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TRANSFORMING
WASTEWATER
TO RESOURCES



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Surgxfwrg

Partnering with Industrial Customers to Make Recycled Water Happen!

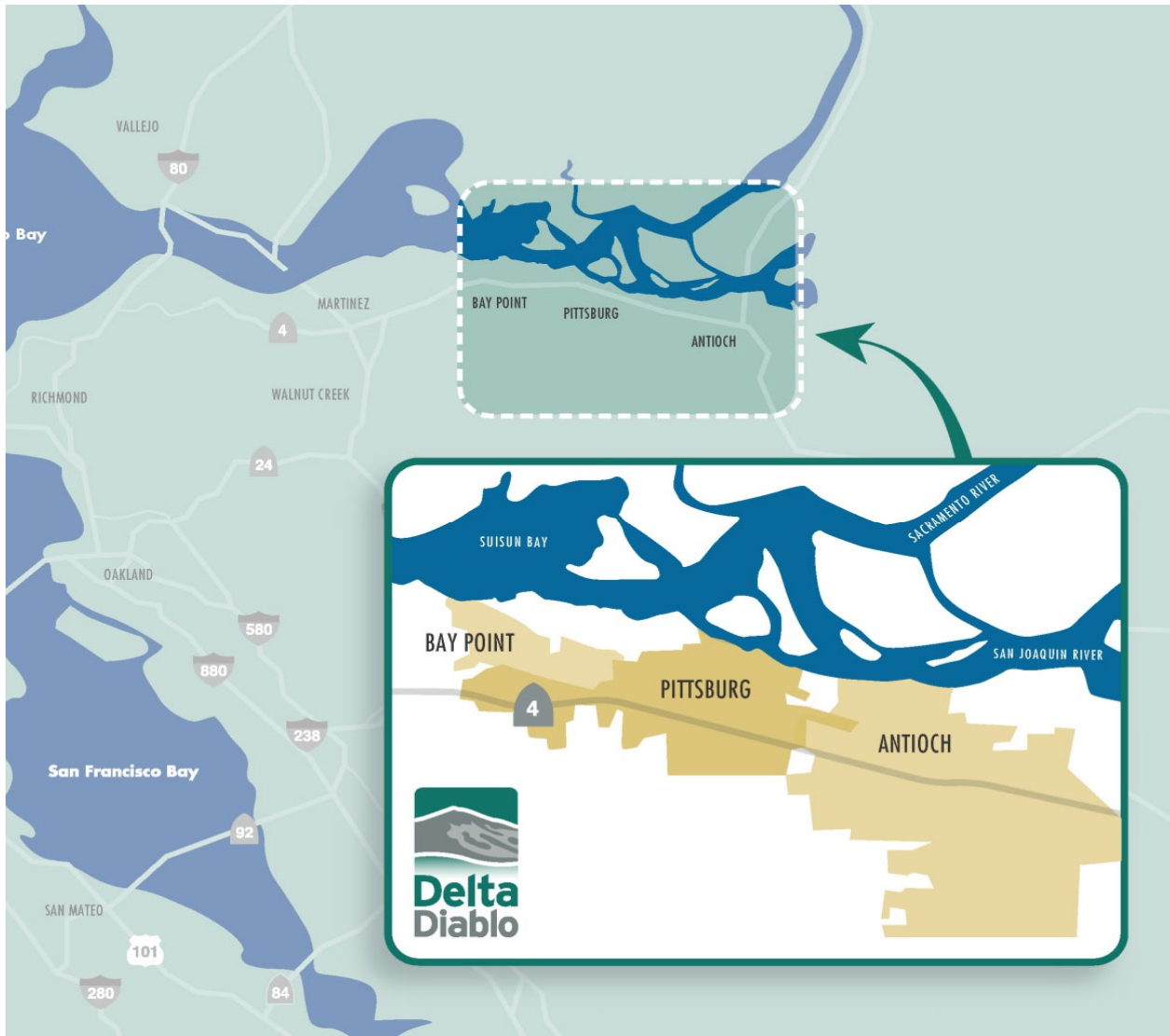


Elrvrdyv
Uhxvh

WaterReuse NorCal
March 8, 2024

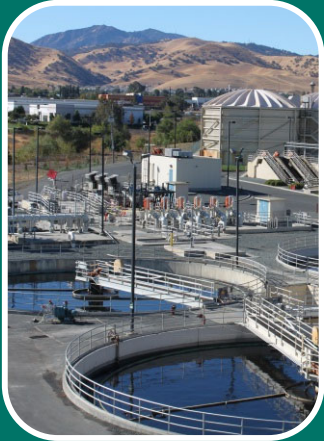
Delta Diablo

Service Area and Facilities



- California Special District
- Service Area: 54 sq. mi.
- Population: 218,000
- Wastewater Treatment Plant (19.5 MGD)
 - 18.5 miles of sewer force main
 - 14 miles of interceptors
 - 5 pump stations
- Recycled Water Facility (12.8 MGD)
 - 16 miles recycled water pipeline

