MARCH 2023

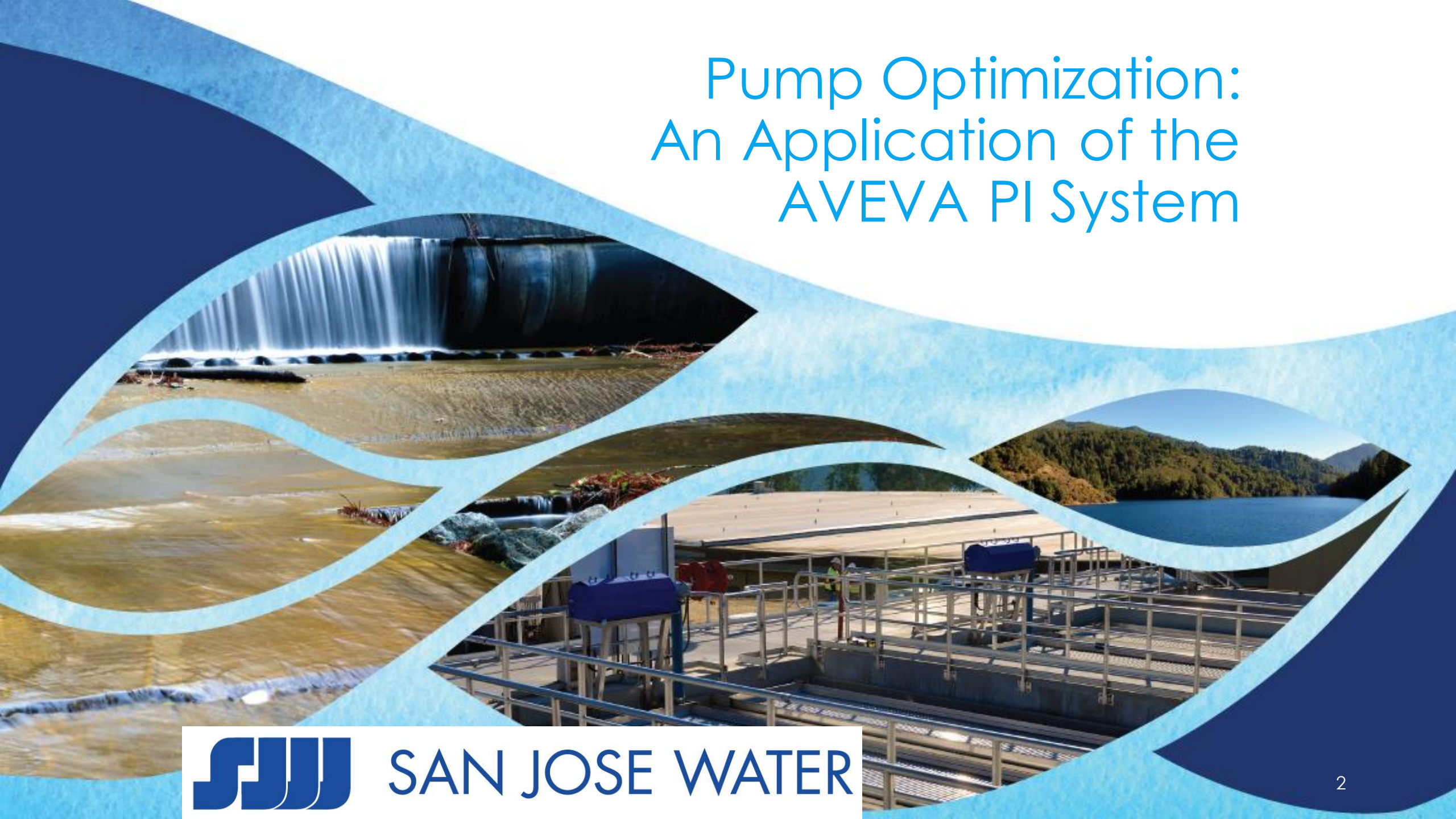
Success Story with the AVEVA PI System

San Jose Water

ASCA Product Specialist Team

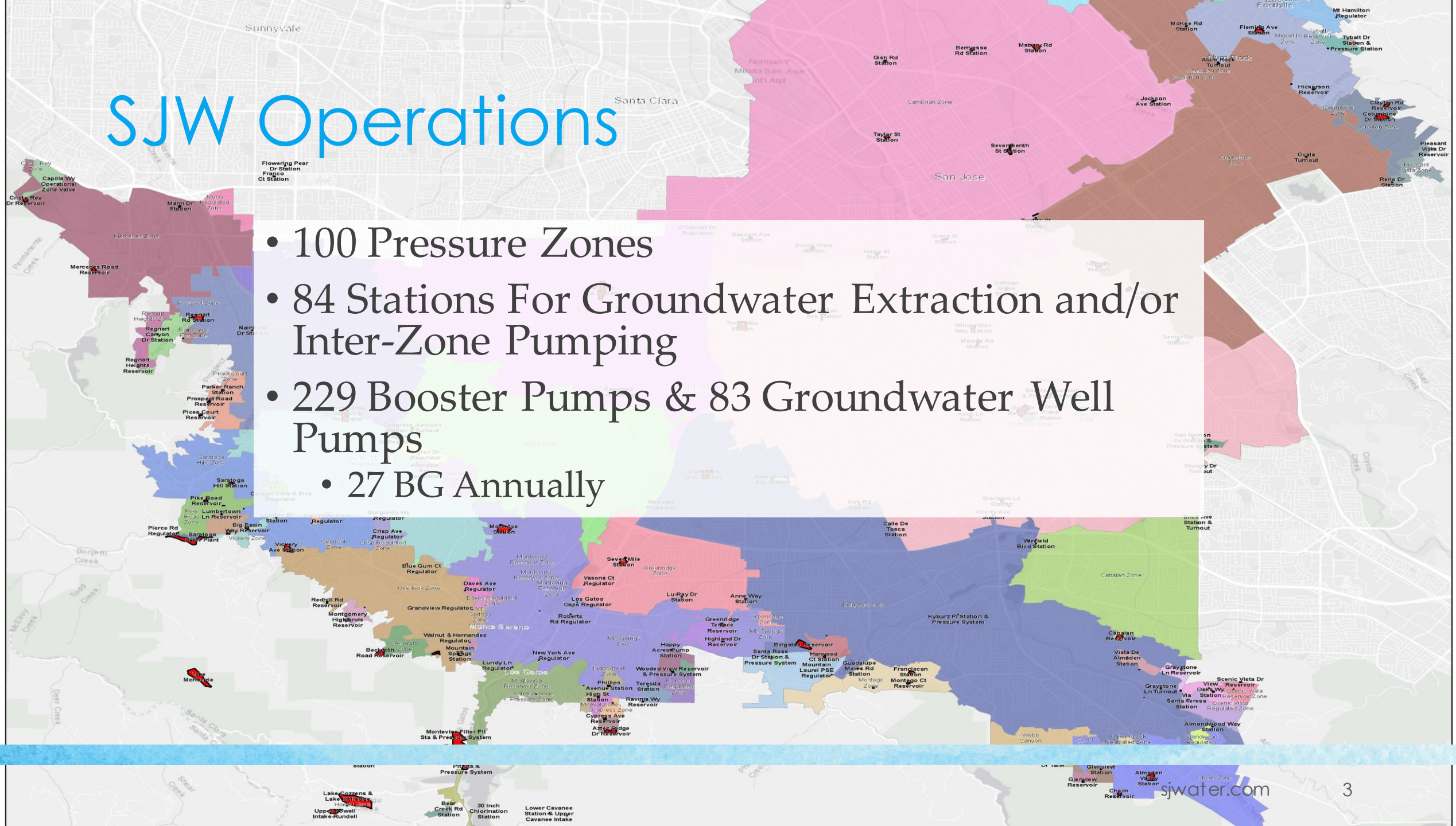
AVEVA | SELECT CALIFORNIA

Pump Optimization: An Application of the AVEVA PI System



