



DROUGHT MANAGEMENT & DEMAND MANAGEMENT

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San Francisco Public Utilities Commission
April 2015**



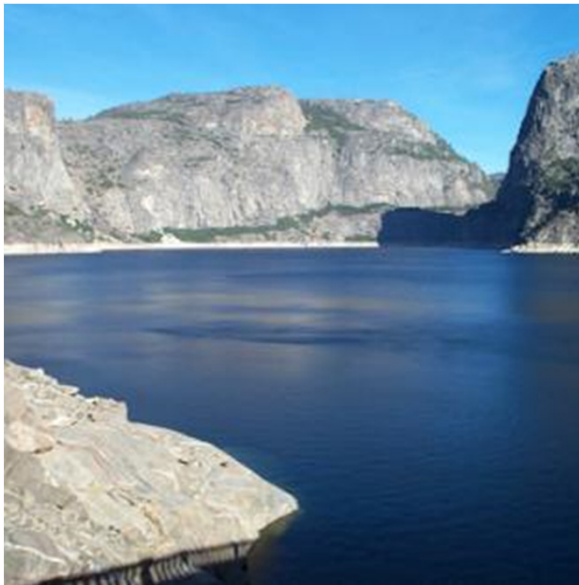
Today's Presentation

- Overview San Francisco Public Utilities Commission
- Drought Management Strategies
- Approach to Conservation & Demand Management

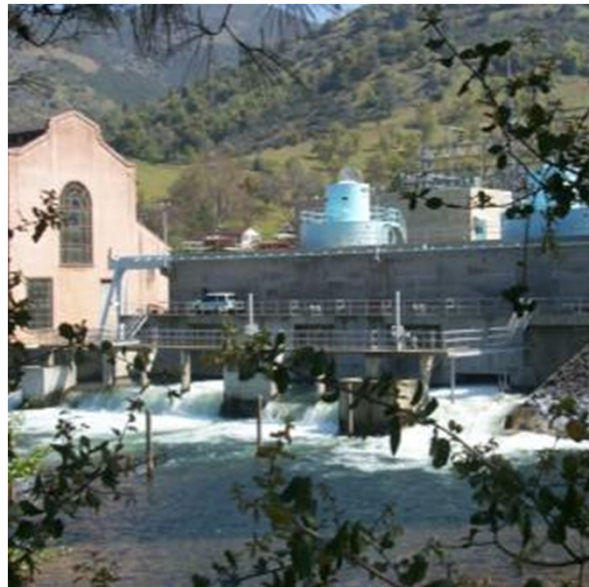




San Francisco Public Utilities Commission (SFPUC)



