



CASE STUDY

Energy Efficiency Profile: Logan City Water

LOGAN CITY WATER

SAVED OVER \$137,000 PER YEAR IN ENERGY COSTS

Energy represents the largest controllable cost of providing water to the public. Utah water systems are designed, built and operated to ensure water needs are met. The majority of water systems have not been designed with energy efficiency as the 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 who 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.

LOGAN CITY WATER

Logan City is the commercial and institutional hub of a rapidly growing metropolitan area with many outlying residential communities. To meet current and future water needs, the city strives to operate their system as energy and water efficient as possible. The city adopted Energy Conservation Measures, including creating a new pressure zone to alleviate high pressures and pressure fluctuations as recommended in an Energy Assessment Report that was conducted by Hansen, Allen & Luce, Inc. in 2012. Water system pressure in the newly created pressure zone was reduced by approximately 40 - 60 psi. In addition to saving energy, the project resulted in higher customer service by reducing pressure fluctuations and extreme pressures.

Service Area
17 square miles

Total Gallons of Storage
10.7 million gallons
(Culinary Water)

Total Peak Pumping Capacity GPM
27,250 gpm

Total Annual Gallons Pumped
2,115,674,637 gallons

Total Connections or Customers
~10,105

Annual Cost of Purchased Energy (2014)
\$291,000

Annual Savings Attributed to Energy Efficient Strategies (2014)
\$137,000

Annual Energy Savings (2014)
900,000 kWh

Energy Audit Partners

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

Logan City Contact

Paul Lindhardt, PE, Manager

ENERGY EFFICIENCY STRATEGIES

- Creating a new pressure zone (split the City into two major pressure zones):
 - Reducing main line leaks by decreasing water pressure from approximately 200 psi to 130 psi in high pressures zones.
 - Rebuilding wells and pumping stations with Variable Frequency Drives (VFD) to lower the energy requirements and to minimize power factor (PF) penalties.
 - Eliminating the need for a major transmission pipeline project.
 - Postponing construction of a new water source.
- Increasing the Energy Load Factor (LF) by avoiding pumping at a high capacity for a short period of time, i.e. run pumps at a slower and steady rate for a longer period of time.

LOGAN CITY’S POWER AND ENERGY SAVINGS

In 2014, Logan City created a new pressure zone. An energy efficiency savings of \$137,00 was realized, a 32 percent reduction from 2013, due to the creation of the new pressure zone and other minor improvements.

Annual Cost Savings in Dollars



- 2014 Annual Cost of Purchased Energy (\$291,000)
- Annual Savings of \$137,000

MAIN BREAK REDUCTION

In addition to savings through energy efficiency, Logan City has seen a major reduction in operation costs and water losses due to a reduction in water pressure.

| Reduction in Main Breaks | 2013 Main Breaks | 2014 Main Breaks | Reduction |
|----------------------------------|------------------|------------------|-----------|
| Main breaks in entire system | 212 | 128 | 40% |
| Main breaks in new pressure zone | 5 | 1 | 80% |

OPERATIONAL STRATEGIES

The following changes were implemented by staff at Logan City to save money and optimize energy and power savings:

- Reducing leaks by implementing a regular water audit and repair program. The City contracts leakage detection services with a firm specializing in leak detection.
- Utilizing storage tanks capacity throughout the day.
- Balance pumping periods/cycles based on DeWitt Spring flow rates to utilize gravity sources.
- Implement optimum Logan City Light & Power rates on pumping facilities.

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. Energy is typically conserved as well because head loss through the distribution piping systems is reduced.

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.