse pipeline of energy workers and entrepreneurs. Programming will occur at the BRITE Energy Labs, located at BRITE's headquarters in downtown Warren, and at community events, in collaboration with established program partners. We expect to provide quality STEM education experiences to at least 300 students and to reach a total of 620 community members.

Texas Alliance for Minorities in Engineering
Austin, TX
Project Title: TAME 2023-24: Immersive Engineering Education for Diverse Students throughout Texas

Description: TAME promotes equity in energy by offering programs and resources for free. Additionally, we don't impose income requirements to participate. Programs are for all students but target students from underrepresented populations in engineering (girls and BIPoC). Our integrated curriculum fosters student's engineering mindset – the belief they are already engineers and can have a prosperous future in any engineering field. To promote sustainability as a lifestyle, TAME's program themes highlight the role engineers play in finding solutions to real world engineering challenges. Engineers are central to groundbreaking innovations and will play a critical role addressing global challenges such as clean water access and resilient infrastructure. Inspiring students to build a sustainable world through engineering is core to our work.

The Board of Trustees of the University of Illinois
Urbana, IL
Project Title: STEM Scholars: Educating and Training the Next Generation of Energy Engineers

Description: The STEM Scholars program, hosted by the Energy Resources Center (ERC) at the University of Illinois Chicago (UIC), comprises an after-school program of six weeks of hands-on STEM activities and an eight-week paid internship for a select number of students to gain professional experience over the summer. The program for marginalized and underrepresented youth is designed to encourage high school students to pursue careers in science, technology, engineering, and math (STEM) and equip them with skills needed for their academic and professional careers.

The Engineering Society of Detroit
Southfield, MI
Project Title: Future City

Description: For 28 years, the ESD has sponsored the Michigan Regional Future City Competition to further our mission to inspire future generations to greater interest in the STEM technical fields. Future City starts with a question--how can we make the world a better place? To answer it, 6th, 7th, and 8th grade students imagine, research, design, and build cities of the future that showcase their solution to a citywide sustainability issue. This year the theme is Electrify Your Future. Students will design a 100% electrically powered city with energy generated from sources that keep their citizens and the environment healthy and safe. Participants complete four deliverables: a 1,500-word city essay; a scale model; a project plan, and a presentation to judges as well as a Q&A session at Regional Competitions in January. Regional winners represent their region at the Finals in Washington, DC in February. After completing Future City, student participants are not only prepared to be citizens of today's complex and technical world, but also poised to become the drivers of tomorrow. Funds received will be utilized in various ways to enhance the effectiveness and reach of the program.
Specifically, funds will be used for marketing and outreach efforts to increase awareness of Future City within Michigan, thereby attracting more students and participants. Funds will also be used to support competition day for the students and judges including venue, meals, and materials for the over 500 participants. Funds from this grant would also go to support staff expenses to run the program including program management, event planning and administrative support with STEAM concepts.

Thompson Island Outward Bound Education Center Inc.
Boston, MA
Project Title: Green Ambassadors: Environmental Career Development on Thompson Island

Description: Thompson Island Outward Bound requests support for Green Ambassadors, our summer employment and job-readiness program for Boston high school students. Green Ambassadors aims to engage those most affected by climate change in the search for solutions and provide them with training for a successful career in the green jobs sector and beyond. By participating in our Green Ambassadors program, students can follow a pathway of knowledge and skill-building that will prepare them for an environmentally focused career. The program takes place in Thompson Island's beautiful natural environment, creating a lifelong connection to nature, and teaching them to persevere in the face of challenges.
Students work for six weeks on Thompson Island, gaining hands-on work experience in conservation and environmental stewardship. Green Ambassadors is designed as a 3-year continuum, where each year builds upon the previous years' experience.

University of Maryland College Park Foundation Inc.
College Park, MD
Project Title: Maryland Regional KidWind Competition
Description: Maryland KidWind engages public school teachers and students in grades 4-12 in STEM for sustainability through the lens of wind and solar energy design and build competitions. The program consists of two main parts. First, there is a teacher academy that brings nearly 100 K-12 public school STEM teachers from across the state of Maryland to UMD's campus for a one-day training. In the Academy, educators learn strategies and lessons to help their students creatively explore the science, technology, and implications of a world powered by renewable energy using KidWind's sustainability design and build competition curriculum, which is aligned with MSDE and NGSS standards.

The second part is the Maryland Regional KidWind Competition. In April 2023, we hosted the first ever regional competition in the state of Maryland. More than 120 total students from teams across Maryland presented their wind turbine design and build process to a panel of volunteer judges, explored clean energy initiatives throughout the university campus, learned about clean energy initiatives from industry professionals, and participated in a hands-on instant design challenge.