

H₂O Ops

MEASURE UP: THE METERING ISSUE

NOVEMBER 2016

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Creating rate structures that are fair for both customers and utilities

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The city of Mesa shows the rest of us how it's done!

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Now that your meters are sending all this data, what do you do with it?

WATER METERING IN BELLINGHAM BY ERIC JOHNSTON, ASSISTANT PUBLIC WORKS DIRECTOR OF OPERATIONS

In addition to installing water meters for all unmetered customers, the City of Bellingham used the Water Use Efficiency law as an opportunity to change the revenue stream by implementing consumption-based billing for all water customers. The city council adopted the new consumption-based rate structure in 2012, following a rate study and public outreach process.

The rate study included funding for a \$12 million multi-year project to install water meters on all single-family services. While each meter installation was small, the cumulative project would normally trigger "public works project" bidding and construction requirements. However, after obtaining clearance from the State Auditor, city crews set to work installing nearly 15,000 meters.

Starting in 2012, Bellingham put in place a multi-year construction and staffing plan, with seven dedicated full-time staff. They monitor progress on a daily basis, and the city is on track to complete the project in early 2017. In addition, an interdisciplinary team of meter readers, construction crews, communication, utility billing and finance staff meet monthly to coordinate efforts and solve problems.

Outreach Strategy

Prior to launch, the city used public outreach planning to develop a communica-

Keys to success include early and frequent communication, giving staff clear direction and prioritization, empowering front line crews to make decisions, and an organization-wide commitment to the core principal of customer service.



Bellingham Public Works employee Marty Gray in the YouTube video the City of Bellingham used to explain the new meters to customers.

Photo courtesy City of Bellingham

tion strategy. Using the Internet, multi-media, public access television, direct mailers, community meetings, utility bill inserts, and door hangers, the city contacts each customer multiple times before city crews arrive to start digging in their front yard.

The city uses consistent internal and external messages, such as, "We are obligated to do the work," "This is how billing will change," and "Our goal is to leave each customer satisfied with the completed construction activity."

An important element of the outreach plan is to let customers know how metered service can help reduce consumption and ultimately save them money. To that end, we identify high

consumption accounts and help to resolve possible leaks before billing starts.

With more than 12,000 installations complete, only one complaint made it past a front-line crew. The homeowner saw a crew member put a banana peel in the excavated trench before backfilling. The crew returned, re-excavated the trench and removed the offending banana peel before management had an opportunity to ask questions!

Most of our customers echo this citizen comment: "I have been SO impressed... When I first heard this was going to happen, I thought it was a recipe for disaster. I could not have been more wrong. The crews have operated like a highly skilled surgical strike team: they get in, get the job done, and get out. They are very professional and highly aware of their impact on accessing road (and other needs of) drivers." 💧

STATE EFFORTS TO ENSURE COMPLIANCE WITH METER INSTALLATION

January 22, 2017, the 10-year deadline for installing meters will be here before you know it. Some water system owners and operators may wonder what the Department of Health Office of Drinking Water will do if they fail to comply with the requirement.

Our strategy is, and always has been, to review meter installation progress by referring to the annual WUE report. That's why we put so much emphasis on the annual reporting requirement. The reports identify and monitor systems' efforts to improve water efficiency in their communities, including meter installation.

Hint! WUE reports aren't due until July 1. Therefore, water systems have a bit more time to complete meter installation before they submit their annual reports to us. Although this isn't an "official extension," it does give some breathing room to systems struggling to complete their metering in the first half of 2017.

When we review the next annual WUE reports, we will focus on identifying water systems that didn't complete meter installation. After we consider the circumstances surrounding a system's failure to comply,



we will take appropriate action to convince the system to finish installing meters. For example, we may:

1. Ask the system to submit a meter installation schedule with specific details on progress so far and the date it plans to finish the meter installation project.
2. Send a violation letter to place the system on notice for failure to install meters.
3. Give a system the opportunity to enter into a bilateral compliance agreement, which establishes negotiated benchmarks for meeting the requirement.