Water: delivering high quality water every day to 2.6 million people

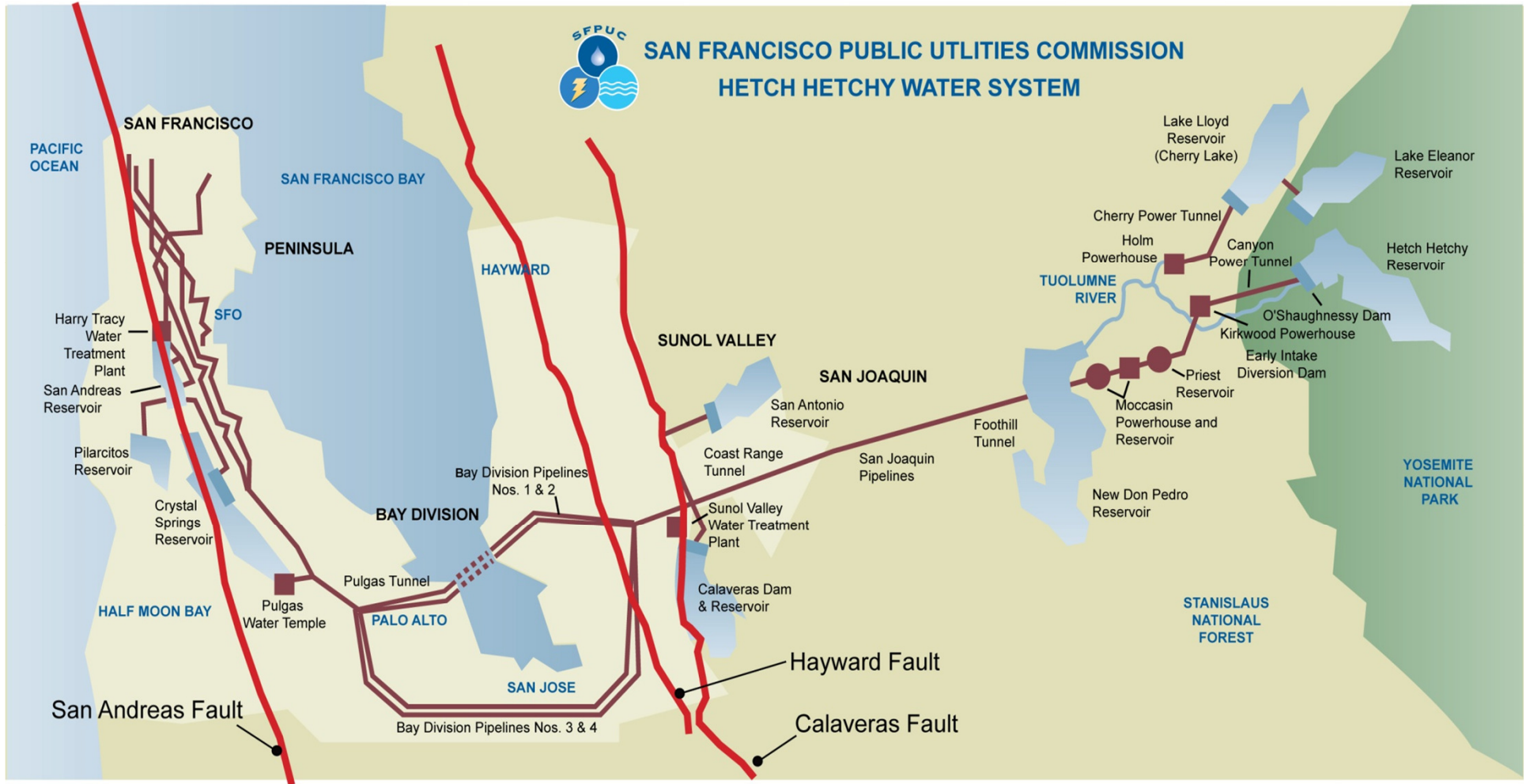


Power: generating clean energy for vital City services



Wastewater: protecting public health and the environment

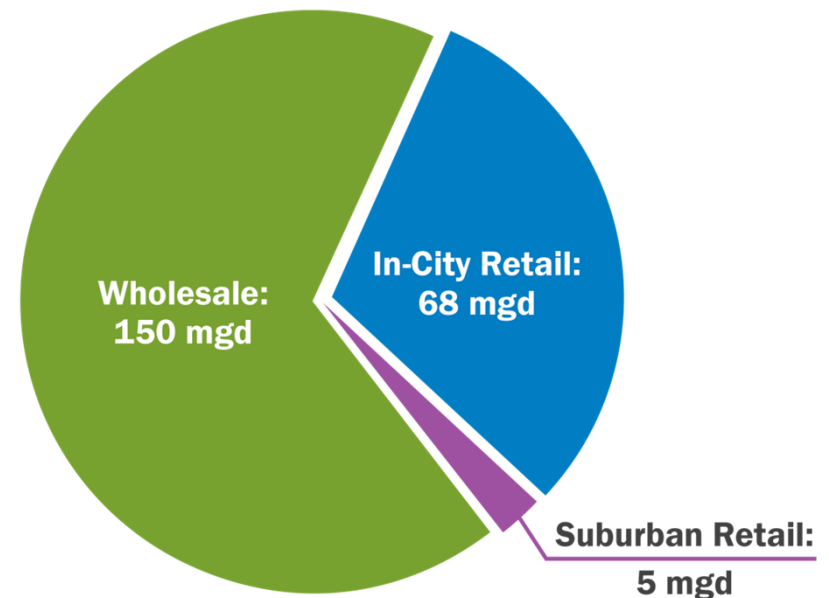
SFPUC Regional Water System





SFPUC is a Retail and Wholesale Water Provider

- Serve 2.6 million people
- Provide water to City and County of San Francisco
- Provide wholesale water to 27 agencies
- Average delivery of 223 million gallons a day (840 ML)



City of San Francisco

- 49 square miles (127 km²)
- Over 850,000 people, daytime population over 1M Population
- Dense urban city, little outdoor irrigation
- Mediterranean climate: short rainy season, long dry season
- Average annual precipitation is 21 inches per year (53 cm)



Major Droughts in California

- 1976-1977 Drought
- 1987- 1992 Drought
- 2012- ?



1987-1992 Drought

- 1998 call for mandatory rationing (water allocation by customer)
- Initiated a Water Conservation Program
- 1991 at risk of running out of water with Hetch Hetchy Reservoir at 14% of storage capacity
- 1991 proposed 45% mandatory rationing



Steps Taken During 1987-1992 Drought

- Adopted Water Shortage Emergency Resolutions
- Prepared Water Use Restrictions
- Established a Water Rationing Unit
- Developed Water Allocations
- Set-up an Appeals Process
- Developed Excess Use Charges
- Initiated a Water Conservation Program



Water Use Restrictions Focus on Outdoor Water Use

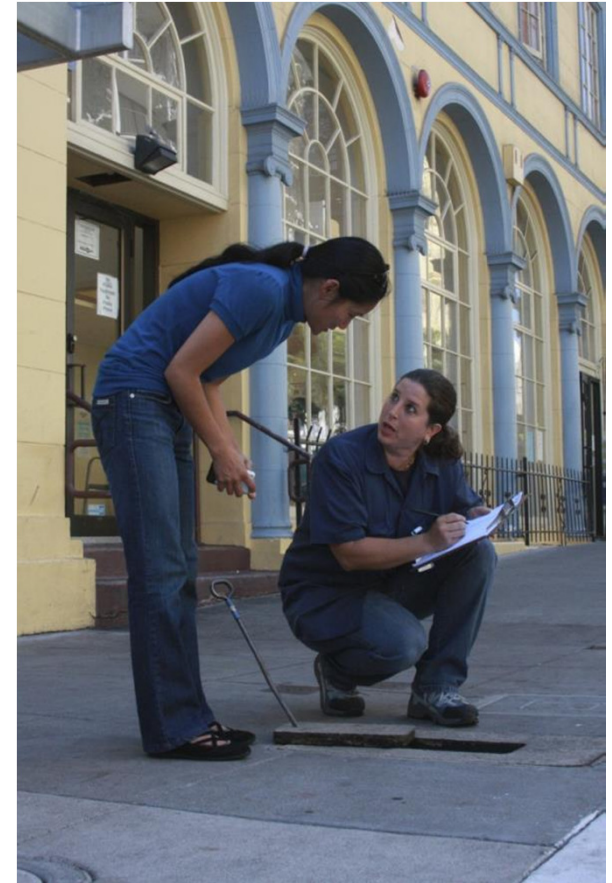
Prohibitions:

- Runoff into street or gutters
- Hoses to clean sidewalks, streets, or other hard surfaces
- Potable water in fountains, cleaning vehicles and dust control
- Potable water for cooling purposes, commercial car washes, street sweepers



Water Rationing Unit

- Water Rationing: establish water allocations (amount of water) by customer sector
- Water Rationing Unit: Enforce mandatory rationing and manage allocation process
- Additional staffing: program administrator, clerical and field inspectors
- Manage appeal process (over 130,000 appeals over 6 year period)



Water Shortage Allocations

- 25% reduction rationing methodology:
 - Achieve 25% through a reduction of 10% indoor use and 60% reduction in outdoor consumption
- 45% reduction rationing methodology:
 - Achieve 45% through a reduction of 33% indoor use and 90% reduction for outdoor consumption
- Allocations includes minimum and maximum thresholds



Rationing Stages during 1987-1992 Drought

Year	Mandatory Rationing	Appeals
May 1988-May 1989	25%	25,000 appeals in the first 11 days, 68,000 total appeals
May 1989-May 1990	No Rationing Program	
May 1990- March 1991	25%	11,000 appeals in first 11 days, 34,000 total
March 1991	45%	14,000 appeals in the first 2 weeks, 21,000 total
June 1991	25%	
Feb 1993	Rationing Ends	



