BPA Emerging Technologies for Energy Efficiency Technology Focus Area: Industrial & Agricultural Technology

Technology Background

Public utilities in the Pacific Northwest serve more than 2,000 megawatts of industrial and agricultural load. BPA has a long history of supporting and advancing energy efficiency directly with industrial and agricultural customers throughout the region. Through our Technology Innovation Office and Energy Efficiency programs, BPA partners with businesses and research organizations to develop and deploy new strategies to increase the productivity of electric power in these sectors.

Current Research Projects

Low Energy Precision Application (LEPA) Irrigation Demonstration Project
Timeline: 2012 – 2015
Collaborators: Washington State University, University of Idaho

Low Energy Precision Application (LEPA) irrigation systems consist of pivots where the drops extend to, or nearly to, the soil surface. Although LEPA is wide-spread in Texas, Oklahoma and Kansas, it is seldom used outside of this limited area. This study is a multi-state demonstration project to introduce this technology to the Pacific Northwest and demonstrate how to mitigate run-off issues.

To date, trials have been conducted in Idaho, Washington and Nevada. Phase 2 of the project will conclude in the fall of 2014 with data analyses completed over the winter months. Preliminary results have been positive showing savings for both electricity and water. Phase 3 will be conducted during the summer of 2015

Emerging Hardware and Software Platforms for Strategic Energy Management
Timeline: 2014 – 2016
Collaborators: Cascade Energy Inc., PerceivIt, Rogers Machinery

This project investigates the data visualizations and analytics that empower multiple stakeholders in the industrial value chain, from plant operators to equipment vendors. Objectives include identifying the most effective hardware, dataflow, and software technologies for implementing Strategic Energy Management (SEM) at the subsystem level and demonstrating the benefits of those tools. Compressed air systems are targeted in this pilot because of their ubiquity in the Pacific Northwest and the potential for O&M savings via leak reduction, pressure minimization, and sequencing optimization. A four-site demonstration project will focus on compressed air monitoring and notifications at lowest cost.

Evaluating Energy Intensity of Microwave Sterilization & Pasteurization Technologies
Timeline: 2012 – 2015
Collaborators: Washington State University, Seafood Products Association

Developed by a team led by Washington State University (WSU) Department of Biological Systems Engineering, Microwave Assisted Thermal Sterilization (MATS™) reduces processing time by approximately 80 percent compared to conventional preservation methods. Past research has demonstrated direct benefits in reducing the cost of electricity, steam and water, plus indirect benefits of better quality food

when compared with conventional retort technology currently used by food processors. This project seeks to evaluate the relative energy intensity of the MATS™ process versus conventional sterilization and pasteurization processes.

Optimization of Variable Frequency Drives for Irrigation Pump Stations
Timeline: 2014 – 2015
Collaborators: Wy'East Resource Conservation and Development Area Council

This project will focus on methods for optimizing controls of variable-frequency drives (VFD) in irrigation pump stations. Wy'East will test automated controls in more than 10 pumping plants, as a supplement to an existing National Conservation Innovation Grant (CIG) from NRCS. Measured data will include power and energy use, flow data, and pressure. Objectives include establishing a baseline for improved VFD controls and best practices to be shared region wide.

Completed Projects

Engine Generator Block Heater Pilot and M&V Methods Development
Timeline: 2012 – 2013
Collaborators: City of Cheney, Kootenai Electric Cooperative, Ravalli Electric Cooperative, Flathead Electric Cooperative, Missoula Electric Cooperative

Most existing generator block heaters depend on thermo-siphoning to maintain engine block temperatures. These heaters tend to have extreme temperature gradients across the engine block and in the coolant hoses. A pumped block heater eliminates wasteful hot spots, shortening runtime and saving electricity. Since coolant hoses are replaced when a pumped block heater is retrofitted into an existing generator, this helps reduce the chance of brittle hoses bursting, ensuring the generator will run when needed. BPA research has shown that, over a generator's lifetime, most generator block heaters (GBH) use more electricity than the generator produces. Annual savings associated with a pumped block heater can be as high as $3,000, and maintenance costs may also be reduced. Savings depend on the size, location and operation of the existing block heater.

Objectives of field testing with utilities included experience with the technology, knowledge of primary factors of energy efficiency, refined methods for estimating energy savings, and an approved energy conservation measure for implementation in the Northwest.

For more information on this technology, reports, and collaboration opportunities, please visit our website.
www.bpa.gov/goto/E3T