Services



Wastewater
Collection &
Treatment



Street
Sweeping



Recycled
Water



Household
Hazardous
Waste

Quick Facts (2019-2023)

Influent Flow

**4.9 billion
gallons**

Annual Total

13.5 MGD

Daily Average

33.1 MGD

Maximum Day



Effluent Flow

**3.0 billion
gallons**

Annual Total

8.2 MGD

Daily Average

21.0 MGD

Maximum Day

Recycled Water

**2.4 billion
gallons**

Annual Total

6.7 MGD

Daily Average

12.8 MGD

Maximum Day

Biosolids

100%

% Beneficially Reused

**13,090 wet
tons**

Annual Total

Energy

0.83 MW

Daily Avg Demand

46.5%

% Demand from
biogas

Household Hazardous Waste

529 tons

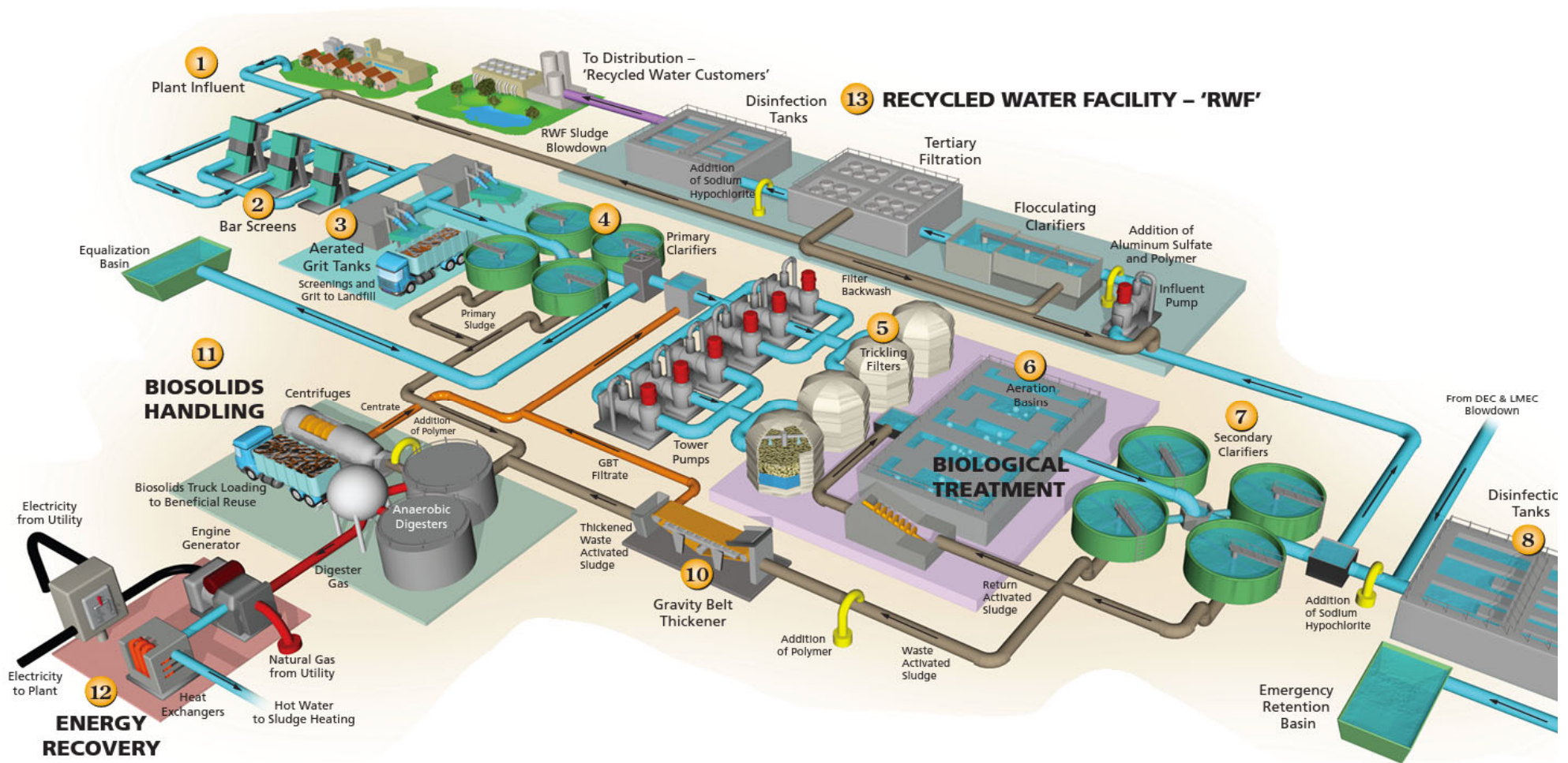
Collected Annually

70.8%

% Recycled

MGD = million gallons per day, MW = megawatts

Process Schematic

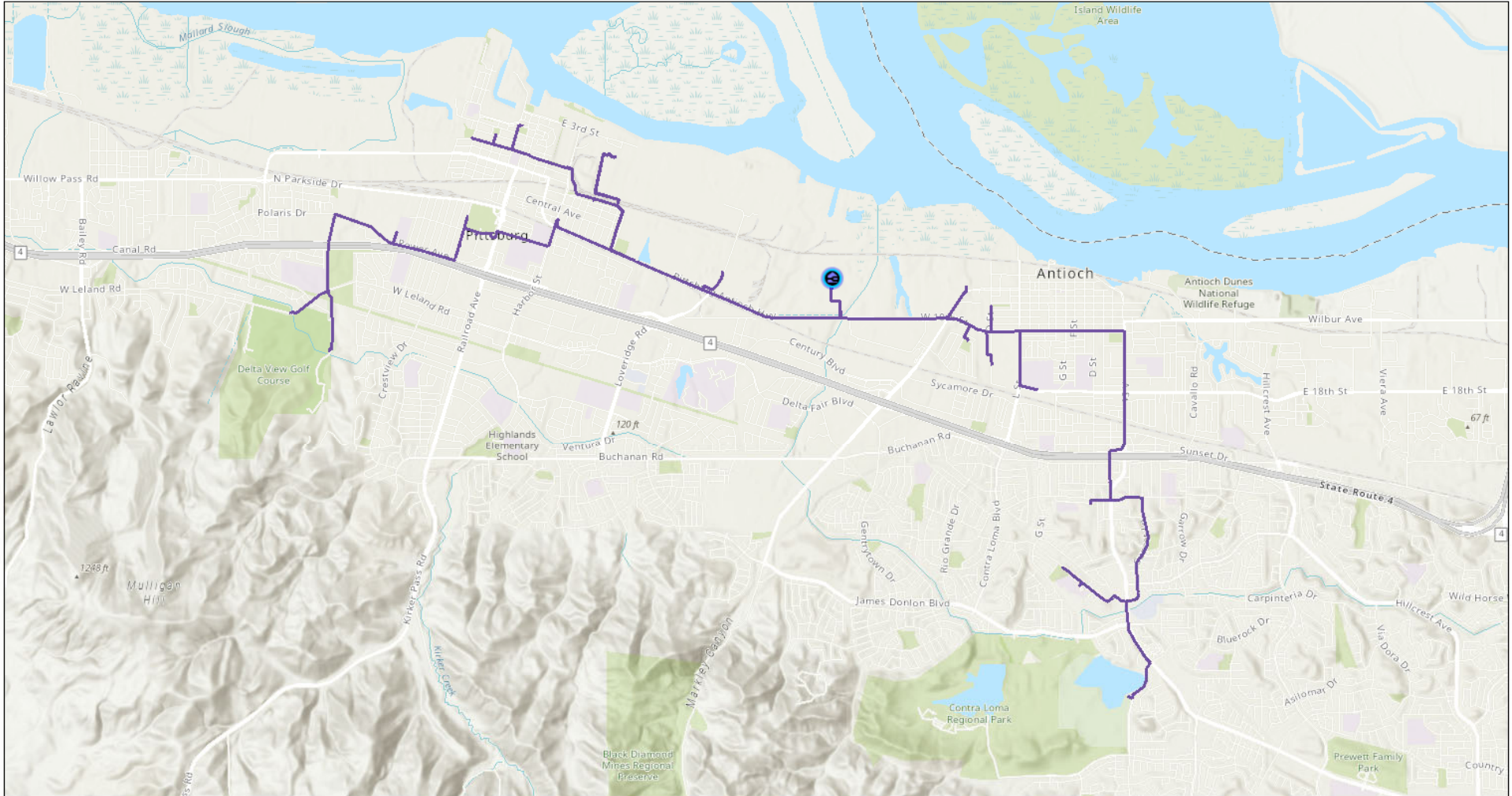


Genesis of Recycled Water Program

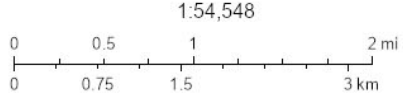


- Calpine planning two power plants in District service area
- California Energy Commission required the use of recycled water
- Proximity to District facilities played a large role

RW Distribution System



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Contracts and Agreements



- Calpine Agreements
 - Development of Recycled Water Facility
 - Purchase and Return of Recycled Water
- Contra Costa Water District
 - General Recycled Water Agreement
 - Recycled Water Purveyorship Agreement
- City of Antioch
 - Recycled Water Purveyorship JPA
- City of Pittsburg
 - Recycled Water Sales & Utility Service JPA



The Recycled Water Facility

- Partnership between Calpine and Delta Diablo
- Sold to District for \$1
- Began Operation in 2001
- Ballasted flocculating clarifier to pre-condition secondary effluent followed by filtration and chlorination
- Tertiary effluent
- Expanded over the last 23 years to include 16.5 miles of purple pipe and 28 use sites



Calpine

Delta Energy Center Los Medanos Energy Center

Highly efficient combined-cycle facilities which are natural gas-fired using steam turbines to produce ancillary electricity.

Combined power generation of 1,429 megawatts

RW piped to LMEC is demineralized as the water source for steam production.