Thresholds for Minimum and Maximum Allocations

- Residential Accounts 50 gallons (189 liters) per day per documented resident
- Single-family residence no more than 300 gallons (1,135 liters) per day
- Multi-family no more than 150 gallons (568 liters) per day x the number of living units in the building
- Irrigation accounts reduced by 90 percent
- Commercial and industrial allocations will be reduced by 32%
- Hospitals and other health care facilities may be subject to lesser restrictions- requires approval



Excess Use Charges- Example from 1991-1992

Water Consumption (Over Allotment)	Excess Use Charge (Times Normal Rate)
Up to 10%	2
10.01%-20%	8
20.01% or over	10

Excess use charges in 1991-1992: \$12 million US

Use in excess of allotment, and after written warning,
the SFPUC could install a flow restrictor

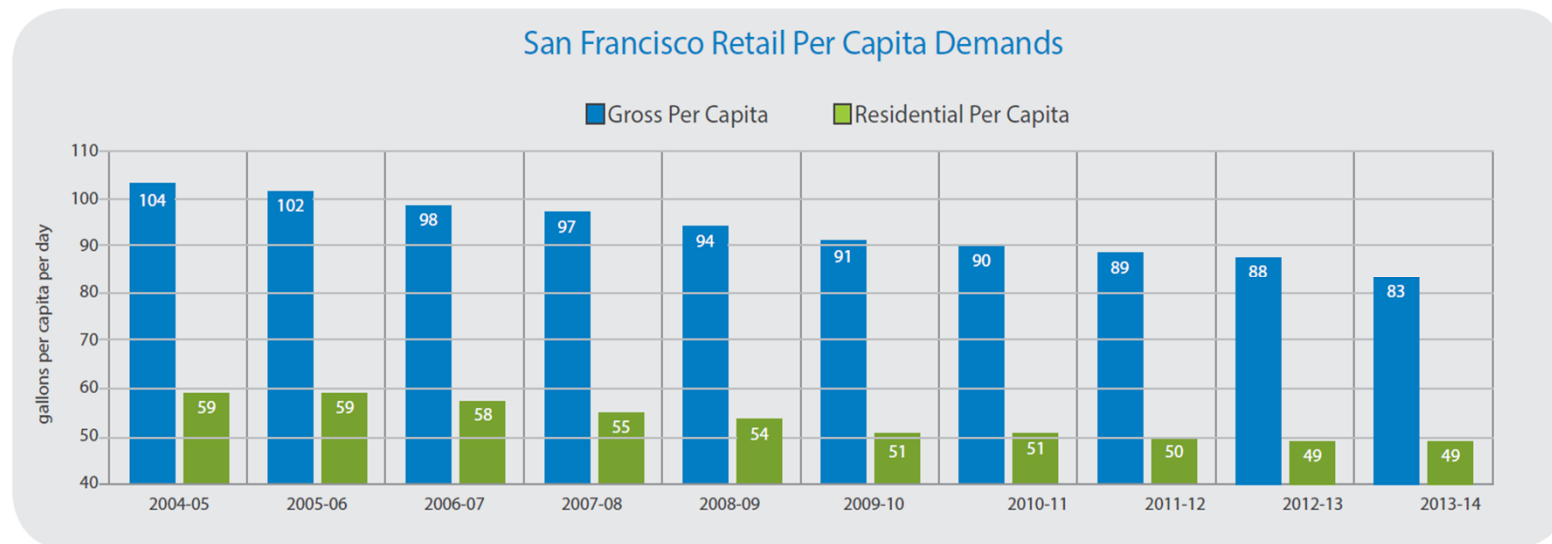
Outcome of 1987-1992 Drought

- Continue Water Conservation Program
- Convert several water use from temporary to permanent restrictions
- Reduced water consumption per capita continues after drought



Conservation Program Maintained Per Capita Water Use Declines

- Residential 59 gallons (223 liters) to 49 gallons (185 liters) per person a day
- Gross 104 gallons (314 liters) to 83 gallons(314 liters) per day



San Francisco water use- among the lowest per capita consumption rates in the CA

2014 Drought 3rd Driest Year on Record in California

- Governor Brown declares a **Drought State of Emergency** and called on all to voluntarily reduce water use by 20% (January 2014)
- **Emergency Regulations** for water use restrictions and irrigation reductions issued by the State's Water Resources Control Board (April 2014)



SFPUC Response to 2014 Drought



Residential Water Conservation Services
A Call to Conserve

We're asking all customers to voluntarily conserve water. The current winter is one of the driest in recorded California history. That's why the San Francisco Public Utilities Commission (SFPUC) is urging customers to voluntarily curtail water use. Everyone needs to do their part; the goal is to reduce overall usage by at least 10%. Voluntary water conservation efforts in the coming months could help avoid possible mandatory rationing in the future should the drought persist.

Water Conservation Tips
Conserving water is as easy as changing everyday habits:

- Don't let the water run while brushing your teeth, shaving or washing dishes - saves about 2 gallons per minute.
- Install water-efficient showerheads and faucet aerators - saves 2 gallons per minute.
- Shorten your shower time by 3 minutes - saves about 8 gallons of water.
- A running garden hose uses about 3.5 gallons per minute. Equip hoses with an automatic shutoff nozzle and save.
- Use a broom to clean sidewalks, driveways and pavement instead of a hose - saves about 3.5 gallons per minute.
- Reduce one load of laundry per week by waiting to run full loads - saves about 20 gallons.
- Cut back on your outdoor watering or irrigate plants only as needed.
- Repair toilets and other plumbing leaks ASAP - saves hundreds of gallons per day. Visit sfwater.org/leakleaks for repair tips. Important reminder: Tenants should immediately report leaking fixtures to property manager.
- Replace older toilets and clothes washers with new water-efficient models and apply for SFPUC rebates. These two fixtures are the largest water users in the home.

NEW! Complete our Home Water Conservation Checklist to help identify ways to improve the water efficiency of your home. Available online at sfwater.org/conservation

- Request customers to reduce consumption by 10% system-wide, on a voluntary basis
- Initiated a comprehensive drought education and paid media campaign (bus ads, signs, stickers, mailings, etc.)



