American Public Power Association



Demonstration of Energy & Efficiency Developments

2024 Completed Grants and Scholarships

Highlights from Public Power's Research and Development Program



The American Public Power Association's Demonstration of Energy & Efficiency Developments (DEED) program is the only research, development, and demonstration program funded by and for public power. A key component of the DEED program is the information exchange between the more than 950 public power utility members. Support for projects not only helps the utilities funded, sharing the key findings and processes helps the more than 950 DEED members to advance and improve their operations and services.

In 2024, nine DEED-funded projects produced findings related to integrating and understanding distributed resources, optimizing storage, using AI to analyze operational impacts, advancing grid monitoring technology and capabilities, and more. In addition, 15 students received funding for research to support DEED members and internships that explored public power career options from linework to engineering, data analysis, and customer service.

Review the full details of these projects, including final reports, in the DEED Project Library: www.PublicPower.org/DEED-Project-Library.





Grants

ENERGY STORAGE Long-Duration Energy Storage Demonstration Project

Burbank Water and Power, California \$125,000

Burbank Water and Power, working with ESS Inc., installed an iron flow battery as part of its EcoCampus project. The unit is a 75 kilowatt/500 kilowatt-hour battery integrated in a containerized system that includes the battery, inverters, a battery management system, and a communications interface. The ESS-patented electrode design and control system, coupled with simple electrochemistry, allows the Energy Warehouse to operate over an unlimited number of deep charge and discharge cycles with no degradation or capacity fade.

www.PublicPower.org/DEED-Project/BWP-EcoCampus-Long-Duration-Energy-Storage-Demonstration-Project

RENEWABLE ENERGY Integration of Energy Recovery Turbines for Renewable Energy Production in Water Utilities

California Municipal Utilities Association, California \$125,000

California Municipal Utilities Association collaborated with one of its members, Marin Municipal Water Association, and the University of California-Davis to develop methods to analyze and site in-line energy recovery turbines for renewable energy generation and improved pressure and energy management in urban water distribution systems. The project also investigated using ERTs for pressure management to increase system water efficiency and reduce future pipe breaks, as well as to reduce leak losses. Over the course of the study, leakage avoided at the Marin distribution system was equivalent to 13-23% of water demand and led to water savings of over four million cubic meters.

www.PublicPower.org/DEED-Project/Optimal-Integration-Energy-Recovery-Turbines-Renewable-Energy-Production-Water-Utilities

GENERATION How Ice Affects Hydropower Resources

New York Power Authority, New York \$125,000

The supercooling of water in the Niagara River, which feeds the reservoirs that power the Robert Moses Niagara Power Plant and the Lewiston Pump Generating Plant, can result in ice formation on the hydro power plant water turbines, affecting plant operations. Using an AI-based model, NYPA conducted a study to quantify the impact of frazil ice on the efficiency of the units, and a separate study to forecast the formation of anchor and frazil ice up to a few days or a few weeks. The model was run and tested with a few icing scenarios and operations personnel at NYPA will continue to utilize the model to run icing forecasts and is looking to expand the factors the model analyzes.

www.PublicPower.org/DEED-Project/Analyze-Impact-Ice-Hydro-Power-Resources-with-Machine-Learning

RELIABILITY Equipping UAS with Light Detection and Ranging Technology

New York Power Authority, New York \$125,000

The New York Power Authority integrated light detection and ranging (LiDAR) technology into an existing in-house unmanned aircraft systems program for performing inspection of transmission rights of way for vegetation management. UAS technology allows for automated flights on demand and mitigates scheduling and other considerations associated with manned inspection. After multiple test flights, NYPA concluded in its analysis that the LiDAR systems accomplished their uses cases as intended.

www.PublicPower.org/DEED-Project/Unmanned-Aircraft-System-UAS-Equipped-With-Light-Detection-And-Ranging-LiDAR-Technology



DISTRIBUTED ENERGY RESOURCES Distribution Battery Project

Pasadena Water & Power, California \$125,000

Pasadena Water & Power installed battery-inverter units on a single distribution feeder across its service territory to explore whether the units could address concerns with voltage quality on an older distribution circuit and defer capital investment in new infrastructure. Each unit, connected at a secondary voltage level, provided 5 kW of output and 27.3 kWh of stored energy. Hurdles, including supply chain and labor disruptions associated with the COVID-19 pandemic, complicated the economics of the project, although the battery units were able to provide enough voltage correction back onto the system at peak time for the circuit to stay out of Pasadena's typical summer low voltage issues.

www.PublicPower.org/DEED-Project/Distribution-Battery-Project

DISTRIBUTED ENERGY RESOURCES Community Energy & Efficiency Resource Universal Mapping

Taunton Municipal Light Plant, Massachusetts \$125,000

Taunton Municipal Light Plant worked with Beacon Climate Innovations to assess the DER potential for TMLP and the City of Taunton across the community by using an analytical tool to help prioritize developing these resources and monitoring progress. The tool, called Community Energy & Efficiency Resource Universal Mapping, or CEERUM, can help utilities assess how weatherization, storage, demand response, and other programs impact emissions, energy consumption, and peak demand alongside the cost and financial return of these efforts.

