San Francisco Water Power Sewer

Services of the San Francisco Public Utilities Commission

AMI: Everything you need to know to run a successful program

CalWEP Peer-to-Peer Conference

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San Francisco Public Utilities Commission

Presentation Overview

- About the SFPUC
- Our AMI system
- Data management & sharing
- Customer engagement tools
- Considerations & challenges

San Francisco Public Utilities Commission (SFPUC)

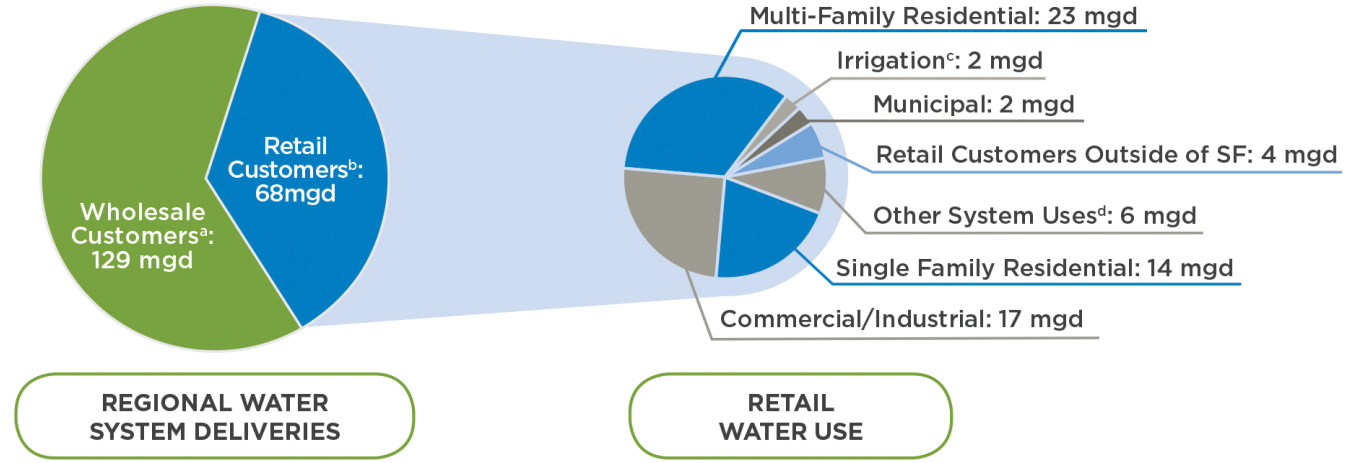
Water: delivering high quality water every day

Power: generating clean energy for vital City services

Wastewater: protecting public health and the environment

Water Supply & Customers

FY 2017-18 Regional Water System Deliveries and Retail Water Use



a Deliveries exclude 5.3 mgd delivered in lieu of groundwater to customers participating in the Regional Groundwater Storage and Recovery Project.

b Retail Customers outside of San Francisco (also called suburban retail customers) account for 4mgd of this total.

c These data are from dedicated irrigation accounts only, and do not include irrigation use from water accounts that jointly serve both indoor and outdoor demands.

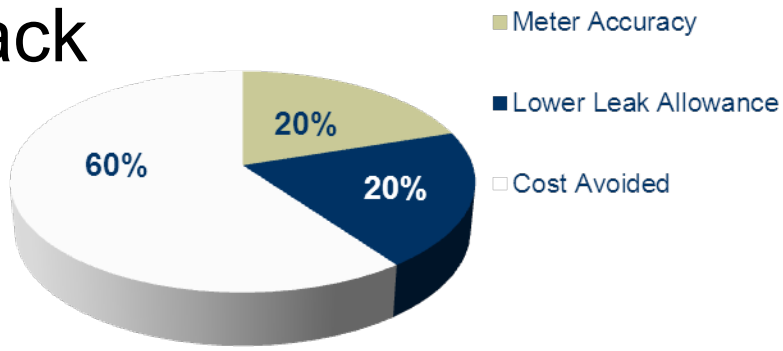
d Other system uses include pipe flushing, firefighting, street cleaning and water system losses from leaks and main breaks.

SFPUC AMI System in San Francisco

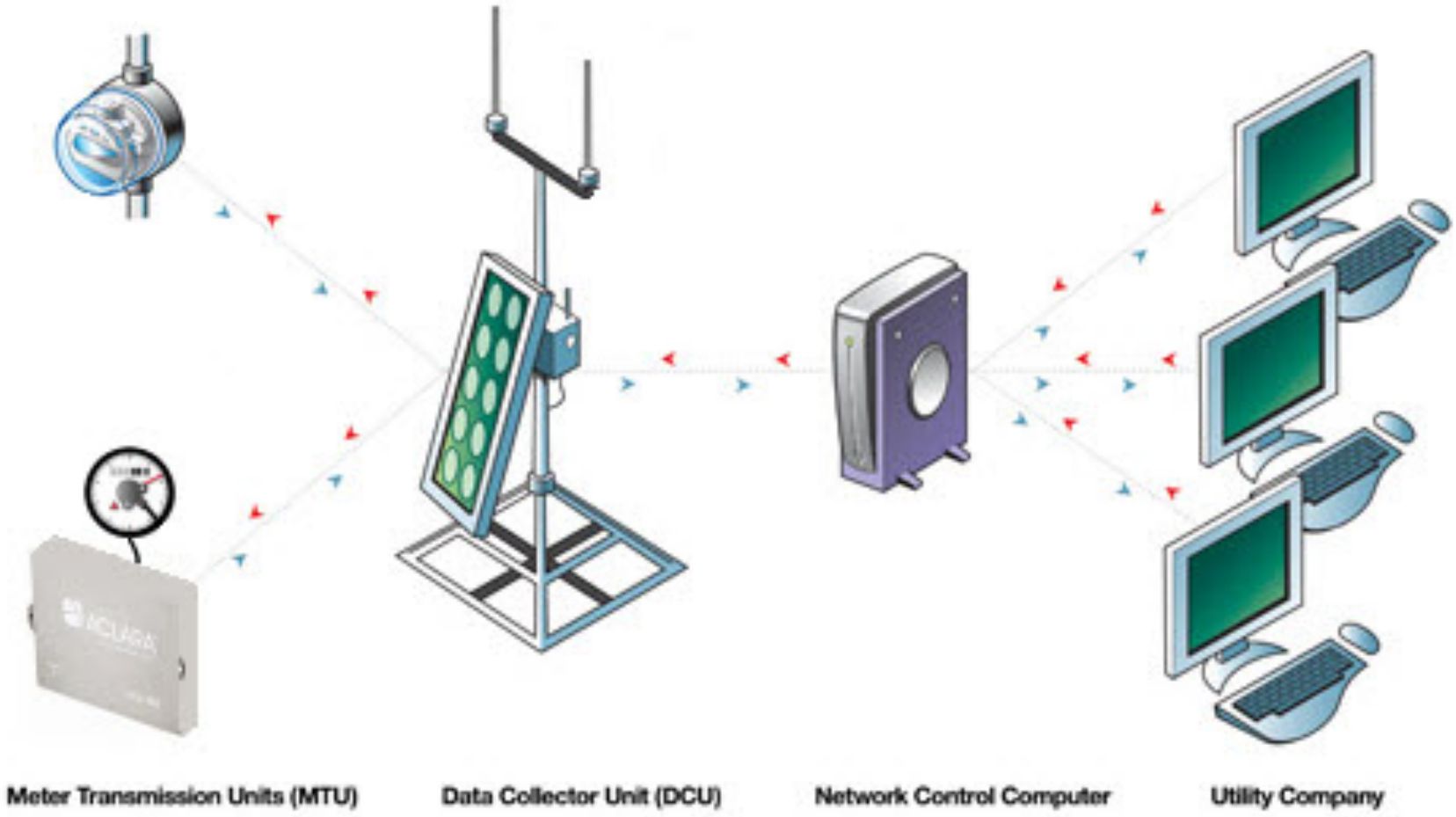
- Aclara STAR fixed network system, transmits hourly reads 4 times a day
- 98% deployed, about 180,000 retail customers
  - Replaced most meters and added wireless transmitters 2010-2013
  - Working through remaining small % to replace and automate
- Began billing with AMI data 2013
  - Switched to monthly billing in 2013, to fractional billing in 2017
- Developed custom Data Screening Tool (ADR) and launched in-house customer web portal 2014
- Started leak notification 2015, expanded in 2017
- Developed automated maintenance system

