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Water Delivery – A Thre

by Tim Tice, Projects Manager

Electricity and water have gone hand in hand for a long time. In 1881 water turned an alternator that supplied electricity to the streets of Surrey Town of Godalming in the United Kingdom.[1] At the same time, Charles Brush connected a generator to produce electricity for nighttime tourists that visited Niagara Falls.[2] With the invention of and progress towards the use of electric motors, and their supported peripheral components, water is now delivered to places unimaginable 100 years ago. Seldom reviewed from an operational perspective is the cost paid for keeping our motors powered. With the number of households increasing by 45 percent in the past 30 years, someone may think energy consumption paralleled the same increase. Yet, contrary to thought, the energy consumption has only increased by ten percent. The energy consumption has lessened due to better efficiency of processes and apparatuses.

The USEPA has determined that 40 percent of a water or wastewater utility's operating cost can be linked to energy.[3] With so many industries looking for practical ways of providing the same service at a lower rate, automation seems to become the go to answer. In the mid-1990s, an 8-megabit hard-drive would cost approximately $400 dollars. Today, a 500 Gb (1gb = 1,000 megabits) will cost $50.00. The efficiency in which components are manufactured and obtained (partially through increased availability and competition) has driven the price down.

What is the single component a water or wastewater utility sells? It is usually a measurement and cost associated with said unit. The average Oregon household uses approximately 6,000 gallons per month, with the average monthly water bill at $42.00, the cost per gallon is $0.007 cents.

The proverbial comparative argument is the cost associated with a gallon of water purchased in 16-ounce bottles. The answer is approximately $8.00 to $16.00 dollars per gallon. While at the grocery store, a couple was filling their 5-gallon plastic bottles (4 total) from the machine for $0.25 per bottle or $0.05 per gallon. Did you see the connection? $0.007 versus $0.05 at the store. The $0.007 cost is at your tap, in your kitchen, more than likely 15 paces from your living room. Where's the justification?

If a water utility could charge a simple rate at $0.01 per gallon, then 6,000 gallons per month would equate to $60.00 dollars. Would this figure allow both water and wastewater utilities to stay ahead of the expense curve?

Two methods cure the growing fatigue to balance a budget for the utilities. Charging more for the services rendered or reduce operating expenses. When we want to charge more for water, the headwinds of resistance gust with reluctancy and many factors play into the decision. Method two, the other side of the coin is reduced operating expenses in the form of better efficiency,

-Sided Drop

but efficiency can cost money to implement initially, particularly in the form of equipment and automation. Let's look at one expense to determine savings and return on investment, energy!

A breakdown and review of utility expenses will show how energy is usually one of the three highest annual expenses for a utility. Energy efficiency, measured in percentages, is obtained by both a review of current costs, existing equipment, and rates, as well as, a possible change in operational procedures. Can any given motor used in production or processes be operated during the off-peak hours? Can operating peripherals (sensors) increase efficiency when applied to these motors.

Without going into detail on how to calculate energy savings, a theoretical example will be presented.

A 40 HP submersible motor is placed in a well and set at a depth of 450 feet and has a required production capacity set at 150-200 gallons per minute. Normal daily water production is approximately 42-48K gallons. This piece of equipment has a duty cycle of approximately 4.0-4.5 hours per day. Looking at total electrical costs, hours of operation, system design, the question is: can a smaller motor have been put into service? A variable frequency drive would certainly reduce the high amperage required to start the motor, but run-times may prove unnecessary, and a soft start application can be more cost efficient. A 30 HP motor in its place, with all the operating parameters the same, may save $1,588 dollars annually.[4]

To deliver water to the customer at any given time takes more from an operator today than ever before, due to varied fields of knowledge someone must be familiar with. We can go about the multiple tasks on our own, hire someone, consult, or charge enough for the service and commodity provided to pay for it all.

The third side (method) may perhaps be our inability to market our product and services. Stated jokingly, "Turn the water off for three days, when people get thirsty and stink, water becomes more appreciated." With the Association participating at many public meetings, a common misunderstanding of customers is the cost of water delivery.

Challenges for a utility today are ever-shifting but can be related to the three-sided drop on its point. Forging, shaping, inverting the drop can be an arduous task, but assistance. Teamwork can lower the height of the hurdles.

At OAWU, two aspects in our mission statement is support and solutions. Our approach to marketing, rates and efficiency is not unique, but the effort towards positive change is exceptional. Continue to call on us, our support is for your success.

The best of everything that life has to offer!

—Mr. OpTIMist

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