



University of California
San Francisco

UCSF Water Program

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UCSF Water Efficiency Program:

Reduce Water Consumption/Weighted Campus User Ratio 36% by 2025 compared to 2007 baseline per UCOP

UCSF met the UCOP goal this year

Eliminate Single-Pass Cooling; Retrofit to Recirculating Chilled Water

Connect sterilizers to recirculating chilled water

Parnassus Cold Rooms retrofit

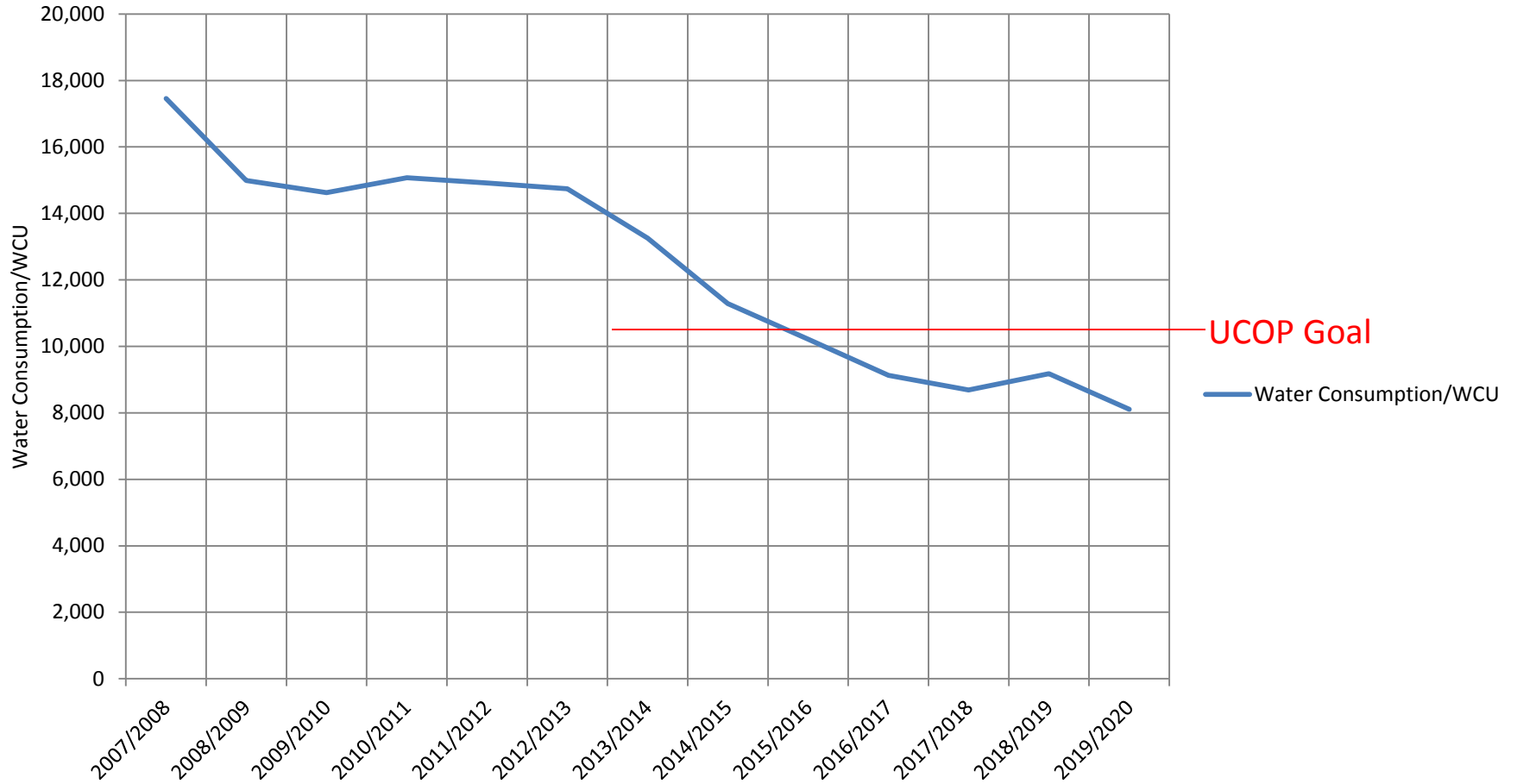
Comprehensive evaluation of all water consumption, including lab equipment and fixtures, restroom fixtures, cooling towers, purified water, irrigation, etc...