The metering requirement will not go away. Therefore, we may extend our communications beyond the primary contact to other individuals, such as board members, owners, certified operators, or other decision makers for the water system.

We hope systems aren't caught up in the compliance question, and just get those meters installed! 💧

METERS: ENSURING DRINKING WATER REMAINS RELIABLE

If you already installed meters, thank you and congratulations! You took an important step to account for, understand, and manage the most important natural resource of all, water. One of the best ways to ensure a safe and reliable water supply for your community is to consistently measure and monitor water use. That's one of the many reasons meters are so important and why the old adage, "you can't manage what you don't measure," holds true for your water system and the Office of Drinking Water.

Improving water efficiency begins with installing meters. Use the meters to collect water use data, establish water-reduction targets, and evaluate rate structures to help meet financial goals. Take time to analyze and understand what the metered data is telling you. And take action to improve the condition of your aging water infrastructure by repairing leaks and replacing pipes, thereby protecting public health and a reliable water supply.

This edition of *H2Ops* provides some insight into the many benefits of meters and the importance of collecting, analyzing, and reporting metered data. Keep reading to learn how meters saved money for two very different water systems (Bellingham and Mesa). National water efficiency experts explain how to develop a sustainable rate structure, and international water-loss control experts discuss the importance of validating your water data.

Ensuring a reliable water supply means using meters to make important water resource decisions. Thank you again for doing your part to protect the current and future water resources of the state. Visit our meter homepage to learn more: www.doh.wa.gov/WaterMeters. 💧

EASY AND AFFORDABLE WATER METER READING

Installing and reading water meters can be challenging for small communities with limited budgets and volunteer staff. If you're seeking easy and affordable ways to obtain meter usage data to meet state reporting requirements, you may consider fitting meters with a cellular radio system.

After installing a cellular endpoint on the meter, hourly usage information is available on the internet with no expensive reading equipment to purchase or maintain—and no need to manually read meters.

Some meter manufacturers offer cellular endpoints with an included warranty, cellular communication and web-based software, storage and security for one price per meter.

Benefits of a cellular radiometer system include no expensive reading equipment to purchase, accessibility anywhere with internet access, customer portals, and smart phone apps.

VOLUMETRIC RATES IMPROVE EQUITY AND PROMOTE EFFICIENCY

CHELSEA HAWKINS, PROGRAM PLANNER, AND BILL CHRISTIANSEN, PROGRAM MANAGER, ALLIANCE FOR WATER EFFICIENCY

Washington State's effort to fully meter by 2017 creates a lot of opportunity for water providers to bill customers more fairly and promote water use efficiency. Unmetered service areas use flat rates to recover operational costs. That means all customers pay the same no matter how much water they use. As a result, low-use customers subsidize high-use customers, and there's no incentive for customers to use water efficiently.

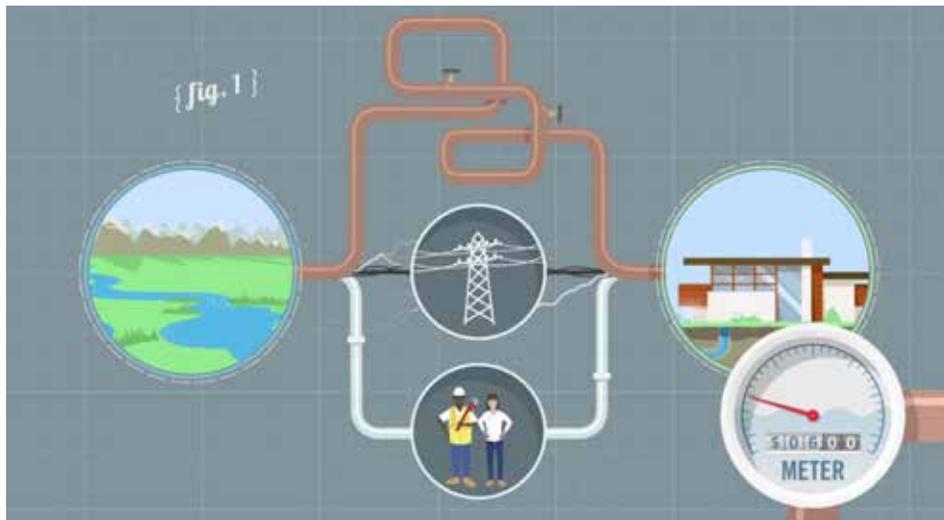
It is more equitable to bill customers for the water they actually use. This "volumetric" billing makes customers more efficient water users because they will take actions to lower their bills. That's why people often call volumetric rates "conservation rates." Most volumetric water rate schedules contain a fixed charge so all revenue isn't tied to consumption. They also can have a seasonal adjustment that increases the price of water during summer months to reflect the increased cost of providing water service during the peak demand season.