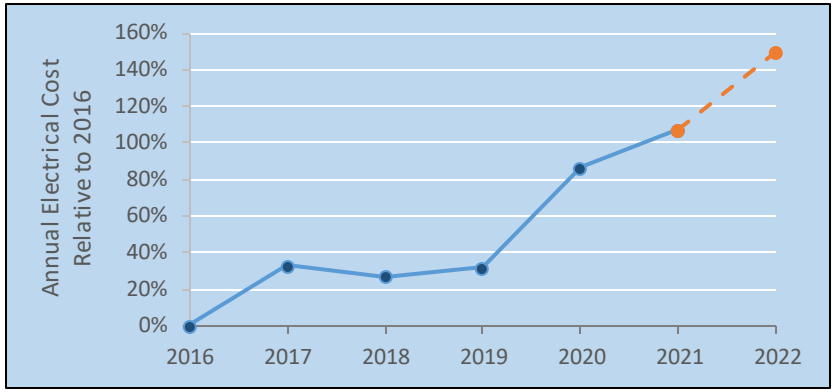
SAN JOSE WATER

SJW Operations



- 100 Pressure Zones
- 84 Stations For Groundwater Extraction and/or Inter-Zone Pumping
- 229 Booster Pumps & 83 Groundwater Well Pumps
  - 27 BG Annually