Essential to grid stability and steam customers



Committees Focused on Success

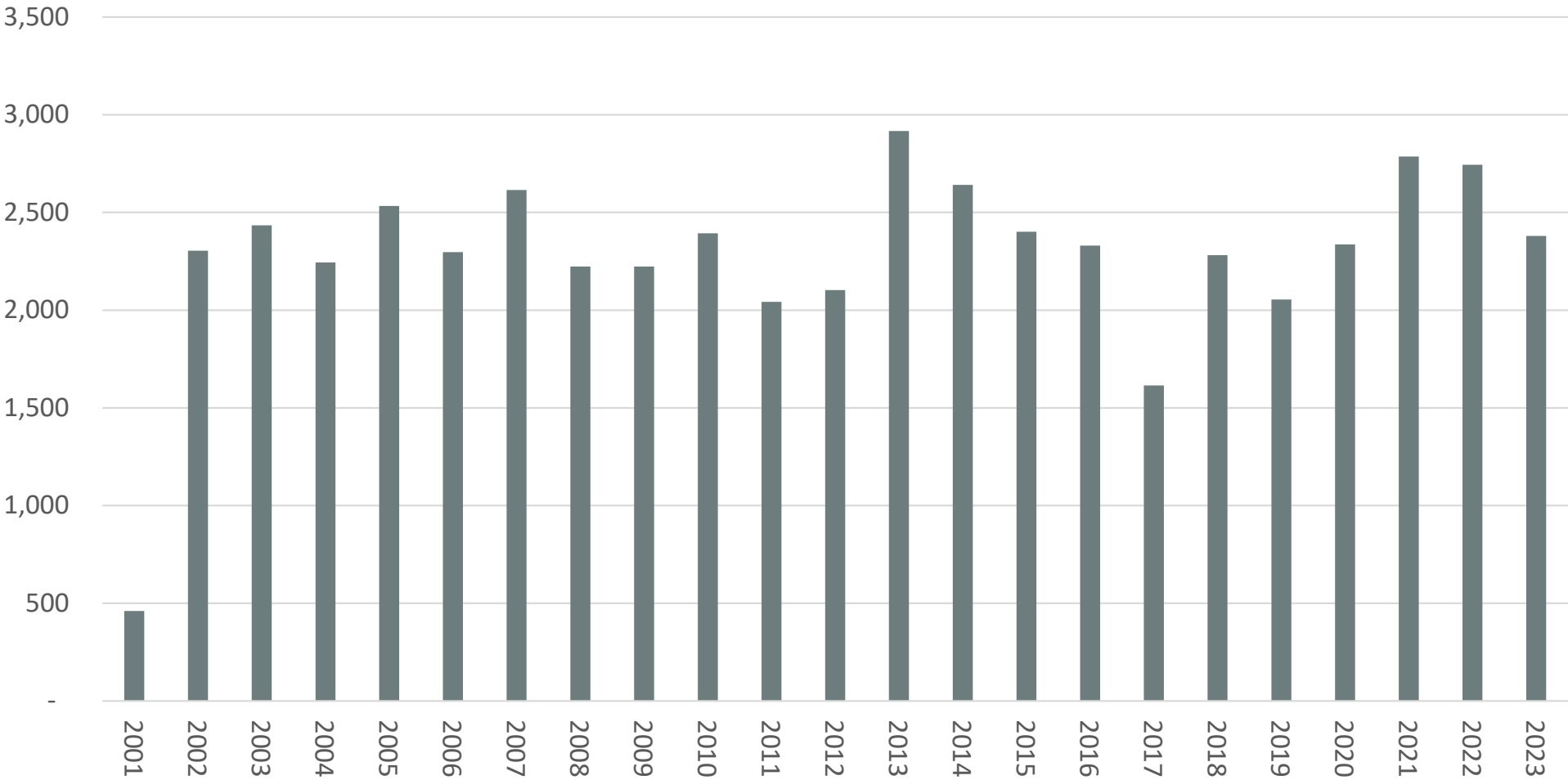


- **Technical Advisory Committee**
 - Quarterly meetings to discuss operations
 - Planned outages
 - Facility operation
 - Tower management changes (i.e., chemical addition)