www.PublicPower.org/DEED-Project/Community-Energy-Efficiency-Resource-Unified-Mapping-Ceerumtm-Multi-Portal-Information-System

WORKFORCE Zero Carbon Champions

Sacramento Municipal Utility District, California \$80,000

Zero Carbon Champions is a pilot program for Sacramento County residents ages 14 to 24 from underserved communities to learn about sustainability and careers in energy. Through the program, young leaders gained career advice, conducted informational interviews with professionals in a variety of clean energy careers, and developed community toolkits outlining pollution reduction efforts. Working with a local community group, additional activities included assisting youth in creating social media campaigns and videos and holding one-on-one sessions between youth participants and utility professionals. www.PublicPower.org/DEED-Project/Zero-Carbon-Champions

ENERGY EFFICIENCY Grid-Interactive & Efficient Building

Guidebook WPPI Energy, Wisconsin

\$69,250

Building upon a Department of Energy roadmap encouraging energy efficiency and demand flexibility in commercial buildings, WPPI Energy, working with the Smart Electric Power Alliance, developed a guidebook on grid-interactive and efficient buildings. GEBs use smart technologies and onsite distributed energy resources to provide demand flexibility and reduce their energy costs. The guidebook offers a stepby-step guide on developing a GEB program, examples of how others have implemented GEBs, and an analysis of which technologies provide the most savings.

www.PublicPower.org/DEED-Project/Grid-Interactive-Efficient-Building-Programs-Guidebook-Small-Mid-Sized-Utilities

RELIABILITY UAMPS Gridware Pilot

Utah Associated Municipal Power Systems, Utah \$54,400

The Gridware Pilot Project looked at how advanced grid monitoring technology could help utilities facing challenges related to aging infrastructure, environmental risks, and grid reliability. Four of UAMPS' member utilities — Brigham City Power, Washington City Power, Lehi City Power, and Springville City Power — participated in the project and deployed continuous monitoring devices on distribution poles throughout their service territories. This project demonstrated how detecting early signs of mechanical and environmental stress on utility poles and distribution equipment could mitigate or altogether avoid consequential outages.

www.PublicPower.org/DEED-Project/UAMPS-Gridware-Pilot-Program

Scholarships and Internships



CUSTOMER SERVICE Kirsten Burek

Utility Sponsor: Westfield Gas & Electric, Massachusetts School: Westfield State University Major: Communication - Journalism

Kirsten created a welcome packet to

help new utility customers navigate Westfield's utility services and an introductory video, which served as a how-to guide for navigating Westfield's website, completing billing processes, and accessing other important resources. Kirsten's goal was to design a user-friendly resource to serve as an enduring tool for engaging new customers and fostering positive first impressions.

www.PublicPower.org/DEED-Project/CS-2678-Customer-Service-Internship-Westfield-Gas-Electric



RELIABILITY Charles Karish

Utility Sponsor: Hibbing Public Utilities Commission, Minnesota School: Minnesota State Community and Technical College – Wadena Major: Electrical Linework

Charles assisted Hibbing's line crew in the performance of routine maintenance and operations. Charles developed a deeper understanding of the daily responsibilities of a lineworker, including the requirement to work in diverse weather conditions and master complex tools, and got to apply his classroom knowledge to working in the field.

www.PublicPower.org/DEED-Project/Hibbing-Public-Utilities-Lineman-Internship-Charlie-Karish



CYBERSECURITY Sydney Jones

Utility Sponsor: Muscatine Power & Water, Iowa School: Iowa State University Major: Cybersecurity Engineering

Sydney updated a variety of Muscatine's policies, including on

acceptable use, penetration testing, and artificial intelligence. Sydney assisted in collecting evidence for critical infrastructure protection standard audits and created an inventory of software used by staff and student interns.

www.PublicPower.org/DEED-Project/Sydney-Jones-Internship-Muscatine-Power-Water



FINANCING Kathryn Kasparian

Sponsor: Northern California Power Agency, California School: California State University, Sacramento Major: Business Administration

Kathryn participated in negotiations

on various federal grant terms and conditions to ensure compliance with reporting requirements. She played a key role in updating NCPA's grant monitoring efforts. Through her DEED award, Kathryn had the opportunity to attend NCPA's Strategic Issues Conference 2025, where she heard presentations from the California Energy Commission, California Air Resources Board, and the California Independent System Operator.

www.PublicPower.org/DEED-Project/Kathryn-Kasparian-Grant-Accountant-Intern-NCPA

Scholarships and Internships



OPERATIONS Mason Kaufman

Sponsor: Prairie du Sac Electric Department, Wisconsin School: Moraine Park Technical College Major: Electric Power Distribution