San Francisco AMI System Drivers

- Enabled us to:
  - Replace old, under-performing meters and address access issues
  - Go from billing every two months to every month
  - Provide customers timely water usage info and tools for reducing water waste
- Anticipated benefits:
  - Save water
  - Improve customer service
  - Reduce operating costs
- Estimated 8-10 year payback



Key Components of In-City AMI



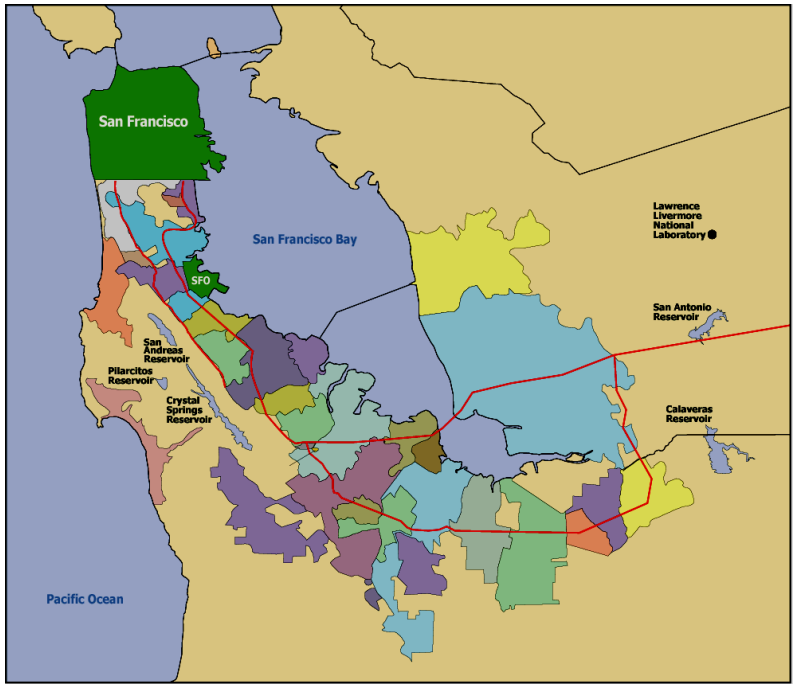
Connected to each meter

On poles or rooftops throughout City, most solar powered

Located at SFPUC and integrated with SFPUC billing system and ADR

SFPUC AMI System Outside San Francisco

- Badger Beacon Cellular AMI System
- 212 meters, 27 wholesale customers in 3 counties
- Cloud-based software with “Eye on Water” for customer data sharing and alerts