San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

Turn me off
Hetch Hetchy Water-Too Good to Waste

不要浪費每一滴珍貴的赫奇自來水
Por favor no desperdicie el agua

sfwater.org



BROWN
is the new **GREEN**

We're doing our part to conserve water during this drought.

[f](https://www.facebook.com/SFPUC) [t](https://twitter.com/SFPUC) #DroughtSF Request a sign: sfwater.org/conservation

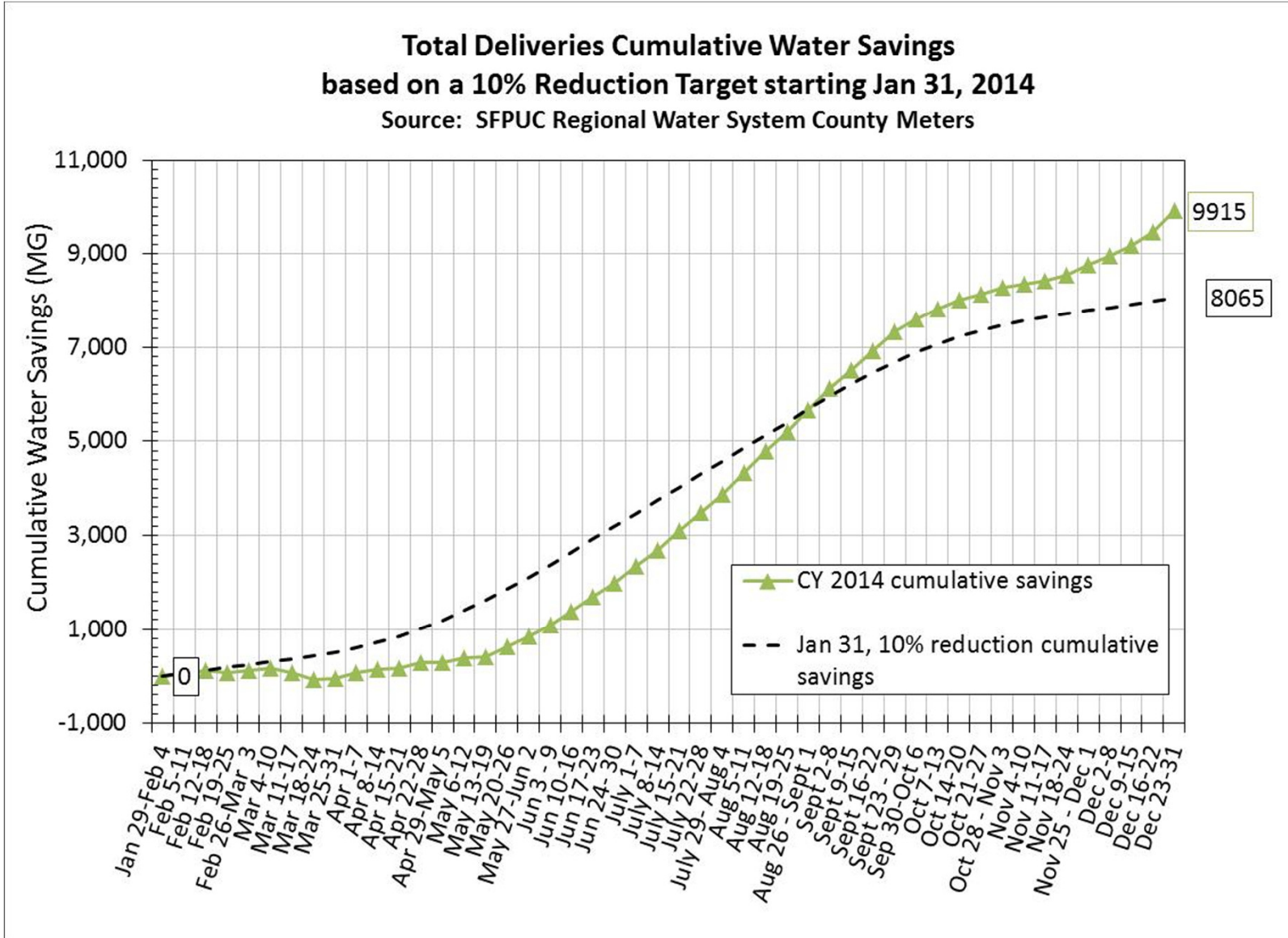
Additional Water Use Restrictions and Mandatory Rationing in SF



- Implement Water Restrictions
 - No runoff on pavement
 - No washing streets
 - Water Wasting Enforcement
- Impose a 10% Mandatory Reduction on irrigation customers and impose excess use charges
- Report monthly to the State Water Board: 49 gallons (185 liters) to 45 gallons (170 liters)



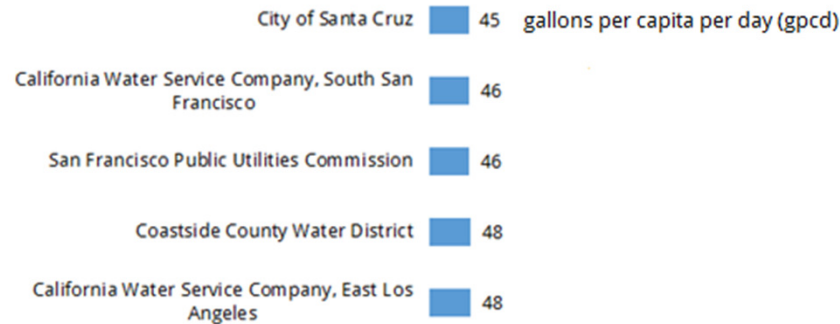
Exceeded 10% Goal in 2014 More than 8 Billion Gallons (30 Gigaliters)



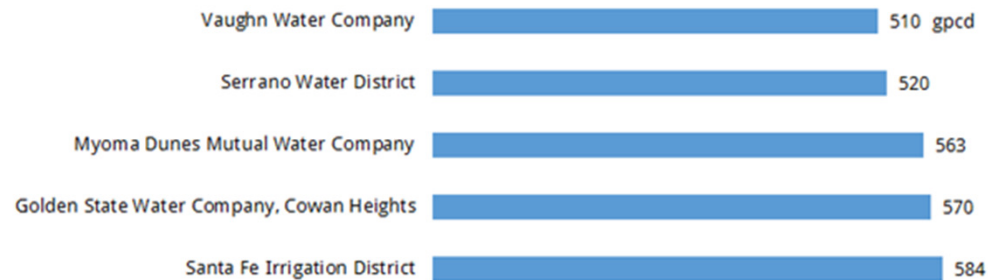


Water Use Across the State 45 gallons (170 liters) to 584 gallons (2,210 liters)

