Leveraging AMI Data Whether your Program has just Started or is Well Established with Mountains of Information

Moderator: Blake Neffendorf
City of Buda

Christopher Tull
California Data Collaborative

Jonathan Orenstein
City of Austin

Max Walther
City of Pflugerville

Leveraging AMI Data Whether your Program has just Started or is Well Established with Mountains of Information

CALIFORNIA
DATA
COLLABORATIVE

Unlocking the Hidden Power of AMI Data

2/22/2023

Christopher Tull, Chief Data Officer
California Data Collaborative

CALIFORNIA
DATA
COLLABORATIVE

CaDC at a Glance

- A nonprofit staffed by data experts and governed by water managers

San Diego County Water Authority

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

City of SACRAMENTO Department of Utilities

moulton niguel water district

WATER DISTRICT

Valley Water
Clean Water • Healthy Environment • Flood Protection

ACWD
ALAMEDA COUNTY WATER DISTRICT

emwd

CRESCENTA VALLEY WATER DISTRICT CVWD

CALLEGUAS MUNICIPAL WATER DISTRICT

DESERT WATER

TOWN OF HILLSBOROUGH INCORPORATED MAY V ADMGMXX

Long Beach Water
Exceptional Water · Exceptional Service

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

City of Thousand Oaks

WESTERN MUNICIPAL WATER DISTRICT

Valley SAN BERNARDINO MUNICIPAL WATER DISTRICT

jurupa Community Services District

MONTECITO WATER DISTRICT

CALIFORNIA
DATA
COLLABORATIVE

CaDC at a Glance

- The California Data Collaborative builds community and technology to enable data-informed water management decisions.
  - A community of practice
  - Data analysis and tools
  - Access to data scientists and software developers
  - Research and data sharing

CALIFORNIA
DATA
COLLABORATIVE

Responding to Challenges

- The CaDC acts like a cooperative
    1. Member agencies identify and prioritize common problems
    2. CaDC data experts research potential solutions
    3. Members and staff collaborate to create a solution (software, research, analysis, etc.)
    4. Solutions and tools are available to all members and customized to their data
    5. CaDC members (and the water community) benefit

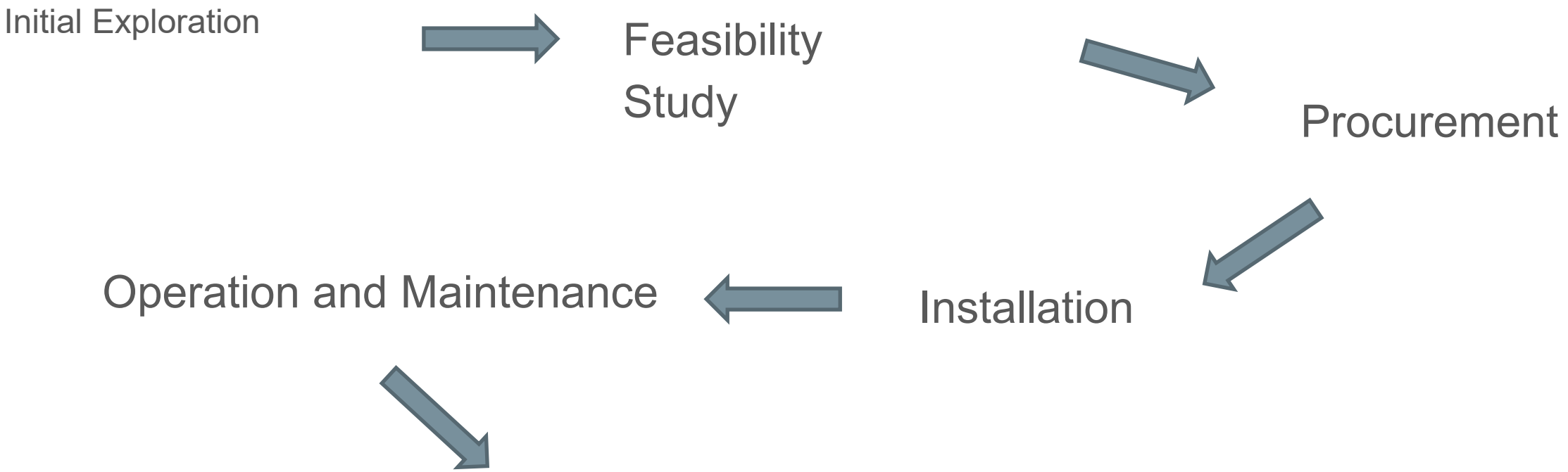
CALIFORNIA
DATA
COLLABORATIVE

Getting to Know the Group

How many of you are from a water supply agency with an existing AMI deployment?

CALIFORNIA
DATA
COLLABORATIVE

Lifecycle of an AMI Project

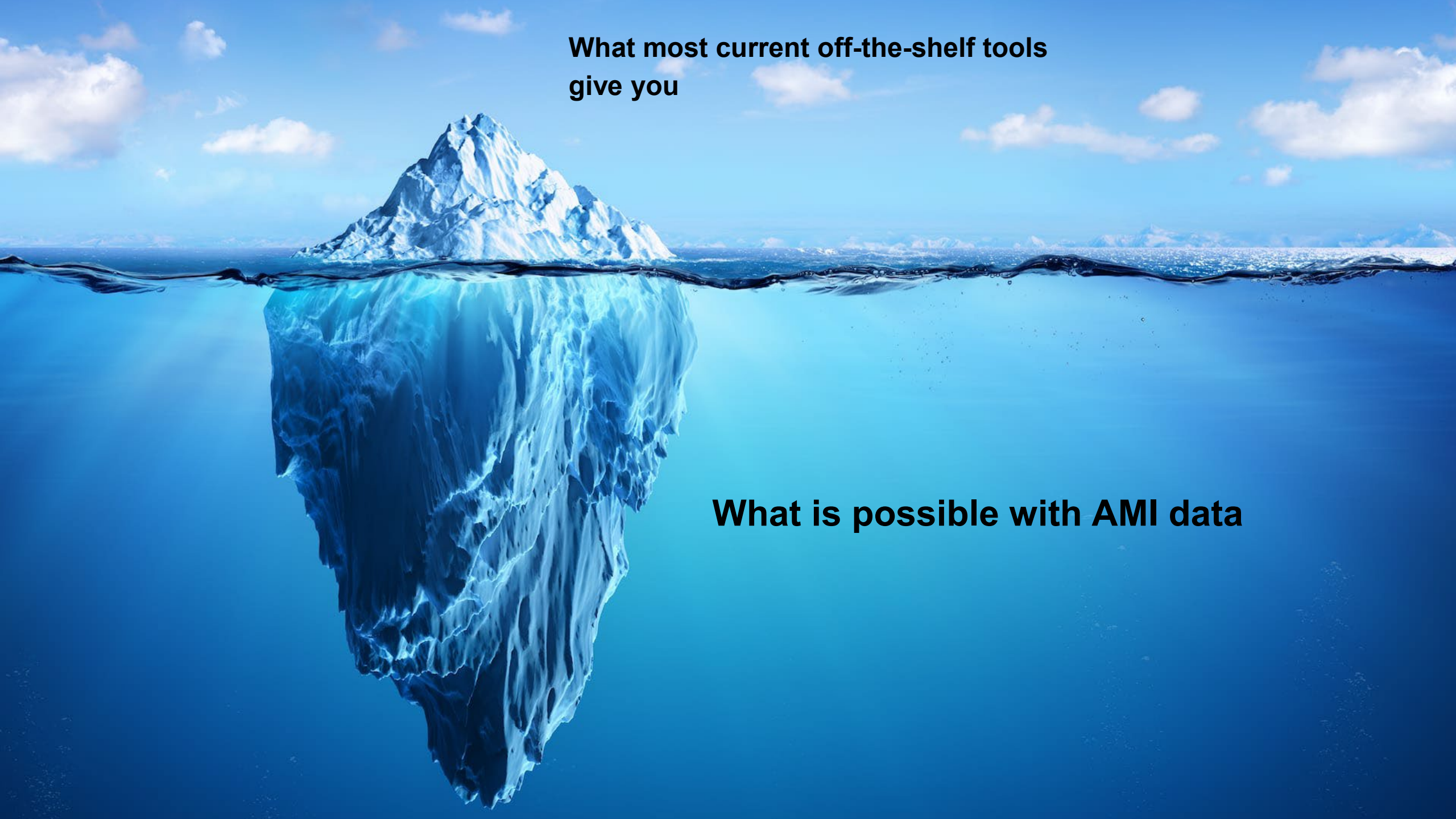


Modified from Water and Wastes Digest “What is Advanced Metering Infrastructure (AMI)?”

CALIFORNIA
DATA
COLLABORATIVE

Benefits of AMI

- Enhancing meter reading efficiency
- Streamlining billing processes
- Improving customer service processes
- Assuring long-term meter accuracy
- Decreasing non-revenue water
- Leak alerts
- Estimating irrigation
- Complying with regulations
- Identifying violations
- …


What most current off-the-shelf tools give you
What is possible with AMI data

CALIFORNIA
DATA
COLLABORATIVE

“More than ever,
hour after hour”