Costs of Pumping

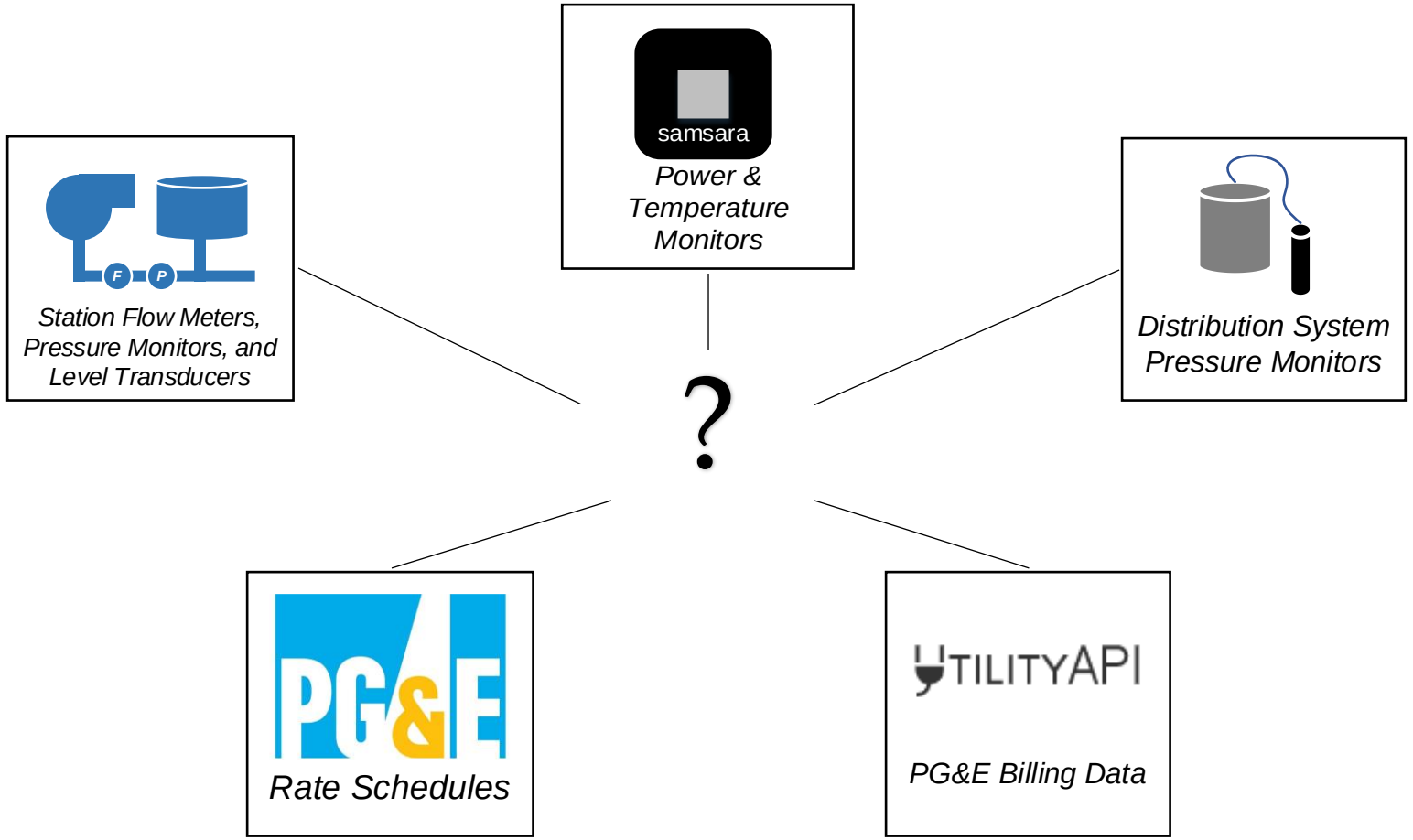


- 92% of Energy Use
  - ~40,000,000 kWh

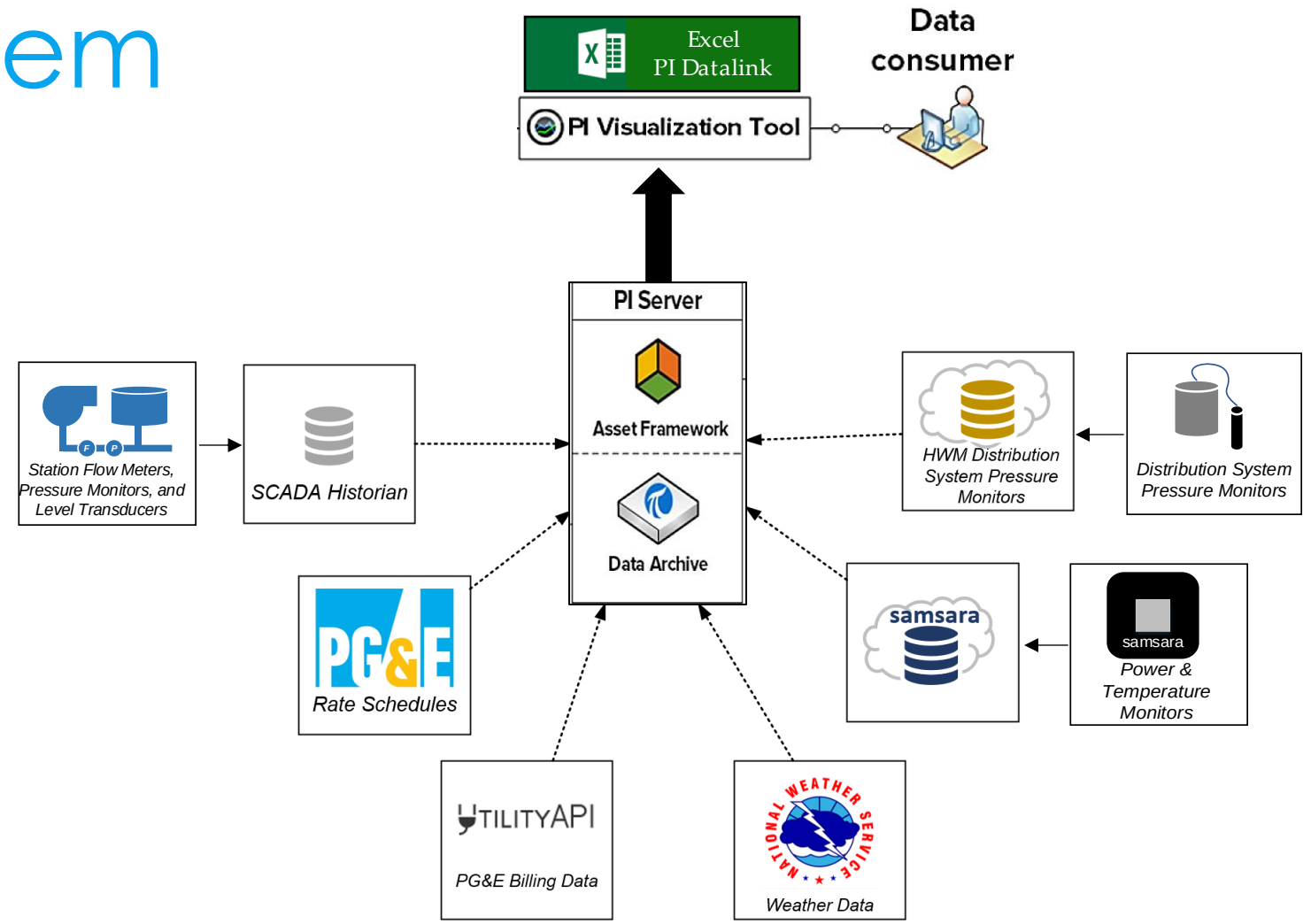
- Limited Monitoring = Reactive Maintenance
  - System Strain
  - Service Interruption
  - More Costly Repair/Replacement

- Pump Prioritization Reliant on Field Efficiency Tests
  - Resource demanding
  - Infrequent
    - Data is Often 2-5 Years Old