Multiple Data Platforms

AMI STAR Data

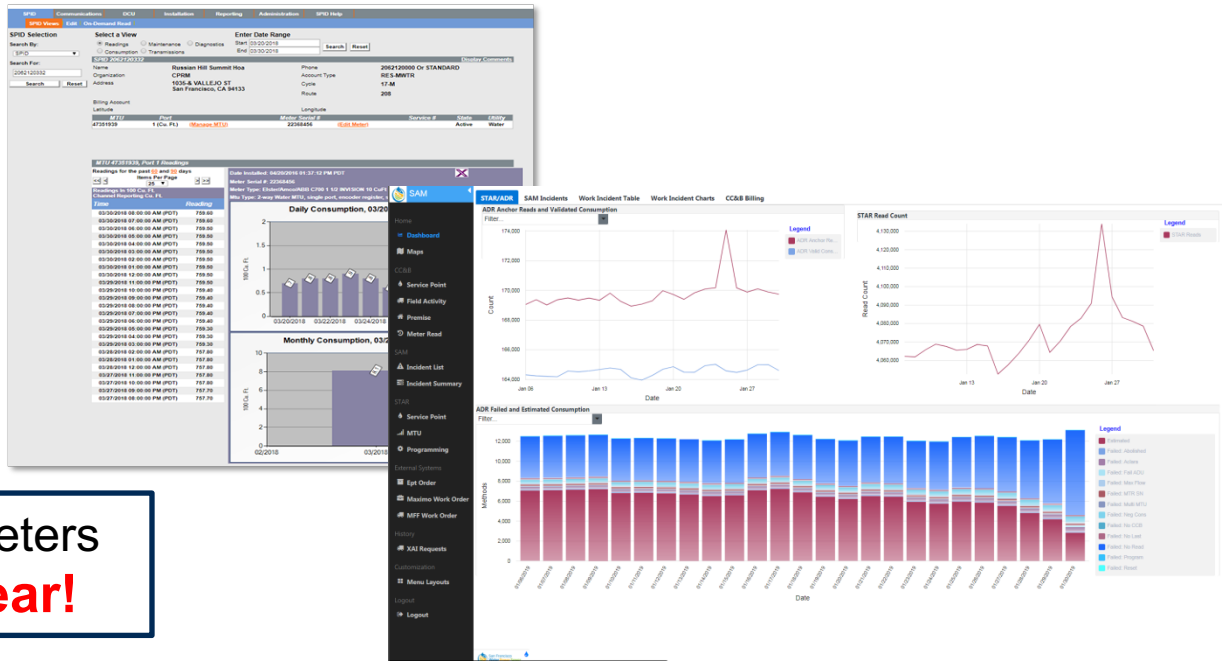
ADR Data Screening

SFPUC Billing System

SFPUC Meter Maintenance Dashboard

My Account Customer Portal

Leak Alert System

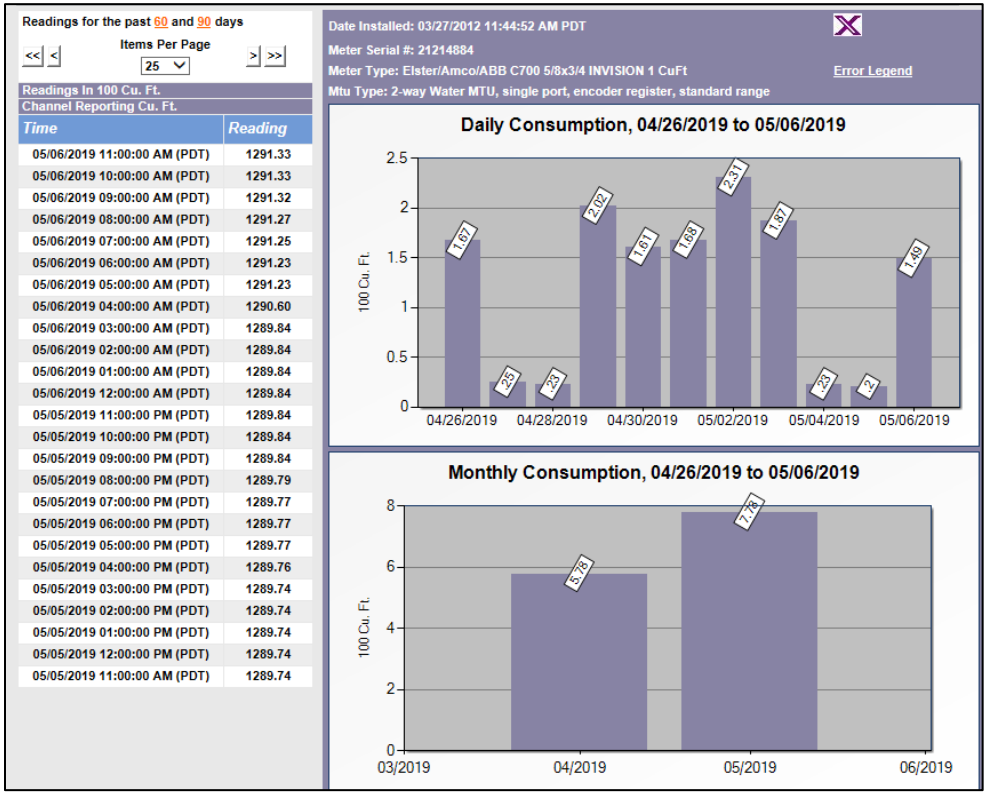


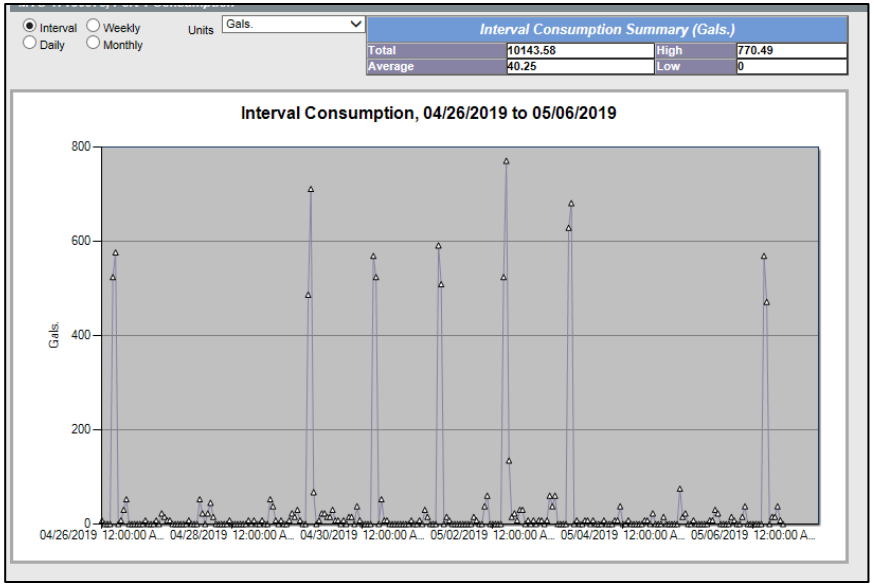
Hourly data @178,000 meters

= 1.6 Billion reads/year!

STAR Database

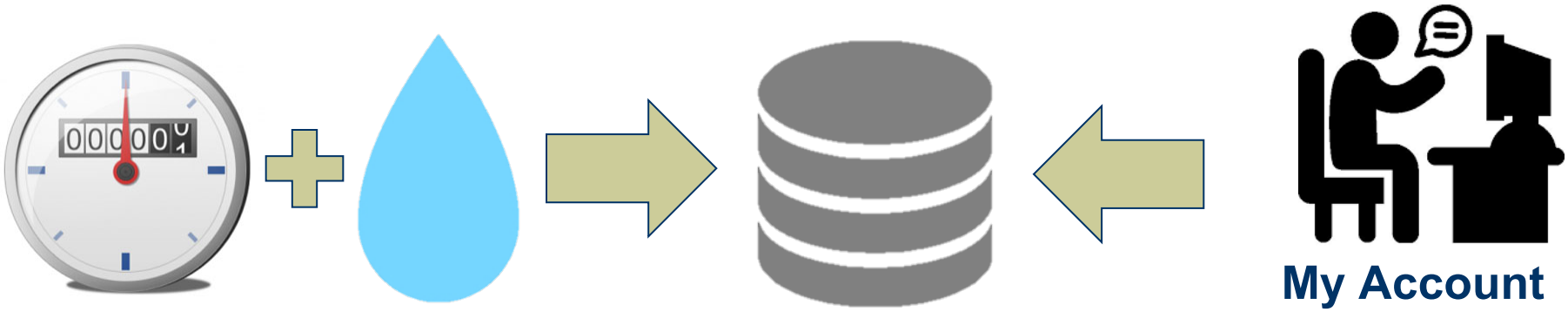
- Provides raw hourly meter reads and consumption data
- Provides standard on transmission, diagnostics, maintenance
- Customer service, conservation, operations staff can log on





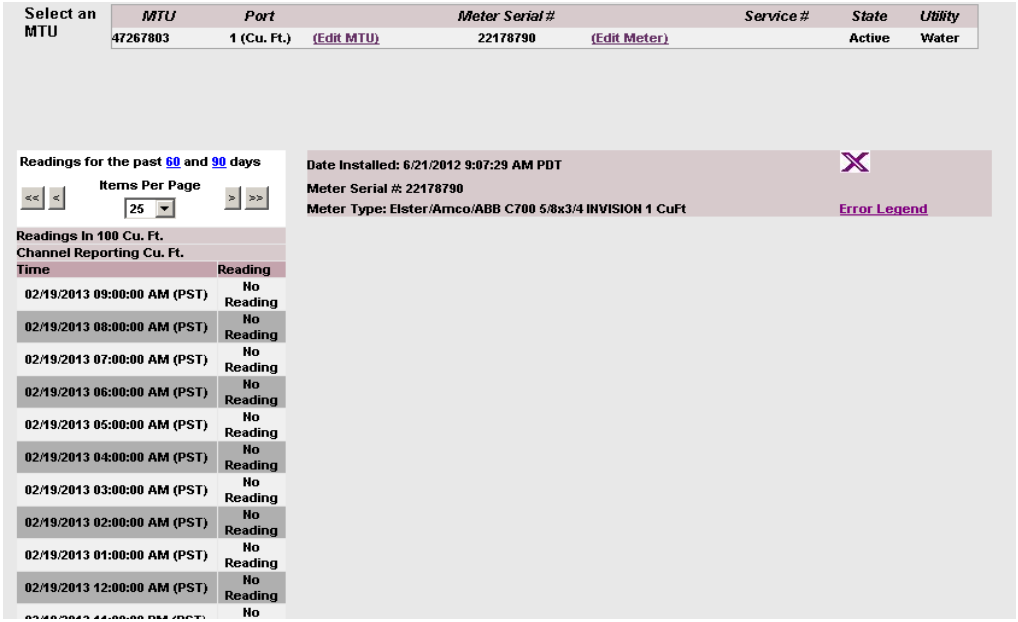
Automated Water Meter Program Data Reservoir (ADR)

- Database that calculates and stores consumption data shared with customers through MyAccount and leak alerts, and populates maintenance database
- Pulls in raw STAR data and calculates consumption
- Screens for errors
- Makes validated data available to customers one day later
  - Started with daily water consumption, later added hourly

