

American Recovery and Reinvestment Act of 2009 (ARRA)

Technical Support Services for USDA Research Facilities

As a U.S. Department of Energy (DOE), Federal Energy Management Program (FEMP) service provider for 12 selected ARRA projects at more than 30 sites during FY10 alone, EMR is helping energy managers through energy audits, retro-commissioning, design reviews, and technical training. These focus on energy efficiency; equipment condition relative to design intent; controls strategies; renewable energy opportunities; sustainable design practices; and water-saving technologies. The objective is to help agencies meet goals set by legislation and the Executive Order (The focus of this project description is on USDA sites only; additional Federal Agency sites are also a part of this overall task order.)

EMR is participating in a series of energy audits and retro-commissioning tasks sponsored by the USDA and Department of Energy, Federal Energy Management Program under the American Recovery and Reinvestment Act of 2009 (ARRA). The following project sites comprise the USDA portion of this contract task order:

- USDA GMPRC Manhattan Kansas Energy Audit
- USDA AGL Aberdeen Idaho Retro-Commissioning
- USDA AFRS Kearneysville, West Virginia Energy Audit
- USDA Eastern Regional Research Center Wyndmoor PA Energy Audit
- USDA New England Plant Soil Water Lab, Orono, ME Energy Audit

Recommended energy conservation opportunities (ECO) address the majority of the building problems such as HVAC equipment installation, design, present performance, design criteria, equipment status, performance assessment of equipment controls, sequence of operation, air distribution, etc. A high energy cost of about \$3/ft or more per square foot is consumed by these facilities. Laboratory requirements such as 100% outside air and fume hood air changes are the cause of the high energy consumption. When compared to office buildings of similar size these USDA facilities consume about 400% more energy. Recommended ECOs include (but not limited to):

- Weatherstripping and sealing of building envelopes
- Replacing cooling towers with Geo Exchange closed loops
- Reconfiguring HVAC air distribution systems for better circulation
- Air conditioning retrofits
- Controls and maintenance training
- Installation of smart meters
- Energy outreach
- Installation of variable frequency drives
- Expansion/upgrade of HVAC controls systems
- Updating motors to premium efficiency types
- Replacing inefficient boilers with multi-stage modular types
- Replacing greenhouse metal halide lights with LED grow-lights

- Replacing shop forced air heaters with infrared heaters
- Replacing low efficiency chillers
- Installation of occupancy sensors
- Lighting upgrades, including delamping and day light maximization
- Reducing plug loads by maximizing use of ENERGYSTAR rated products
- Implementing predictive technologies (vibration analysis, infrared thermography, ultrasound)
- Installing interior insulation
- Installing exterior door vestibules
- Installing a “cool roof”
- Install an absorption chiller fueled by “wasted” steam
- Heat recovery from 100% fresh air fume hoods
- Install a fuel cell

Common challenges encountered are the inability for the facilities to provide the proper work environment, controlling conditioned spaces, reliability of the equipment, and inadequate equipment and improper operations, and inefficient control strategies which does not optimize the operation. EMR has consistently exceeded the expectation of the clients by providing excellent solutions. Typical recommendations include heat recovery from 100% fresh air lab units. Supply, relief and exhaust for units will have uniquely designed heat recovery system demand based ventilation, VFD working to optimize the unit performance. All lab units to have intelligent controls with sensors and controllers, retrofit chiller plants with smaller chillers with ice storage, geothermal heat pumps, geothermal cooling loops, etc. have been proposed.



Pyrolysis reactor used by research scientists at the Agricultural Research Service, Eastern Regional Research Center in Wyndmoor, PA



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