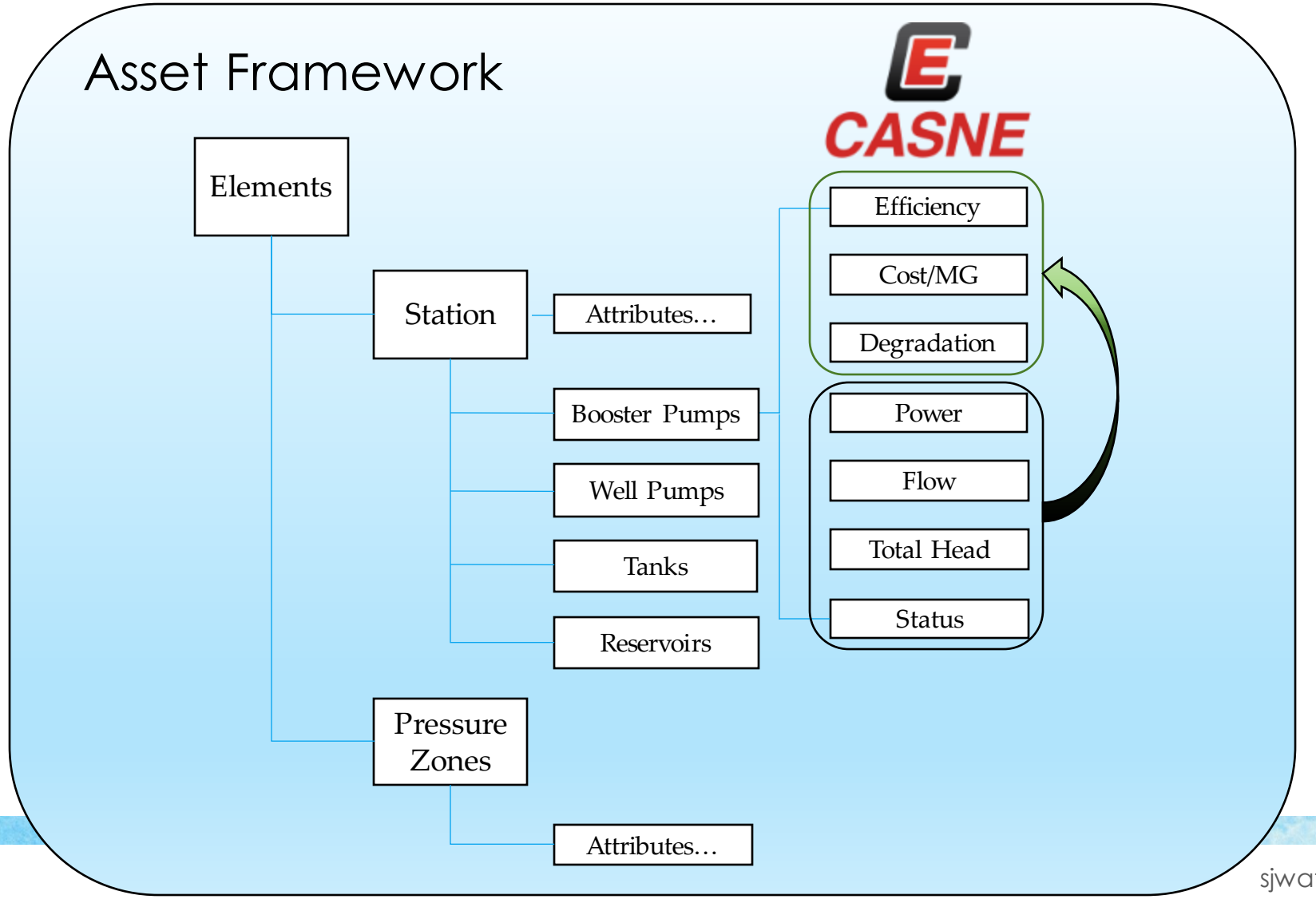
Independent Data Sources



PI System

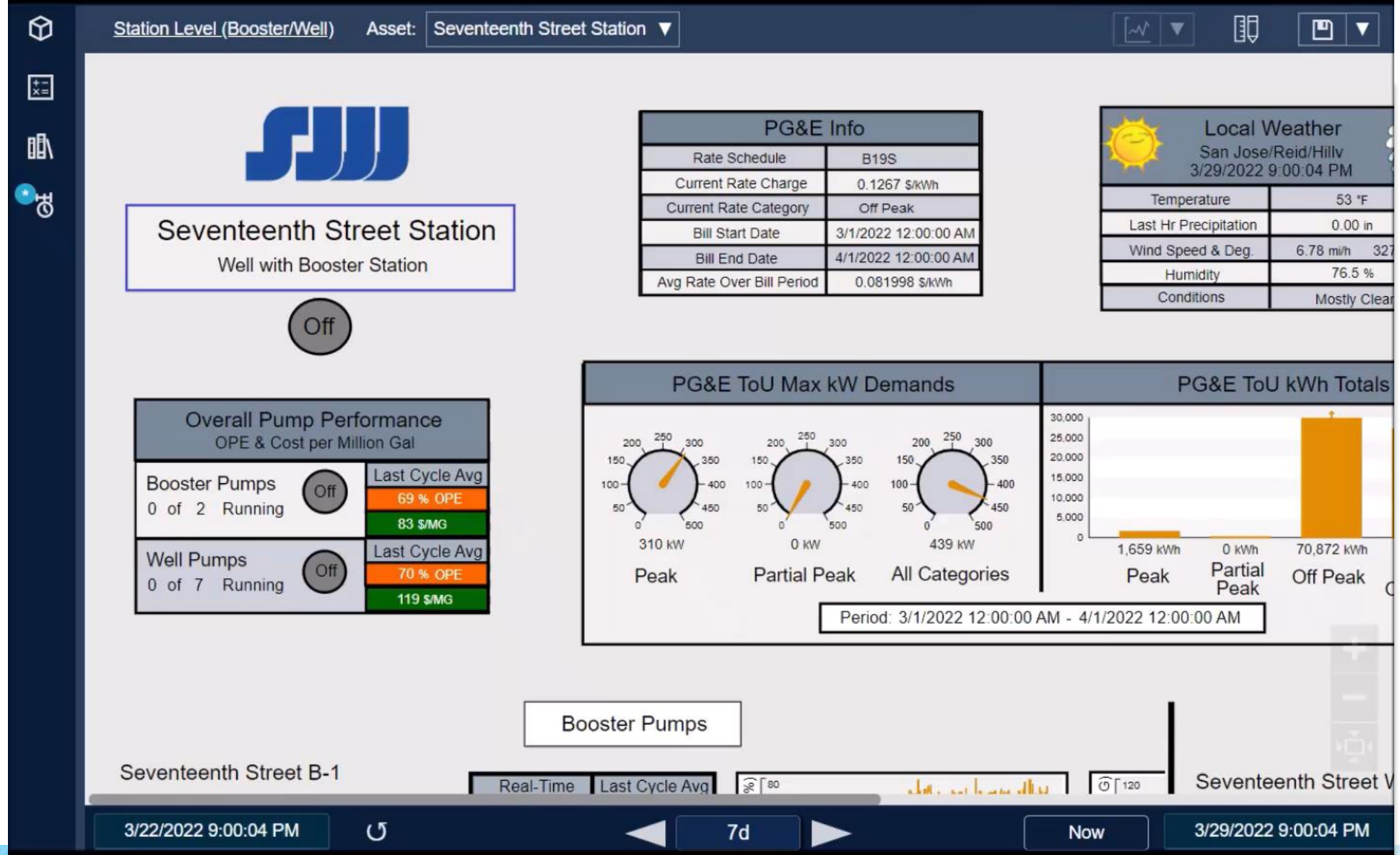

Excel
PI Datalink
Data consumer
PI Visualization Tool
PI Server
Asset Framework
Data Archive
Station Flow Meters, Pressure Monitors, and Level Transducers
SCADA Historian
HWM Distribution System Pressure Monitors
Distribution System Pressure Monitors