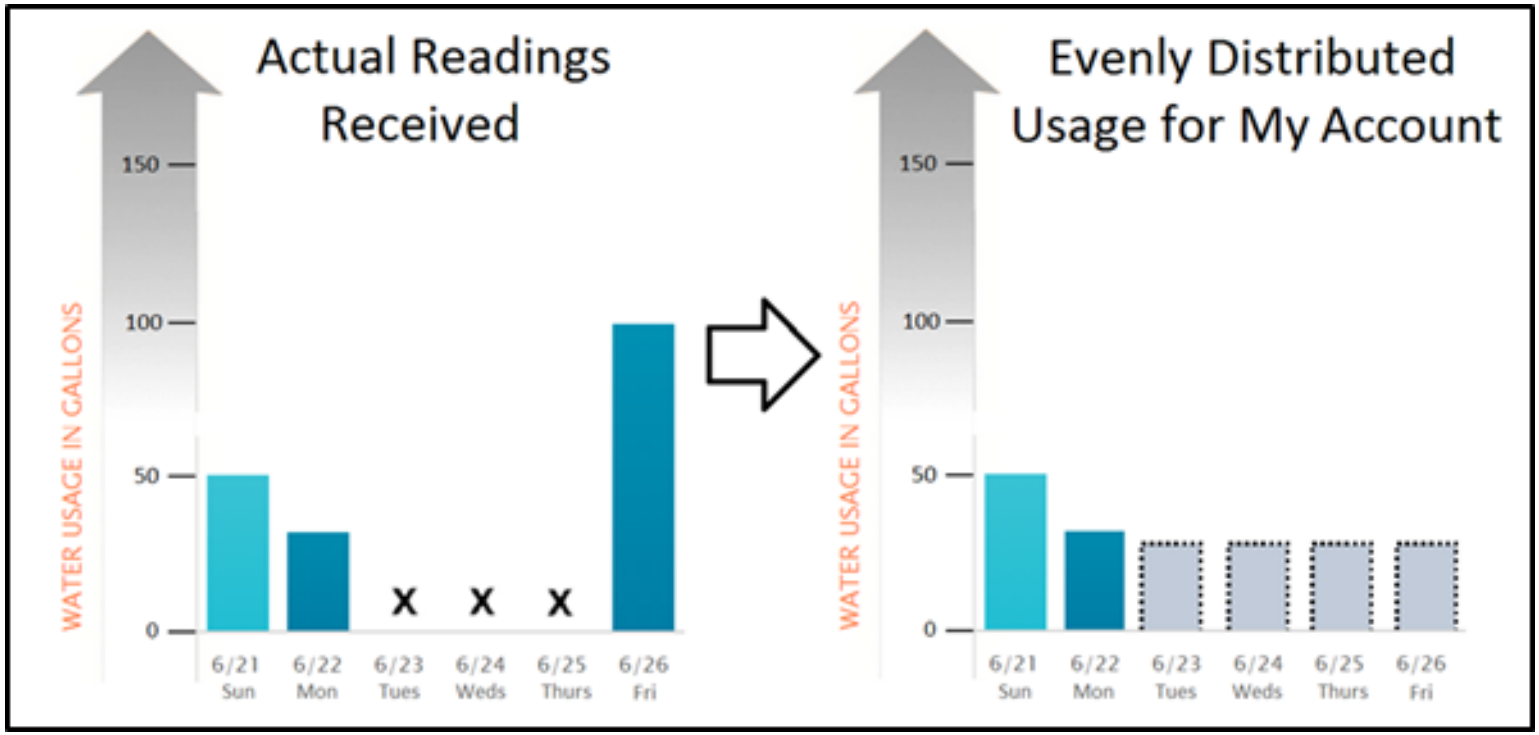


Key Components of Data Screening

- ADR system helps screen for data that could be inaccurately displayed on customer MyAccount portal, or require messaging to avoid customer confusion, or different presentation, such as:
  - MTU/meter replaced
  - Read errors due to “bad digits” and “delta overs”
  - No reads and missed reads
  - OCR issues
  - Multiple, active MTUs



Example of Data Screening

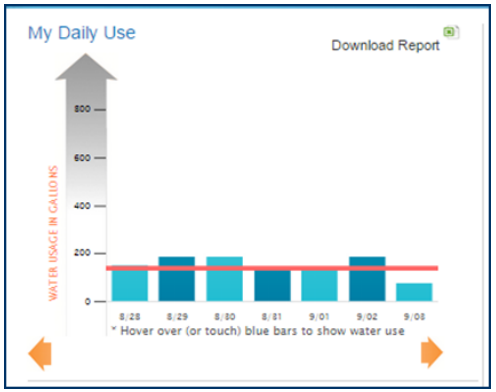


Why does My Water Use graph include an "X"?
An "X" indicates that your meter reading was not available for this time period. For example, there may be periods of time where we do not receive a meter reading successfully through our Automated Water Meter reading system. This could be due to a number of factors. Some examples include (1) a physical obstruction blocking the radio signal from being sent out of the meter box or basement, such as a car parked over your meter during the radio transmission, (2) a problem with the radio equipment or a dead battery in the radio, or (3) a network connection issue with our data collectors. When missed reads occur, we will diagnose the issue and attempt maintenance to restore the reading and minimize the missed read periods.

Why does My Water Use graph include a grey bar and how is this calculated?
A missed reading for any time period will be displayed as an "X". When our system has enough information to fill in missed data, the "X" should be replaced with actual usage shown as blue bars. However, the readings we get may only provide a total usage over several periods combined together rather than a detailed breakdown for each unit of time. In these cases the data will be displayed as a series of grey bars representing an even distribution of the recorded water use over that timeframe**.**

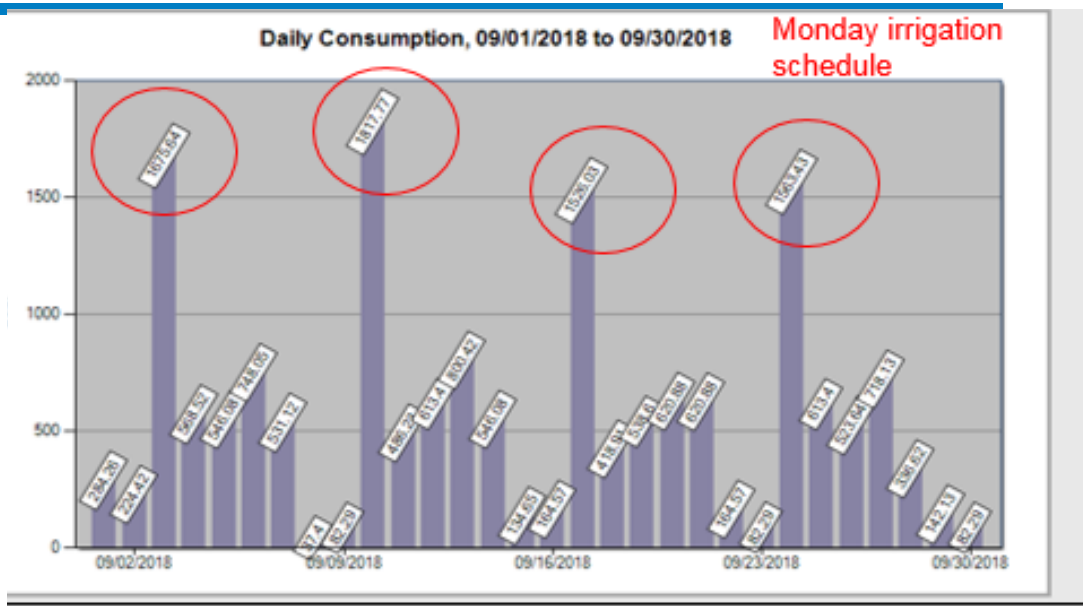
How We Use AMI Data to Engage Customers

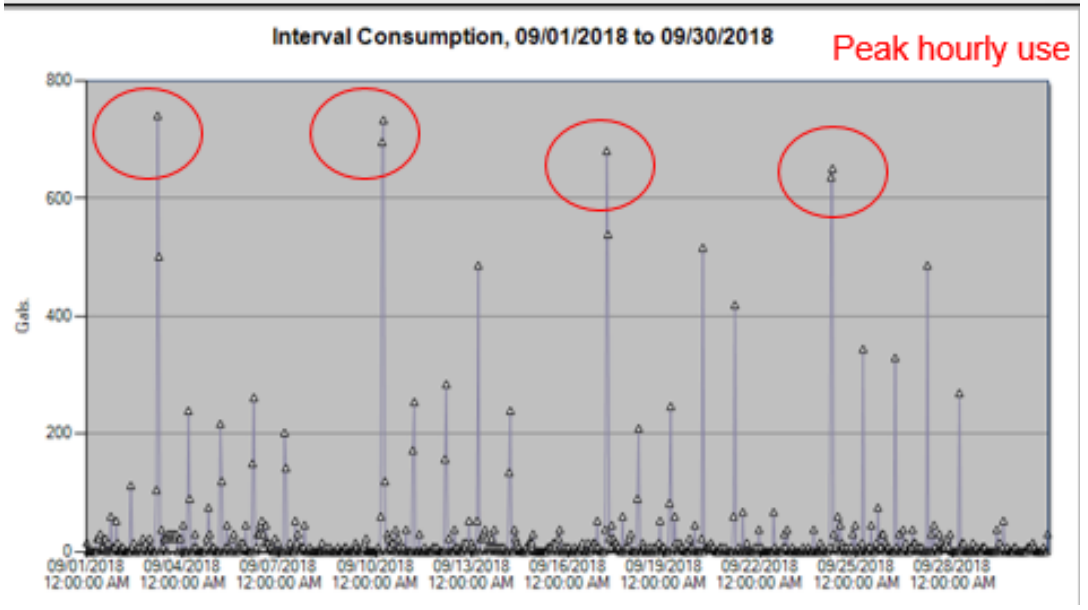
- Staff resource to diagnose site issues
  - Customer service and conservation staff can investigate spikes, constant usage, as well as hourly, daily, and seasonal patterns
- My Account “self-help” web portal for customers
  - Hourly, daily, monthly water use and targets and bills
- Leak alert program