- Daft Punk

CALIFORNIA
DATA
COLLABORATIVE

Quantitative Change leads to Qualitative Change

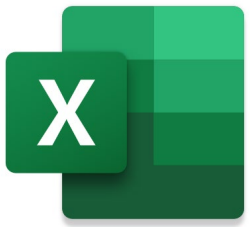
As slope increases, we need new tools

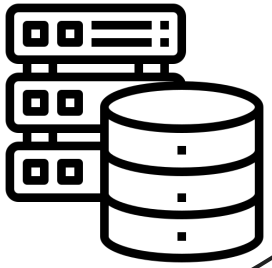
CALIFORNIA
DATA
COLLABORATIVE

Quantitative Change leads to Qualitative Change

As ~~slope~~ data size increases, we need new tools

Data Warehouses, “big data” tools, etc

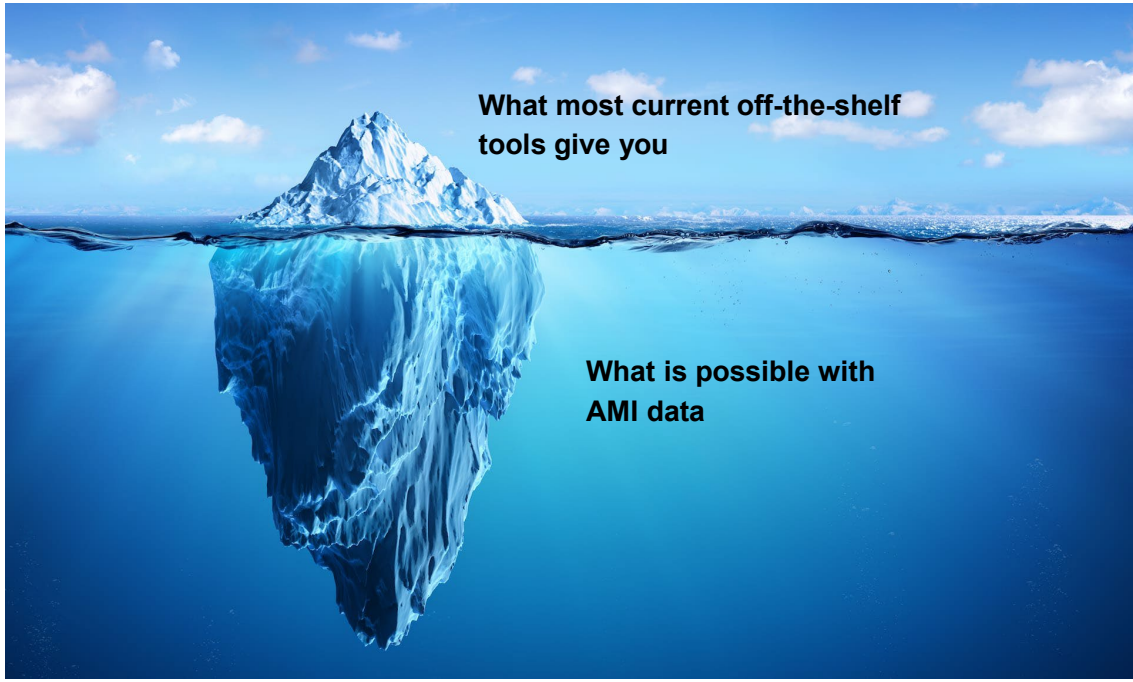




CALIFORNIA
DATA
COLLABORATIVE

How do we mine the iceberg?

1. Access the “raw” meter reads and flows
2. Store your reads for future analysis
3. Tap into any of that data at a moment’s notice
4. Generate complex reports and analysis on top of the data

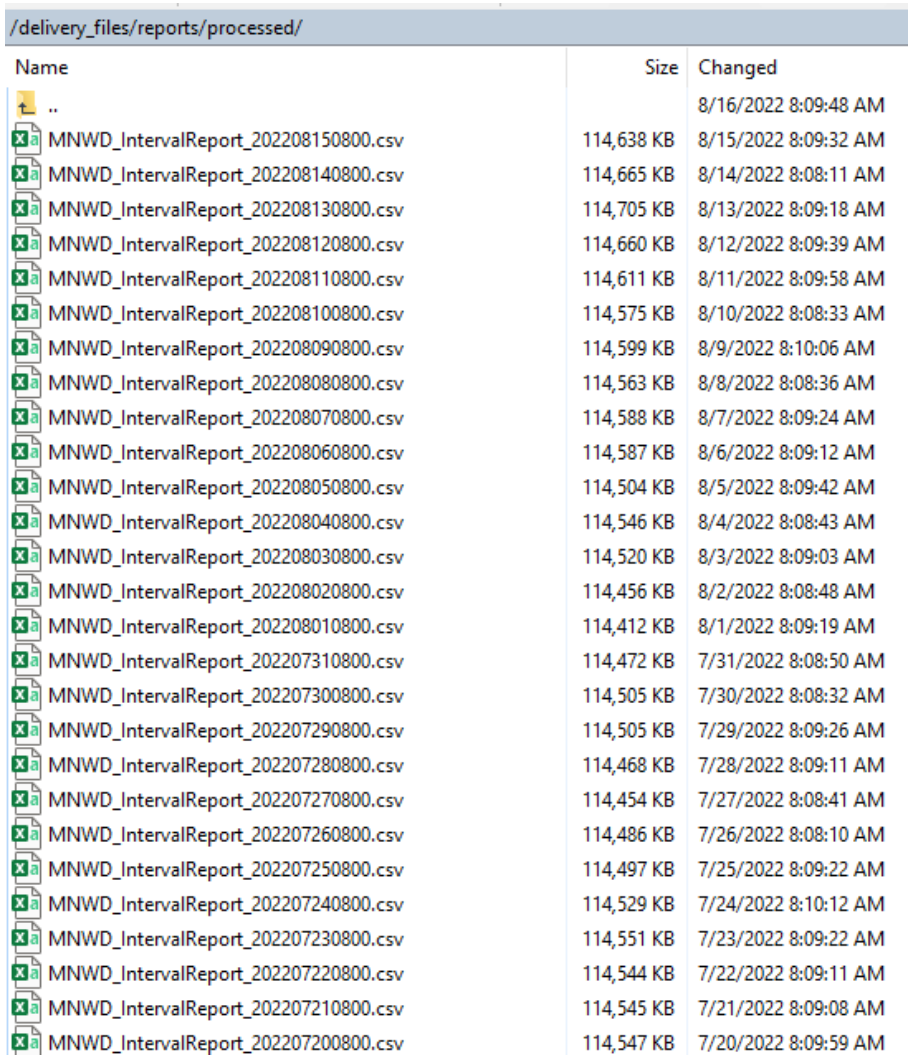


CALIFORNIA
DATA
COLLABORATIVE

Need: Access the raw data

Options vary depending on your vendor:

- Manual reports exported from vendor portal
- Batch files uploaded to an SFTP server
- API access



/delivery_files/reports/processed/

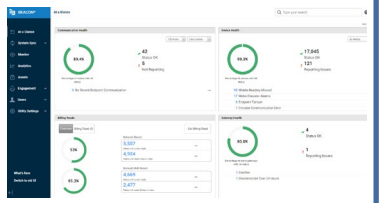
Name	Size	Changed
..		8/16/2022 8:09:48 AM
MNWD_IntervalReport_202208150800.csv	114,638 KB	8/15/2022 8:09:32 AM
MNWD_IntervalReport_202208140800.csv	114,665 KB	8/14/2022 8:08:11 AM
MNWD_IntervalReport_202208130800.csv	114,705 KB	8/13/2022 8:09:18 AM
MNWD_IntervalReport_202208120800.csv	114,660 KB	8/12/2022 8:09:39 AM
MNWD_IntervalReport_202208110800.csv	114,611 KB	8/11/2022 8:09:58 AM
MNWD_IntervalReport_202208100800.csv	114,575 KB	8/10/2022 8:08:33 AM
MNWD_IntervalReport_202208090800.csv	114,599 KB	8/9/2022 8:10:06 AM
MNWD_IntervalReport_202208080800.csv	114,563 KB	8/8/2022 8:08:36 AM
MNWD_IntervalReport_202208070800.csv	114,588 KB	8/7/2022 8:09:24 AM
MNWD_IntervalReport_202208060800.csv	114,587 KB	8/6/2022 8:09:12 AM
MNWD_IntervalReport_202208050800.csv	114,504 KB	8/5/2022 8:09:42 AM
MNWD_IntervalReport_202208040800.csv	114,546 KB	8/4/2022 8:08:43 AM
MNWD_IntervalReport_202208030800.csv	114,520 KB	8/3/2022 8:09:03 AM
MNWD_IntervalReport_202208020800.csv	114,456 KB	8/2/2022 8:08:48 AM
MNWD_IntervalReport_202208010800.csv	114,412 KB	8/1/2022 8:09:19 AM
MNWD_IntervalReport_202207310800.csv	114,472 KB	7/31/2022 8:08:50 AM
MNWD_IntervalReport_202207300800.csv	114,505 KB	7/30/2022 8:08:32 AM
MNWD_IntervalReport_202207290800.csv	114,505 KB	7/29/2022 8:09:26 AM
MNWD_IntervalReport_202207280800.csv	114,468 KB	7/28/2022 8:09:11 AM
MNWD_IntervalReport_202207270800.csv	114,454 KB	7/27/2022 8:08:41 AM
MNWD_IntervalReport_202207260800.csv	114,486 KB	7/26/2022 8:08:10 AM
MNWD_IntervalReport_202207250800.csv	114,497 KB	7/25/2022 8:09:22 AM
MNWD_IntervalReport_202207240800.csv	114,529 KB	7/24/2022 8:10:12 AM
MNWD_IntervalReport_202207230800.csv	114,551 KB	7/23/2022 8:09:22 AM
MNWD_IntervalReport_202207220800.csv	114,544 KB	7/22/2022 8:09:11 AM
MNWD_IntervalReport_202207210800.csv	114,545 KB	7/21/2022 8:09:08 AM
MNWD_IntervalReport_202207200800.csv	114,547 KB	7/20/2022 8:09:59 AM

CALIFORNIA
DATA
COLLABORATIVE

Overview

Ami Vendor

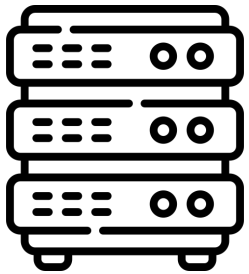
Sensus
Analytics

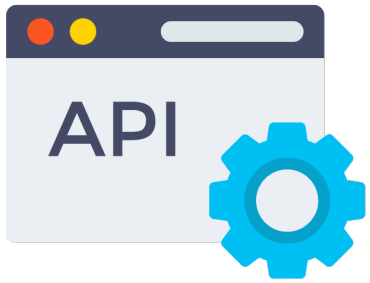


Beacon

Other Portals

Customer
Portal



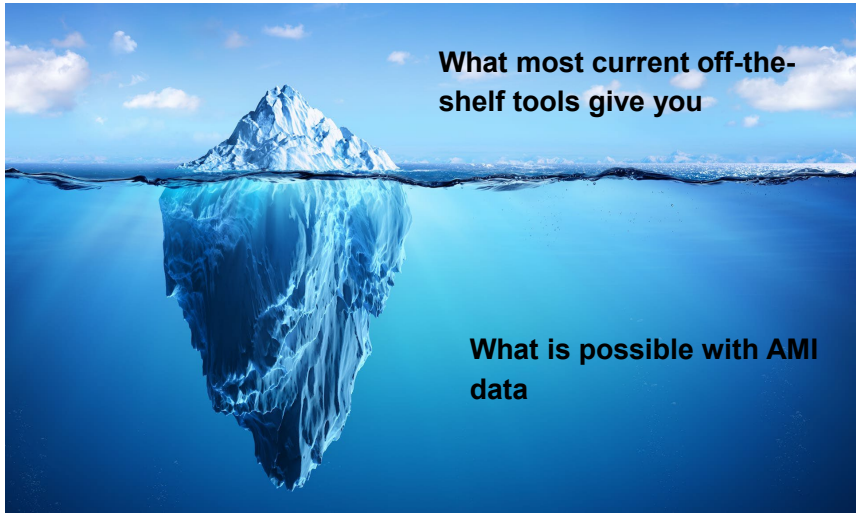


Raw data
SFTP server

CALIFORNIA
DATA
COLLABORATIVE

How do we mine the iceberg?