PG&E
Rate Schedules
samsara
samsara
Power & Temperature Monitors
UTILITYAPI
PG&E Billing Data
NATIONAL WEATHER SERVICE
Weather Data

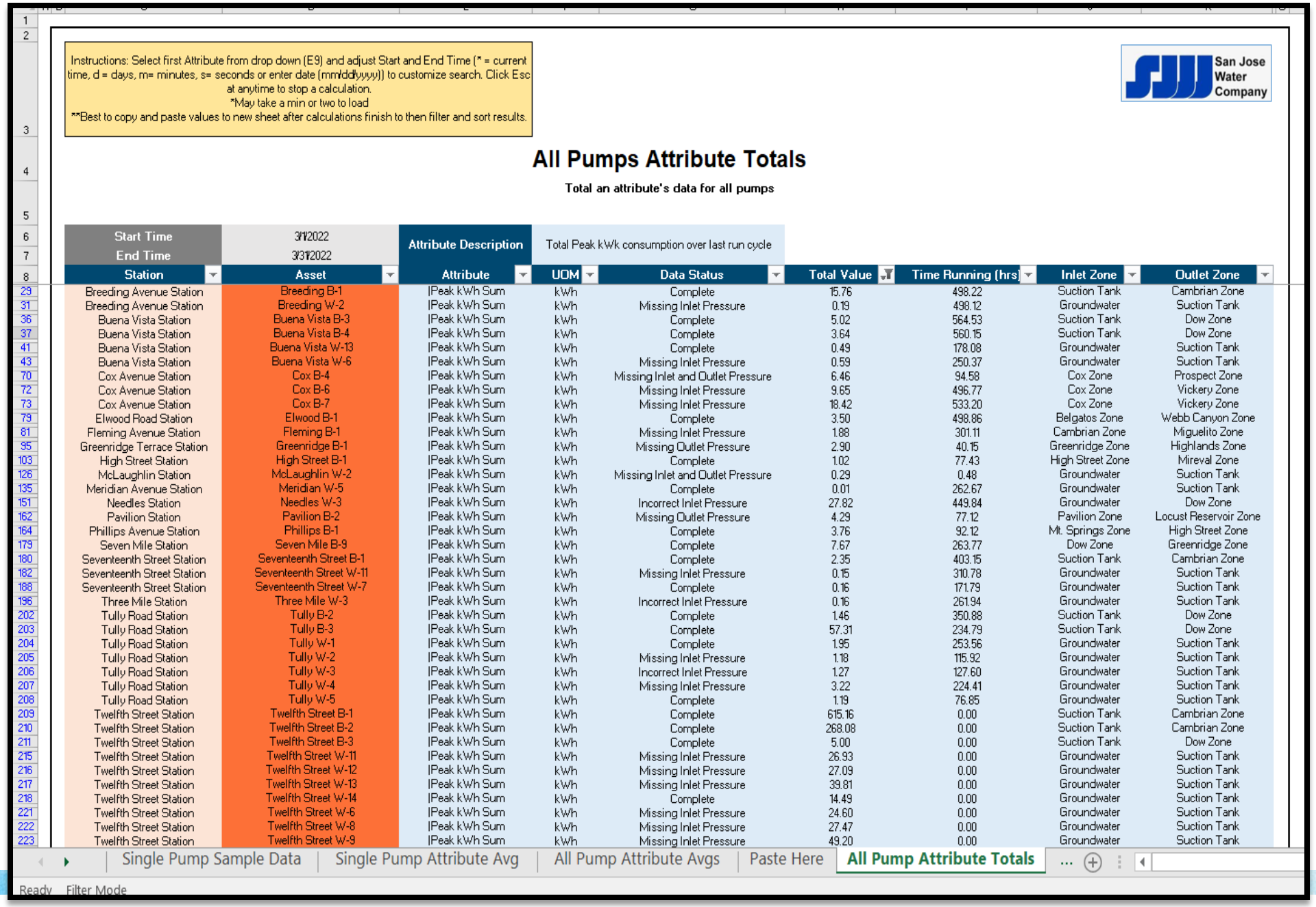
Implementation



Application: Alerts

- Pump
  - Efficiency < Threshold
  - Pump Degradation > Threshold
  - Max kW @ Peak ToU > Threshold
  - Pump On @ Peak ToU


