PECAN STREET

University Municipal Water Consortium

Using data and technology to change water use

“In the history of science and technology, when you have a leap forward in the accuracy of measuring something, new possibilities emerge.”

Steven Johnson, *How We Got to Now: Six Innovations that Made the Modern World*

Utility data-driven program management

Supporting SAWS' Conservation Dept.'s customer program management digital initiative

Customers can apply online for conservation programs

SAWS Conservation will integrate multiple data sources to measure impacts of programs and external variables

SAWS Conservation Dept Portal

Mohan Rajagopalam

Dashboard

Coupons

Month

September 2016

Number issued	124
Number redeemed	81
Total value of redeemed coupons	$41,060

SHOW MORE

Year

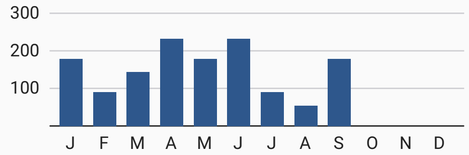
Coupons Issued	1,849
Coupons Redeemed	1,401
Total value of redeemed coupons	$331,210

SHOW MORE

Add Report

Redeemed (All)

2016



Coupons redeemed (all categories) by month

Average per month	107
Highest Month	April
Number Redeemed	221
Lowest Month	August
Number Redeemed	68

Add Sub-report

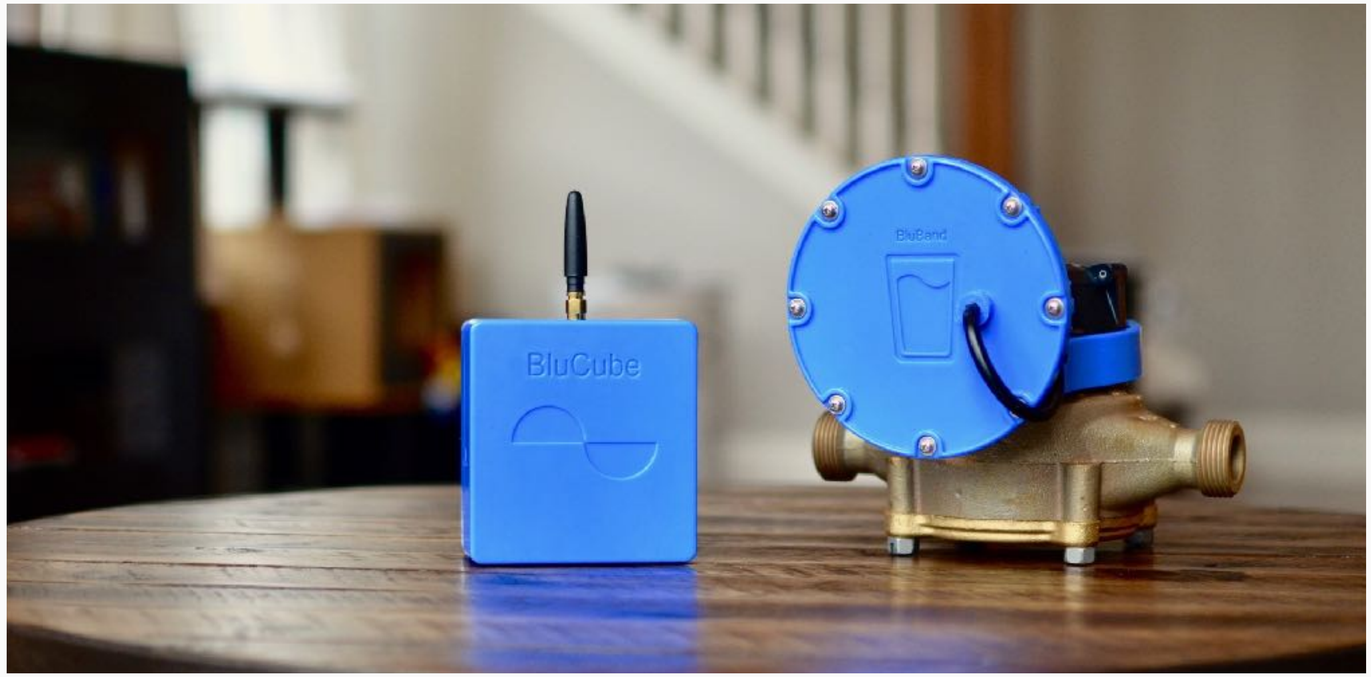
Largest and most data-intensive research on customer end uses of water

Residential water use research

Using BluBand system with existing meters

First customer end use research to incorporate > 1 month of actual home irrigation data

This is BluBand



Customers can view and manage real-time information from BluBands over Pecan St-developed

