UTAH DEPARTMENT of ENVIRONMENTAL QUALITY

CASE STUDY

Energy Efficiency Profile: Mountain Regional Water Special Service District

MOUNTAIN REGIONAL WATER DISTRICT SAVED $392,812 PER YEAR IN ENERGY COSTS

Energy represents the largest controllable cost of providing water to the public. Utah water systems are designed and built to meet future water needs. The majority of water systems have not been designed with energy efficiency as the main focus. Energy audits, available through Rocky Mountain Power's (RMP) wattsmart program, are an essential first step towards energy efficiency. Water system operators and managers that haven't implemented some or all of the energy efficiency measures recommended in an energy audit are probably spending more energy to deliver water to their customers. The money savings achieved by implementing energy efficiency measures can be used for equipment upgrades, meeting new water quality requirements, boosting the salaries of staff, or keeping water rates affordable.

MOUNTAIN REGIONAL WATER SPECIAL SERVICE DISTRICT

Mountain Regional Water Special Service District (Mountain Regional Water) takes conservation and protection of its natural resources very seriously. They are mindful of operating their system as if they are in a drought. Drought is inevitable in Utah—and they are usually extended and last several years at a time. If they didn't design their system for such a natural swing in our weather patterns, they would not be able to serve their customers in the peak of the worst drought years. Their conservation mind set also applies to energy use, as they are also mindful of operating their system as energy efficient as possible. Mountain Regional Water has adopted the following strategies to conserve energy and water:

ENERGY EFFICIENCY STRATEGIES

- Pump during RMP's Off-Peak (at night) periods.
- Increase the Energy Load Factor (LF) by avoiding pumping at a high capacity for a short period of time.
- Ensure that distribution piping and Pressure Relief Valves (PRV) do not allow pumped water to recirculate back to the pumping facility suctions (i.e., re-pumping).
- Reduce leaks by implementing a regular water audit and repair program.
- Minimize power factor (PF) penalties by ensuring all large pumping facilities have PF correction devices.

Service Area
25 square miles

Total Gallons of Storage
10,100,000 Culinary Water
10,100,000 Raw Untreated Water

Total Peak Pumping Capacity GPM
36,500 gpm

Total Annual Gallons Pumped
2,858,207,000

Total Connections or Customers
4,200

Source Water Annual Cost of Purchased Energy
$694,875
(9.0 million kilowatt hours)

Annual Savings: Attributed to Energy Efficient Strategies (as of 2015)
$392,812

Energy Audit Partners

Steve Jones, PE
Hansen, Allen & Luce, Inc.

Mt. Regional Water Contact

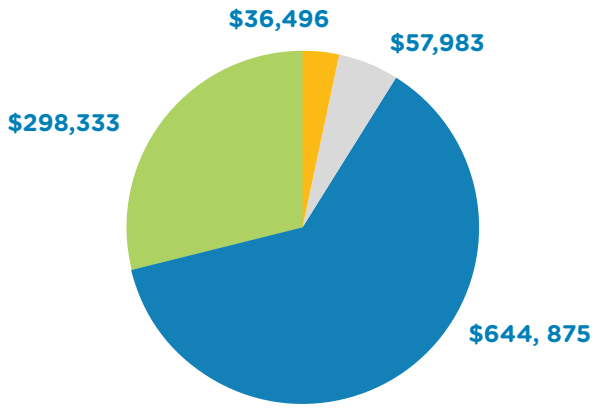
Doug Evans,
Chief Technical Officer

MOUNTAIN POWER AND ENERGY SAVINGS

Mountain Regional Water began its program in 2010. By 2012, the district achieved an initial savings of $300,000 during a period of regular annual rate increases by RMP. By 2015, annual savings increased to $392,812.

Mountain Regional 2015
Annual Energy & Power Cost Savings in Dollars

(Based on an Original $1,037,687 Annual Energy and Power Bill)



- ***Current Net (of Savings) Energy & Power Bill***
- ***Savings Achieved by Power & Energy Management***
- ***Savings Achieved through User Conservation Programs***
- ***Savings Achieved by Water Management (i.e. Loss Prevention) Programs***

Realized Annual Savings of $392,812

POTENTIAL ENERGY SAVINGS USING OPTIMAL POWER RATES

Energy savings are listed in order of effort to implement, with the most difficult listed last, assuming a 500 foot average pumping head.

Rate Structure	Annual Cost/ERC	Cost 1,000 ERCs	Annual Savings
Typical Rate 6 Usage @ 20% LF*	$155.00	$155,000.00	
Switch to Rate 6A with No LF Change	$114.00	$114,000.00	$41,000
Use Rate 6 Managed to 80% LF	$62.00	$62,000.00	$93,000
Switch to Rate 6A & Managed Pumping Load to Total Off-Peak**	$54.00	$54,000.00	$101,000
Switch to Rate 8 Totally Off-Peak***			$121,000
Switch to Rate 9 Totally Off-Peak***			$129,000
Switch to Rate 6B After Totally Going Off-Peak for 1 Year			$124,000

* Load Factor (LF). (See Definitions.)
** Off-peak: 8 hours—from 11:00 PM to 7:00 AM—plus all day weekends and certain holidays.
*** Only available to accounts using over 1 Megawatt of peak power demand per month.

OPERATIONAL STRATEGIES

The following changes were implemented by staff at Mountain Regional Water to save money and optimize energy and power savings:

- Implement optimum RMP rates on pumping facilities to reduce pump energy and/or power charges (see table).
- Eliminate or reduce Demand Charges by pumping during off-peak periods.
- Use VFDs to increase the LF and to replace flow regulation by valve restrictions.
- Utilize water storage reservoirs more efficiently by increasing drawdowns to allow for off-peak pumping strategies.
- Decrease pumping head losses by slowing down pump rates with VFDs or smaller pumps, and upgrading pipe sizes.
- Find and remedy sources of water loss, and water looping (re-pumping).

DEFINITIONS

Energy Load Factor (LF): LF is a measurement, expressed as a percentage, of the amount of time a facility runs during the billing cycle. A peak power (kw) charge is assessed if a pumping system runs at a high capacity for a short time, as short as 15 minutes. It is less expensive to operate at a lower capacity for a longer period of time, where the same amount of water is pumped during a day or month but the peak power charge is much less.

Equivalent Residential Connection (ERC): An ERC represents the common or standardized unit of water demand of a typical residence, which is applied to all other users, such as commercial.

Power Factor (PF): A measure of the inefficient reactive power used in a system, expressed as VARs. If this goes over a certain limit, the power utilities will assess a monthly penalty.

Variable Frequency Drive (VFD): An electrical device which controls the speed of a motor by changing the frequency or cycle per second, measured in hertz (Hz), of the electrical system feeding it. In many situations, a VFD can increase the efficiency of a pumping system and eliminate PF penalties.