Example of Staff Use of AMI Data

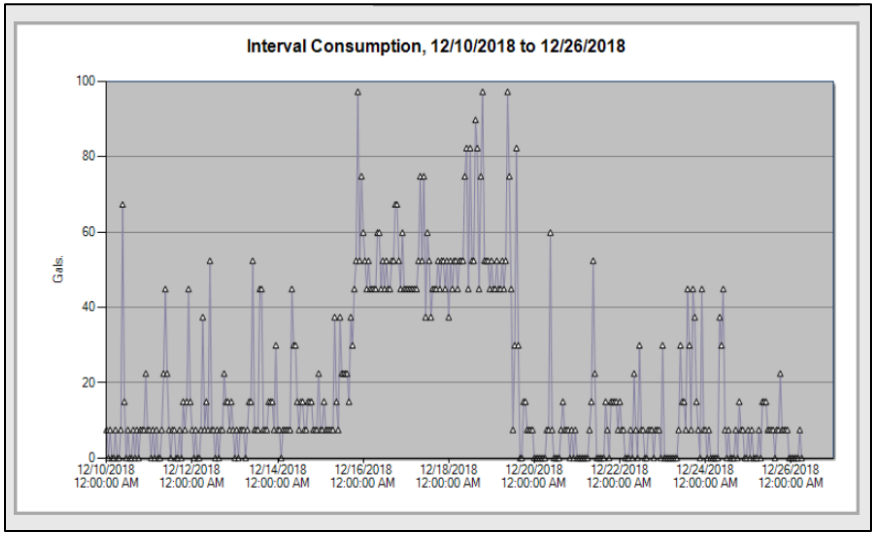
- Before landscape evaluation at single family home, AMI data enables staff to easily:
  - Estimate days, hours, patterns, and amount of irrigation water use
- After visit, data makes it easy to see water savings from irrigation changes and customer compliance with recommendations



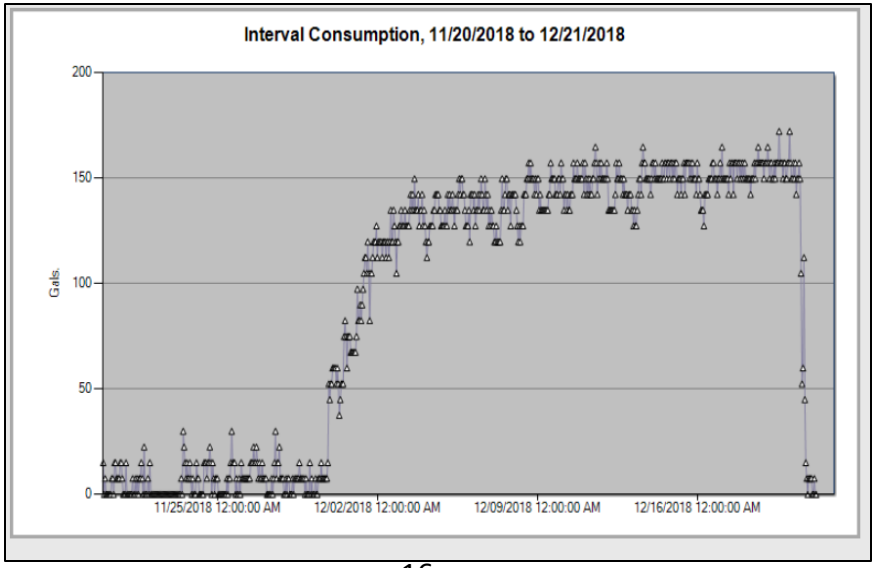


More Examples of Staff Use of AMI Data

- Residential customer with hot water tank break. Received SFPUC leak notice, replaced heater and applied for SFPUC bill adjustment. Customer service staff used STAR to confirm constant usage had stopped.

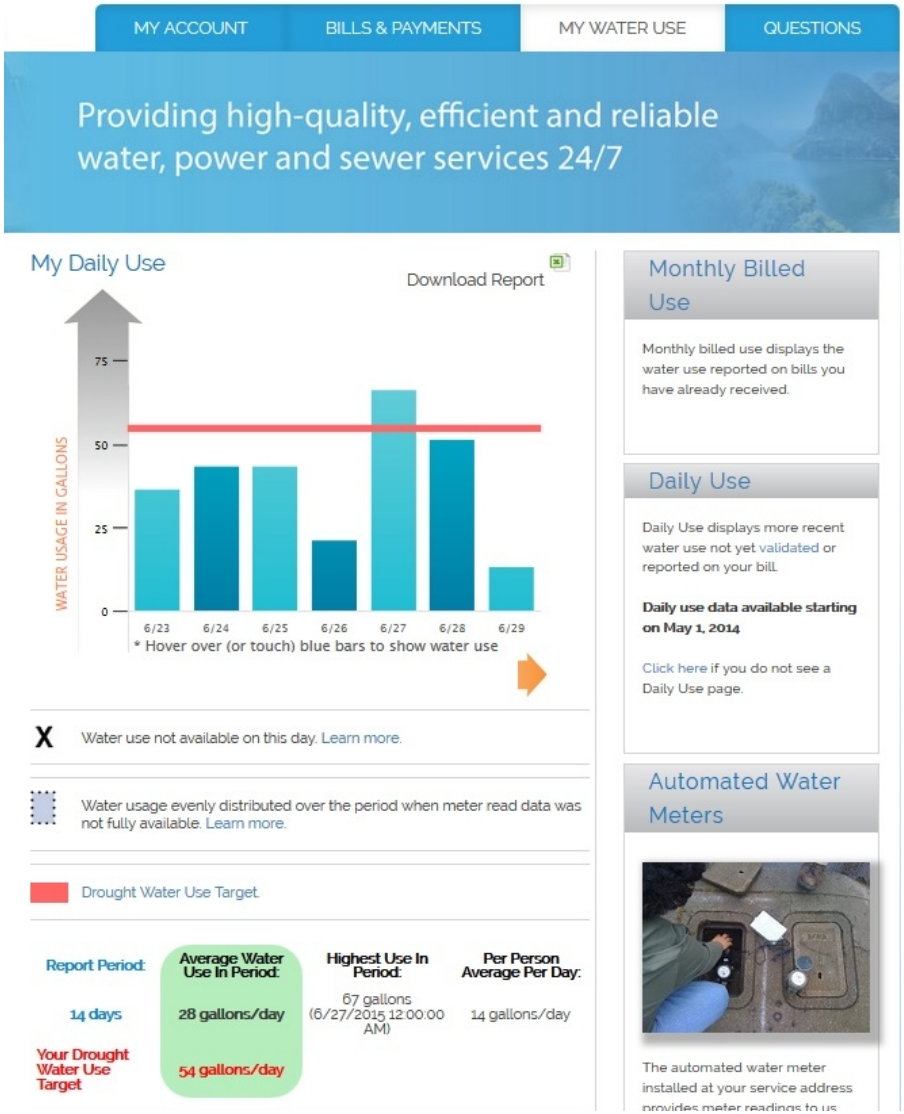


- Car dealership with single faulty toilet valve stuck open. SFPUC staff noticed the spike while reviewing STAR report, contacted the company and they fixed the fixture.