Mason supported staff in daily

operations such as parks and pavement maintenance, conducting safety checks and equipment inspections and maintaining tools and safety gear. Through a partnership with Sauk Prairie School District's Youth Apprenticeship Program, Mason was able to earn high school credits for completing his internship.

www.PublicPower.org/DEED-Project/Mason-Kaufman-Internship-Village-Prairie-Du-Sac-Municipal-Utilities



DISTRIBUTION Mariah Rodriguez

Utility Sponsor: City of Georgetown, Texas School: Stephen F. Austin State University Major: Geospatial Sciences

Mariah's project centered around the management and integration of electrical and solar energy systems. She designed a one-line diagram, a detailed representation of the electrical distribution system, ensuring quality, accurate records for solar energy providers.

www.PublicPower.org/DEED-Project/Mariah-Rodriguez-Intern-City-Georgetown-TX



RELIABILITY Benjamin E. Kowaleski

Utility Sponsor: Tillamook People's Utility District, Oregon School: Embry-Riddle Aeronautical University Major: Unmanned Aircraft Systems

Benjamin assisted with developing the mapping, software, and inspection reports for Tillamook's drone operations. Benjamin focused on ensuring that Tillamook's unmanned aerial system was able to autonomously navigate various terrains and maneuver around power line structures.

www.PublicPower.org/DEED-Project/Benjamin-E-Kowaleski-Electric-Utility-Drone-Program-Operator-Intern



COMMUNITY ENGAGEMENT Ayden LaPoint

Utility Sponsor: Stowe Electric Department, Vermont School: Vermont State University Major: Architectural Engineering

Ayden designed and developed

communication campaigns showcasing the benefits of Stowe Electric's renewable energy initiatives and community projects. Ayden also produced a series of fact sheets on the utility's renewable and electrification projects.

www.PublicPower.org/DEED-Project/Stowe-Electric-Communications-And-Community-Engagement-Internship-Ayden-Lapoint



RATES & MARKETS Brian Rostowski

Utility Sponsor: Westfield Gas & Electric, Massachusetts School: Western New England University Major: Business Analytics and Information Management

Brian assisted with Westfield's first comprehensive internal cost of service study by conducting data analyses and modeling. Brian significantly improved the overall efficiency and impact of the study, including helping to simplify data collection processes.

www.PublicPower.org/DEED-Project/2669-Energy-Supply-Intern



SAFETY Gabriel Sanchez

Utility Sponsor: Muscatine Power & Water, Iowa School: Iowa State University Major: Aerospace Engineering

Gabriel updated Muscatine's cloudbased Safety Data Sheet (SDS), a

catalogue of all chemicals to which employees are exposed. Gabriel plans to return to the utility in 2025 to create QR codes for chemical storage areas.

www.PublicPower.org/DEED-Project/Gabriel-Sanchez-Safety-Training-Intern





RELIABILITY Brendon Schumaker

Utility Sponsor: Muscatine Power & Water, Iowa School: University of Iowa Major: Electrical and Computer Engineering

Brendon gained real-world experience as an engineer at a utility, where he focused on tracking

historical outages and linking them to power quality issues in a local industrial plan. Brendon plans to return as a full-time employee after completing his bachelor's degree.

www.PublicPower.org/DEED-Project/Brendon-Schumaker-Electrical-Engineer-Intern



CYBERSECURITY Fatemeh Sharifi

Sponsor: Virginia Tech Electric Service, Virginia School: Virginia Polytechnic Institute and State University

Major: Electrical and Computer Engineering

Fatemeh helped develop a method to detect false data injection, a type of cyberattack used to deceive the grid control system. This project served as Fatemeh's dissertation towards her doctoral degree.

www.PublicPower.org/DEED-Project/CS-2648-Fatemeh-Sharifi-Virginia-Tech-Electric-Service



ENERGY STORAGE Vishwesh Vancheeswaran

Sponsor: Northern California Power Agency, California School: California Polytechnic State University Major: Mechanical Engineering

Vishwesh studied the feasibility and setup of a battery energy storage system to suit NCPA's needs. Vishwesh collaborated with consultants from Black & Veatch on the system installation and configuration.

www.PublicPower.org/DEED-Project/Vishwesh-Vancheeswaran-Generation-Services-Intern-NCPA

Want to join DEED?

Membership benefits include:

- Utility grants up to \$125,000 per project. Receive funding for an early commercialization project, pilot programs and services, new technology demonstration, or other initiative to advance your utility.
- Access research and receive discounts on tools and publications that help strengthen public power utilities and improve customers' lives.
- Internship funding. Boost your workforce development and recruitments efforts through DEED's scholarship program. Get a student to work at your utility and strengthen relationships with local universities.
- Opportunities for national recognition. Apply for DEED's Energy Innovator Award and earn honors to tell stakeholders about the great work you do. Awardees are recognized at APPA's National Conference each year.

Please contact the DEED team with questions at **DEED**@**PublicPower.org** or 202-467-2900.

American Public Power Association



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