 - Sampling schedules (coordination between Calpine's sample collections and Delta Diablo lab)
- **Recycled Water Sub-Committee Meeting**
 - Bi-monthly meetings focused on vetting tower control through various chemicals
 - Introduction of proposed operational changes

RW Historical Demand



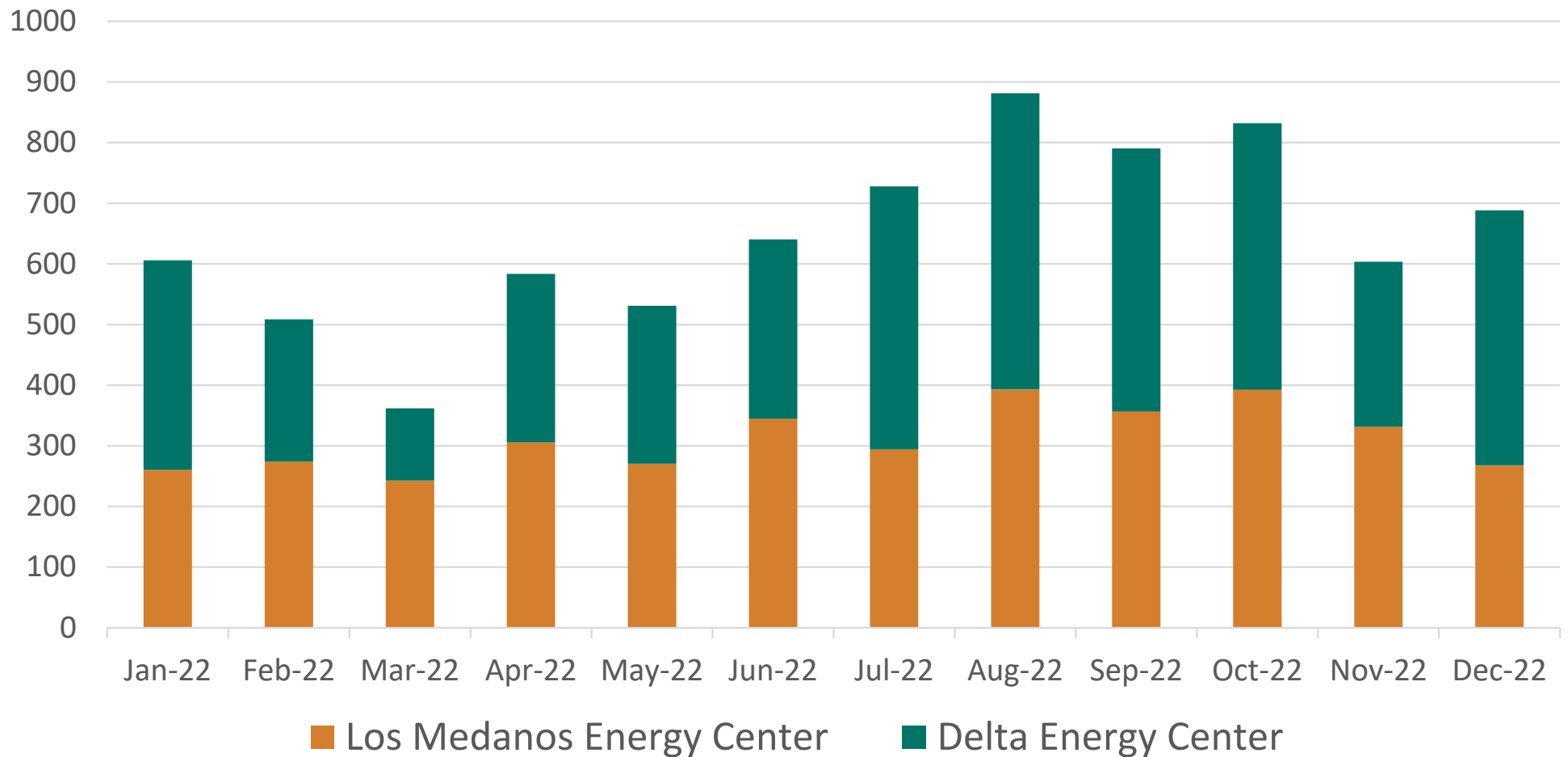
Annual Consumption (MG)



