



Advancing Energy Efficiency at Water and Wastewater Treatment Facilities

Brief Description:

Too often, energy management is not a priority for municipal officials whose primary concern is how water and wastewater treatment costs fit within a larger fiscal picture. Neither is it a priority for operators who are primarily responsible for ensuring that the treated water meets regulatory standards. As such, energy management at the facilities often falls between the cracks. Many municipalities may not notice that they are using more energy than necessary, typically accounting for 30% to 40% of the total energy budget. By making energy efficiency an established priority, facilities can reduce GHG emissions as well as the cost of energy to the municipality.

In 2008, with financial support from EPA's Office of Wastewater Management, Region 4 hosted a workshop in Nashville that presented energy efficiency as a management concept. In 2011, a formal partnership began with a proposal from Region 4 to TDEC for a joint Region 4-TDEC Energy Management Initiative (EMI) in Tennessee. The EMI would focus on a select group of water/wastewater utilities and assist them in identifying and implementing energy conservation measures. During the subsequent months, seven municipalities in Tennessee demonstrated significant interest and joined the EMI partnership. EPA and TDEC successfully obtained critical support from other key partners including the Tennessee Valley Authority, the University of Memphis, the University of Tennessee, the University of North Carolina Environmental Finance Center, Schneider Electric, Inc., and the Tennessee Department of Economic and Community Development.

EPA, TDEC, and the other partners visited the participating facilities to identify initial opportunities to save energy. EPA worked with the partners to develop Preliminary Energy Assessment reports that analyzed the process energy data and presented the partnership's recommendations. The municipalities were then invited to participate in four workshops to assist them with developing energy management plans that included their overall energy efficiency goals, specific projects, and potential opportunities to fund implementation of the projects.

Subobjective:

Water Safe to Drink and Water Quality

Type:

Energy Efficiency

Highlights:

- **What:** EPA Region 4 is promoting energy efficiency at water and wastewater treatment facilities through a three-pronged approach: (1) developing the capacity of state and tribal water regulatory programs, municipalities, and other stakeholders to act on the opportunities for reducing energy use and cost at facilities; (2) establishing relationships with potential collaborators and stakeholders to advance energy efficiency at facilities in certain geographic areas in the Southeast; and (3) targeting low- or no-cost strategies as developed by energy efficiency partnerships to achieve significant reductions in energy use, cost, and greenhouse gas (GHG) emissions.
- **Who:** EPA Region 4 Grants and Infrastructure Branch and the Tennessee Department of Environment and Conservation (TDEC).
- **Why:** The costs of energy use for water and wastewater treatment facilities can represent a significant share of most city government budgets. High energy costs reduce funds available for important upgrades for treatment technologies and compliance attainment.

Current Status:

EPA Region 4 has expanded its efforts to educate state agencies, municipalities, and other key stakeholders regarding the significant energy efficiency opportunities available. The success of the Tennessee EMI is being promoted by the municipalities and other stakeholders that participated in this effort. TDEC is leading a second initiative focused on a new group of utilities in Tennessee. Region 4 is supporting

the effort as it works to replicate the success of this initiative throughout the region.

The Alabama Department of Environmental Management has also partnered with Region 4 to conduct a similar initiative with selected utilities in Alabama. The utility selection process is underway, and site visits and workshops will occur over the rest of 2014. Region 4 has developed a simplified Energy Assessment Tool (R4 EAT) to help the EMI team and the utilities assess and track energy usage and prioritize processes/equipment for further analysis. The R4 EAT is being used in Alabama and will be made available for other states and utilities to help identify potential energy saving opportunities.

Region 4 is also collaborating with United South and Eastern Tribes, Inc. (USET), which provides assistance to tribal governments to enhance their capability to meet the needs of the Indian population. USET serves 26 tribes from Texas to Maine and is headquartered in Nashville, Tennessee. Region 4 is working with USET to build its capacity to provide energy management assistance to tribal utilities and will serve as a resource to provide onsite tribal assistance with USET as needed.

Outcomes:

Region 4 staff have measured and verified reductions of over 5 million kilowatt-hours per year in energy consumption, \$400,000 in energy costs, and 4,800 tons of GHG emissions achieved by four of the seven municipal water and wastewater utilities that participated in the EMI partnership in Tennessee. Pending further verification, Region 4 projects that the seven utilities will reduce their energy consumption overall by 16%. This translates to saving a total of 7 million kilowatt-hours per year, reducing annual GHG emissions by 6,600 tons, and saving nearly \$600,000 per year.

These results underscore the significant energy saving opportunities available through operational modifications of water and wastewater treatment facilities that the utilities can implement at minimal cost. These modifications can also reduce GHG emissions and provide municipalities with a cash flow to fund additional energy conservation measures, water/wastewater treatment upgrades, or other important needs. Region 4's effort builds on the work initiated by EPA's Office of Wastewater Management through the Plan-Do-Check-Act framework outlined in its Energy Management Guidebook for Water and Wastewater Utilities issued in 2008. Other EPA regions have undertaken similar efforts.

Lessons Learned/Recommendations:

The most important lessons learned through the EMI partnership were:

- The opportunity to save energy exists at almost all public water and wastewater systems, often through operational changes the utility can implement for little to no cost.
- Disconnects often exist between those who use the energy and those who pay for the energy.
- The success of an energy management effort depends upon the involvement of people with good relationships with the utilities.
- A more intensive engagement with the utilities helps develop a long-term focus on energy as a management concept, rather than a one-time problem with a one-time solution.

EPA expects that the results of these efforts will continue to encourage other states to seek similar success, directly advancing the Agency's priorities to make visible differences in communities, take action on climate change, and advance sustainability.

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Columbia TN Total Energy Use By Year