- web software
- mobile applications

Pecan St data center stores data, carries out quality control scripts

Algorithms scan data for anomalies

Servers send data and alerts to customer systems

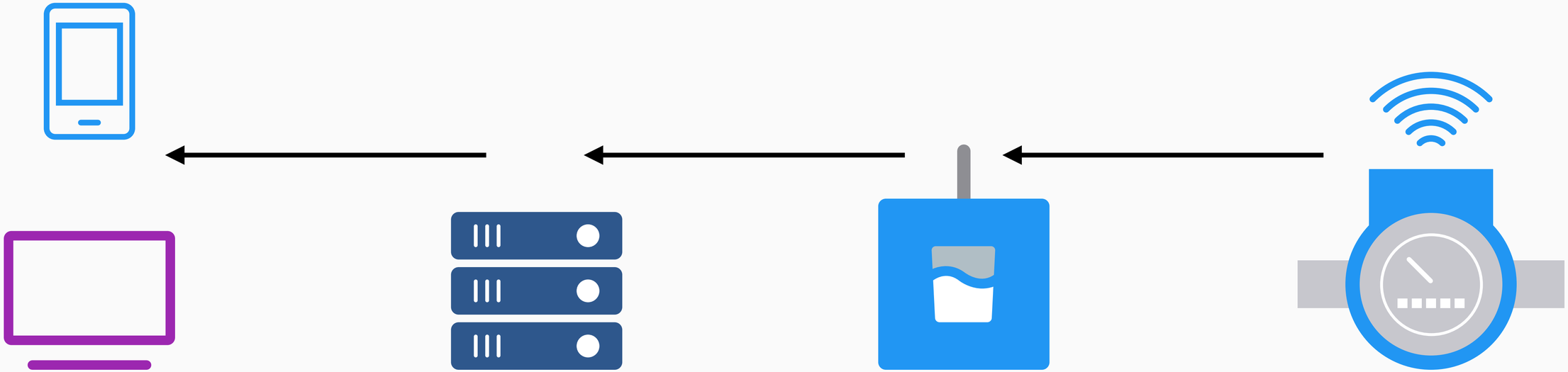
BluCube hub device downloads, caches and process data from BluBand

