Energy Management Initiative for Water and Wastewater Utilities– Summer 2012

City of Hutchinson

Overview

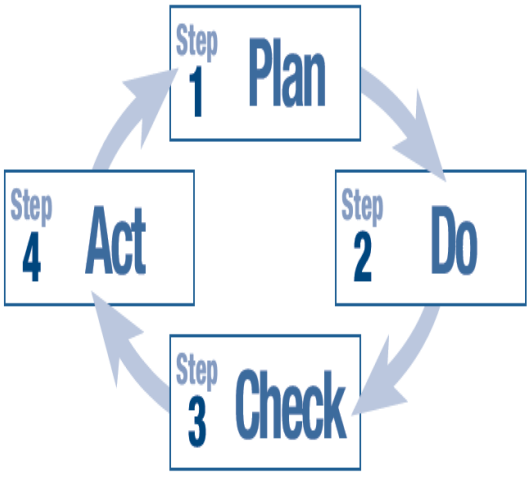
One of the most effective ways for cities to reduce their costs and improve environmental performance is to improve energy efficiency. In U.S. cities, an estimated 30 to 40 percent of municipal energy use and associated operating budgets are spent treating water and wastewater. Rising energy costs add to the other challenges that water utilities are facing. These challenges include the need to expand services, meet more stringent regulations, and replace aging infrastructure. Because most of the energy used to pump and treat water in the Midwest comes from coal-fired power plants; significant quantities of air pollutants are also emitted as a result. Energy conservation can be a mechanism to improve both air and water quality as well as save money.

In May 2011, the U.S. Environmental Protection Agency (EPA) invited 10 Kansas communities to participate in an Energy Management Initiative for Water and Wastewater Utilities, a pilot program led by the Kansas Water and Energy Efficiency Partners (KANWE) which included the EPA Region 7 Office, Kansas Department of Health and Environment, the Wichita State University Environmental Finance Center, Kansas State University, Kansas Municipal Utilities, and Schneider Electric. Five communities chose to participate in the pilot program which included developing an Energy Management Plan, implementing an energy efficiency project, maintaining data and sharing results.

About Hutchinson's Water and Wastewater Utilities

The City of Hutchinson is home to nearly 41,000 people and is located in Reno County to the northwest of Wichita. The Wastewater Treatment Plant (WWTP) was built at its current location in 1959 and has undergone two major upgrades. The plant performs an activated sludge treatment process. Presently, the facility treats approximately 4.6 million gallons of domestic and industrial wastewater per day. Treated wastewater is discharged to the Arkansas River. Approximately 7,000 cubic yards of sludge produced annually is land-applied as fertilizer to nearby farmland.

Hutchinson's new water treatment plant was completed in May 2009. It draws water from 17 groundwater wells, 4 of which are purified using a reverse osmosis treatment process and then pumps water through the distribution system. The plant produces an average daily capacity of 6.5 million gallons per day.



Developing an Energy Management Plan

The KANWE partnership provided an energy assessment and a series of 4 workshops for community representatives during which each developed an Energy Management Plan for their respective communities. The training followed a plan/do/check/act sequence, as outlined in EPA's *Ensuring a Sustainable Future: An Energy Management Guidebook for Wastewater and Water Utilities.* During the workshops, participants set an energy goal and baseline, drafted an energy policy, formed an energy team, explored opportunities for saving energy, prioritized projects, developed near and longer term plans and developed a set of measures of success along with a schedule for implementation.

Hutchinson's energy policy calls for the city to reduce energy use by 10% (compared to their 2011 usage) in wastewater utilities by implementing a set of projects and practices. The policy further sets out the following standards for day-to-day operations at each of their water treatment facilities:

- Implement power saving practices for office equipment.
- Complete an energy life cycle cost analysis on all new construction projects.
- Regulate heating and cooling in buildings according to peak occupancy.
- Operate all electrical equipment at optimum ranges according to operation & maintenance plans.
- Provide training to employees to make sure each has knowledge and skills necessary to operate equipment efficiently.

Project Selection

As part of Hutchinson's Energy Management Plan, the city chose to implement four projects; two for water and two for wastewater. These were selected based on their regulatory impact, severity of the impact, environmental impact, long-term impact, cost and constructability, management support, and infrastructure impacts.

1. Monitoring Equipment
Install new monitoring equipment on the aeration basin at the WWTP. This project was chosen because in comparison to its overall cost, $50,000, the project offers significant benefits as operators can monitor more carefully the requirements of the wastewater being processed through the treatment plant. Specifically, monitors will be installed for nutrients, solids, and oxygen. This project will provide energy savings by reducing unnecessary processing, allowing the treatment facility to use only the electricity required for the wastewater treatment and avoid any additional energy usage that is not needed.

2. Replace Gas Regulators
Replace the existing gas regulators in the digester with electric regulating valves. The final project was selected because at an estimated cost of $10,000, it offered an affordable alternative to the gas regulators in the digester. The electric valves not only more efficiently regulate the digester, but are also more accurate than the gas regulators.

3. Install VFDs on Booster Station
To install variable frequency drives (VFD's) at the Water Tower 4 booster station. The cost savings are yet to be determined due to other project enhancements at the Water Tower that will also affect energy use.

4. Pump Replacements
Replace the pump on drinking water well #21. This project was selected because it offered the greatest energy savings for the cost of implementation. Specifically, it calls for replacing the existing vertical turbine pump and motor with a lower capacity submersible pump. The cost of this project is $15,000.

"Participation by the City of Hutchinson water and wastewater staff in the Kansas Water and Energy Partnership Program identified a number of potential cost saving opportunities to consider through energy efficiency improvements. Opportunities we intend to pursue as we proceed with future projects."
-Reg Jones, Director of Public Works, City of Hutchinson

Financing

The City of Hutchinson currently spends $1 million per year on the energy necessary to operate its water and wastewater utilities. The nutrient monitoring equipment was financed out of the yearly capital budget and completed in the summer of 2013. The total cost of the project was $60,000. The Water Tower 4 project will be financed as a capital improvement project financed through the City's water fund in 2014. Funding for the remaining two projects have yet to be determined.

Next Steps

At the beginning of their participation in the KANWE program, the City of Hutchinson set a goal to improve their energy efficiency by 10% based on 2011 energy usage as a baseline and then identified projects to meet that goal; but the energy management plan is not done there. To maintain energy and water conservation standards, several activities will be put in place to ensure the success of the new energy policy. Progress will be monitored on a continuing basis by keeping energy consumption records to track consumption. Training will be provided to employees to ensure they have the necessary skills and knowledge to effectively apply the technology used to achieve energy savings. The proper maintenance processes will be implemented and scheduled to ensure that systems operate as efficiently as possible.

Looking towards future projects, the city of Hutchinson looks forward to applying the Energy Management System approach to other departments and programs.

Hutchinson Wastewater Treatment Plant

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