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We Have AMI Data – Now What Do We Do With It? Lessons Learned from Energy and Water AMI Data Analysis

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<u>Author/Presenters</u> Michelle Maddaus, Maddaus Water Management Inc. Andree Johnson, Bay Area Water Supply and Conservation Agency

<u>Coauthor</u> Ryan Stroupe, **PG&E Pacific Energy Center**







Agenda

Water and energy connection



Lessons learned from energy AMI meters



Case study: Jordan Valley, UT



Case study: Abbotsford BC, Canada

Case study: BAWSCA, CA







Pacific Gas & Electric's Accomplishments in Water-Energy Programs



Key Benefits of AMI for Energy Utilities

Identify	 Identify savings opportunities Pre-audit assessments billing data analysis more powerful with AMI data Could not identify operational patterns previously with monthly data
Quantify	 Quantify benefits of implementing projects Can use AMI data to quantify energy savings using historic daily climate data
Document	 Document that energy savings are persisting over time Can correlate daily energy use to daily temperature Can view savings strategy is working 1 month or 1 year later Without AMI data, could not see the changes – would get lost in the "noise" of the energy use



Optimal frequency of AMI meter reads

- For energy utilities:
 - 15-minute intervals in electricity
 - 1-day intervals for gas typical (ideally gas meters would be once per hour)
 - Valuable to have data at higher frequencies for data analysis
- For water utilities:
 - Best practice would be hourly AMI meter reads
 - At minimum, daily AMI meter reads
 - Valuable to watch things on a schedule (e.g., irrigation timers, cooling tower blow down, laundry, kitchen dishwashing)



Ideal amount of data to provide to customers

- For energy utilities:
 - Require minimum 1 year of data to see variations over seasons and different use patterns
 - Provide customers with clear and conclusive graphic depictions of data
- For water utilities:
 - Similar to energy ideally need full year of data to see water use patterns
 - Provide valid data to customers with clear and conclusive graphic depictions



Most effective format for sharing AMI output data

- Data ideally comes in annotated graphical format
 - Example annotation: "Time lights turn on is too early."
 - Provide data in Excel format
 - Can graph AMI information and see correlations

 - Temperature ↓ = more natural gas energy used for space heating



One Year Energy AMI Data Analysis: Total Example Commercial Site



OSA = Outside Air



One Year Energy AMI Data Analysis: Weekday, Operating Hours



Maddaus Water Management Inc.

One Year Energy AMI Data Analysis: Weekday, Off Hours

Power vs. OSA temperature



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One Year Energy AMI Data Analysis: Weekends

Power vs. OSA temperature





One Year Energy AMI Data Analysis: Day of the Week





Liability considerations

- Data and graphs produced to evaluate energy use & savings
 - Energy Audits:
 - Quality of data minimize risk by studying use data *before* doing an energy audit then confirming it in the field
 - Energy Savings:
 - ESCO (Energy Service Contract) business model where payment is based on savings projections; financial savings due to retrofit savings
 - Example savings based on school district – could get paid per year based on estimated savings



Liability considerations

- AMI meter data access and privacy
 - Customer web portal to view historical energy data
 - 3 years of data stored and provided
 - Data goes back as far as AMI meter installation
 - All customers have access residential & commercial
 - Customer specific and password protected
 - Data not given out unless directly to the customer
 - Customer may elect to sign authorization agreement to allow data to be provided to a third party



Considerations When Converting to AMI

- Send a clear message to customers regarding the value that AMI data can provide in managing their utility usage
 - PG&E AMI energy meters initially installed in 2010, but customers just now understanding value of seeing their data
- Share information to help customers manage water use
 - Consider a well-designed customer user interface
- Explain to customers that meters use radio frequency
 - Power is less than cell phones that people use near their heads
 - Meters do not constantly communicate with towers
- Customers should be allowed to opt out of AMI meters



Case Study: Jordan Valley WCD, UT

Service area background:

- 17,131 connections
- 55,000 residential customers
- Population approximately 58,000
- 10,775 AF/year production
 - 66% of the City's water demand is residential
 - 34% is commercial, institutional, governmental, industrial and dedicated landscape accounts
- 60% outdoor water use
- Supply from reservoirs and wells



JORDAN VALLEY WATER CONSERVANCY DISTRICT



Case Study: Jordan Valley WCD, UT

Advanced Metering Infrastructure & Customer Feedback Implementation

- Install fixed network
 AMI system
- Redesign customer bills
- Implement semi-annual reports
- Design customer web portal



Source: Forsyth, Bart (2018). Customer Engagement Strategies: Water Conservation Related Utility Billing & Rates. WaterNow Alliance Annual Summit presentation, March 2018, Salt Lake City, UT.



Case Study: Jordan Valley WCD

AMI Customer Communications & Implementation Schedule

- Began installation of new AMI meters and infrastructure (Spring 2015)
- Placed door notices as meters were replaced
- Finalized AMI system implementation including new web portal (March 2017)
- Sent introduction letter describing new meter and benefits (March 2017)
- Sent "how to read your bill" insert for new water use comparison bill (May 2017)
- Sent first new water use comparison bill (May 2017)
- Sent first semi-annual water use report (October 2017)

Source: Forsyth, Bart (2018). Customer Engagement Strategies: Water Conservation Related Utility Billing & Rates. WaterNow Alliance Annual Summit presentation, March 2018, Salt Lake City, UT.



Case Study: Jordan Valley WCD, UT

Welcome Letter

Welcome to your NEW WATER BILL

more information, more empowerment



Source: Forsyth, Bart (2018). Customer Engagement Strategies: Water Conservation Related Utility Billing & Rates. WaterNow Alliance Annual Summit presentation, March 2018, Salt Lake City, UT.