1. Access the “raw” meter reads and flows ✓
2. Store all hourly reads indefinitely
3. Tap into any of that data at a moment’s notice
4. Generate complex reports and analysis on top of the data



CALIFORNIA
DATA
COLLABORATIVE

Need: Store the data

Options:

- Out of the box: rely on your vendor for data storage
- Third party data system
- **Store raw data in-house**

CALIFORNIA
DATA
COLLABORATIVE

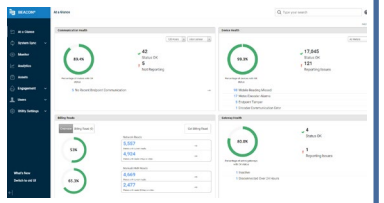
Overview

Ami Vendor

Other Portals

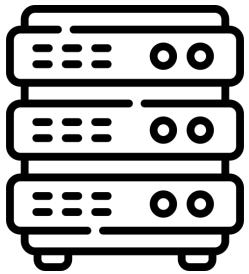
Your Agency

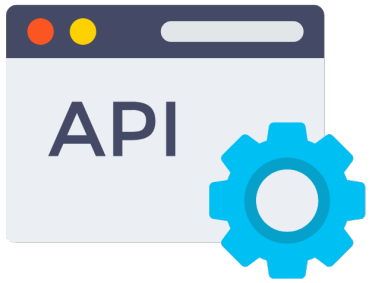
Sensus
Analytics



Beacon

Customer
Portal



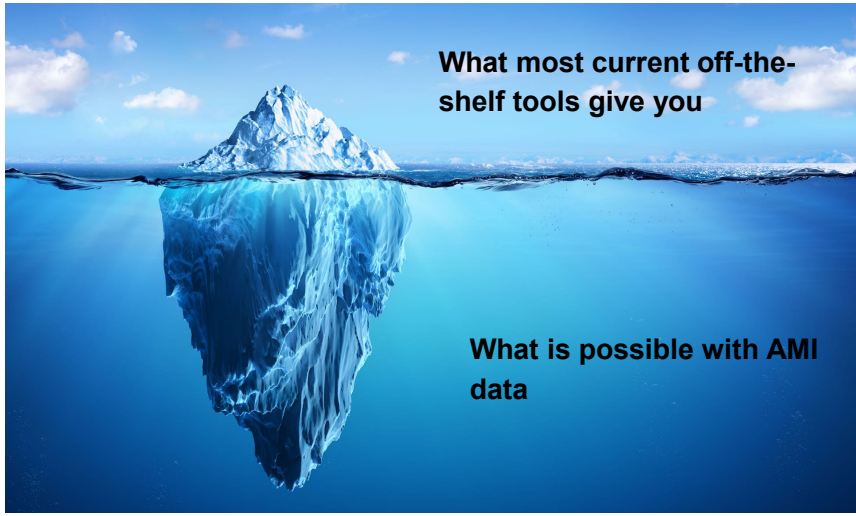


Raw data
SFTP server

CALIFORNIA
DATA
COLLABORATIVE

How do we mine the iceberg?

1. Access the “raw” meter reads and flows ✓
2. Store all hourly reads indefinitely ✓
3. Tap into any of that data at a moment’s notice
4. Generate complex reports and analysis on top of the data



CALIFORNIA
DATA
COLLABORATIVE

Need: Seamlessly tap into data

Options:

- Access data through the vendor
- Put the data in some sort of database
  - Traditional database (SQL Server, PostgreSQL, MySQL, MS Access, etc…)
  - **High-performance cloud database A.K.A. “cloud data warehouse” (Redshift, Snowflake, Athena, BigQuery, Firebolt, etc)**

CALIFORNIA
DATA
COLLABORATIVE

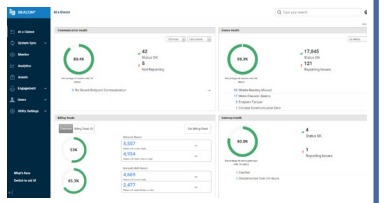
Overview

Ami Vendor

Other Portals

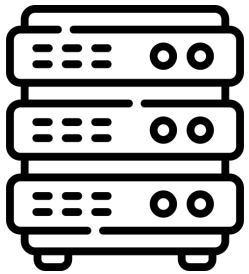
Your Agency

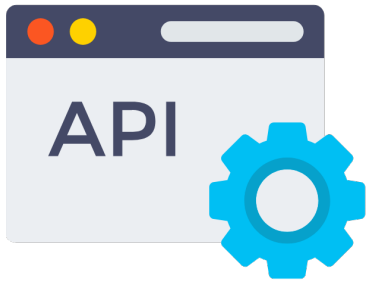
Sensus
Analytics



Beacon

Customer
Portal



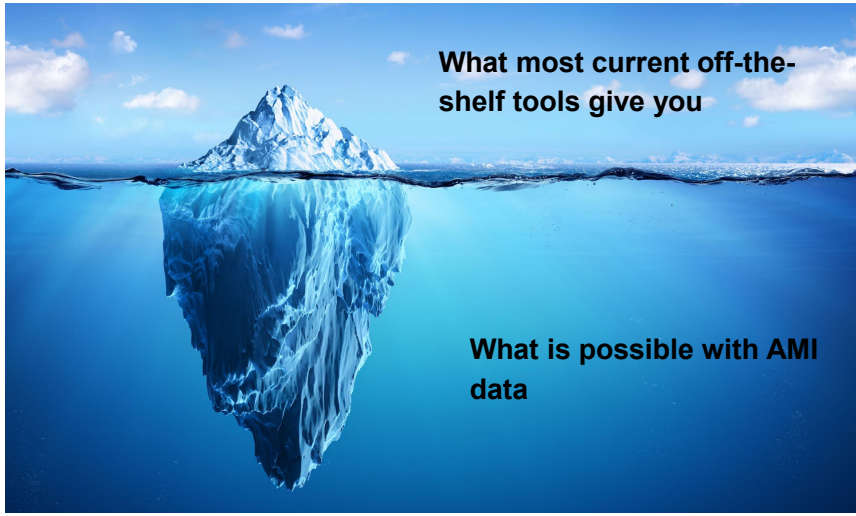


Raw data
SFTP server

CALIFORNIA
DATA
COLLABORATIVE

How do we mine the iceberg?

1. Access the “raw” meter reads and flows
2. Store all hourly reads indefinitely
3. Tap into any of that data at a moment’s notice
4. Generate complex reports and analysis on top of the data

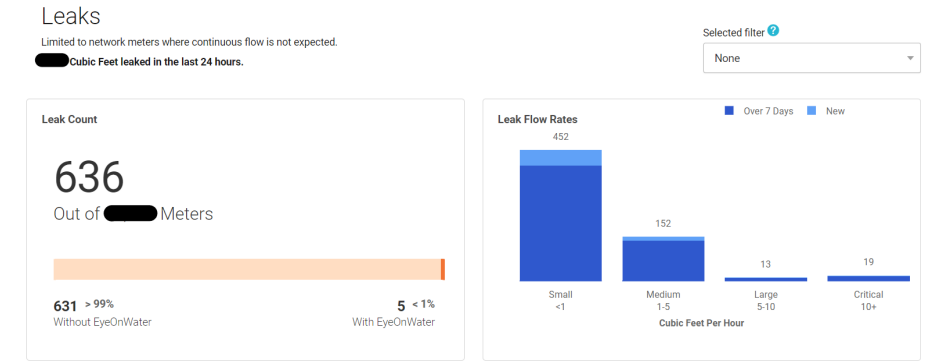


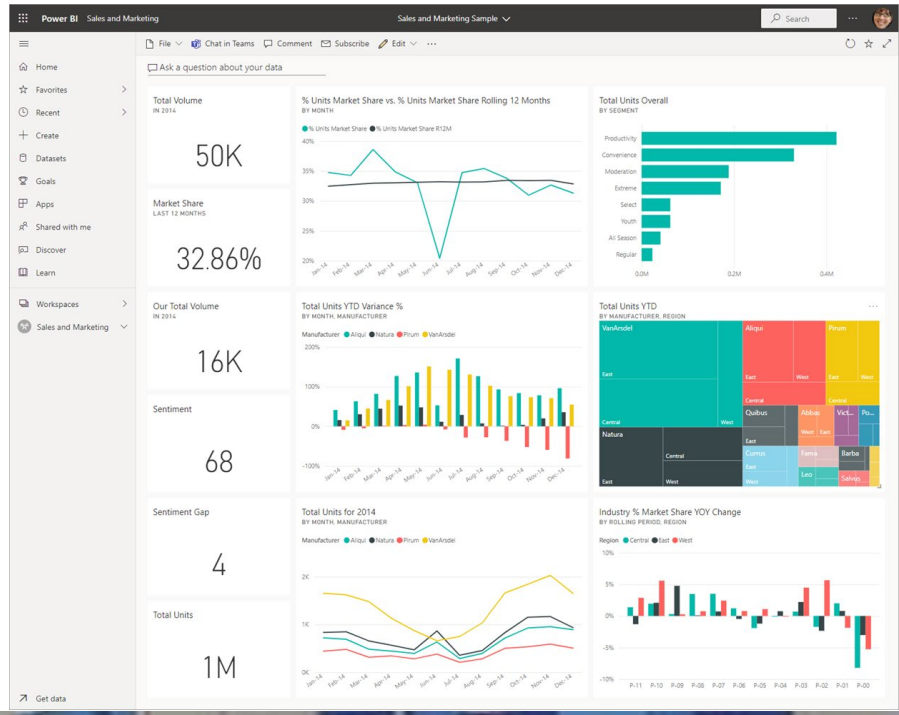
CALIFORNIA
DATA
COLLABORATIVE

Need: Complex reports and analysis

Options:

- Use whatever reports are provided by the vendor
- Procure an AMI analysis system
- Build your own!
  - Query the data directly in the database using SQL
  - Connect to BI tools (Power BI, Tableau, etc.)
  - Custom reports and dashboards using programming tools



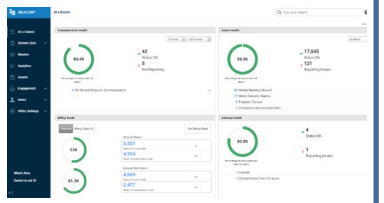


CALIFORNIA
DATA
COLLABORATIVE

Overview

Ami Vendor

Sensus
Analytics



Beacon

Other Portals

Customer
Portal

Your Agency

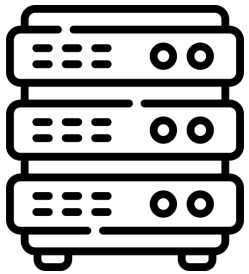
SQL

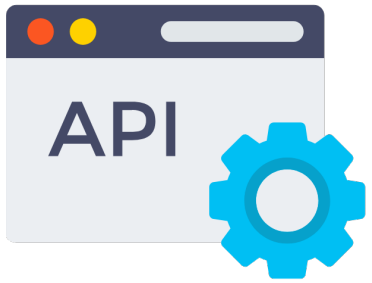
R

Power BI

+ableau

etc...



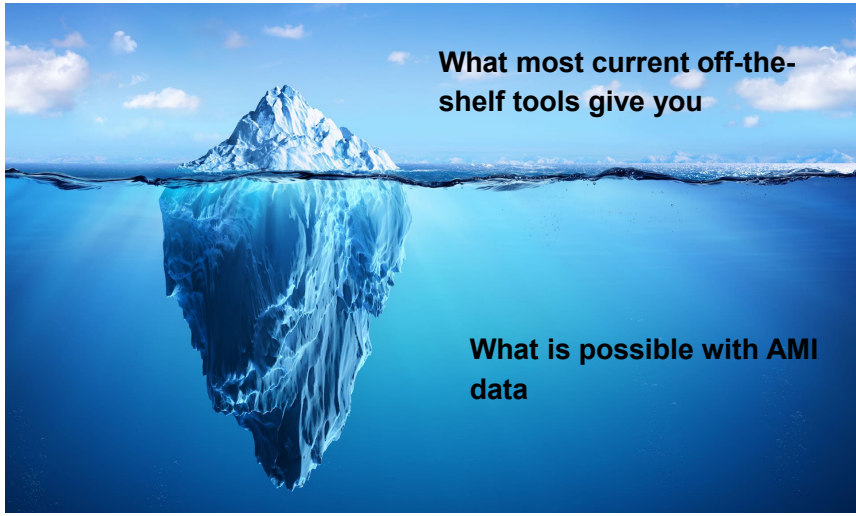


Raw data
SFTP server

CALIFORNIA
DATA
COLLABORATIVE

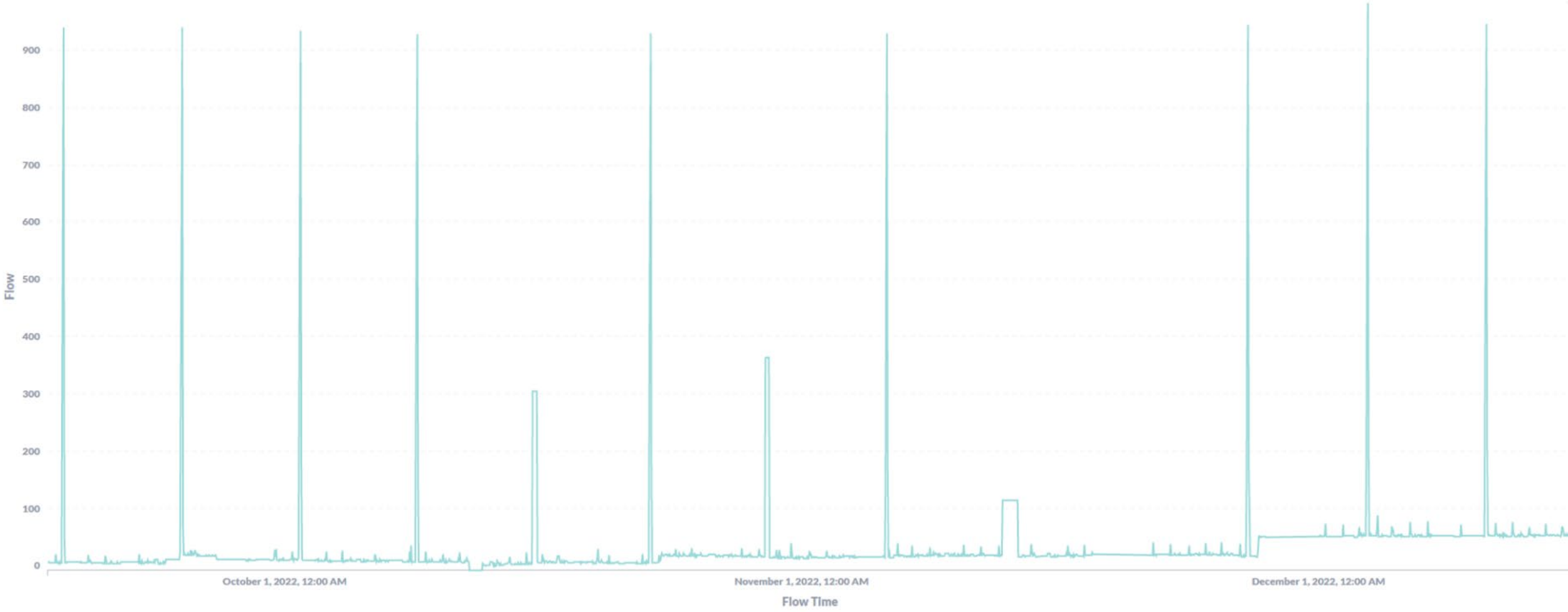
Let’s get mining!

1. Access the “raw” meter reads and flows ✓
2. Store all hourly reads indefinitely ✓
3. Tap into any of that data at a moment’s notice ✓
4. Generate complex reports and analysis on top of the data ✓