Water utilities with the lowest per capita residential use



Water utilities with the highest per capita residential use



Highest and lowest residential per capita water use rates among California water utilities in September 2014



2015 Drought 4th Driest Year in the Last Century

- Governor Brown Issues Executive Order to reduce water consumption ***statewide by 25%***-- first time in California's history
- Executive Order directs State Water Board to implement mandatory water reductions to reduce urban water usage by 25% to save 1.3 million acre-feet (160,350 Gigaliters)
- Proposed regulatory framework includes mandatory rationing tiers (10%-35%) for 411 water suppliers across the state of California to achieve overall 25% reduction

Proposed State Requirements and Enforcement

- Additional water use restrictions- target outdoor irrigation uses
- Additional reporting requirements on water suppliers to provide production and use data to State
- Up to \$10,000 a day for non-compliance



Executive Order Leads to New Standards for 2016

- Toilets: 1.28 gallons (4.84 liters) per flush
- Urinal: 0.125 gallons (0.47 liters) per flush
- Residential lavatory faucets: 1.2 gallons (4.5 liters) per minute flow rate
- Kitchen faucets: 1.8 gallons (6.8 liters) per minute flow rate
- Public lavatory faucets: 0.5 gallons (1.9 liters) per minute flow rate

Expected to save 10 billion gallons (37 GL) of water in the 1st year Over time, expected to save 105 billion gallons (390 GL) per year





State's Proposed Target for San Francisco is 10%

San Francisco proposing to adopt new reductions and restrictions:

- 10% reduction for all customers
- 25% reduction for irrigation accounts, with excess fees
- Adopt additional water use restrictions and prohibitions



Responding to Droughts

- Tends to be a reactive strategy through public messaging and rationing
- Tends to be behavioral in nature
- Water savings may or may not last following drought periods



SFPUC Plans for Long Term Reliable & Resilient Water Supply

- Capital Improvement Program
- Commitment to Ongoing Water Supply Planning





Water System Improvement Program

Program designed to continue to reliably meet the needs of our customers today and future during normal and dry years:

- Repair, replace, and seismically upgrade infrastructure
- \$4.8 billion
- Over 80% complete
- Improve use of water sources & diversify water supplies

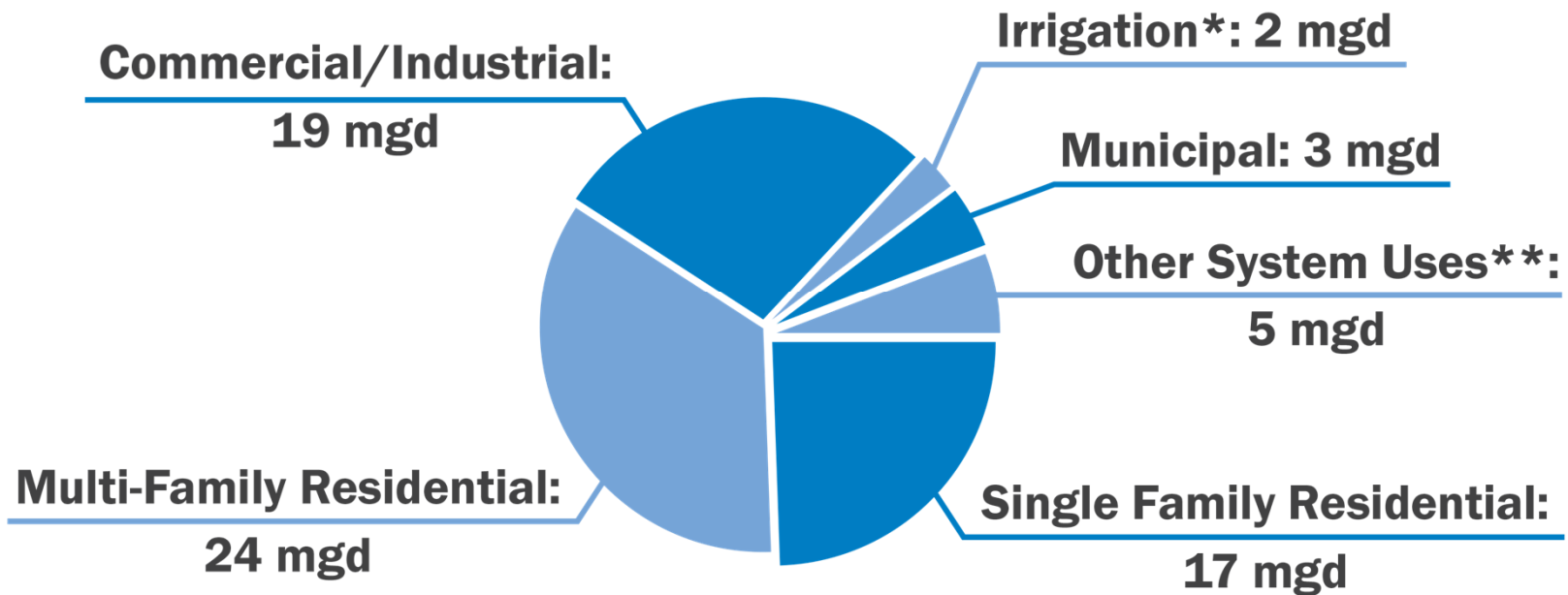


Conservation Program: Reducing Demand for Water

- Long term water savings
- Requires fixture replacements
- Codes & Mandates
- Financial incentives and technical assistance enable water savings sooner



San Francisco Water Use by Sector



SF Water Efficient Fixture Requirements

- Showerheads 1.5 gpm
- Faucet aerators (0.5 gpm-2.2 gpm)
- Toilet 1.28 gallon per flush (43 L)
- Clothes washers less than 20 gallons (<76 L)



Rebates for Efficient Fixtures

Rebates for Qualifying High Efficiency Fixtures:

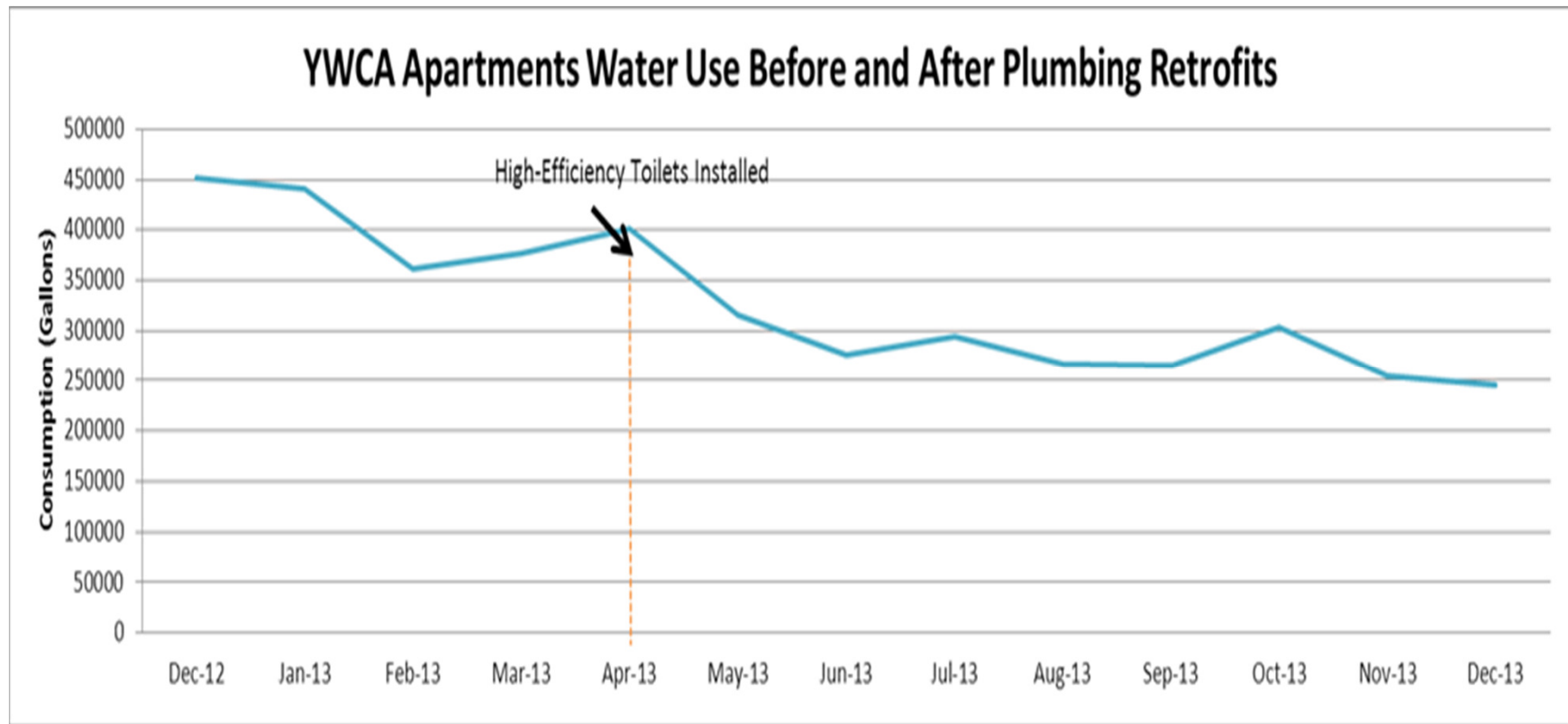
- Toilets: up to \$125 tank & up to \$500 for flushometer
- Urinals: up to \$300
- Clothes washers: up to \$200 residential, \$500 commercial coin-op
- Commercial equipment retrofits





Example of Customer Water Savings from Conservation

- 97-unit YWCA housing facility reduced monthly water use average of 35% since replacing 101 toilets and all showerheads and aerators through SFPUC assistance

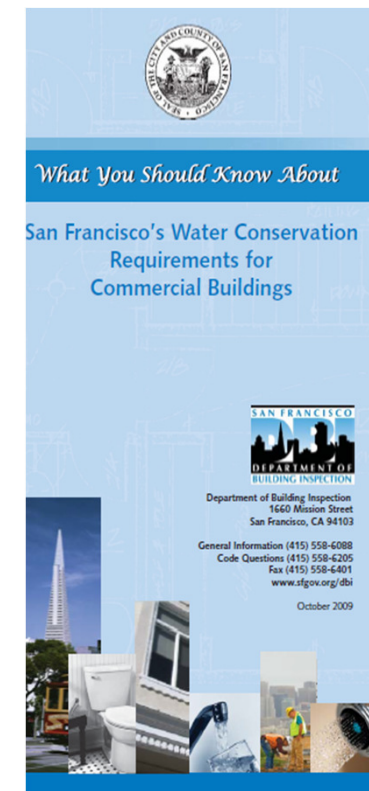
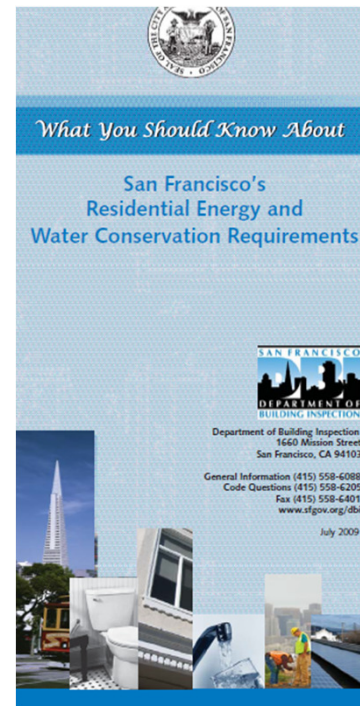


Residential & Commercial Water Conservation Ordinances

Replace old, non-compliant fixtures with water-efficient models and requirement to fix leaks

Residential ordinance is triggered upon resale of property

Commercial ordinance requires compliance in buildings by 2017



Requirements for properties with new or modified landscape of 1,000 square feet or more:

- Efficient irrigation systems
- Low water-use plants
- Site-specific water budgets