Device uploads data over cellular or customer Internet

BluBand slides over existing meter register

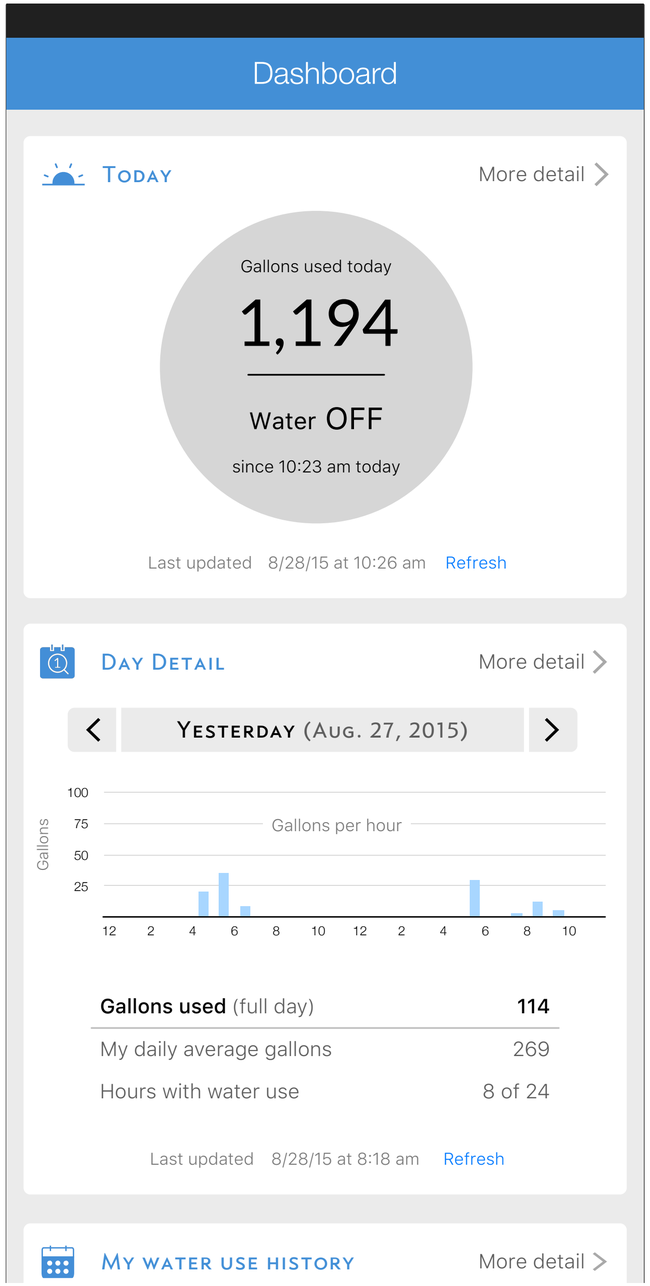
Sensors read meter's magnetic rotation

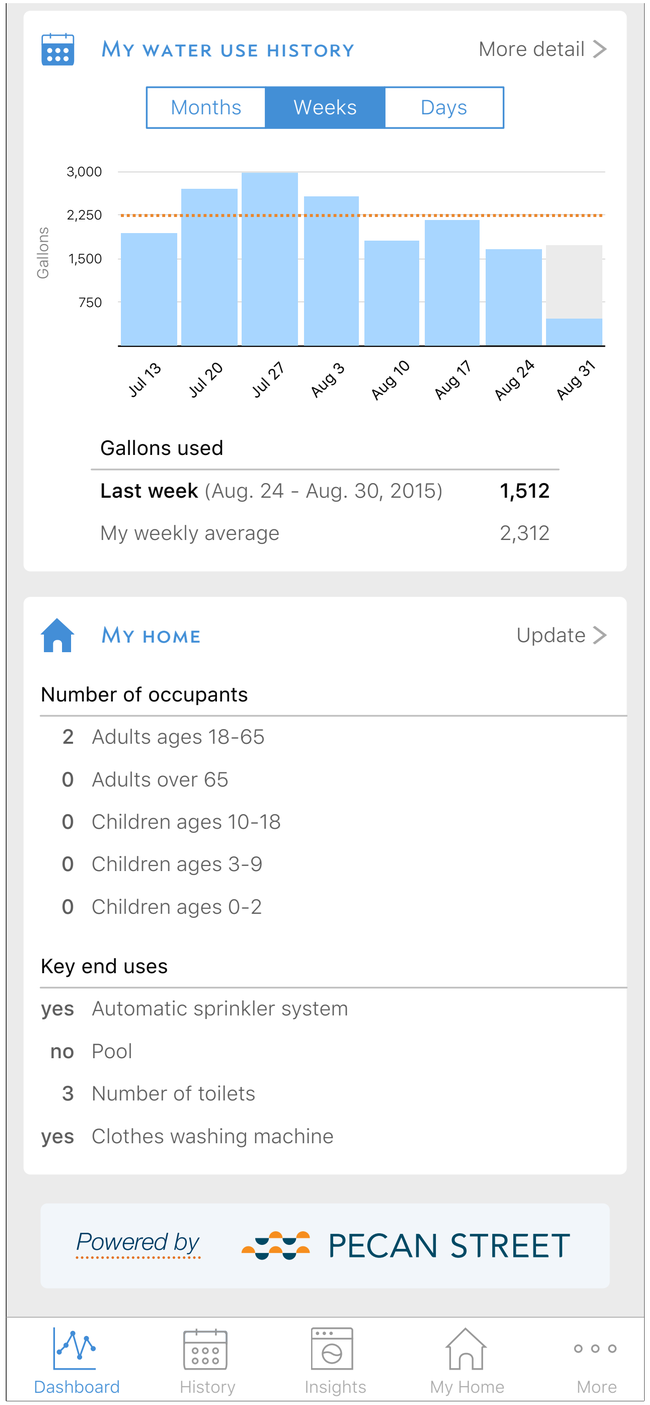
Broadcasts data to BluCube



Free customer app:

BluWater





What can better data tell us about water use?