Cooling Towers and Irrigation are operating efficiently

Comprehensive lab survey in progress

UCSF Campus Water Consumption Trend

Water Consumption/Weighted Campus User



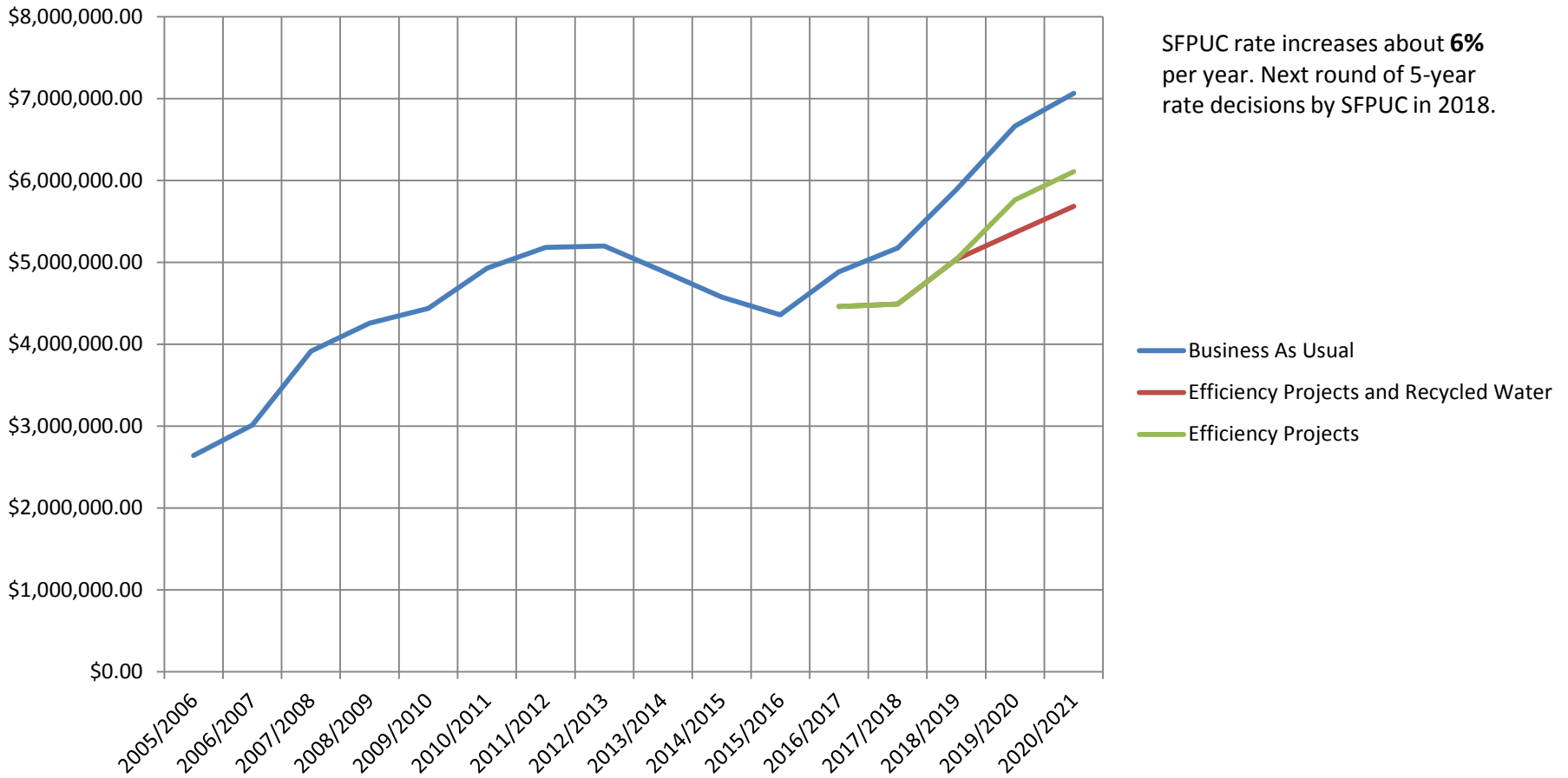
UCSF Total Water Consumption

UCSF Campus/Medical Center Water Consumption



Water Utilities Rate Projection

UCSF Campus/Medical Center Water Utilities Budget



UCSF Water Efficiency Strategy:

Technical Performance Standards:

High standards for new construction water efficiency

Projects & Programs:

Eliminate once-through equipment cooling: Sterilizers, Cold Rooms, Ice Machines, etc...