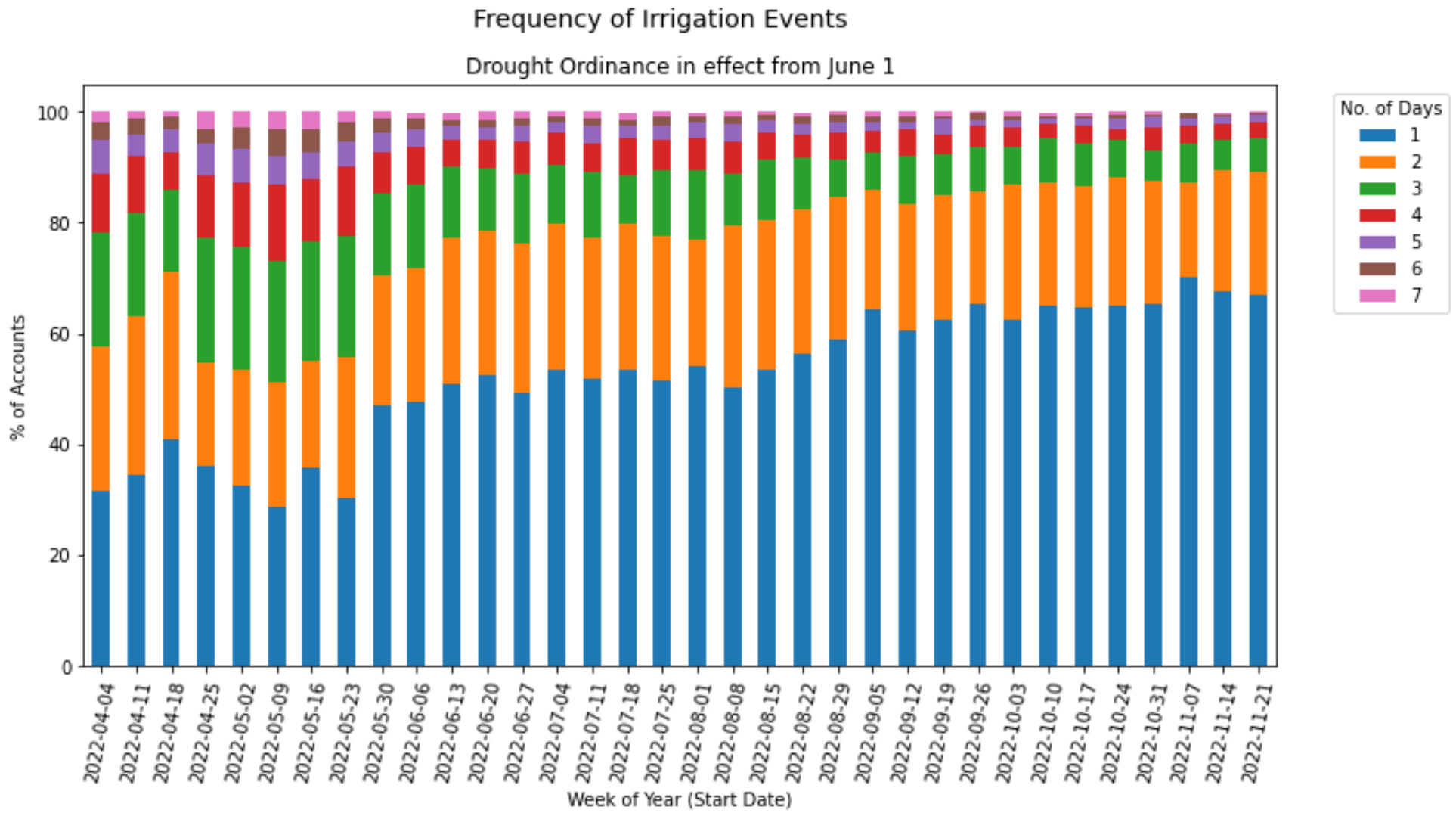
CALIFORNIA
DATA
COLLABORATIVE

Use Case: Irrigation Detection



CALIFORNIA
DATA
COLLABORATIVE

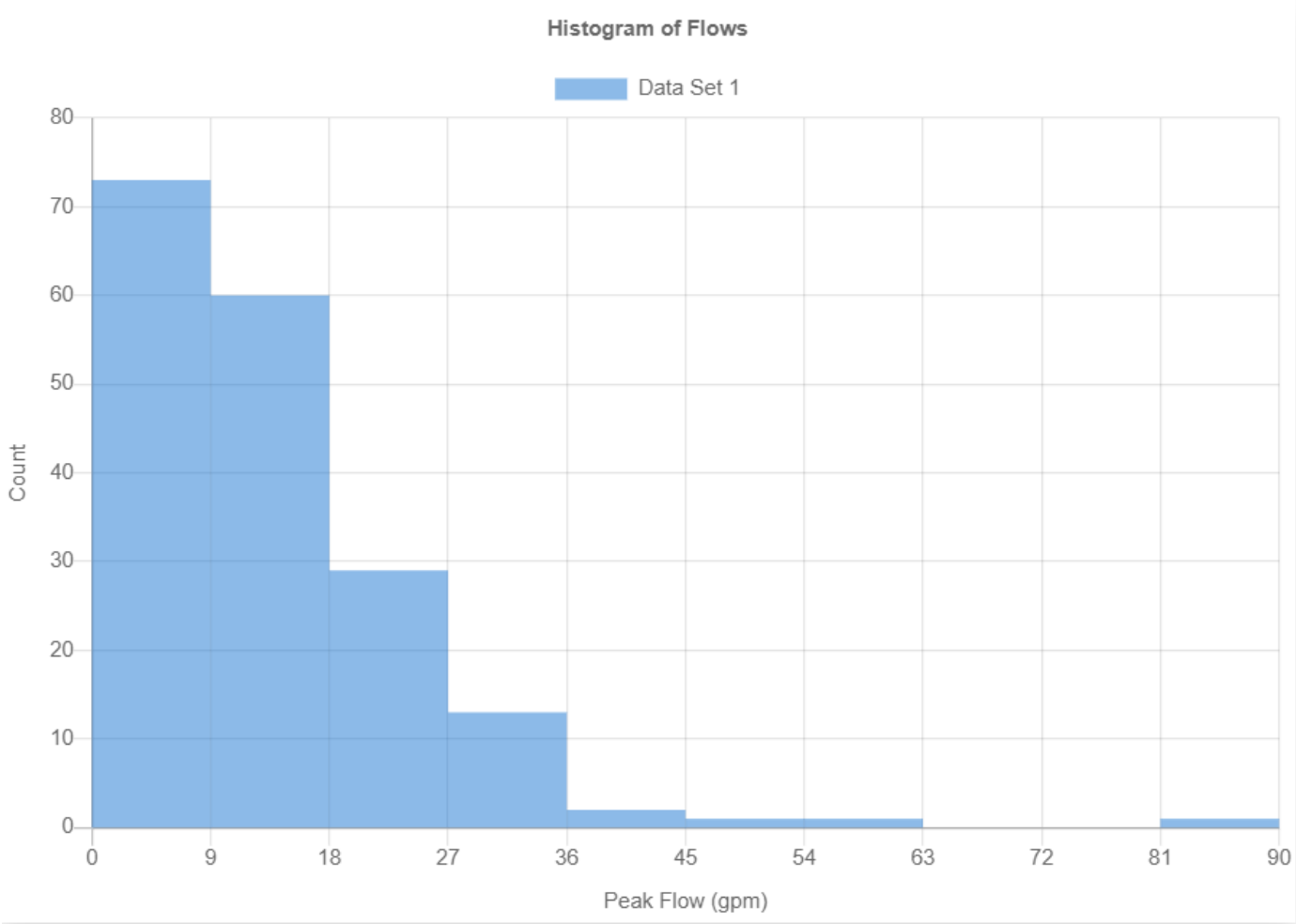
Use Case: Irrigation Trends



CALIFORNIA
DATA
COLLABORATIVE

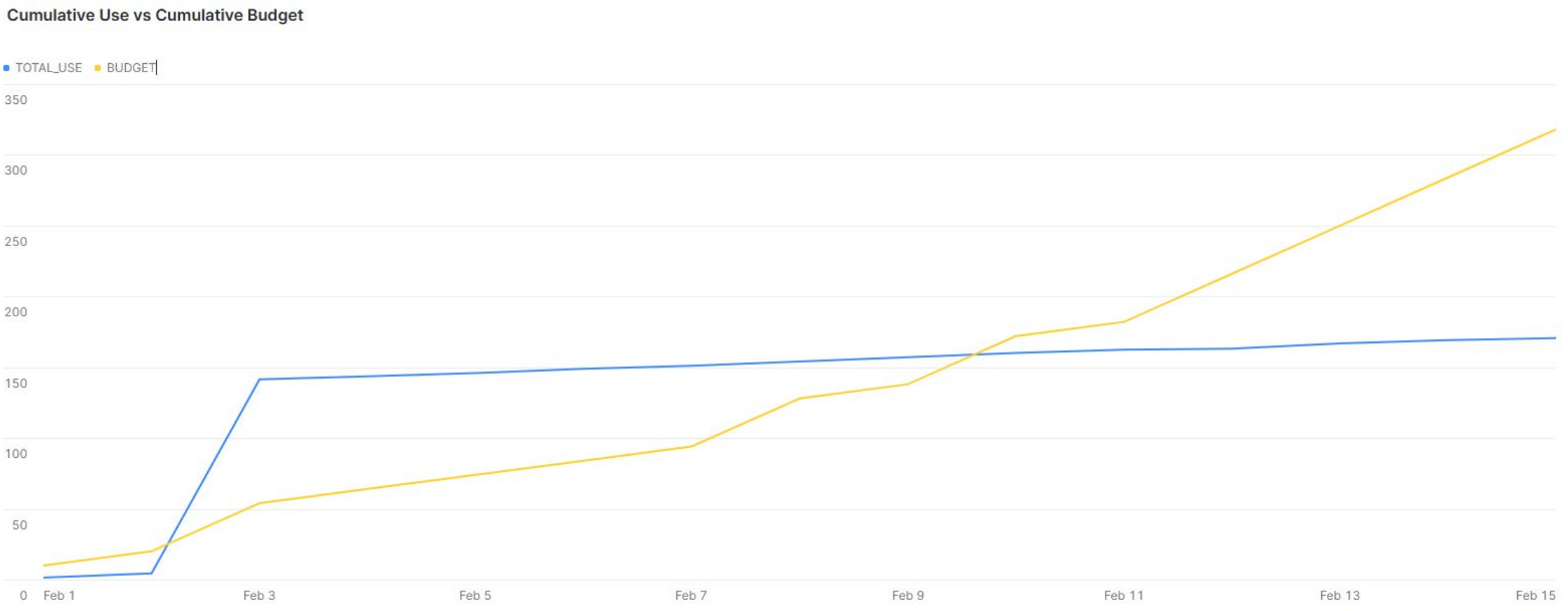
Use Case: Peak Flows and Meter Sizing

- Goal: evaluate a potential program to rebate customers with meters that are “too large”