RW Seasonal Variations



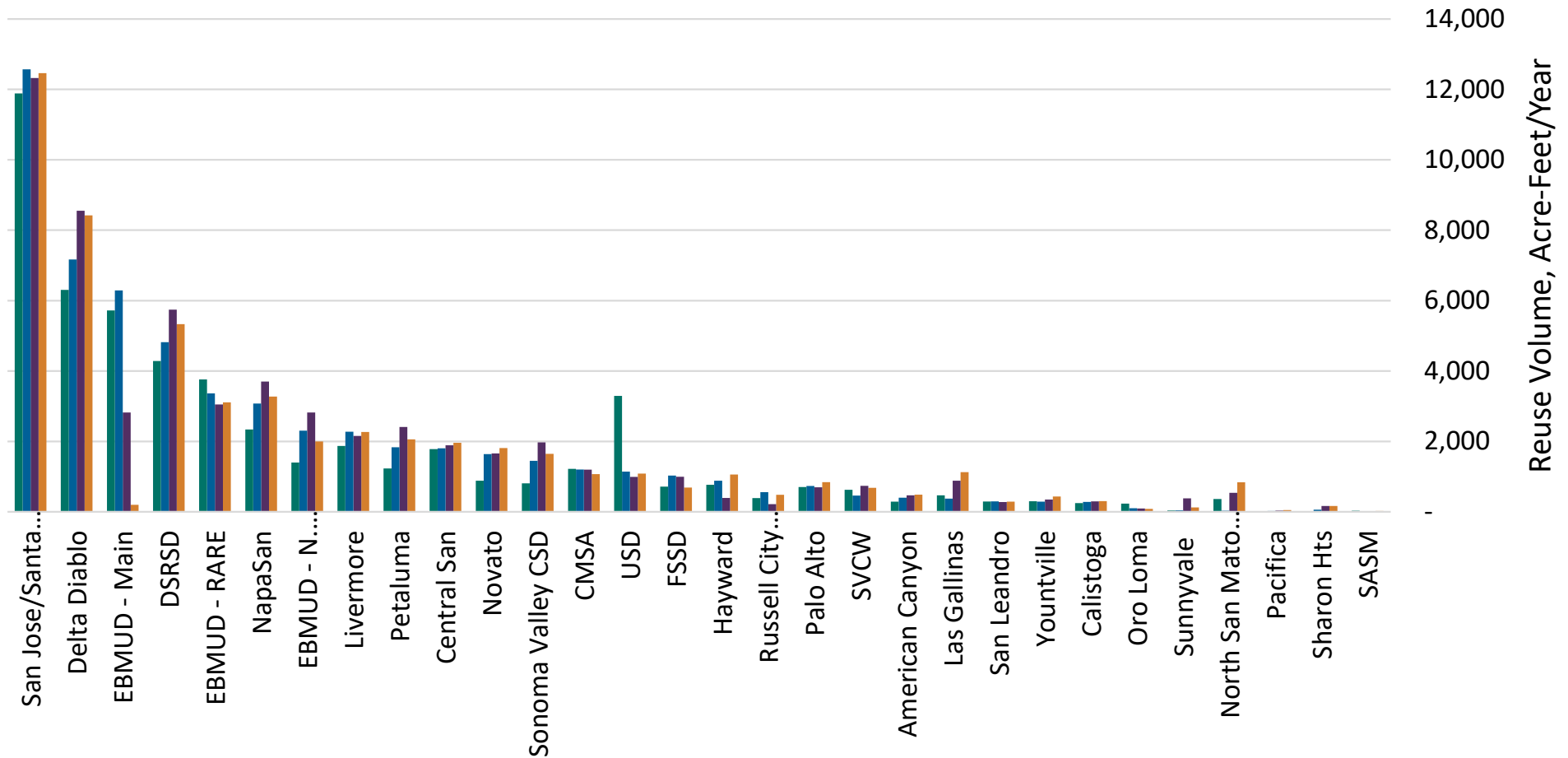
Monthly Demand (AF/M)