Water use categories

Outdoor landscape watering

Pools

Leaks

Indoor use: Toilets

Indoor use: Cleaning and drinking

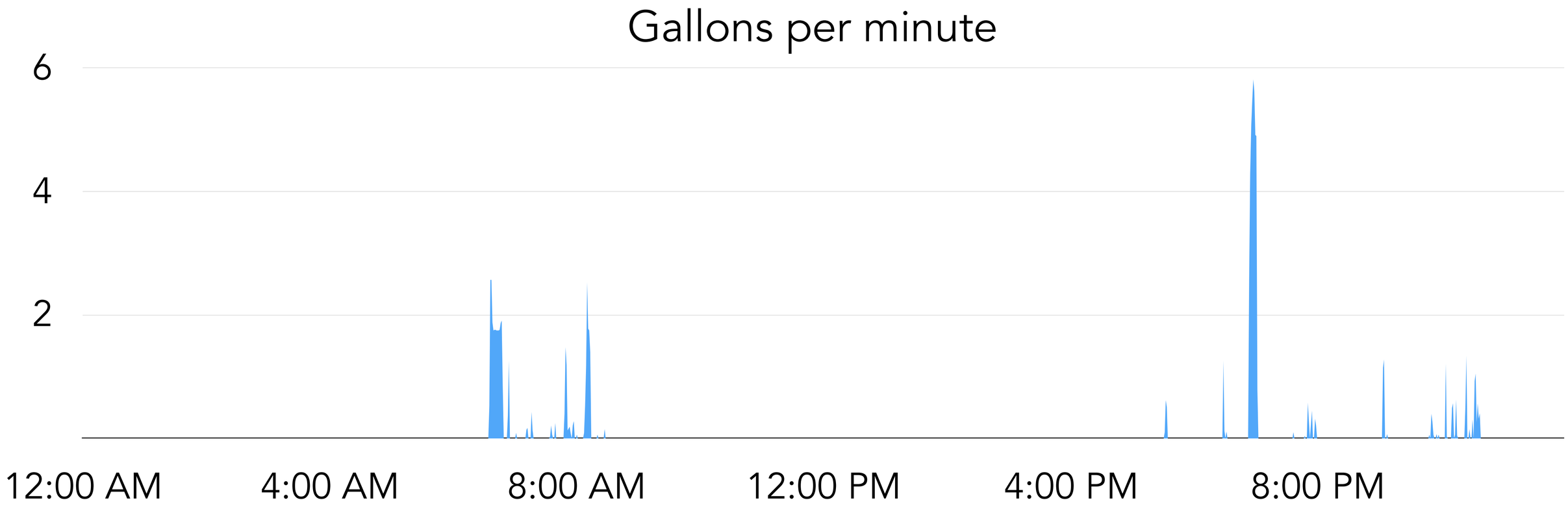
Home water use: top 4 end uses

Outdoor landscape watering

Leaks

Toilets

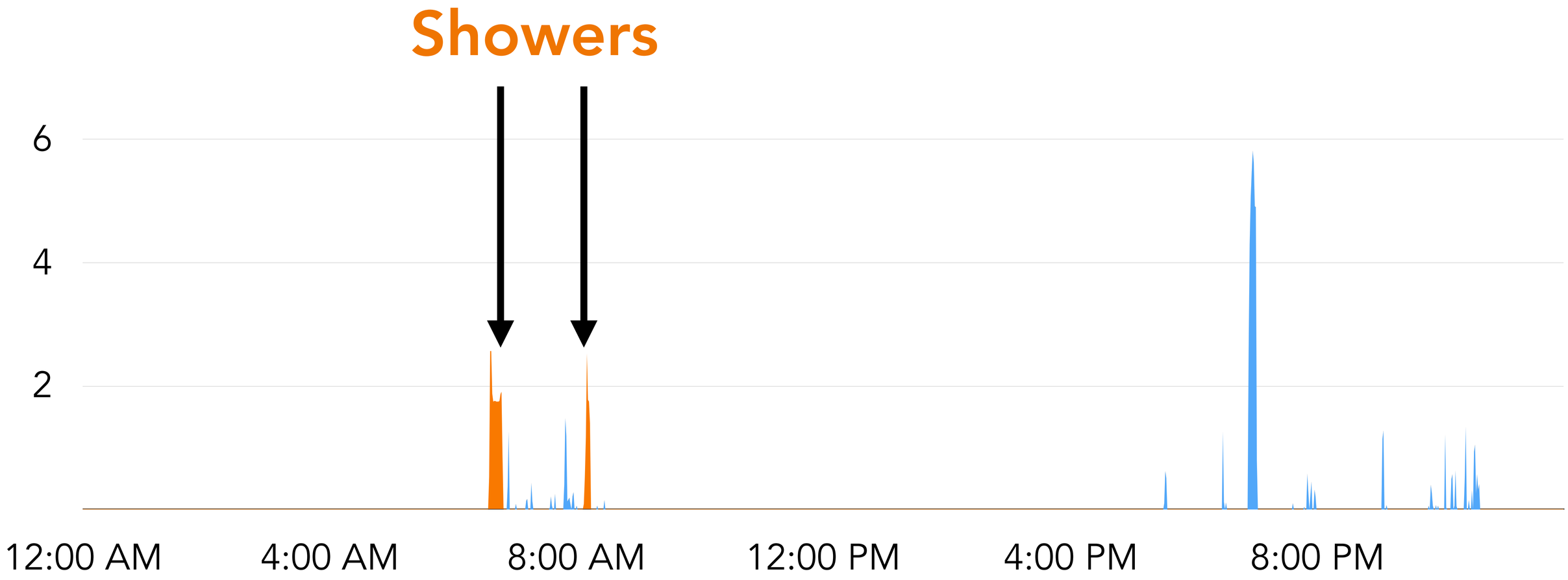