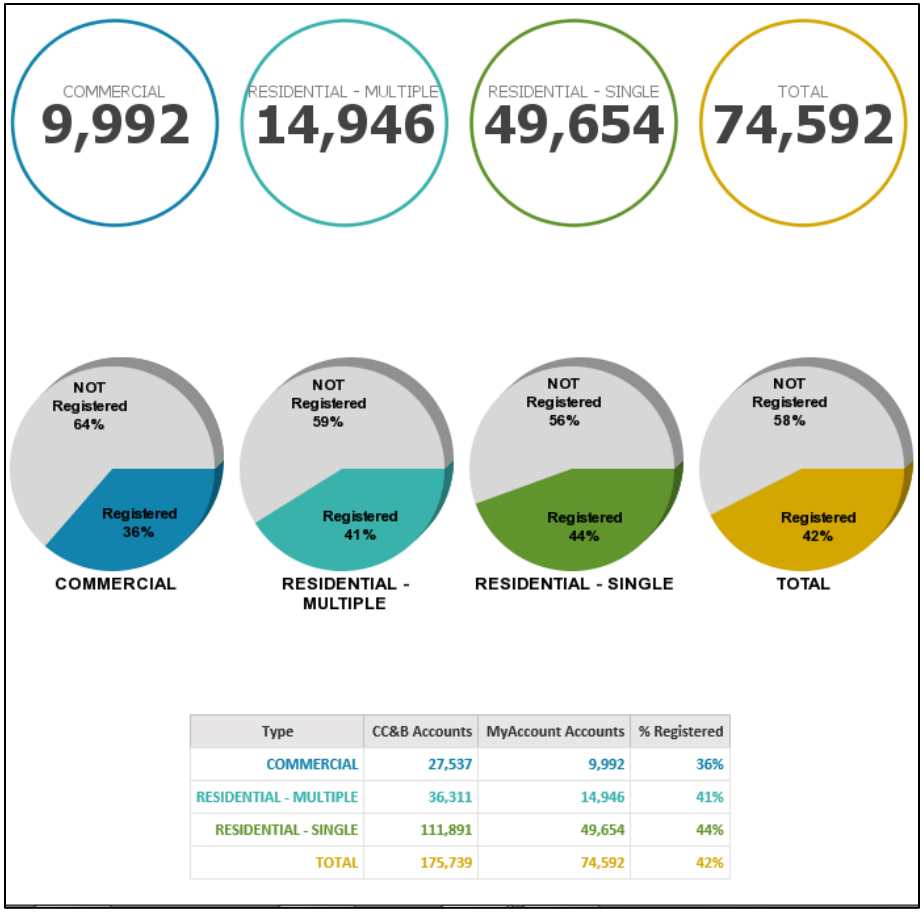


Customer My Account Web Portal

- Launched May 2014, upgraded 2016 with single sign on for eBill and in 2017 with hourly data
- Key functions:
  - Manage account
  - View and pay bills
  - View past bills and billing history
  - View monthly, daily and hourly water use over different periods of time, going back 90 days
  - Generate and export water use reports
  - Compare residential water use to SFPUC's goal of under 50 gpcd or to drought target during drought
- Portal admin tool enables staff to log on and see customer view



MyAccount Users



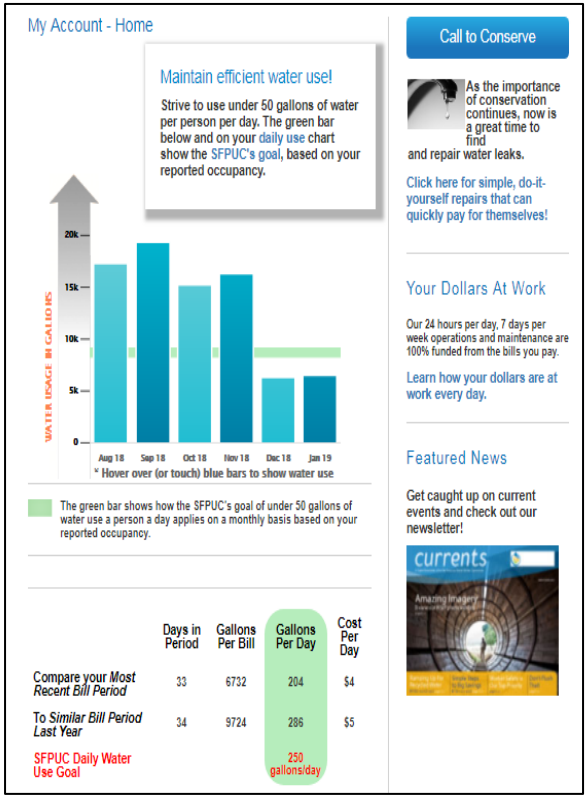
Type	CC&B Accounts	MyAccount Accounts	% Registered
COMMERCIAL	27,537	9,992	36%
RESIDENTIAL - MULTIPLE	36,311	14,946	41%
RESIDENTIAL - SINGLE	111,891	49,654	44%
TOTAL	175,739	74,592	42%

Account Type	CCB Account	# of Linked Accounts	Registration Date	# of Logins
MULTIRES	0052171193	40	3/4/2015	10,799
MULTIRES	0740020000	24	9/2/2016	6,418
CLOSED	0220465870	50	11/10/2016	5,549
MULTIRES	0368601329	46	10/4/2016	5,518
SINGLERES	6335909033	1	7/31/2015	5,214
IRRIGATION	0254020000	74	8/19/2016	3,738
SINGLERES	6367232512	1	5/26/2015	3,357
COMMERCIAL	8073700000	88	9/7/2016	3,216
CLOSED	0977356834	1	8/9/2016	3,135
MULTIRES	0377947808	23	10/4/2016	2,546
MULTIRES	4117700000	1	5/31/2014	2,500
FIRE	4271800918	4	12/2/2015	2,459
MULTIRES	3877950129	46	3/2/2017	2,417
MULTIRES	0314400000	1	10/18/2016	2,341
SINGLERES	9326510000	1	3/31/2015	2,298
MULTIRES	9789910000	105	4/13/2015	2,182
COMMERCIAL	1101369572	1	8/17/2015	2,156
SINGLERES	6441310000	1	9/29/2015	2,099
COMMERCIAL	6212876609	2	8/17/2015	2,094
MULTIRES	0360500000	23	9/20/2016	2,012

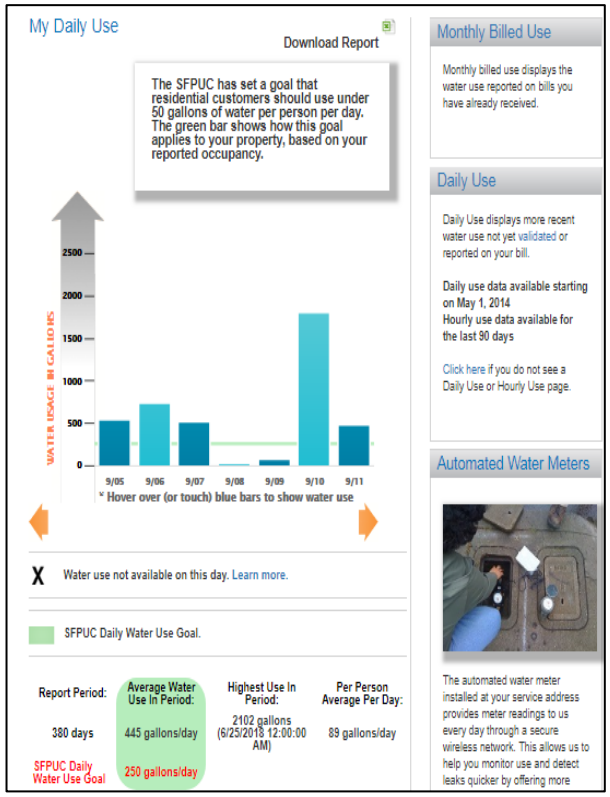
Top 20 users log in frequently. However, 23% of those registered never visit, and 33% haven't visited 60 days since their last log on