High Efficiency Lab Fixtures and Equipment Program

High Efficiency Irrigation

High Efficiency Restroom Fixtures

Campus-Wide Outreach Program: Water Working Group is developing the program

Measurement and Verification:

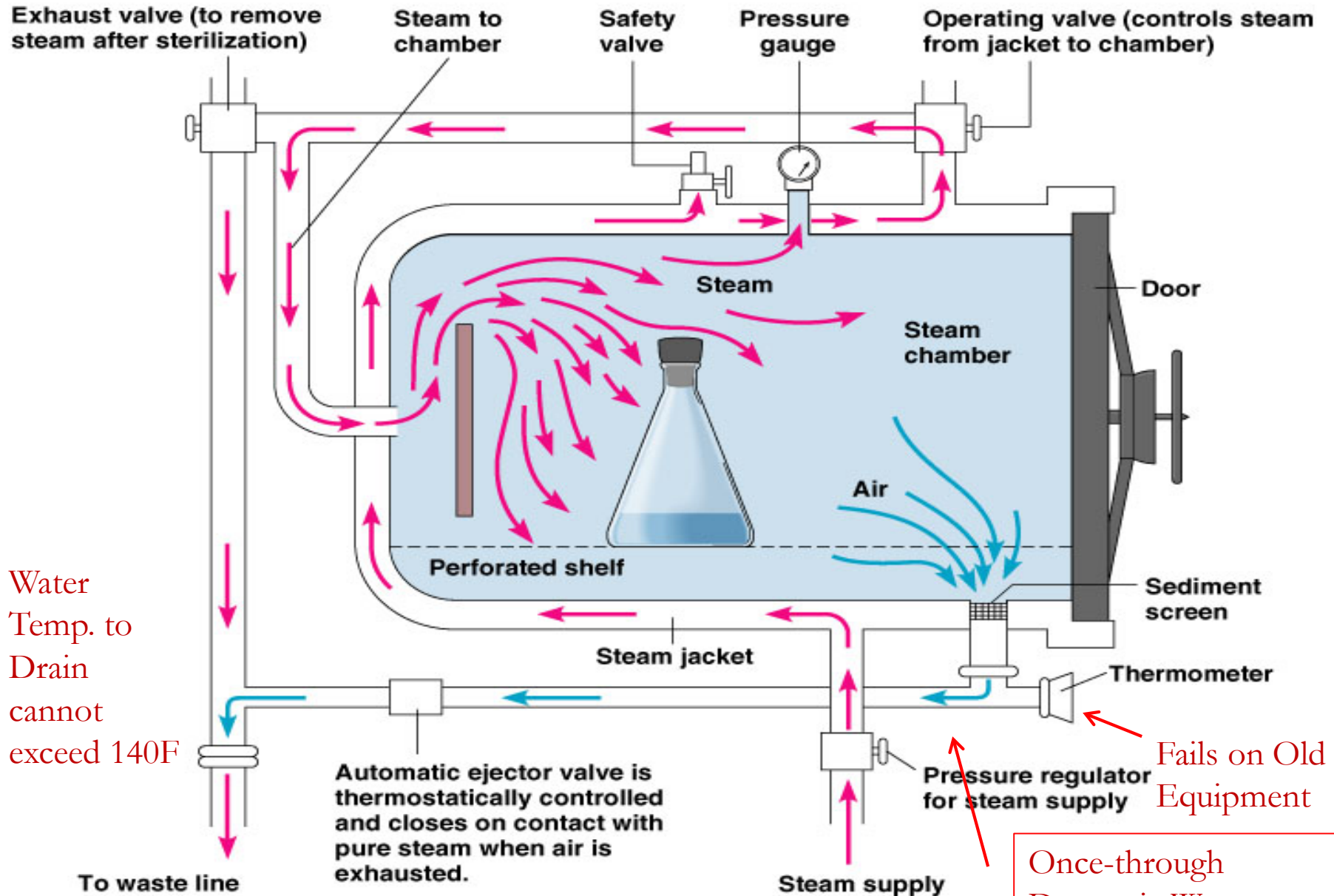
New water meters installed and connected to SkySpark