Bay Area Recycled Water Production by Facility, 2019-2022

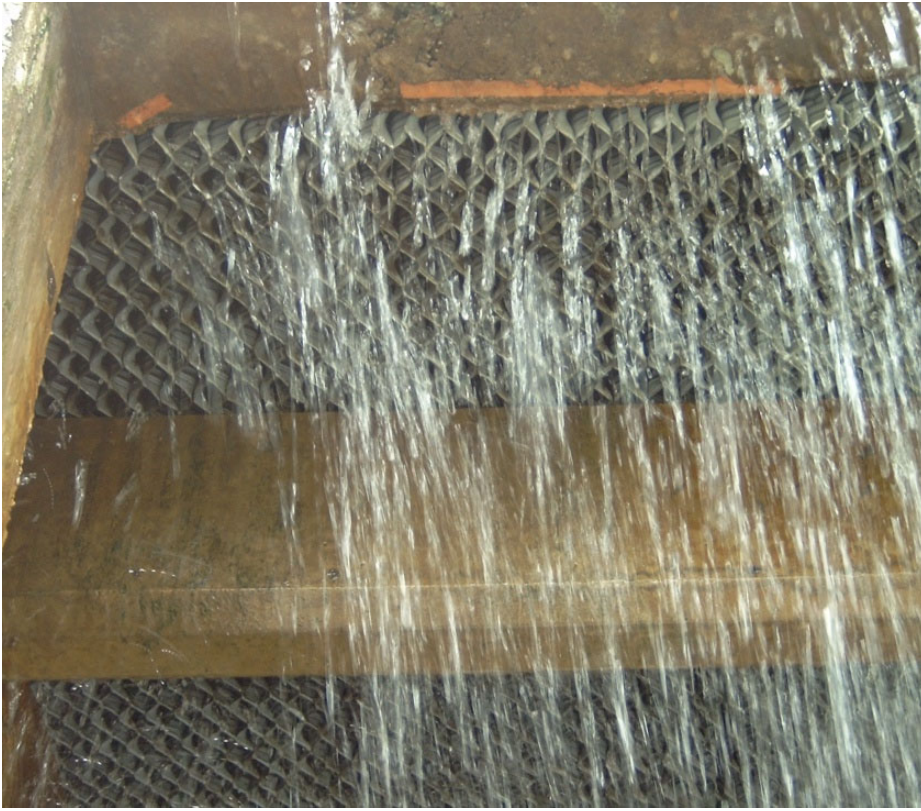


2022 2021 2020 2019



A green rectangular sign with rounded corners and a white border, mounted on two wooden posts. The sign features the word "Challenges" in a large, white, sans-serif font. The background is a bright blue sky with scattered white clouds.