Clothes washing machine



Source: Pecan Street

One day of water use in a typical home

98 gallons



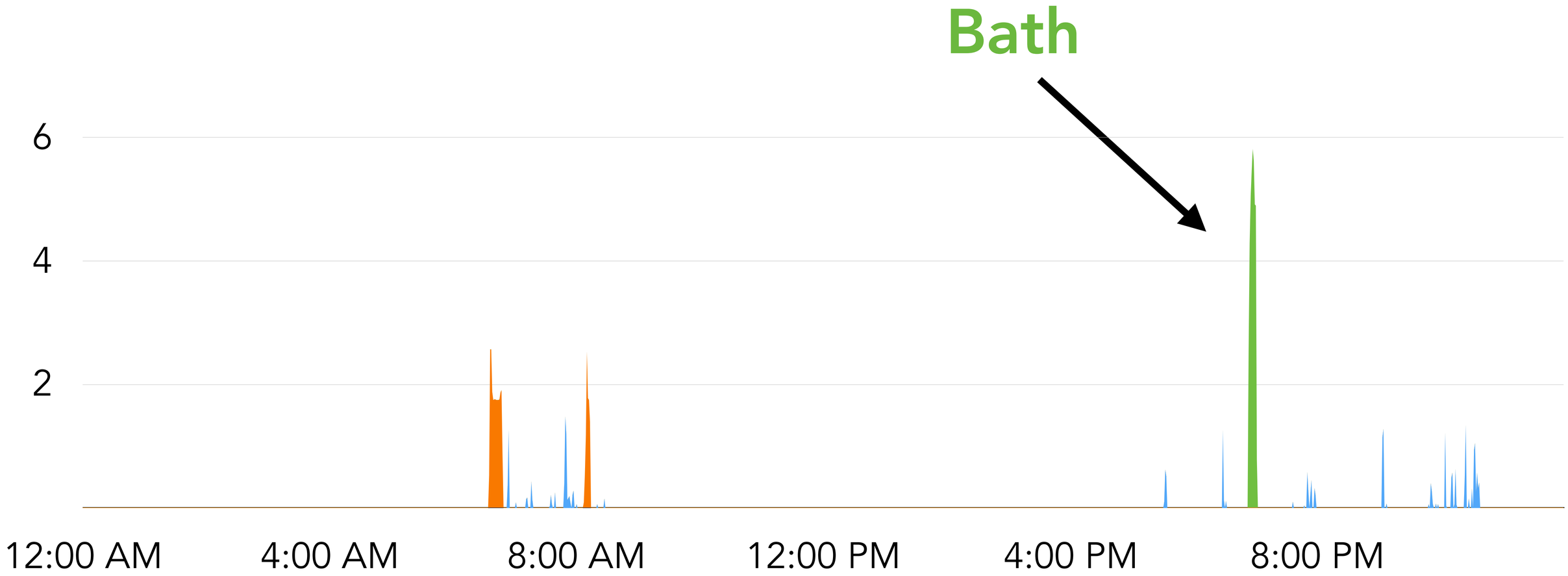
Source: Pecan Street

Day's total

98 gallons

Shower 1 24.46 gallons

Shower 2 9.25 gallons



Source: Pecan Street

Day's total