Station Level (Booster/Well)
Asset: Seventeenth Street Station
Seventeenth Street Station
Well with Booster Station
Off
PG&E Info
Rate Schedule B19S
Current Rate Charge 0.1267 $/kWh
Current Rate Category Off Peak
Bill Start Date 3/1/2022 12:00:00 AM
Bill End Date 4/1/2022 12:00:00 AM
Avg Rate Over Bill Period 0.081998 $/kWh
Local Weather
San Jose/Reid/Hillv
3/29/2022 9:00:04 PM
Temperature 53 °F
Last Hr Precipitation 0.00 in
Wind Speed & Deg. 6.78 mi/h
Humidity 76.5 %
Conditions Mostly Clear
Overall Pump Performance
OPE & Cost per Million Gal
Booster Pumps
0 of 2 Running
Off
Last Cycle Avg
69 % OPE
83 $/MG
Well Pumps
0 of 7 Running
Off
Last Cycle Avg
70 % OPE
119 $/MG
PG&E ToU Max kW Demands
310 kW
Peak
0 kW
Partial Peak
439 kW
All Categories
PG&E ToU kWh Totals
1,659 kWh
Peak
0 kWh
Partial Peak
70,872 kWh
Off Peak
Period: 3/1/2022 12:00:00 AM - 4/1/2022 12:00:00 AM
Booster Pumps
Seventeenth Street B-1
Real-Time
Last Cycle Avg
Seventeenth Street W
3/22/2022 9:00:04 PM
7d
Now
3/29/2022 9:00:04 PM



Instructions: Select first Attribute from drop down (E9) and adjust Start and End Time (* = current time, d = days, m= minutes, s= seconds or enter date (mm/dd/yyyy)) to customize search. Click Esc at anytime to stop a calculation.
*May take a min or two to load
**Best to copy and paste values to new sheet after calculations finish to then filter and sort results.

San Jose Water Company

All Pumps Attribute Totals

Total an attribute's data for all pumps

Start Time	3/1/2022	Attribute Description	Total Peak kWk consumption over last run cycle
End Time	3/31/2022		