Customer Use of MyAccount Portal

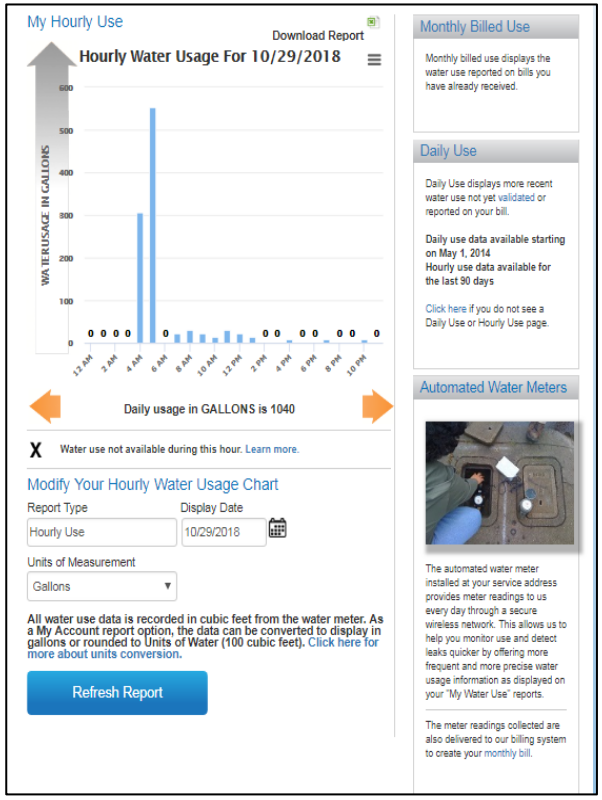
Monthly billed water use



Daily water use



Hourly water use

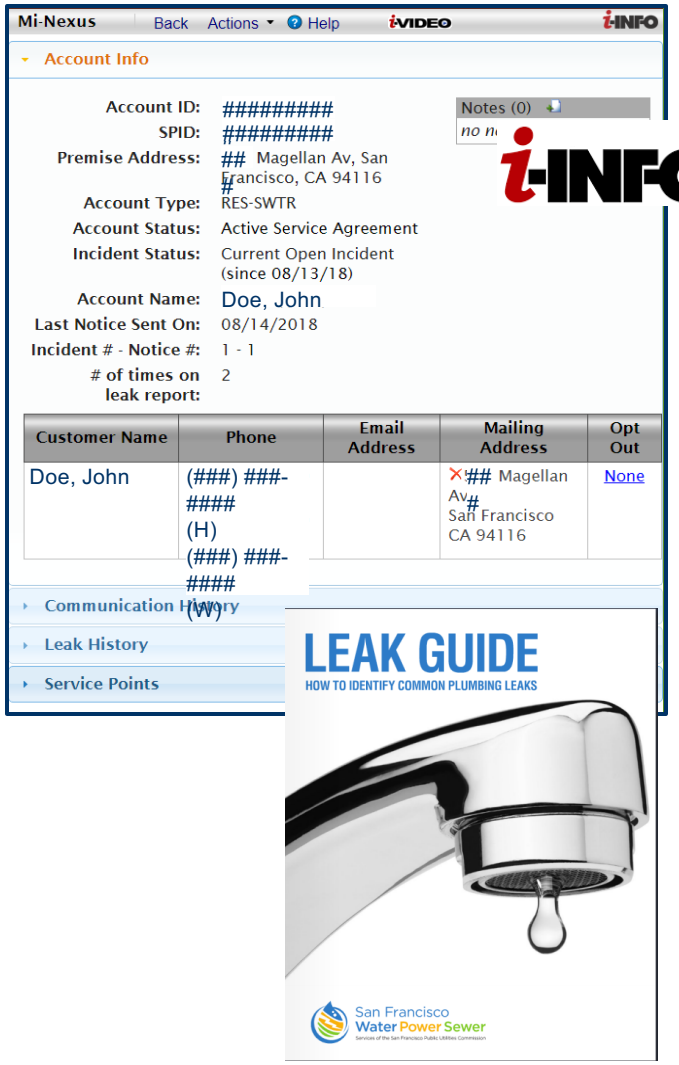


Leak Alert Program – Pilot

- March 2015 – August 2017
- Weekly postcards to single-family customers with 3 days of constant usage of at least 1 CF/hour between Wed - Friday
- Reports of customers with constant usage generated from STAR database
  - 7,200 accounts notified (about 6% of all single family customers)
  - Few contacted our customer service call center after getting a post card
  - About 76% stopped constant usage in 4 weeks
  - Most had low rate of constant usage, while about 13% had high usage of 5+ CF/hr
  - Reaching chronic constant users took extensive follow up; some never responded

Automated Leak Alert Program

- Using i-INFO platform by Alliance for Community Solutions to generate and issue phone, email, text alerts
- Configurable and scalable
- Automated, runs daily instead of weekly and includes voice call, text message, email, and letter in 4 languages
- 3 rounds of noticing using all methods available (manual door hanger provided as 4th and final step)
- Simple messages coupled with assistance are critical; FAQs and info on www.sfwater.org/fixleaks
- Added multi-family with 2-5 dwelling units Sept 2018 and irrigation accounts Mar 2019



Activity by Leak Alert Type

Combined Leak Alert Program Summary Metrics for Week Ending 4/27/2019:

Number of Incidents Opened Last Week

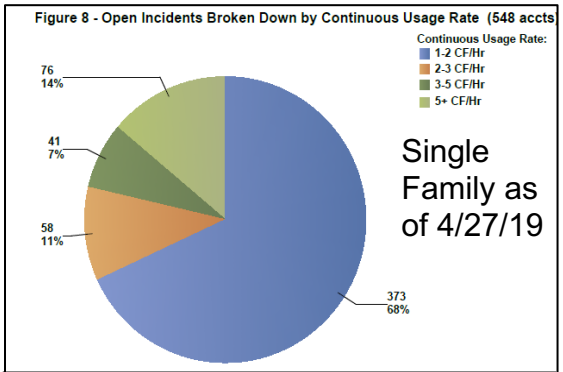
Dwelling Units/Incident Type	Count of SPIDs
1 - Single Family	37
2 - Multi-Family	10
3 - Multi-Family	9
4 - Multi-Family	1
5 - Multi-Family	2
Irrigation - Non-Municipal	2

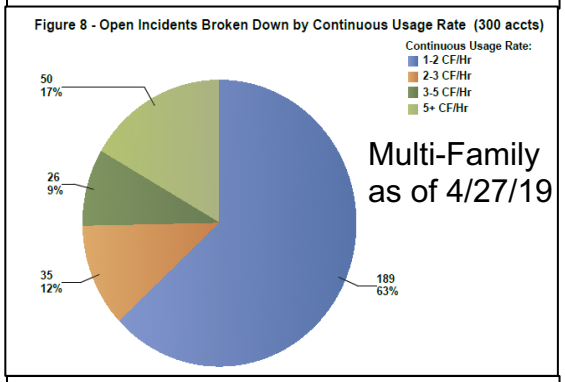
Number of Incidents Closed Last Week

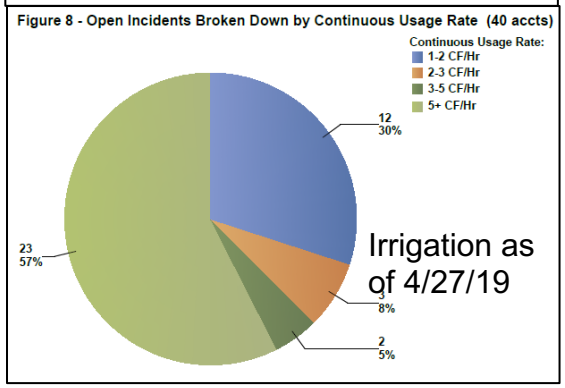
Dwelling Units/Incident Type	Count of SPIDs
1 - Single Family	99
2 - Multi-Family	15
3 - Multi-Family	9
4 - Multi-Family	2
Irrigation - Non-Municipal	1

Number of SPIDs Receiving Notification(s)

