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## **Energy Management at the Silverthorne/Dillon Joint Sewer Authority**

Providing wastewater services to citizens requires energy- a lot of it. Steadily increasing energy costs, new and complex regulations, and expanding service areas have made the issue of energy management one of the most important issues facing wastewater utilities today. Water and wastewater utilities in the U.S. spend about \$4 billion a year on energy to pump, treat, deliver, collect, and clean water. Energy costs for wastewater treatment can be 25-30 percent of a municipalities total energy bill.

The Silverthorne/Dillon Joint Sewer Authority (**JSA**) owns and operates the Blue River Wastewater Treatment Plant (**BRWTP**) and sewer interceptor collection system. The BRWTP is designed to treat 4 million gallons of wastewater per day and provides wastewater services to the Towns of Silverthorne, and Dillon, and the special districts of Dillon Valley, Buffalo Mountain, and Mesa Cortina. The Town of Silverthorne is the managing entity for the JSA and directs the day to day operations of the joint facilities.

Energy represents the largest controllable cost of providing wastewater services to the public. The JSA has invested heavily in energy efficiency projects. These projects offer excellent rates of return, reducing energy costs at the facility by 25% or more. Automation of unit treatment processes at the JSA has proven to be the best payback on investment. For example, the treatment process of aeration is a major energy user at the facility. Oxygen sensors in basins measure oxygen levels and automatically control the output from blowers to maintain dissolved oxygen set-points. Think of it as cruise control for a car, you always get better gas mileage when your car automatically controls the speed. Similar automated control loops are in place for pumping and process control systems throughout the facility.

This level of automation not only improves wastewater treatment it also reduces electrical demand charges. Benchmarking and tracking electrical energy use is an important energy management tool. JSA operators are able to track kW usage minute by minute throughout the

day for each individual large motor. The kW usage is trend charted and the charts reviewed by operators for process optimization and also to alert operators to unusual conditions. The facility presents itself as a consistent load to the electrical utility, Xcel Energy. With both a steady load factor (average kW use/max kW demand) and kW demand, the facility pays a fairly modest rate for electricity, averaging just under 7 cents /kWh. Compare this to the average industrial user rate of 11 cents /kWh.

Xcel Energy offers cash rebates for energy efficiency projects that the JSA has taken advantage of. Recently, variable frequency drives (VFD's) were purchased to automatically control aeration equipment at a cost of \$40,000.00. Xcel Energy awarded the JSA a \$16,000.00 rebate for the VFD's.

In conjunction with Xcel Energy, the Town of Silverthorne recently completed a comprehensive energy efficiency engineering study of the JSA facilities to identify opportunities for further energy savings. The cost of the study was \$28,000.00, and Xcel Energy provided a \$21,000 rebate. The study identified \$195,000.00 in equipment upgrades and estimated that the annual electrical cost savings would be \$15,000.00 when the upgrades are completed. These upgrades are eligible for a \$45,000.00 Xcel Energy rebate. The application for preapproval of the project has been submitted to Xcel and is under review. After the preapproval process, the upgrades will be made as the budget allows.

Renewable energy sources are an important part of the JSA's energy management policy. The Town of Silverthorne intends to submit a letter of interest for 100 kW of solar production for the JSA when the 2MW Summit County Solar Garden is constructed. 100kW will produce about 140,000 kWh/year and cost \$300,000.00 to \$350,000.00. This will supply about 5% of the total annual usage at the treatment facility.

Projects to reduce building heat loss have been completed. The treatment facility buildings total approximately 90,000 square feet under roof and use natural gas for heating. A few years ago a project to improve the heating/ventilation system was completed. Heat recovery coils were added to recover heat from the ventilated air, and also to recover heat produced by the biological treatment process. The recovered heat is used to heat one of the outlying buildings. Improvements in the building ventilation system provide five to six air changes per hour and produce a healthier and less corrosive indoor atmosphere. Heat loss is offset by the heat recovery system. Also, this past summer the exterior of the main treatment building was stripped of its old stucco. New exterior insulation and a vapor barrier were added along with a new stucco top coat.

What does the future hold for wastewater utilities? The EPA has mandated that States promulgate regulations to control nutrients entering waterways. This will require wastewater utilities to remove more phosphorous and nitrogen before the treated wastewater is discharged to the environment. In March of 2012 Colorado will pass nutrient regulations that will be implemented over the next ten years. Removing more nutrients from wastewater will of course require more energy and operator expertise. As JSA staff evaluate system and equipment upgrades, consideration as to how they will fit with the new nutrient regulations is given high priority. As decisions are made on how to best manage our energy resources, protecting the environment and providing economical wastewater services has always been, and will continue to be the number one goal of the JSA.