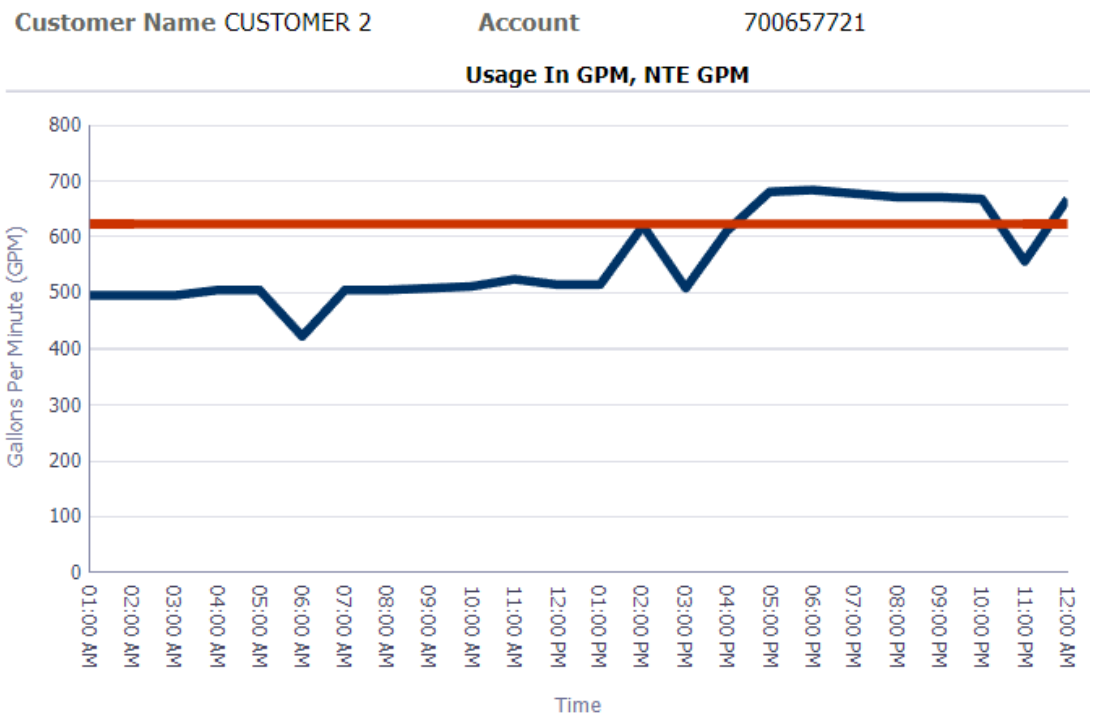
CALIFORNIA
DATA
COLLABORATIVE

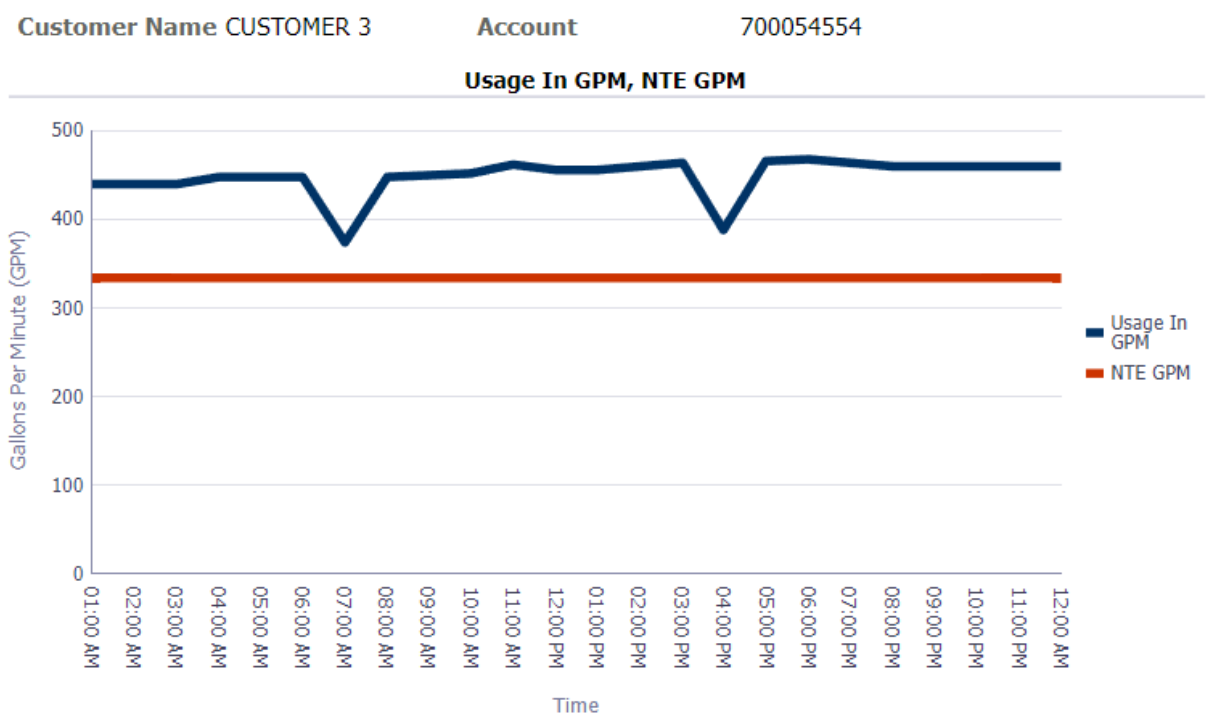
Use Case: Cumulative Water Budgets



CALIFORNIA
DATA
COLLABORATIVE

Use Case: Hourly Max Flows

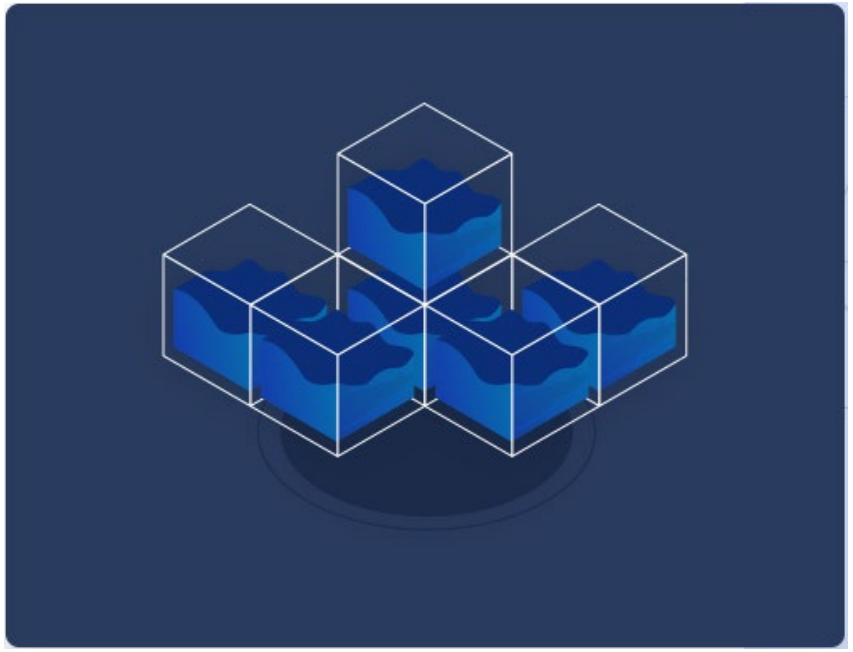




CALIFORNIA
DATA
COLLABORATIVE

What's next for AMI data?

- Agencies will continue to adopt AMI
- Continue to improve tooling for accessing and putting AMI data to use
- Develop, refine, and expand access to other AMI analytics beyond leak alerts
    - Irrigation detection, Meter health, System operations
- Secure data sharing for planning and research



CALIFORNIA
DATA
COLLABORATIVE

Get in touch

Christopher Tull, Chief Data Officer
Email: chris@theCaDC.org

CaliforniaDataCollaborative.org

CALIFORNIA DATA COLLABORATIVE

Leveraging AMI Data Whether your Program has just Started or is Well Established with Mountains of Information

How AMI Changed My Life

By Jonathan Orenstein | Division Manager, Customer Services | Austin Water

Austin Water Service Area

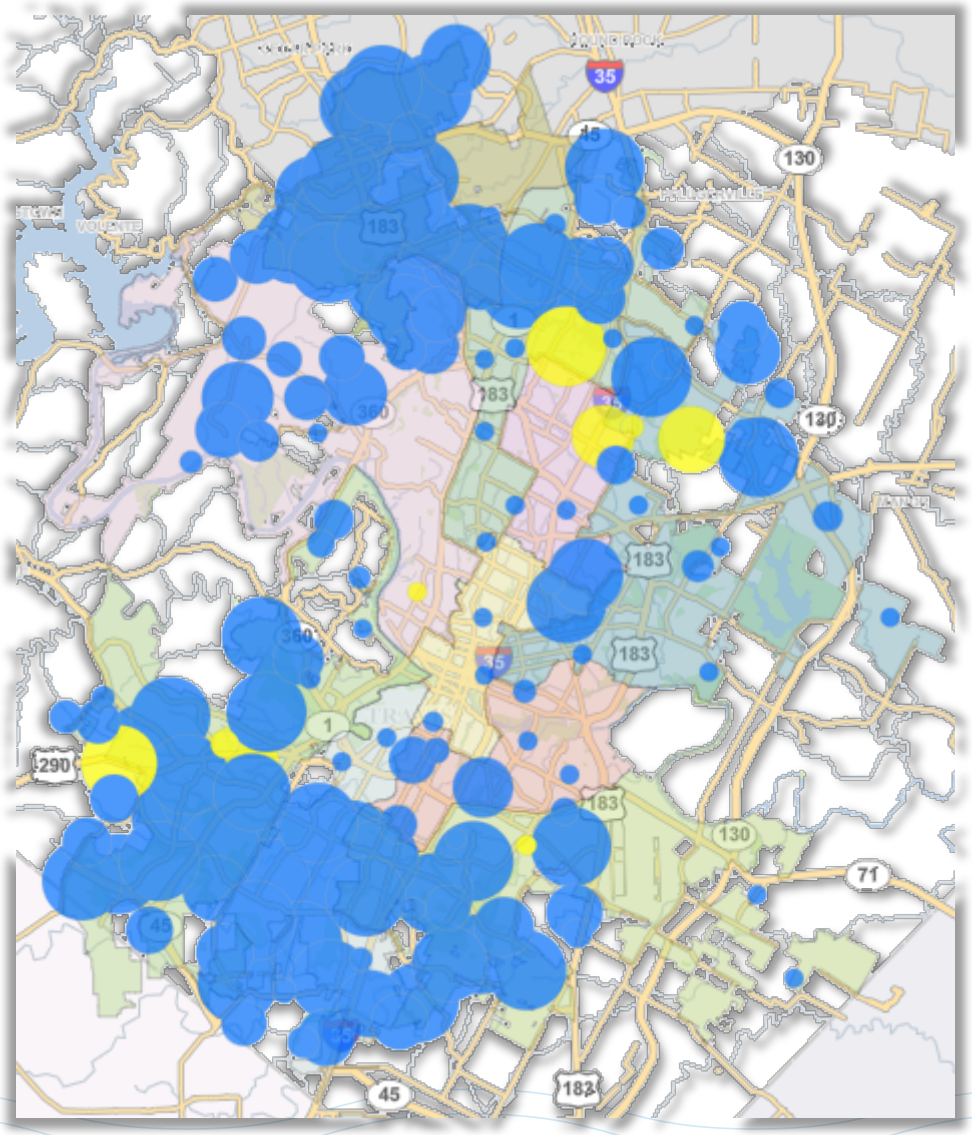
Service Area Population 1.1 million
~675 square miles
~230,000 Utility Accounts

162 Data Collector Units (DCU)
Expected DCU coverage

- 80% of meters – three DCUs
- 10% of meters – two DCUs
- 10% of meters – one DCU