Two Common Volumetric Rate Structures

With a uniform rate structure, utilities charge all customers the same amount per unit of consumption. Their utility bills increase by a uniform amount for each additional unit of water consumed and establish a correlation between high consumption and high bills. Uniform rates may differ for each customer class. The straightforward design and implementation of this structure tends to be easiest for customers to understand.

With an increasing block rate structure, utilities increase the per-unit price of water as water consumption increases. They charge less for lower blocks (less use), and more when a customer's level of consumption enters a higher block. This price signal encourages consumers to conserve water. Although more complicated to design than uniform rates, increasing block rates may offer advantages, such as sending a stronger price signal.

There is no one-size-fits-all water rate, so each water system must evaluate their situation carefully before making a deci-



Frame from the Alliance for Water Efficiency video "Water: What You Pay For."

sion. James Bonbright's principles of rate-making¹ may help. Rates should:

1. Be simple, understandable, acceptable to the public, and feasible to apply.
2. Be free of controversy related to interpretation.
3. Yield the revenue required.
4. Provide revenue stability year over year.
5. Be stable with a minimum of unexpected changes.
6. Fairly distribute the cost of service among customers.
7. Be nondiscriminatory in rate relationships.
8. Discourage wasteful use.

Public engagement is crucial, particularly when moving from a flat rate to a conservation rate because some customer water bills will decrease while others increase. Systems can garner public support through outreach and opportunities for feedback. Use your customer education program:

1. To explain how the rate structure will work and why you selected it.
2. To convey the true cost of water service and how the new rate structure works to recover those costs equitably.
3. For customers to pose questions and voice concerns directly to utility staff.

The Alliance for Water Efficiency's Financing Sustainable Water website www.financingsustainablewater.org has free resources for water systems transitioning from a flat to a conservation rate:

1. **Building Better Rates in an Uncertain World** handbook provides the background and concepts needed to develop, evaluate, and implement an effective rate structure.
2. **Sales Forecasting and Rate Model** can be used to model the effects of rate structures.
3. **Water: What You Pay For** video is free for public use to help communicate the value of water to your customers.
4. Tools for developing implementation plans that achieve effective billing systems, institutional approval, and customer engagement.

Rate design is a big, fluid undertaking, so it's important to be flexible and prepared before the process begins. Preparation means evaluating revenue needs, operations and maintenance expenses, taxes, capital costs, data availability, and other operational factors. ♦

The Alliance for Water Efficiency is a nonprofit organization dedicated to the efficient and sustainable use of water. For information, visit www.allianceforwaterefficiency.org.

¹ Bonbright, James. (1961). *Principles of Public Utility Rates*. The principles presented here are paraphrased from Bonbright's original version. See also American Water Works Association. (2012). *Principles of Water Rates, Fees, and Charges: M1*.

ARE INACCURATE METERS MISLEADING YOU?

Since WUE requirements took effect in 2007, we've seen water systems try to troubleshoot data that doesn't make sense. For example, every year since 2010 about five percent of water systems report *selling more water than they pumped* from their sources—a "negative loss"!

If you have data issues, it could be your meters. Inaccurate data from under-registering meters falls into the "apparent losses" category of distribution system leakage (DSL). It could affect your ability to reduce losses below 10 percent and cause negative losses.