Equipment metering

Innovation:

Recycled water facility serving Mission Bay campus

Sterilizer: Once-Through Cooling



Sterilizer Replacement/Retrofit Scope:

Problem Statement: Water meter data indicates sterilizers can use between **150,000-1,000,000** gallons per year. Large cage washers can use **5,000,000** gallons per year. Old equipment is highly inefficient. UCSF has 25 sterilizers which are at least 20 years old.

Scope: Replace all old sterilizers by working with Labs. Incentivize replacement with Facilities rebate and SFPUC rebate program. Connect sterilizers to chilled water. Install quench tanks on sterilizers which do not have chilled water in the facility. Install water meters on sterilizers to verify consumption.

Current Projects: Helen Diller LARC, Genentech Hall, Hooper Lab, Pathology Lab

Challenge: Sterilizers are expensive. Labs run them until they break down.

Outcome: New sterilizers will be connected to recirculating cooling water, eliminating up to 97% of water consumption.

This Sterilizer uses 1,000,000 gallons per year!



Cold Room Retrofit Scope:

Problem Statement: Parnassus campus has 9 cold rooms using once through water cooling. Water meter data indicates these cold rooms are each using between **150,000-250,000** gallons per year.

Scope: Chilled water supply/return will be connected to the cold rooms compressors to eliminate water use.

Current Projects: S1069, S1240, HSE 537 with Facilities

Challenge: Long return on investment

Outcome: Eliminate water use at cold rooms

*Water
Dumps to
Drain
24/7*



Laboratory Water Efficiency Program

1. Lab Equipment Incentive Program

- Target high consuming equipment(sterilizers) with a \$5000 incentive based on 1 year payback in water savings
- Utilize SFPUC program for water efficient equipment rebate program.

2. High-Value Equipment Contract with Getinge

3. Comprehensive physical survey of all research laboratory space:

- Inventory all water consuming equipment
- Rinse/Wash faucet flow testing for efficiency retrofit scope(reduce to 1.5gpm)
- 650 faucets at Parnassus (40 at +5gpm, 125 at 4-5gpm, 150 at 3-4gpm, 170 at 2-3gpm, 165 at 2gpm or less)

4. High Efficiency Lab Equipment Operation Standards:

- Meter equipment and work with lab managers to identify highest efficiency sterilization and wash cycles.

5. Purified Water Study (Purifying water rejects up to 75% of water to drain)

- Labs have 100s of DI water faucets and Millipore units
- Aquatics labs such as zebrafish use purified water

Restroom Fixture Efficiency

- Mission Bay toilet sensors have been changed from automatic to manual due to consistent multiple flushing.
- Mission Bay urinals are 1gpf. The plan is to switch them (50 total) to 0.125gpf urinals. Estimated savings of 2,500,000 gallons per year (\$55,748)
- Housing is planning on switching all showerheads from 2.5gpm to 1.5gpm this fiscal year. Estimated savings of 7,205,100 gallons per year (\$144,487)
- Assess restroom faucet efficiency for future retrofit.