Challenges



Nutrient / Biological Growth Management

- Review and approval process for use of disinfectants and biocides.
- Monitoring of nitrite/nitrate levels
- Priority pollutants in sanitizers
- Unanticipated side effects

Blowdown Discharge

- 70% evaporation 30% return as blowdown
- Concentrated effluent
- Regular monitoring of effluent
- Coordinate sample collection and sample upstream of blowdown addition
- Ability to divert blowdown to holding basin and/or front of plant



Secondary Effluent Discharge



- During peak summer months 100% of effluent can be blowdown
- Influent flow was often limiting factor in available RW supply
- Industrial Wastewater Permit issued to each power plant passing along the District NPDES requirements
- Elevated constituent response plan

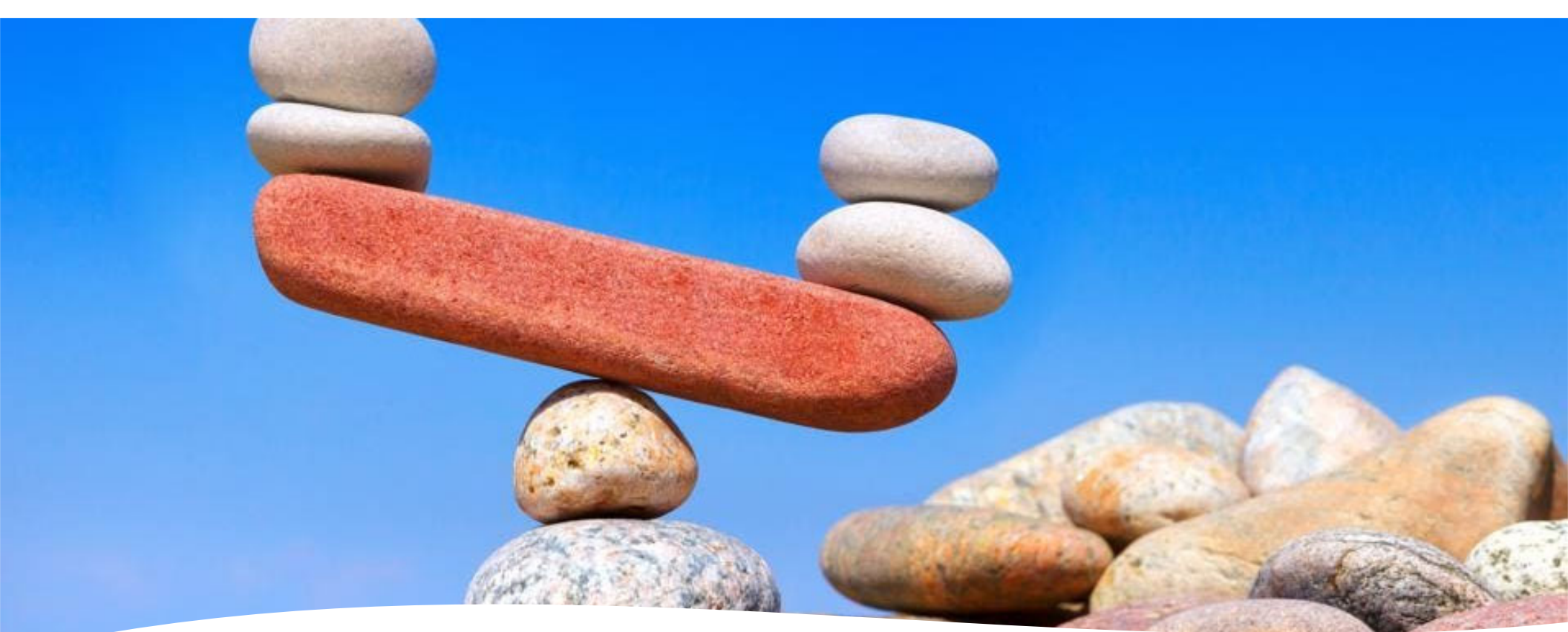
Unanticipated Side Effects

- Pulling blowdown back to RW production facility
- Frequent staff turnover at Calpine
- Calpine intentionally nitrifying in cooling tower without discussion/involvement
- Nitrate levels causing excessive sodium bisulfite usage
- Exceedances of mercury limit forcing extended blowdown rerouting to headworks



Facility Maintenance

- Both facilities cannot be offline at the same time resulting in 24/7 demand with limited redundant equipment
- Planning maintenance during lower demand in spring
- Unintended maintenance due to technology selection / design
- Aging infrastructure replacement plan and shelf spare for critical components



Balancing Resources

- Limited staff, which takes priority treatment plant or recycled water production
- Accurately capturing fees/cost associated with RW facility

Future of RW for Delta Diablo

- Currently conducting a Master Plan
- What happens if we lose Calpine's facilities?
- Expanding capacity and customer base
- Looking at nutrient removal and how RW fits into the puzzle



Contact Information



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