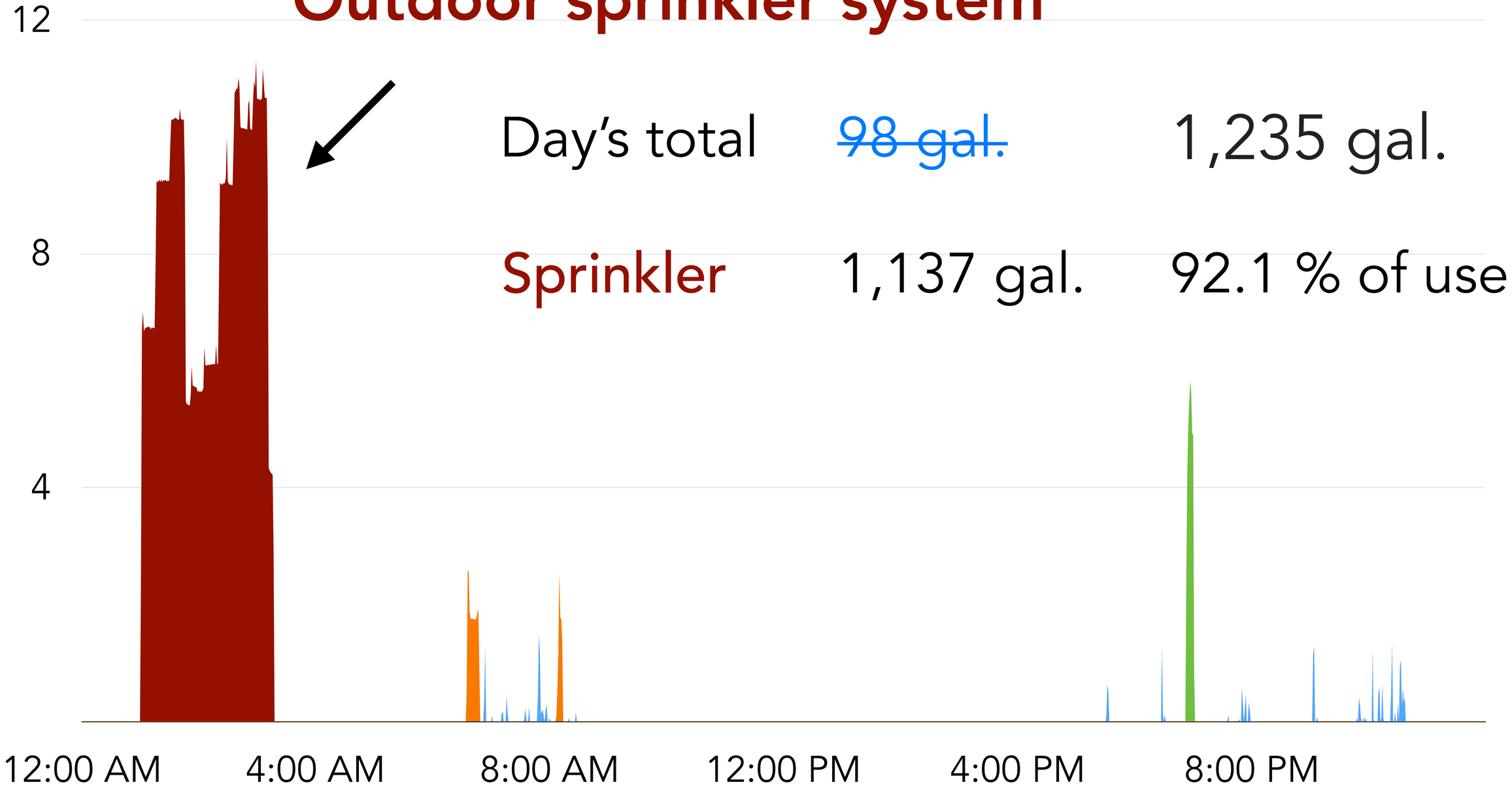
98 gallons

Shower 1 24.46 gallons

Shower 2 9.25 gallons

Bath 39.45 gallons

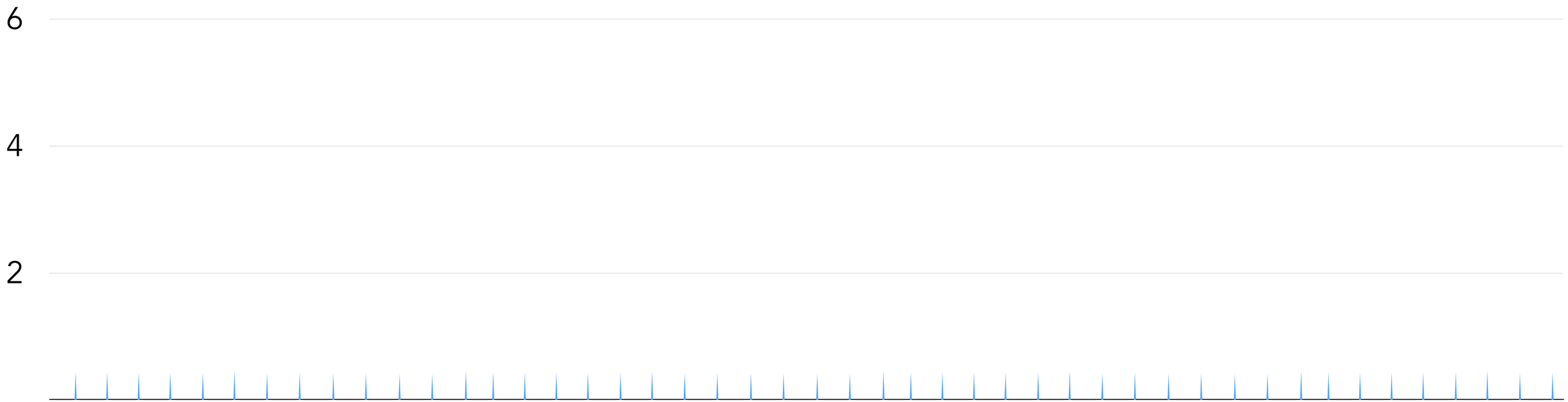
Outdoor sprinkler system



Day's total	~~98 gal.~~	1,235 gal.
Sprinkler	1,137 gal.	92.1 % of use

Source: Pecan Street

Small toilet leak



