

## Truckee Meadows Water Authority, Reno, Nevada

February 21, 2012

### Facility Profile

Truckee Meadows Water Authority (TMWA) has chosen its drinking water facility, Chalk Bluff Water Treatment Plant, for the Energy Management Initiative. The plant was built in 1994 and serves more than 330,000 customers throughout 110 square miles within Washoe County, Nevada. The Chalk Bluff Plant treats water from the Truckee River, which flows from Lake Tahoe and the Sierra Nevada mountain range.



### Baseline Data

TMWA serves 93,000 customer connections. In 2009 the water authority spent just under \$7 million on electricity and \$88,000 on natural gas. The Chalk Bluff Water Treatment Plant uses 13.5 gigawatt hours (GWh) and 74,452 therms per year, and spends \$1.35 million for electricity. The total energy use results in estimated annual greenhouse gas (GHG) emissions of 9,309 metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>).

### Energy Improvement Management Plan

While TMWA relies on gravity as much as possible, in a mountainous community, pumping water is a reality. The Chalk Bluff Plant is TMWA's largest water producer and highest energy use facility. The high energy use is due to the pumping of water uphill from the river into the plant. To reduce energy consumption at Chalk Bluff, the implementation plan consists of two parts: (1) optimizing the time-of-use operating procedures, and (2) water supply capital improvements.

- 1) The first strategy is to optimize time-of-use operating procedures by creating a mass flow/electric cost model of the treatment and effluent pumping processes. The model will be used to predict how changes to the operating procedure will affect electricity cost. In 2010, TMWA spent \$938,000 on 7.8 GWh for non-water supply processes at the plant. This project intended to reduce non-supply electric costs by 15% or \$141,000.
- 2) The second project involves water supply improvements to the Highland Canal which transports 90% of Chalk Bluff's water directly to the plant using gravity. The improvement plan will allow 100% of the water to be brought to the plant using the Highland Canal and meets multiple objectives. Improvements will be made during winter months when customer water demands are lowest to reduce the water supply pumping costs during construction. Currently, TMWA spends \$60,000 on 0.5 GWh for water supply pumping at the Chalk Bluff Plant. Energy use will be zero when the project is complete. The design life of the new infrastructure is over 100 years and it will require no energy to operate.

### Challenges

Originally scheduled to begin construction during the fall of 2011, delays in obtaining highway encroachment permits has postponed construction. To minimize water supply pumping costs during construction and therefore continue to reduce energy costs, this project has been delayed until the fall of 2012.

TMWA attempted to use a mass balance/electric cost model to optimize time-of-use operating procedures. However, the mass balance/electric cost model is not capable of the sophisticated decision making used by the experienced water plant operators. Therefore, the purpose of the model has shifted from generating decisions to being one of several techniques useful for improving time-of-use energy optimization at the Chalk Bluff Plant.

## Accomplishments

1) TMWA began setting and tracking time-of-use electricity goals for the Chalk Bluff Plant in November of 2010. The goals depend on time of day (e.g., 200 kW On-Peak, 400 kW Mid-Peak, and 950 kW Off-Peak), and vary with season, based on the electric utility's tariffs. Water Plant operators have the ability to be innovative in order to meet electricity use goals and system demands. The mass balance/electric cost modeling effort was valuable to establish baseline energy usage by (1) formally inventorying energy intensive unit processes, (2) establishing kW draw of equipment, (3) establishing and ranking historic kWh usage of equipment, and (4) suggesting starting point kW targets for further optimization by operators.

TMWA considers the time-of-use optimization project a great success due to its ability to save energy costs, and will continue to optimize and track the project's results. For the 12 months from November 2010 through October 2011 the time-of-use optimization has saved more than \$225,000 (24.4%) compared to the same period the previous year. During this time electric energy usage was reduced by only 0.45 GWh (5.8%), indicating the savings was primarily due to improved time-of-use cost management.

Going through the process of identifying energy needs of each process was eye opening. Talking to the operators and getting them to work toward the time of use goals was educational, engaging, and strengthened the team.



Annual Projected GHG Reductions: 310 MTCO<sub>2</sub>, equal to the removal of 61 passenger vehicles from the road

Project Cost: Zero

Payback Period: Zero

2) Design is substantially complete for the water supply improvement project, and highway encroachment permits are expected in time for the project to proceed in the fall of 2012.



Annual Projected GHG Reductions: 345 MTCO<sub>2</sub>, equal to the removal of 68 passenger vehicles from the road

Project Cost: \$3,000,000

Payback Period: 50 years

## Next Steps

- 1) Complete; continue to optimize and track project results.
- 2) Get permits; construction.

## Contact

Keith Ristinen  
[kristinen@tmwa.net](mailto:kristinen@tmwa.net)