Meter Population 250,000

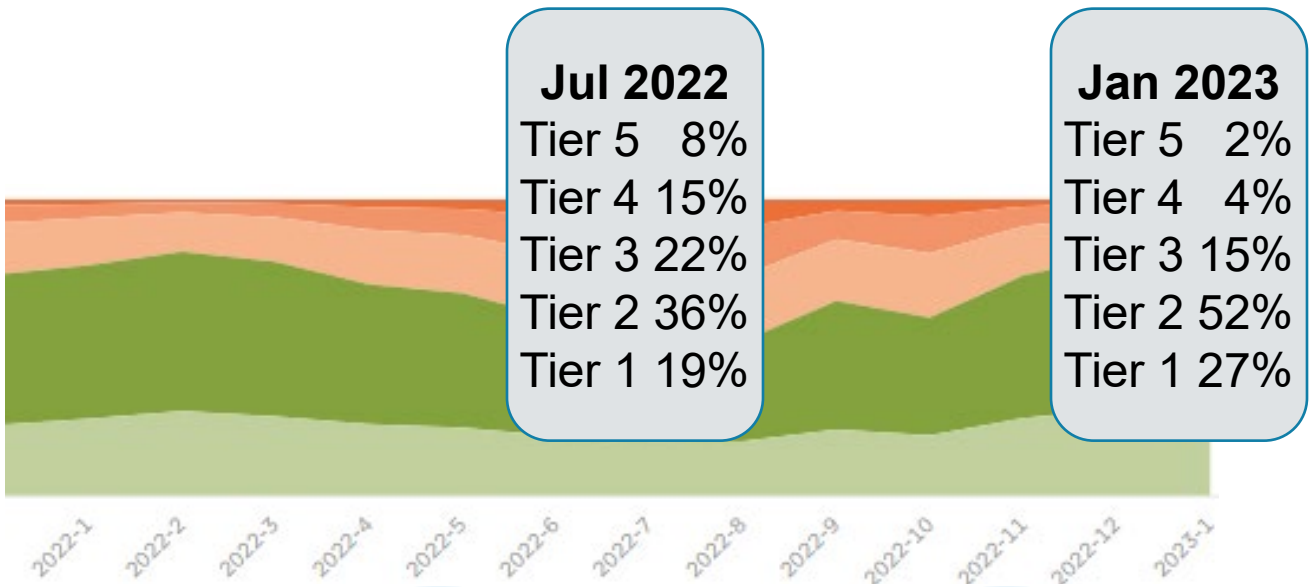
- AMI installations 103,000
- Billing AMI Reads 57,000

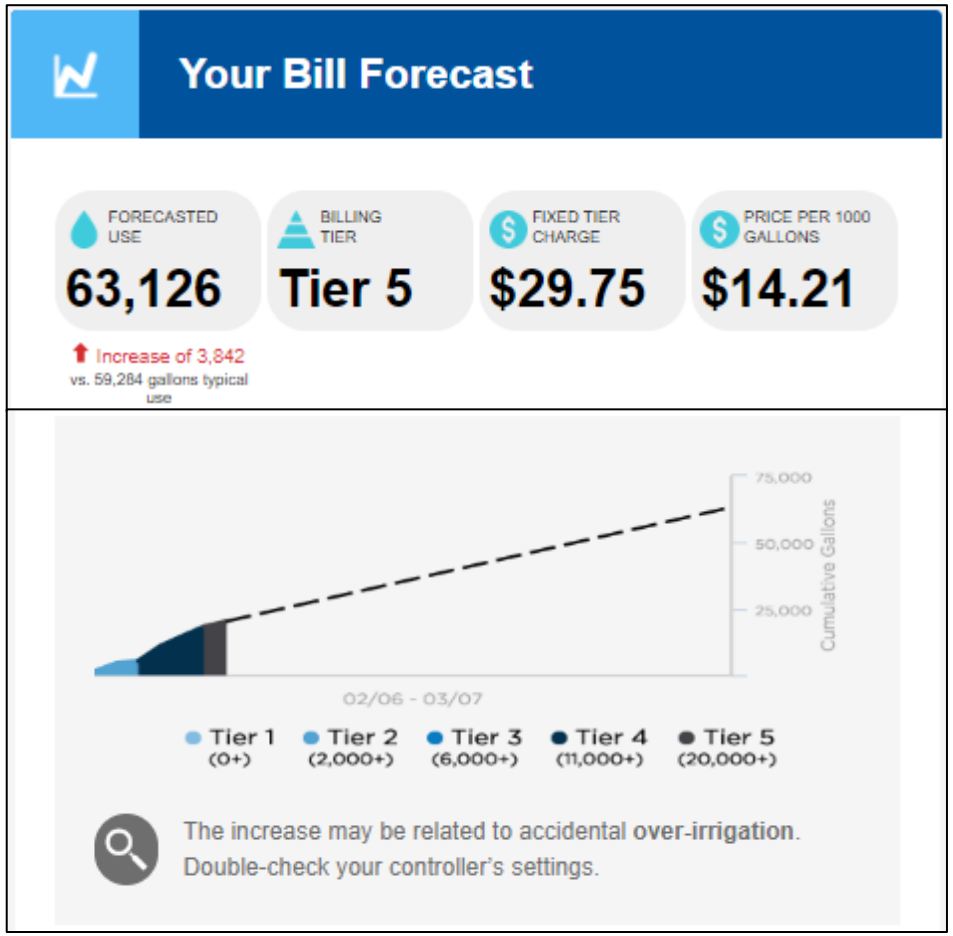


Austin Water Residential Rates

Five Tier Rate Structure

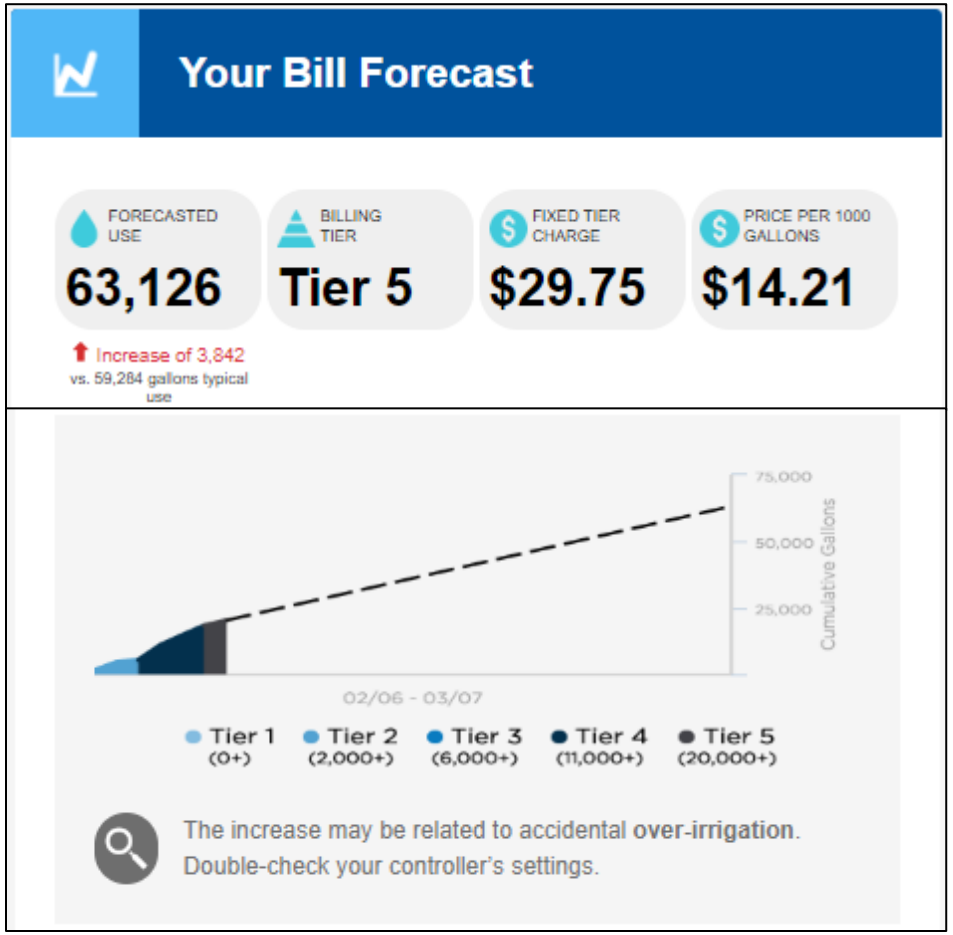
<= 2,000	2,001 – 6,000	6,001 – 11,000	11,001 – 20,000	20,001+
$2.89	**$4.81**	**$8.34**	**$12.70**	**$14.21**