Applies to Residential, Commercial, and Public Agency properties





Grants for Large Commercial and Irrigation Customers

- Indoor equipment rebates
 - Ice machines, food steamers, laundry retrofits, cooling tower pH controllers, custom projects
- Large landscape and community garden grants



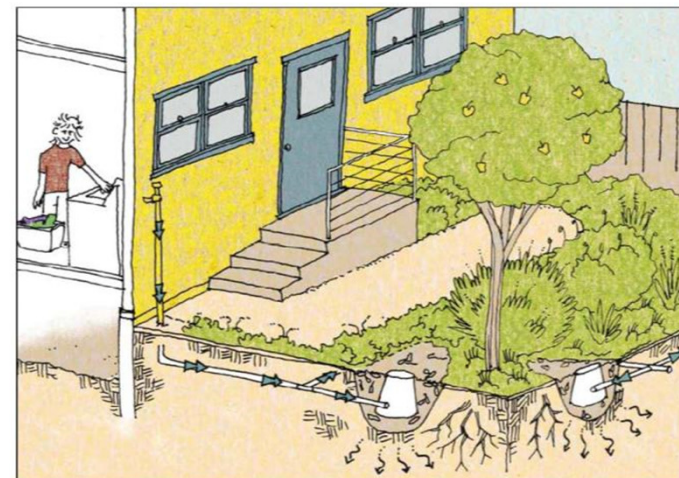
SFPUC Indoor Conservation Assistance

- Free Water-Wise Evaluations for residents and businesses
- Educational materials
- Free water-efficient plumbing devices:
 - Showerheads
 - Kitchen faucet and bathroom aerators
 - Garden spray nozzles
 - Restaurant pre-rinse spray valve
 - Toilet leak detection tablets and repair kits



SFPUC Outdoor Conservation Assistance

- Free landscape and irrigation outdoor evaluations
- Free gardening classes and handbooks
- Residential graywater program for outdoor irrigation
- Residential rain barrels and cisterns program in 2015



2013-2014 Conservation Program Achievements

- Provided over 7,500 rebates for toilets, urinals and clothes washers
- Distributed more than 27,000 plumbing devices
- Completed over 4,000 Water-Wise Evaluations



Conservation Program Annual Budget

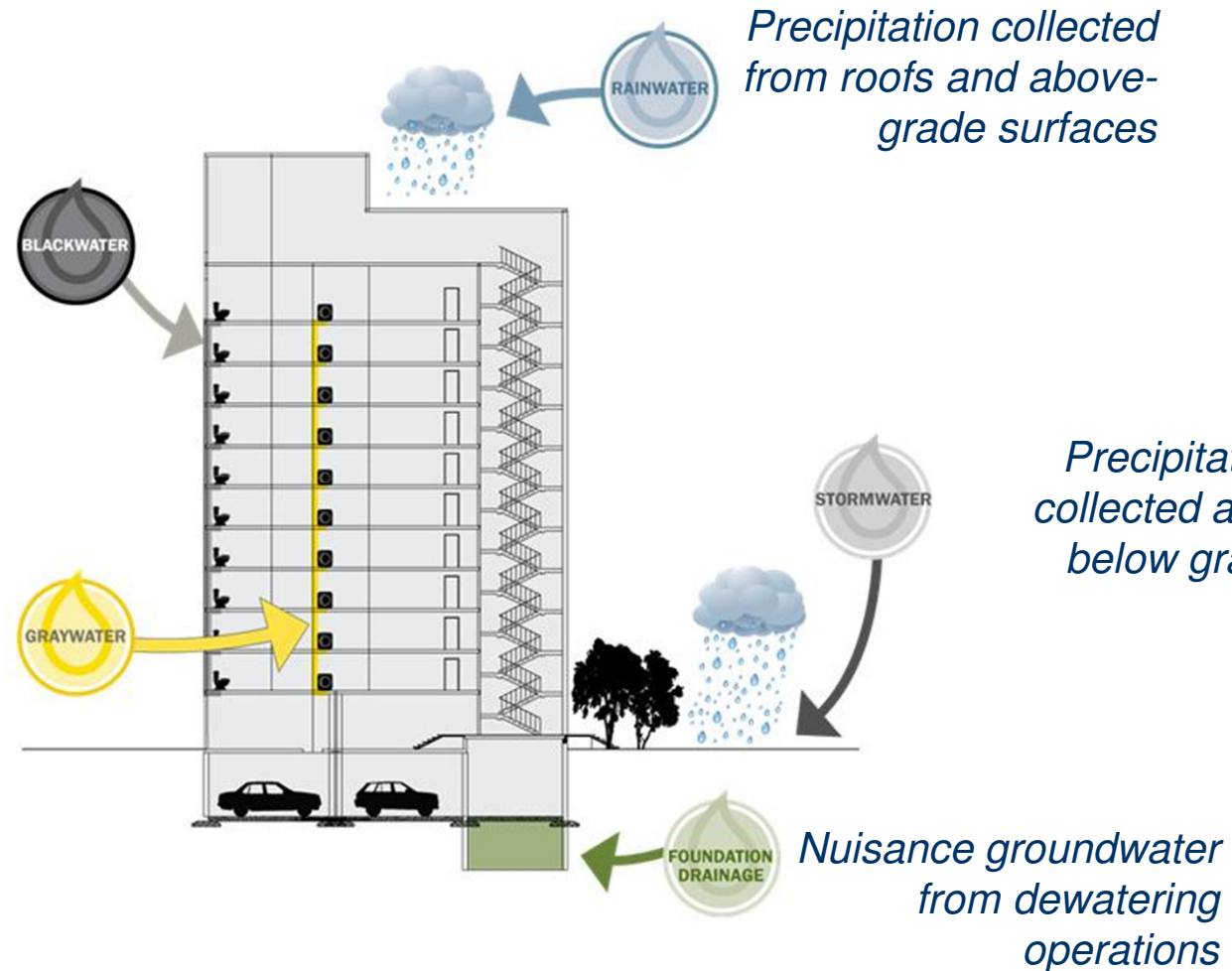


- 15 Conservation staff
- \$6.2 M annual operating budget
- Average \$2 M rebates per year
- Average \$3 M grant program per year