Source: Pecan Street

gallons per minute

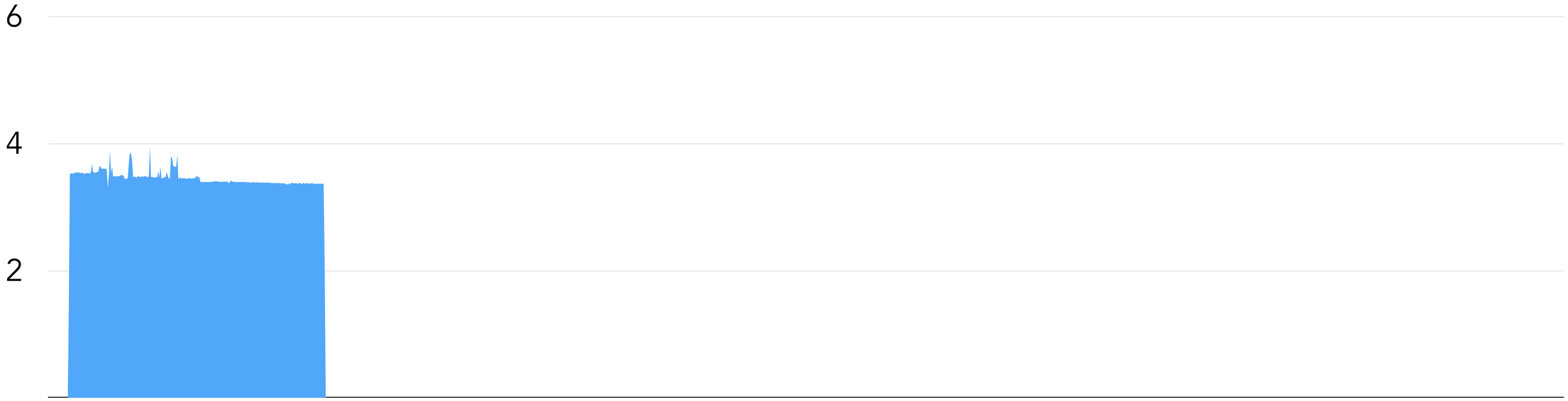
Source: Pecan Street

Small toilet leak

Avg. gallons per hour	0.86
Water loss/month *	619
Water loss/year *	7,534

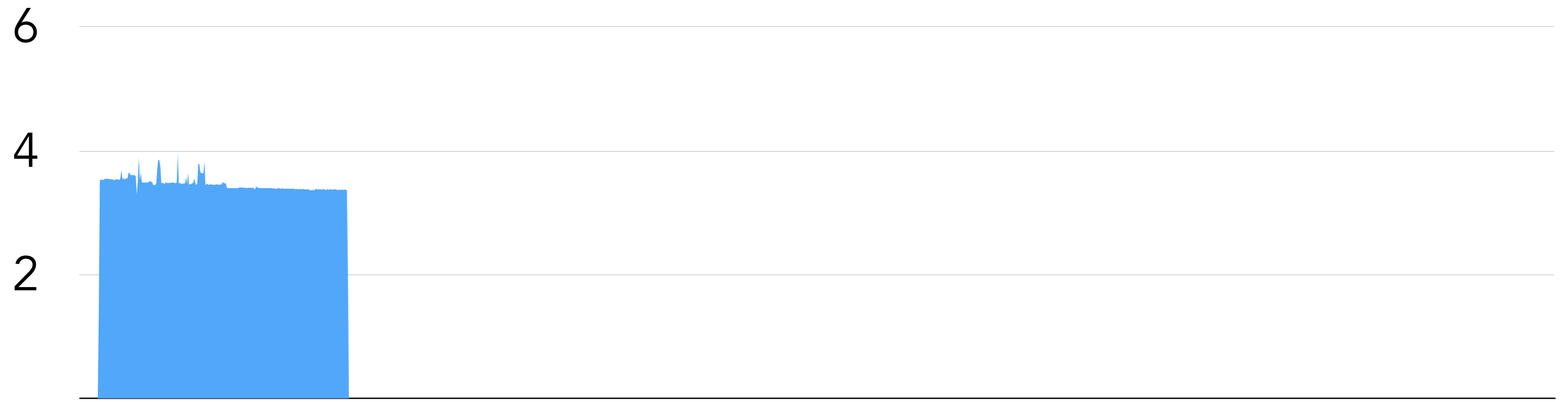
* *(assuming leak remains undiscovered)*