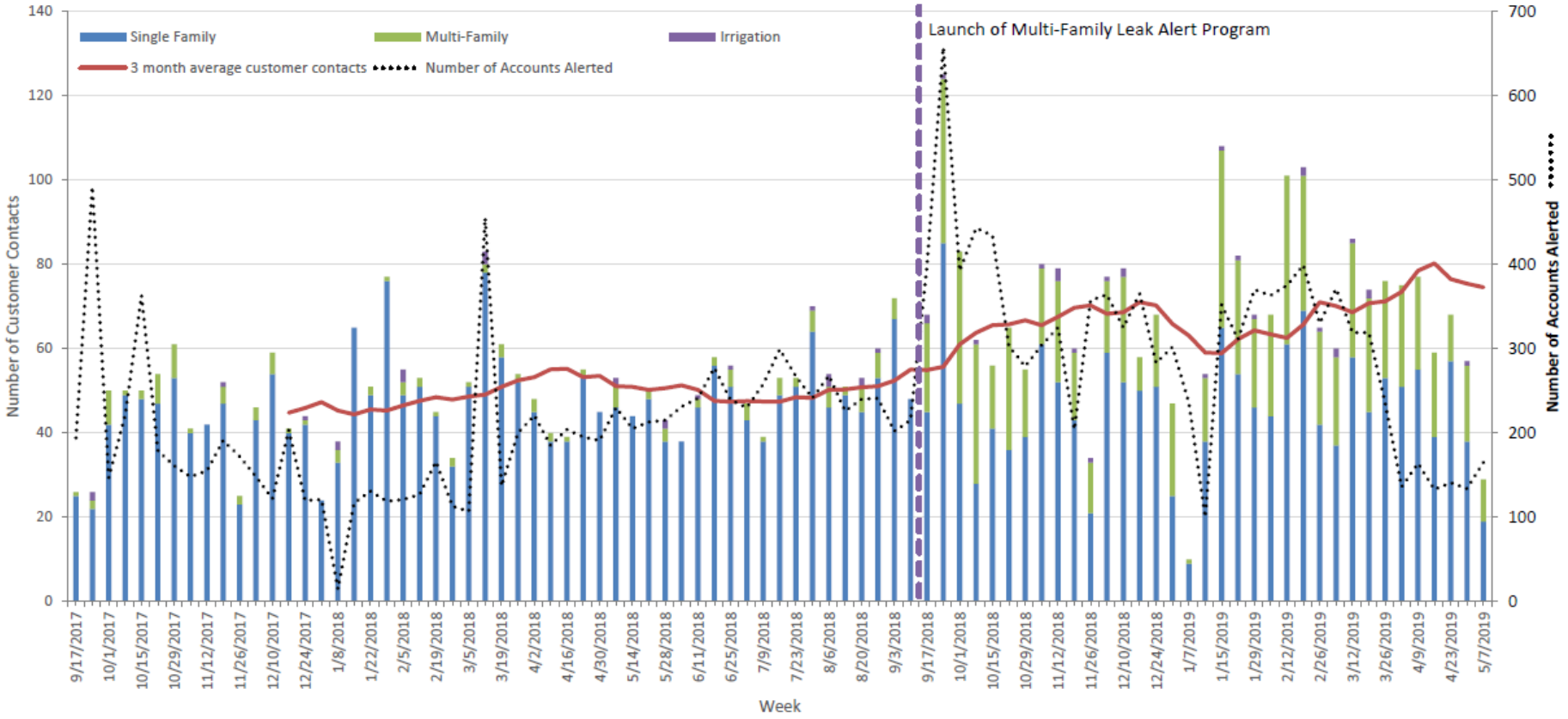
Dwelling Units/Incident Type	Count of Notifications
1 - Single Family	79
2 - Multi-Family	23
3 - Multi-Family	12
4 - Multi-Family	2
5 - Multi-Family	2
Irrigation - Non-Municipal	2





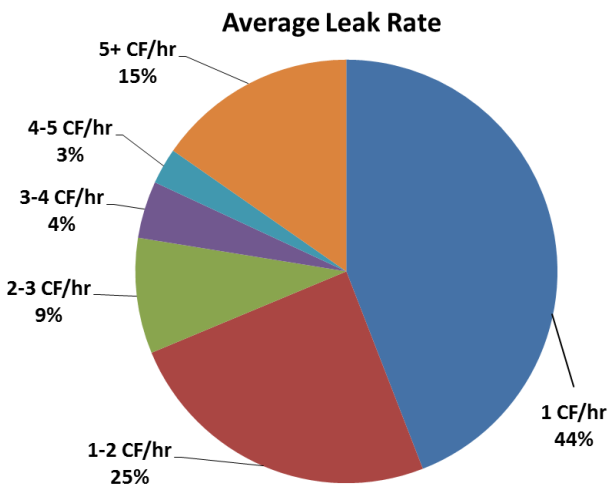


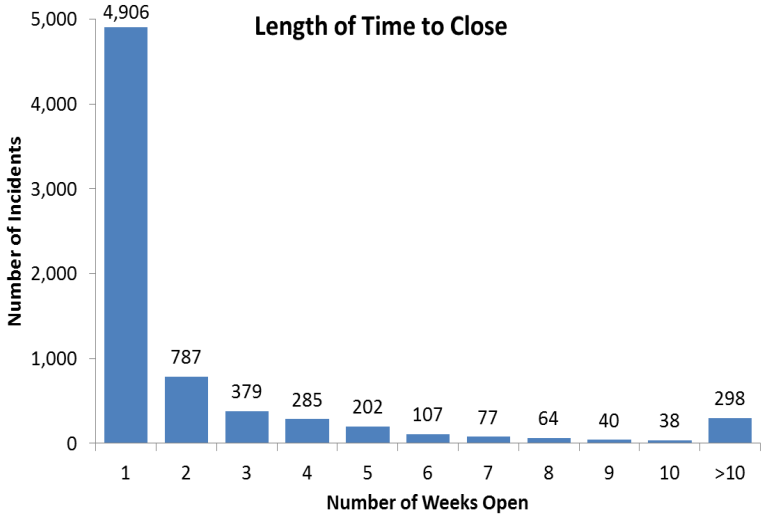
Customer Contacts in Response to Alerts



Single Family Alerts - Sept 2017 to Feb 2019

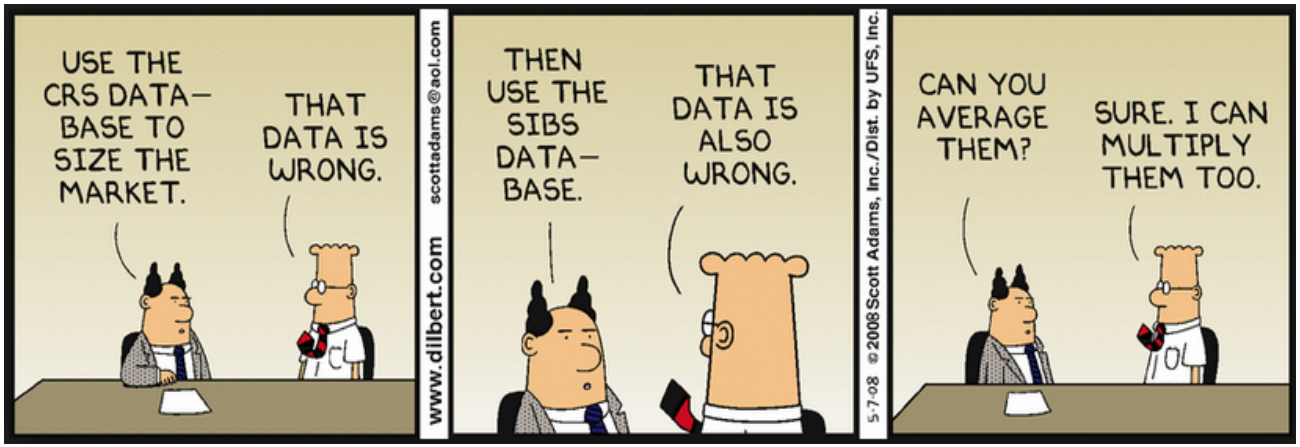
- 27,087 alerts sent to 6,580 accounts - 6% of single-family homes
- Per research study, alerts reduce single family leak volume 46%, program savings of 31.2 MG/year ± 4 MG/year (95% CI)
- Customers notified by multiple methods twice as likely to investigate leak vs those notified only by letter, resulting in fixing leaks 3 to 6 days faster on average





Data Management Considerations

- Determine & secure resources for developing, hosting, interfacing and maintaining multiple data platforms
- Address provisional nature of automated data; i.e. synchronizing with billing, handling aggregate multi-meter accounts & compound meters, network outages, late transmissions
- Provide staff training and guidance on what data sources to use for what, when and why



Engagement Tool Considerations

- Determine what's important to share
- Anticipate customer inquiries
- User test and pilot first
- Not everyone uses self help tools
- Clarify expectations about courtesy service and "real time" data
- Evaluate in-house vs. vendor-hosted, full-service vs. multiple systems
- Track world of evolving technology

For More Information

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