

City of Vallejo Water Division pursues energy efficiency and renewable resources

Background

The City of Vallejo Water Division supplies potable water to Vallejo and surrounding communities including Green Valley, Glen Cove and the Travis Air Force Base. The district supplies on average 15 MGD (million gallons per day) with peaks exceeding 20 MGD in the summer months.

The Water Division has policies that encourage sound environmental practices and sustainability initiatives in each of their facilities. In support of these policies the Water Superintendent was looking for ways to reduce their energy consumption and overall energy costs. Pacific Gas and Electric (PG&E) hired AESC to perform a series of energy audits throughout the Water district, including the pumping stations and treatment plants, to identify energy efficiency opportunities.



Study Description

The Division receives water from Lake Berryessa and the North Bay aqueduct. The water is mixed and then pumped to a treatment facility where it is treated and pumped to distribution pumping stations. Finally, the pumping stations deliver the water to a storage tank that directly feeds the water customers. AESC visited more than 20 individual pumping sites, sub-metered facility equipment (or gathered SCADA system data) and generated an audit report for each facility and pumping station. The audits involved approximately 30 electric meters and two gas meters. AESC's team identified 43 potential retro-commissioning, energy efficiency, load management, demand response and self-generation measures. The energy efficiency measures identified by the audit team supported the goal of how to do the same job with less energy. AESC intentionally avoided costly system modifications, and focused on reducing the existing systems' energy intensity. Engineering analyses were developed to understand the cost on a per gallon basis to identify the potential for improvements. The suggested measures included:

- Increase the diameter of pipe sections or add parallel pipes to decrease pressure losses and add flexibility and reliability to the system,
- Add Variable Frequency Drives (VFDs) to electric driven pumps to reduce speed and pressure losses, to better control storage tank levels, and to assist in controlling load management operations in order to limit demand charges,
- Replace gas driven engines with smaller electric driven pumps equipped with VFD's,
- Retrofit the compressed air system to reduce power usage to produce the CFM of compressed air delivered,

- Retrofit the exterior lights with LED near the settling tank,
- Select a more cost effective electric rate schedule,
- Manage equipment's electric demand to reduce demand charges,
- Add renewable generation including solar, wind, and hydroelectric,
- Re-commission an existing under-performing photovoltaic system.

Natural gas driven pumps to be replaced by smaller VFD electric driven pumps



Project Results

The Water Division is currently planning, engineering and constructing the first group of projects that should result in annual savings of approximately 800,000 kWh (electric), 7 MMBTU (gas), and \$130,000 in utility bill costs.

In 2013, AESC will audit the remaining pump stations utilizing a higher level ASHRAE audit process, including measurements of power, flow rates and pressure. These detailed measurements will accurately define the load profile and thus the

energy consumption and potential savings of systems.

AESC Services and Specialties

- Energy efficiency assessment and calculations of commercial and industrial facilities
- ASHRAE Level I, II, and III audits
- Design and specification of HVAC systems
- Installation inspection and measurement and verification (M&V)
- Combined heat & power (CHP) feasibility analysis with advanced generation and energy storage
- Energy and environmental impact evaluation
- Identification of incentives and financing options
- Utility and end-user energy program development and support

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