Dear Valued Customer:

Enclosed with this letter is your new water bill from Jordan Valley Water Conservancy District. Please take the time to familiarize yourself with the new bill layout and content. If you prefer the old layout, it is on the back of the bill.

Why did we change the bill?

You recently had a new "smart" meter installed for your property that provides near real-time water-use data. As part of this change, Jordan Valley Water Conservancy District is excited to introduce a web portal, notification system, and this redesigned bill. Information from your new meter combined with these personalized customer feedback tools will allow you to become a more educated water consumer.

How will you benefit?

Your new meter now sends hourly water use data, rather than a manual monthly read. This frequent reporting will help you better understand how and when you're using water, detect leaks sooner, and manage your water use to lower your monthly water bill. The redesigned bill has more detailed water use information and tips for saving water!

Set Up Your User Profile, Preferences & Alerts

To access your daily water use, download water statements, create water alerts, update your billing preferences and more, please log in to your personalized customer portal at https://mywater.jvwcd.org. Once you log in, verify and update your account profile to get information that is most relevant to you.

Questions?

We hope your new bill is helpful and easy to understand. If you have any questions about the bill, smart meter, or web portal, please contact us online at jvwcd.org/contact or by calling (801) 565-4300. We appreciate your business and hope to help you be a more savvy water consumer.



Case Study: Jordan Valley WCD, UT

Source: Forsyth, Bart (2018). Customer Engagement Strategies: Water Conservation Related Utility Billing & Rates. WaterNow Alliance Annual Summit presentation, March 2018, Salt Lake City, UT.

new bill AT A GLANCE



-o water use MESSAGE

If you delay watering until at least Mother's Day, your lawn roots will be deeper and your lawn will be healthier. #Wait2Water #TrainYourTurf



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water use information.



Service area background:

- 27,000 customer meters
- 26,000 customer accounts
- Population approximately 144,000
- 2015 per capita demand was 185 litres per person per day (49 GPCD)
- 3 water sources:
 - Norrish Creek
 - Cannell Lake
 - 19 groundwater wells



Uses AMI to enhance conservation efforts

- Installed AMI system in 2011
 - Installed on all meters ~135,000 residents and businesses
- Benefits that enhance conservation
 - Switched from annual bills to bi-monthly bills
 - Implemented volumetric rates
 - Identified leaks and sent 3,000 letters
 - Measured water savings



Itron Automated Meter End Point



30% Reduction with a High Efficiency Toilet



19% Reduction with High Efficiency Washing Machine



Reduction in Water Use from an Irrigation Assessment





Summer Consumption in a Heavily Irrigated Neighborhood





Case Study: BAWSCA, California



BAWSCA = Bay Area Water Supply and Conservation Agency

Special District representing the interests of:

- 26 water suppliers in San Mateo, Santa Clara, and Alameda Counties
- 1.8 million residents and over 40,000 businesses
- All rely on the San Francisco Regional Water System

Provides regional water supply planning and conservation programming



BAWSCA Member Survey: AMI Systems Installation Status



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Case Study: BAWSCA Study Goals

- Residential Water Use Study was a component of BAWSCA's Conservation Strategic Plan
 - Goal: to prepare BAWSCA agencies to comply with new California water use efficiency requirements AB 1668 and SB 606 which were adopted in 2018
- Study goals:
 - Understand residential indoor and outdoor water use patterns within BAWSCA communities
 - Support development of effective water use efficiency programs
 - Support water use demand forecasting efforts ongoing in 2019-2020



Case Study: BAWSCA What Data Was Submitted?

Data Collected		
Type of Data	Total	
Number of Data Points	371,461,703	
Number of Accounts	54,070	
Number of Accounts Used in Analysis	2,462	
AMI?	67%	



Drought Behavior/Changes: What can we learn from AMI data?



AMI water meter data

- 1. Review outdoor water use analysis patterns in 2013 before the drought
 - Note the water use trends vs Daily ETo
 - Do you think this site has an irrigation controller?



How did we do at start of drought?



AMI water meter data

- 2. Review outdoor water use analysis patterns in 2014
 - Can you identify where they started to react to the drought?
 - Again, do you think this site has an irrigation controller?

Answer: mid-July 2014



How did we do during the drought?



AMI water meter data

- 3. Review outdoor water use analysis patterns in 2015
 - Can you spot the 2 day per week watering during the drought?
 - Again, do you think this site has an irrigation controller?

Answers: Yes! You can spot water use going down to zero.



How did we do at end of the drought?



AMI water meter data

4. Review outdoor water use analysis patterns in 2016

- Can you identify when restrictions were lifted?
- Final answer: Do you think this site has an irrigation controller?
- Key question: By estimating which sites have controllers and which do not, can we do a baseline survey of how many more installations remain?



Summary

For water utility consideration

- The energy industry is years ahead in using AMI meter data for customers and programs – but there are many lessons learned and water is catching up!
 - Water has many differences in infrastructure, number of utilities delivering resource
- Best practice would be hourly AMI meter reads
 - Value could be watching things on a schedule (e.g., irrigation timers, cooling tower blow down, laundry, kitchen dishwashing)
- Provide valid data to customers has clear and conclusive graphic depictions



Contact Information



Maddaus Water Management inc.

Michelle Maddaus, P.E. Maddaus Water Management (925) 831-0194 michelle@maddauswater.com

www.maddauswater.com



Pacific Gas and Electric Company®

Ryan Stroupe PG&E Pacific Energy Center (415) 973-7257 <u>R2S2@pge.com</u> <u>www.pge.com/pec</u>



Andree Johnson Bay Area Water Supply & Conservation Agency 650-349-3000 ajohnson@bawsca.org BAWSCA.org