Toilet flapper stuck open



Source: Pecan Street

gallons per minute



Source: Pecan Street

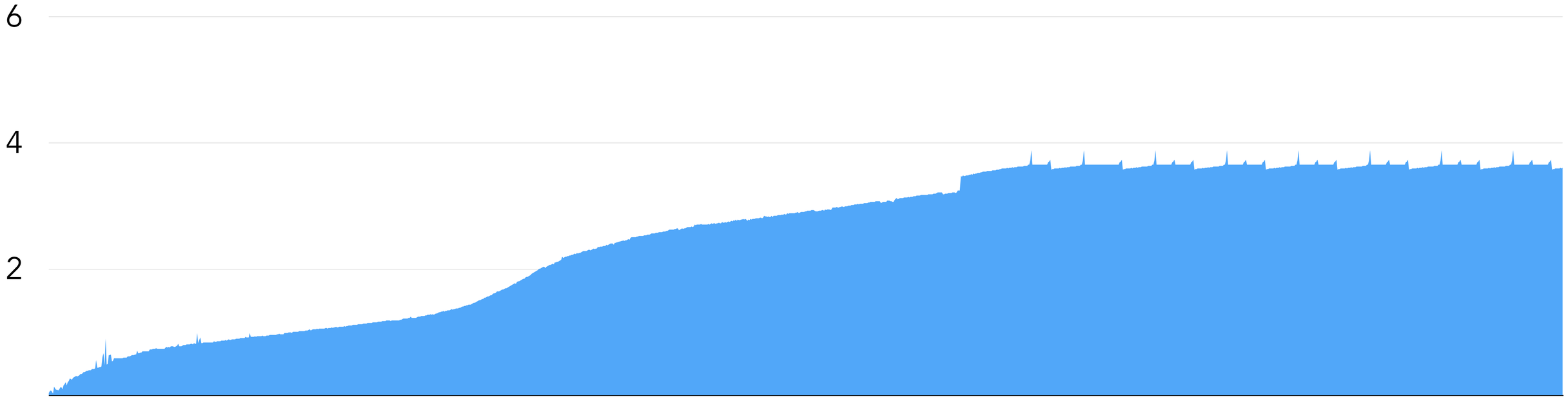
Toilet flapper stuck open

Gallons per minute	3.5
Water loss/event	842
Water loss/month *	151,200

* *(assuming leak remains undiscovered)*

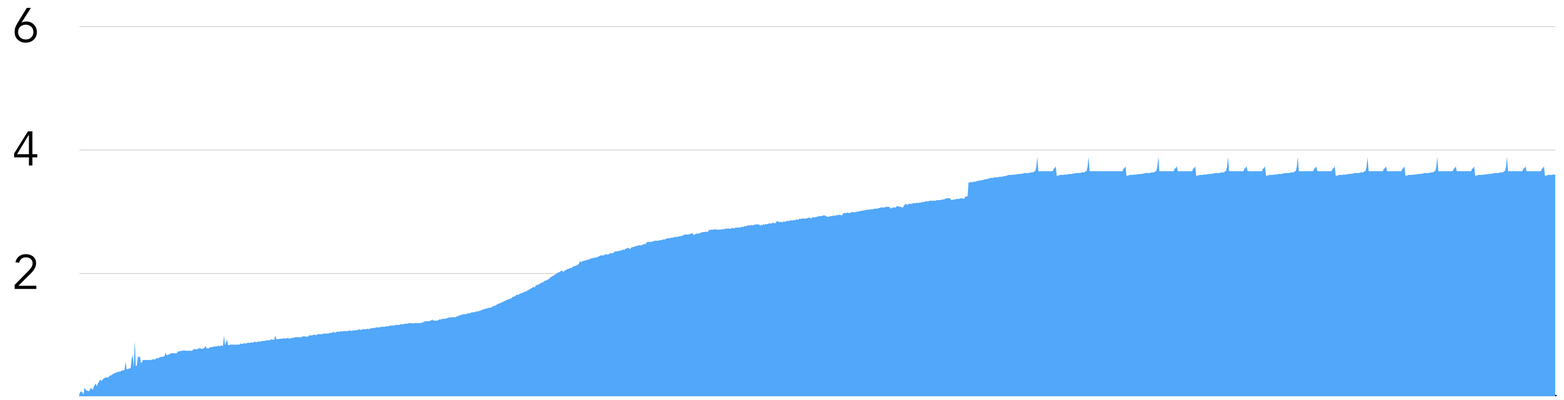
Pipe rupture at curb

(*customer side of meter*)



Source: Pecan Street

gallons per minute



Source: Pecan Street

Pipe rupture at curb

Gallons per minute	3.65
Water loss/event	3,703
Water loss/month *	157,680

* *(assuming leak remains undiscovered)*

Outdoor sprinklers	8 - 18	gal/min
Pool	5 - 8	gal/min
Everything else	3 - 5	gal/min
Toilets	1 - 6	gal/flush
Dishwasher	~ 5	gal

Data categories

3 categories of data-enabled products

Technology-assisted

Information only – *high engagement*

Information only – critical event alert

Technology assisted

Replaces an existing appliance's manual controls with information technology controls

Core concept: product's technology does a superior job of acting in response to information than people do

Examples

- Smart thermostats (e.g., Nest)
- Demand response
- Self-driving cars

Information only: *high engagement*

Provides users with much richer information so they can become engaged managers of their energy use

Core concept: users will interact frequently with the product and change their behavior in response to the information they receive

Examples

- Time-of-use pricing
- Customer engagement platforms
- Dieting programs

Information only: *critical event alerts*

Monitors data to detect occurrence of high impact risks, then alerts customer.

Core concept: by providing timely alerts about occurrence of critical event, customers can take quick action to address issue

Examples

- Leak alerts through data
- Burglar alarms
- Smoke, carbon monoxide detectors

Variables impacting usefulness of data

Proximity in time

Data resolution

Frequency of reads