Inaccurate meters can mislead you about *real* losses (leaks) versus *apparent* losses. Knowing the accuracy of your meters will make it easier to find and measure real

leaks. Service meters that don't register low flows cause apparent losses—and lost revenue. For example, an unexplained increase in a customer's bill usually indicates a leak (perhaps a running toilet). If the meter doesn't measure low flows indicative of leaks, the consumer might not see a bill increase, even as leaks grow.

To improve accounting for water use, take a closer look at your metered data. You'll reduce nonrevenue water and apparent losses, and ultimately lower the percentage of annual DSL.

The potential to recover nonrevenue water is significant for utilities that install accurate meters, according to Natural Resources Defense Council (NRDC) spokesman Tracy Quinn. NRDC and several util-

ities are working on a proposal to raise awareness and revise meter standards around low-level leaks.

Their proposal would require an extended low-flow test with an accuracy band of 80 to 101.5 percent. Low flow ranges from $\frac{1}{16}$ gallon per minute (gpm) for service meters below $\frac{3}{4}$ inch to $\frac{1}{2}$ gpm for 2-inch meters. This would help reduce waste by tackling low-level leaks and improving water system accounting.

If the American Water Works Association adopts the proposal, manufacturers would have to ensure new meters are more accurate at extended low flows. Some manufacturers believe they already meet these proposed standards. 💧

FROM DATA TO AUDIT TO WATER LOSS CONTROL

BY LUCY ANDREWS, PROJECT MANAGER, AND REINHARD STURM, CEO AND PRESIDENT, WATER SYSTEMS OPTIMIZATION, INC.

More and more states and individual utilities understand that water audits evaluate system efficiency by accounting for all water introduced into and withdrawn from a water distribution system in order to estimate volumes of water loss. Water audits produce more nuanced and actionable insights into system efficiency than simple proportional leakage assessments.

After a utility builds a detailed picture of its water distribution efficiency, or water loss baseline, it can implement a water-loss control program. Water-loss control is the practice of assessing water distribution efficiency, evaluating the economic parameters of system management, and then reducing water loss to a cost-effective level.

Fundamental Questions About Loss Control

Water loss control and investment in distribution efficiency offer a plethora of benefits. However, some utilities aren't familiar with water auditing methodology. Others have misconceptions about the pursuit of efficiency. To proceed, consider answers to the following questions. *Do I have all the data I need for a water audit? How efficient is my water distribution system? Is it efficient enough?*

All Systems Leak

Let's admit this up front. Water distribution systems leak. Joints and fittings

seep. Pipes sometimes break. Community members occasionally shear fire hydrants. Leakage happens.

As a result, the goal of a water loss control program is not to eliminate leakage. You can't fully eliminate leakage and it would not be cost effective! Instead, **water loss control aims to reduce leakage to a cost-effective level and then maintain efficient performance.**

Data Is Never Perfect

Investigating system efficiency requires deep and critical engagement with both archived and real-time data from all utility departments. Descriptive data is produced by the complex interactions of mechanical instruments, electronic signals, database platforms, and utility staff. Usually these interactions go well and produce reliable data. However, occasionally data processes go awry—sometimes explicable, sometimes mysteriously.

If you have data woes, don't worry. You're certainly not the first water system owner or operator to suffer measurement and data management inaccuracies. If you think your data systems are perfect, think again. You probably have hidden gaps, redundancies, uncertainties, and inaccuracies waiting to be discovered!

Fortunately, **effective water auditing and water loss control don't require**

perfect data. Pursuing distribution efficiency only requires you to be honest about the state of your data and willing to dig deep. You never know what you'll find, and there are always ways to fill in the gaps.

Take Informed, Economically Justified Action

A thorough and reliable water audit will highlight areas your system performs inefficiently, whether in terms of leakage, revenue generation, or data management. After you identify inefficiencies, it will be incumbent on you to reduce those inefficiencies, *but only to the extent cost-effective.* Fortunately, water loss control program design incorporates economic considerations like the value of water, the costs of intervention, and available resources. In fact, effective water loss control will probably *decrease* your production costs and *increase* your revenue.

Performing a water audit will point you toward improvements in efficiency. However, even after you know your water loss baseline, you don't have to do anything that doesn't make sense!