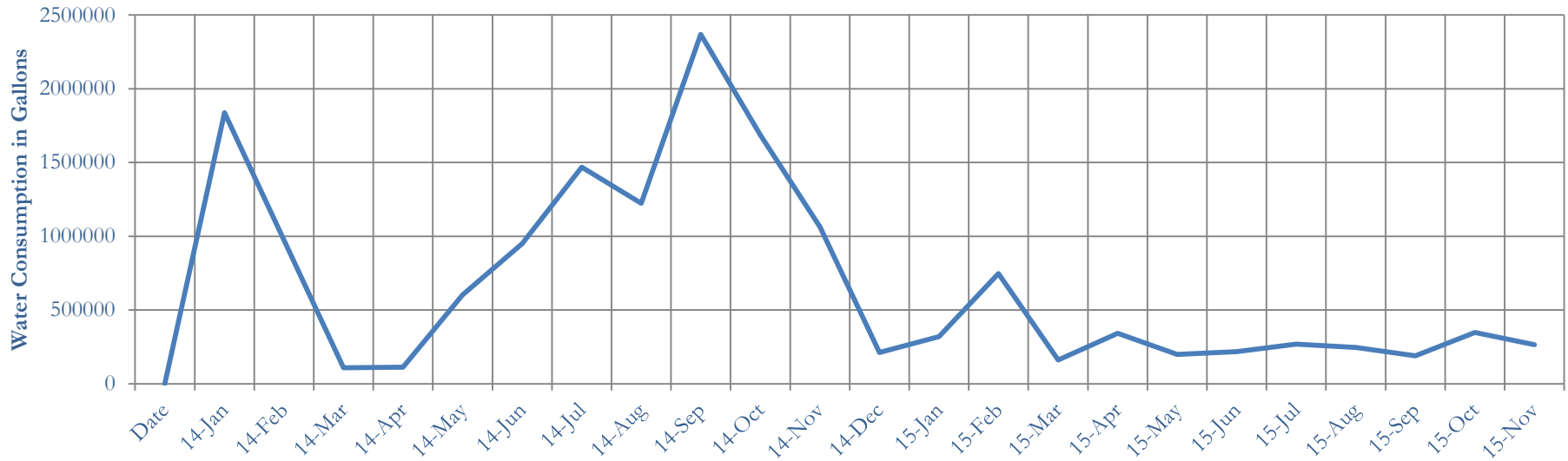
Irrigation Efficiency

Problem Statement: Irrigation can have high water consumption. Policy update requires mapping of functional/non-functional turf areas.

Scope: Program high efficiency scheduling. Retrofit irrigation at Parnassus.

Outcome: Minimize irrigation water consumption. Programming last year saved about **9.5 Million Gallons** compared to the previous year.

Mission Bay Irrigation Water Consumption in Gallons 84% ↓



Water Infrastructure: Metering, Asset Management and Water Safety

Problem Statement: Water Meters do not connect to the controls system, and plumbing infrastructure is not on GIS.

Scope: Upgrade Water Meters and connect to SkySpark in conjunction with network and controls upgrade projects. Upload plumbing as-built AutoCAD drawings to GIS system. ASHRAE 188(Legionella) calls for water system map, and testing based upon end points of use. Water quality program (Lead).

Current Projects: Genentech and Helen Diller bulk sterilizer and tunnel washer water metering, Rock Hall water meter upgrade. Water testing program for Lead.

Challenge: Water meter installation can be disruptive. No responsible party to develop plumbing GIS. Discovery of problems through water testing.

Outcome: Data Analytics to evaluate consumption and identify problems. Preventative maintenance program based upon high-level data. Water quality program.

District Scale Recycled Water - Mission Bay

Problem Statement: Mission Bay campus has recycled water piping infrastructure in the street, which connects to the irrigation system. The pipes use potable water, as there is no source of recycled water.

Scope: The City of SF will potentially select a company to convert sanitary sewage pumping stations into recycled water facilities. UCSF would enter into a water purchasing agreement with the company, buying water at a lower rate than potable water.

Current Projects: UCSF is finalizing a water balance study to identify uses of recycled water in existing and planned facilities.

Challenge: This is a new business model for the City. Existing UCSF buildings would have to be connected to recycled water piping currently in the street. Recycled water currently cannot be used in OSHPD space.

Outcome: Recycled water would be used for Cooling Towers, Irrigation, Dual-Plumbed Toilets and Urinals. This would significantly offset Mission Bay potable water consumption, and reduce the water utilities budget.

UCSF Water Efficiency Program Vision

- All Equipment and Fixtures are high efficiency
- Once-Through Cooling is eliminated
- Water Meters are on all major water services and output to SkySpark
- Data Analytics are programmed through SkySpark to identify water consumption issues
- Plumbing Layout is on a GIS system which allows for asset management and long-term maintenance planning
- Water Quality Testing Program
- District Scale Recycled Water at Mission Bay campus