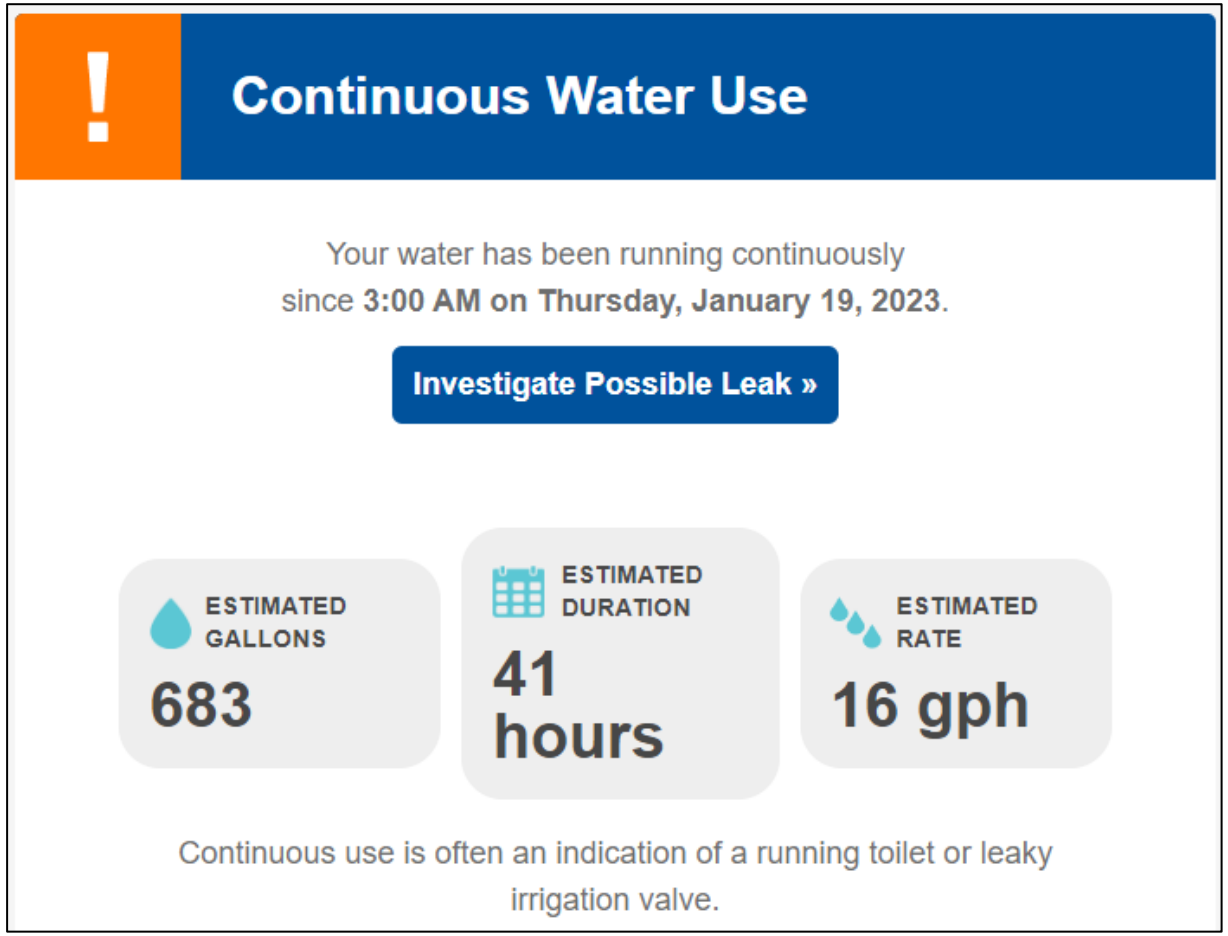


Customer Portal Alerts

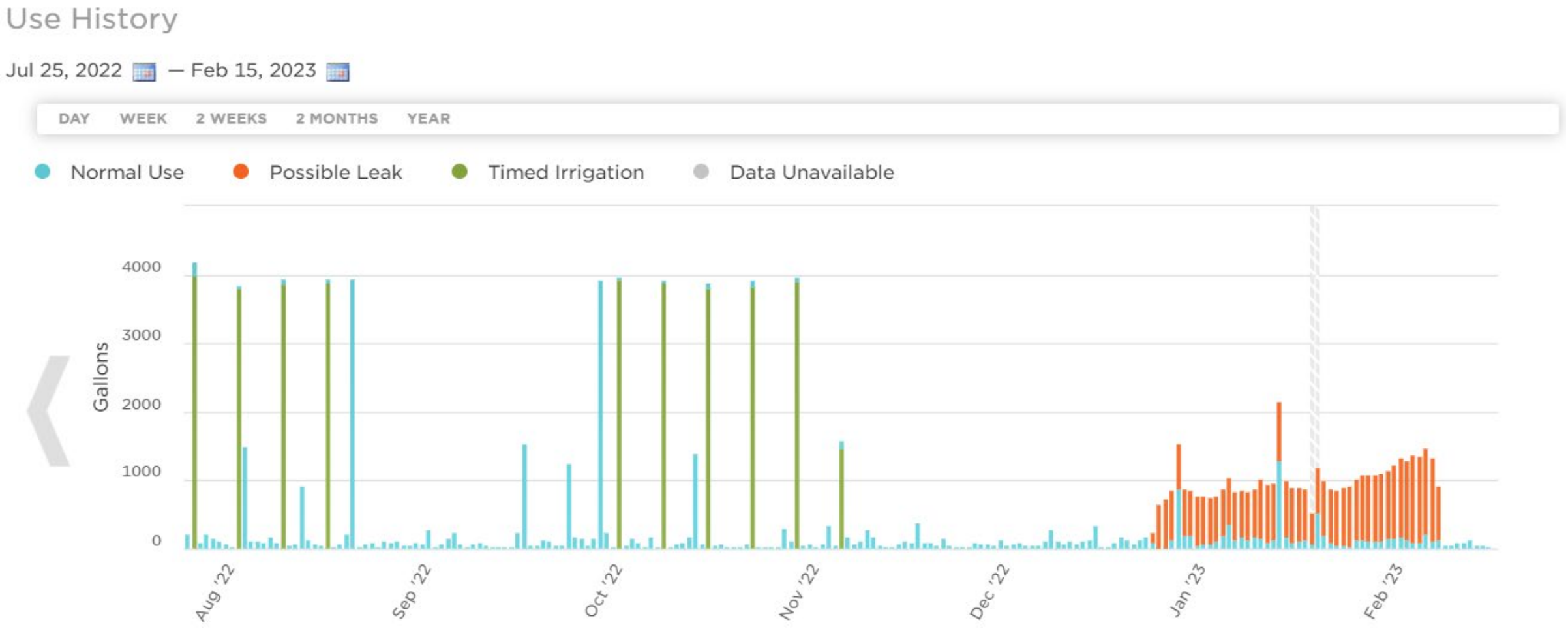
Bill Forecast – Tiered Rate Notification



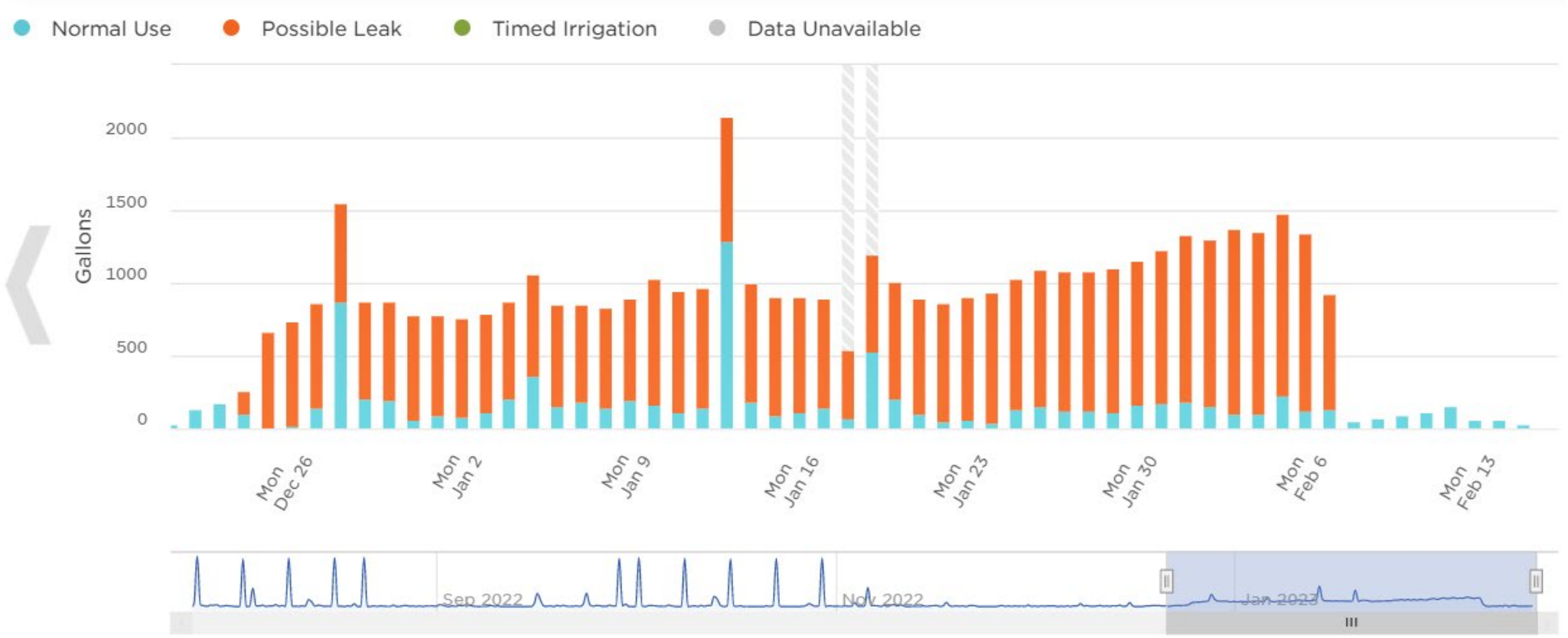
Continuous Water Use Alert



Change the Narrative with AMI Data



Stop Calling It A Leak



Total	Possible Leak	Timed Irrigation
47,340 Gallons	37,814 Gallons	0 Gallons

Thank You

Austinwater.org

Leveraging AMI Data Whether your Program has just Started or is Well Established with Mountains of Information

where quality meets life

PFLUGERVILLE

TEXAS

AMI Integration and Customer Outreach

AMI Integration – General Overview

10,000+ AMR to AMI MIU Replacements

5000+ Existing AMI Antenna Installations

7 Gateways Installed

Moved from Drive By + Handheld Readers to Neptune 360 Software via Tablet

Data import directly from Neptune 360 to Incode and WaterSmart Portal

AMI Integration – Challenges

Public Education – What exactly is AMI and how does it affect them

Physical MIU replacements – Customer complaints and disputes

Data Collection – Gateways not receiving every current AMI signal

Meter Box Lid Replacements – Metal to Plastic (Special Orders)

AMI Integration – Customer Outreach So Far…

Interactive Installation Map – customers search their address and receive results informing them if they are in an area due for replacement and when work will start

Public Education via Social Media(s) and FAQ website

Public Education – City Council Demonstrations

Contractor – Magnetic Door Placards with Program Contact Information

Challenge – Due to Partial Implementation, Portal is not currently available to customers

AMI Integration – Customer Outreach Future

Larger PSA Program – Including additional Social Media blasts, direct emails, etc.

Direct Emails – over 90% (20000+) of customers have accounts with emails on file

City Vehicle and Facility Placards – QR code placards with links to FAQ and educational pieces

Internal Portal Use – We will be able to send alerts to customers, informing them of high usage, irregular usage, leak alerts, etc.

External Portal Use – Customers will be able to set triggers like high usage alerts, leak detection, consumption limits

where quality meets life

PFLUGERVILLE

TEXAS

AMI Integration And Customer Outreach

Max Walther
Utility Superintendent
Tel: 512.990.6408
Email: maxw@pflugervilletx.gov

Moderator: Blake Neffendorf
City of Buda

Christopher Tull
California Data Collaborative

Jonathan Orenstein
City of Austin

Max Walther
City of Pflugerville

Leveraging AMI Data Whether your Program has just Started or is Well Established with Mountains of Information

Leveraging AMI Data Whether your Program has just Started or is Well Established with Mountains of Information