Station	Asset	Attribute	UOM	Data Status	Total Value	Time Running (hrs)	Inlet Zone	Outlet Zone
Breeding Avenue Station	Breeding B-1	Peak kWh Sum	kWh	Complete	15.76	498.22	Suction Tank	Cambrian Zone
Breeding Avenue Station	Breeding W-2	Peak kWh Sum	kWh	Missing Inlet Pressure	0.19	498.12	Groundwater	Suction Tank
Buena Vista Station	Buena Vista B-3	Peak kWh Sum	kWh	Complete	5.02	564.53	Suction Tank	Dow Zone
Buena Vista Station	Buena Vista B-4	Peak kWh Sum	kWh	Complete	3.64	560.15	Suction Tank	Dow Zone
Buena Vista Station	Buena Vista W-13	Peak kWh Sum	kWh	Complete	0.49	178.08	Groundwater	Suction Tank
Buena Vista Station	Buena Vista W-6	Peak kWh Sum	kWh	Missing Inlet Pressure	0.59	250.37	Groundwater	Suction Tank
Cox Avenue Station	Cox B-4	Peak kWh Sum	kWh	Missing Inlet and Outlet Pressure	6.46	94.58	Cox Zone	Prospect Zone
Cox Avenue Station	Cox B-6	Peak kWh Sum	kWh	Missing Inlet Pressure	9.65	496.77	Cox Zone	Vickery Zone
Cox Avenue Station	Cox B-7	Peak kWh Sum	kWh	Missing Inlet Pressure	18.42	533.20	Cox Zone	Vickery Zone
Elwood Road Station	Elwood B-1	Peak kWh Sum	kWh	Complete	3.50	498.86	Belgatos Zone	Webb Canyon Zone
Fleming Avenue Station	Fleming B-1	Peak kWh Sum	kWh	Missing Inlet Pressure	1.88	301.11	Cambrian Zone	Miguelito Zone
Greenridge Terrace Station	Greenridge B-1	Peak kWh Sum	kWh	Missing Outlet Pressure	2.90	40.15	Greenridge Zone	Highlands Zone
High Street Station	High Street B-1	Peak kWh Sum	kWh	Complete	1.02	77.43	High Street Zone	Mireval Zone
McLaughlin Station	McLaughlin W-2	Peak kWh Sum	kWh	Missing Inlet and Outlet Pressure	0.29	0.48	Groundwater	Suction Tank
Meridian Avenue Station	Meridian W-5	Peak kWh Sum	kWh	Complete	0.01	262.67	Groundwater	Suction Tank
Needles Station	Needles W-3	Peak kWh Sum	kWh	Incorrect Inlet Pressure	27.82	449.84	Groundwater	Dow Zone
Pavilion Station	Pavilion B-2	Peak kWh Sum	kWh	Missing Outlet Pressure	4.29	77.12	Pavilion Zone	Locust Reservoir Zone
Phillips Avenue Station	Phillips B-1	Peak kWh Sum	kWh	Complete	3.76	92.12	Mt. Springs Zone	High Street Zone
Seven Mile Station	Seven Mile B-9	Peak kWh Sum	kWh	Complete	7.67	263.77	Dow Zone	Greenridge Zone
Seventeenth Street Station	Seventeenth Street B-1	Peak kWh Sum	kWh	Complete	2.35	403.15	Suction Tank	Cambrian Zone
Seventeenth Street Station	Seventeenth Street W-11	Peak kWh Sum	kWh	Missing Inlet Pressure	0.15	310.78	Groundwater	Suction Tank
Seventeenth Street Station	Seventeenth Street W-7	Peak kWh Sum	kWh	Complete	0.16	171.79	Groundwater	Suction Tank
Three Mile Station	Three Mile W-3	Peak kWh Sum	kWh	Incorrect Inlet Pressure	0.16	261.94	Groundwater	Suction Tank
Tully Road Station	Tully B-2	Peak kWh Sum	kWh	Complete	1.46	350.88	Suction Tank	Dow Zone
Tully Road Station	Tully B-3	Peak kWh Sum	kWh	Complete	57.31	234.79	Suction Tank	Dow Zone
Tully Road Station	Tully W-1	Peak kWh Sum	kWh	Complete	1.95	253.56	Groundwater	Suction Tank
Tully Road Station	Tully W-2	Peak kWh Sum	kWh	Missing Inlet Pressure	1.18	115.92	Groundwater	Suction Tank
Tully Road Station	Tully W-3	Peak kWh Sum	kWh	Incorrect Inlet Pressure	1.27	127.60	Groundwater	Suction Tank
Tully Road Station	Tully W-4	Peak kWh Sum	kWh	Missing Inlet Pressure	3.22	224.41	Groundwater	Suction Tank
Tully Road Station	Tully W-5	Peak kWh Sum	kWh	Complete	1.19	76.85	Groundwater	Suction Tank
Twelfth Street Station	Twelfth Street B-1	Peak kWh Sum	kWh	Complete	615.16	0.00	Suction Tank	Cambrian Zone
Twelfth Street Station	Twelfth Street B-2	Peak kWh Sum	kWh	Complete	268.08	0.00	Suction Tank	Cambrian Zone
Twelfth Street Station	Twelfth Street B-3	Peak kWh Sum	kWh	Complete	5.00	0.00	Suction Tank	Dow Zone
Twelfth Street Station	Twelfth Street W-11	Peak kWh Sum	kWh	Missing Inlet Pressure	26.93	0.00	Groundwater	Suction Tank
Twelfth Street Station	Twelfth Street W-12	Peak kWh Sum	kWh	Missing Inlet Pressure	27.09	0.00	Groundwater	Suction Tank
Twelfth Street Station	Twelfth Street W-13	Peak kWh Sum	kWh	Missing Inlet Pressure	39.81	0.00	Groundwater	Suction Tank
Twelfth Street Station	Twelfth Street W-14	Peak kWh Sum	kWh	Complete	14.49	0.00	Groundwater	Suction Tank
Twelfth Street Station	Twelfth Street W-6	Peak kWh Sum	kWh	Missing Inlet Pressure	24.60	0.00	Groundwater	Suction Tank
Twelfth Street Station	Twelfth Street W-8	Peak kWh Sum	kWh	Missing Inlet Pressure	27.47	0.00	Groundwater	Suction Tank
Twelfth Street Station	Twelfth Street W-9	Peak kWh Sum	kWh	Missing Inlet Pressure	49.20	0.00	Groundwater	Suction Tank

Single Pump Sample Data | Single Pump Attribute Avg | All Pump Attribute Avgs | Paste Here | **All Pump Attribute Totals** | ...

Ready Filter Mode

Estimated Savings

- Peak → Off Peak = **$540,000 / Year**
  - 30 Pumps/Mon Unintentionally On During Peak
- Prioritizing Most Efficient Pump = 2% ↑ Eff.
- 2% ↑ Efficiency = **$210,000 / Year**
  - i.e., 800,000 kWh Reduction

  = 564 metric tons of CO_2

Overall Results

- Dissolve Data Silos
- Real-time Performance Monitoring and Alerts
- Exportable Performance Data
- Real-Time Data Driven Pump & Station Prioritization
- Expected ROI < 1 Yr

- Date
- Title
- Subtitle
- ASCA Product Specialist Team

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ABOUT AVEVA

AVEVA is a global leader in engineering and industrial software driving digital transformation across the entire asset and operational life cycle of capital-intensive industries.

The company's engineering, planning and operations, asset performance, and monitoring and control solutions deliver proven results to over 16,000 customers across the globe. Its customers are supported by the largest industrial software ecosystem, including 4,200 partners and 5,700 certified developers. AVEVA is headquartered in Cambridge, UK, with over 4,400 employees at 80 locations in over 40 countries.

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