

Motor System Efficiency in Water and Wastewater Systems: A Call to Action

R. Neal Elliott, Chair, CEE Motors Committee, American Council for an Energy-Efficient Economy

Ted Jones, Industrial Program Manager
Consortium for Energy Efficiency

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Water and wastewater treatment facilities are ubiquitous throughout the country, providing clean, potable water for municipalities and industrial facilities, and treating municipal and industrial sewage to preserve the quality of waterways and aquifers. The clear water is pumped through extensive distribution systems, with the waste returning back to treatment facilities. These facilities are energy intensive, one of the largest and most energy intensive facilities owned and operated by local governments accounting for 35% of energy used by municipalities (EFAB 2001). Electricity use in water and wastewater treatment and pumping in the United States is estimated to cost over \$6.5 billion annually, with savings of 15% readily achievable (ASE 2002).

A number of different techniques are used to process water and wastewater depending upon location and size. For example, daily electricity consumption for a million gallon per day (mgd) wastewater plant will vary from 1811 kWh for a tricking filter plant to almost 3000 kWh for an advanced plant with nitrification (Water Environment Federation 1997). Motors consume the vast majority of the electricity used in municipal water systems, with most used for pumping (46%) and aeration (40%) (Xenergy 1998).

While facilities vary in process detail, motors pumps and high-pressure blowers are used in much the same way so that what is learned at one facility is almost directly applicable at other facilities in the same region. This makes municipal water systems an excellent candidate for developing regional pump and blower system optimization efforts. U.S. DOE, in cooperation with the California Motors Initiative, developed a pump-system-training program for water and wastewater treatment system operators. This program was initially offered in California in cooperation with the American Water Works Associations (AWWA). Subsequently AWWA has made the training available nationally to excellent reviews (Nadel, et al. 2002).

In 1999, Consortium for Energy Efficiency (CEE) launched a Motor Systems Initiative in order to organize its members, collect tools and promote pump, fan and compressed air system efficiency opportunities nationally (CEE 1999). As part of this initiative, CEE organized a working session on pump and fan system efficiency during the 2002 ACEEE-CEE Market Transformation Symposium in Washington, DC. Twenty-five utility and state administrators of energy-efficiency programs attended. (CEE 2002) Of this number, 18 (11 CEE members) participated in a conference call to discuss program opportunities. Targeting specific sectors, such as water and wastewater treatment systems, was appealing to the group since several CEE-members, such as Southern California Edison, have decades of program experience to contribute.

Others have also realized these opportunities. The Environmental Financial Advisory Board to the administrator of the U.S. Environmental Protection Agency has recommended that the state revolving fund programs begin to offer loans for energy efficiency and co-generation technologies (EFAB 2001). In response the EPA Energy Star program is now looking at the opportunities for a municipal water and wastewater initiative. The Alliance to Save Energy has just completed a new report, *Watergy*, on domestic and international opportunities for energy conservation in water systems (ASE 2002). At the same time, the public power community has begun to look at voluntary initiatives they can participate in to reduce energy use and greenhouse gas emissions, with municipal water systems high on the list (Duncan 2002).

As briefly described above, a combination of factors suggests that water and wastewater system energy-efficiency represents a national market transformation opportunity. The potential energy savings are substantial, key regional and national groups have demonstrated interest, and technical resources (training, tools, etc.) are readily available. The prospect of EPA making low-cost financing and Energy Star resources available for these projects

addresses still more market barriers. These factors represent a unique opportunity to form a coalition to support a national market transformation initiative. All that is needed is a focus that can provide coordination among all these groups.

NEXT STEPS

CEE's Motor Systems Committee proposes to organize a workshop (this Fall) to explore the opportunity for a national initiative on water and wastewater treatment systems. CEE was established in 1991 for the very purpose of accelerating market adoption of super-efficient products and services through the development of national market transformation initiatives. These initiatives are implemented in the field when CEE members incorporate them into their regional, state and local energy-efficiency programs. Currently, CEE has 13 initiatives that range in scope from super-efficient home appliances, to high-efficiency commercial HVAC equipment, to premium-efficiency industrial motors. CEE has also been successful in working outside its membership to address motor system efficiency opportunities. For instance, CEE played a key role in the creation of the Compressed Air Challenge and the Motor Decisions Matter campaign. The purpose of the proposed workshop is to determine if there is adequate interest in targeting energy efficiency opportunities in water and wastewater treatment facilities and to begin planning our approach.

References

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