If you cannot describe and defend your distribution system's efficiency, you should complete a water audit. Don't let concerns about perfection of data and performance get in your way. After all, when it comes to leakage, ignorance is expensive, but knowledge is empowering! 💧

Congratulations, Mesa Water Department! After installing and calibrating new meters, water use declined by 50 percent and leakage dropped to 8.8 percent. From left, we salute Agustin Garcia, maintenance relief; Cade Scott, public works superintendent; and Terri Standridge, clerk treasurer.

Mesa City Hall

103 Franklin Street
Mesa, WA 99343



Photo courtesy City of Mesa

HIGH 5! A METERING SUCCESS STORY FOR CITY OF MESA WATER DEPARTMENT

After installing new meters, the Mesa Water Department dropped its flat rate and started charging customers for the water they actually use. Among other benefits, the utility saw phenomenal declines in water use and leakage.

Mesa is a small city in Franklin County supported by dryland farming, irrigated farming, and livestock production. Originally called Bluff Wells, then Judson, the city grew around a Northern Pacific Railroad station established in 1883. Mesa incorporated in 1955. The Columbia Basin Irrigation Project brought water to the area in 1948. Before then, people relied on private wells or the railroad well.

Today, the Mesa Water Department serves 495 people on 148 residential and 24 nonresidential connections. It recently finished replacing old meters with advanced meter infrastructure (AMI). Before city employees installed the new meters, they lost 90 percent of their water production to leakage and apparent losses. Customers paid a flat rate of almost \$70 during the summer and about \$55 during the rest of the year.

After the city installed their meters and got them calibrated, a little bit of magic happened. Water use from the wells dropped by 50 percent. Distribution system leakage dropped to 8.8 percent. Customers now pay a base rate of \$33 per month for 1,000 cubic feet of water and a tiered rate for anything over that. Moreover, now there are fewer customer complaints.

"Our customers enjoy paying \$30 a month less, but they're actually very conscious about water usage," said Terri Standridge, clerk treasurer at city hall. "They like the new system. They used to get upset because they were paying the same as those who were wasting water."

The new AMI meters have a radio-read system that sends monthly usage reports directly to city hall. The system also generates an alarm if it detects a possible leak on the customer's property. The alarm goes off every three days and the city follows up by sending a message to the customer.

"We found three or four good-sized leaks on private property," said Standridge. In fact, most of the city's leaks are now on

private property. Upon request, the city will help the owners identify the leaks, so they can hire someone to fix them. "Our customers cooperate because they don't want to pay for leaking water."

Lower rates do mean less income for the water system, but expenses went down, too. The radio-read system means the city no longer needs to pay a meter reader. And, the city's greatly diminished water usage now means less wear and tear on the system, lower treatment costs, and lower energy bills.

To help finance the \$1.7 million project, the City of Mesa applied for and received a variety of grants and loans from Department of Commerce Community Development Block Grant, U.S. Department of Agriculture Rural Development grant/loan, the Public Works Trust Fund loan, and the Association of Washington Cities Risk Management Service Agency. The city's insurance pool contributed with a \$1,000 grant. 💧

See the article on page 6 to learn about funding options for your water system.

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FUNDING FOR METER PROJECTS

Is your water system unable to pay for meter installation? Do you have a few customers holding out and preventing you from fully completing the meter installation project due to financial concerns? There are funding options out there!

For the 2016 construction loan funding cycle, the Drinking Water State Revolving Fund provides meter installation options for public water systems, but **ONLY** if metering is part of a larger improvement project www.doh.wa.gov/DWSRF.

The State Public Works Board offers funding for meter-only projects for publicly owned water systems. See the Construction Loan Application Guidelines at www.pwb.wa.gov/Documents/pwb-construction-loan-guidelines-2016.pdf.

The Bureau of Reclamation's Water SMART Program offers funding opportunities for water efficiency projects www.usbr.gov/watersmart.

USDA's Rural Development Section 504 Repair Program offers low-interest loans to individual homeowners who meet low-income criteria www.doh.wa.gov/Portals/1/Documents/4200/rd-funds.pdf.