Alternate Water Sources for Non-potable Applications

Wastewater from toilets, dishwashers, kitchen sinks, and utility sinks

Wastewater from clothes washers, bathtubs, showers, and bathroom sinks





San Francisco
Water
Power
Sewer

SFPUC Incorporates Onsite Water Systems



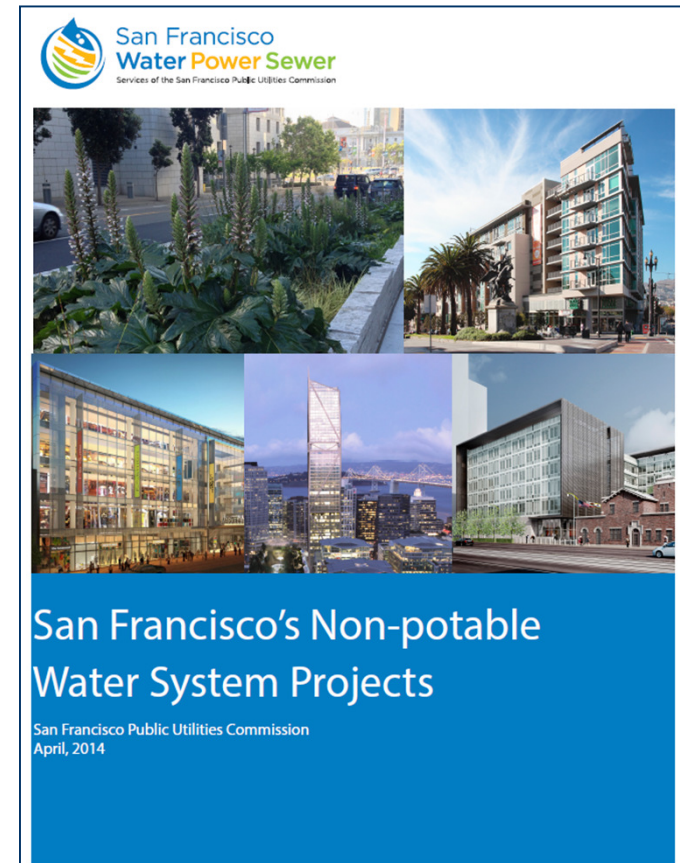
30 Buildings Collecting or Proposing to Install Onsite Water Systems





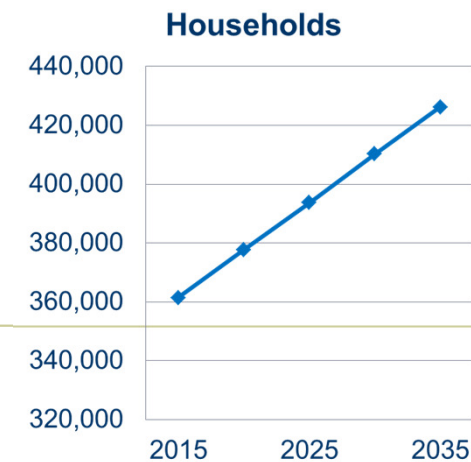
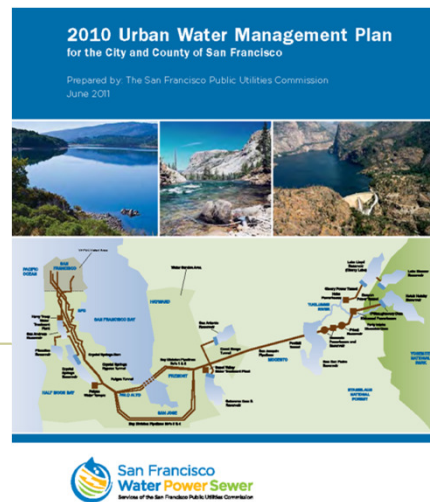
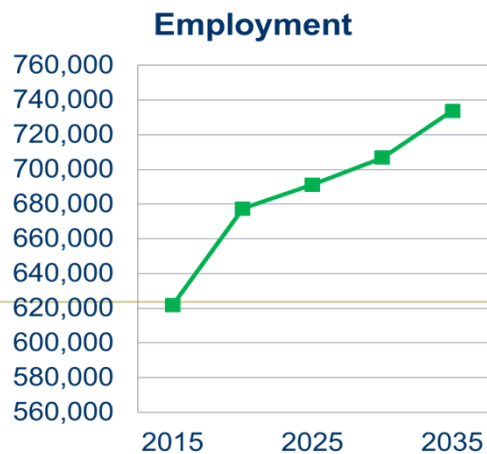
Building and District Scale Onsite Water Systems Grant Program

- Grant Program:
 - \$250,000 for individual building
 - \$500,000 for district scale system



Long Term Water Supply Planning

- Urban Water Management Plans (required by State of California) every 5 years
- Assures water suppliers plan for long-term reliability and conservation to meet existing and future demands



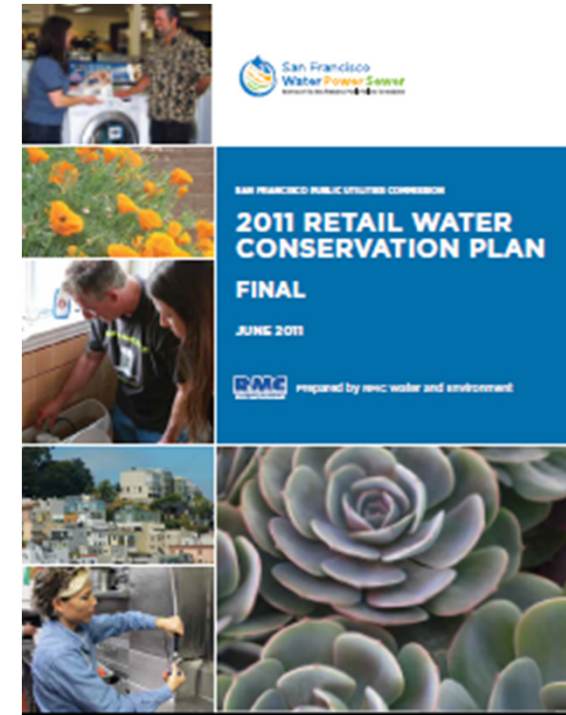
Water Shortage Allocation Plan

- Annual Evaluation Process
 - *Stored water & estimated purchases determines reductions, if any*
- *Water Shortage Allocation Plan* provides specific allocations to retail and wholesale



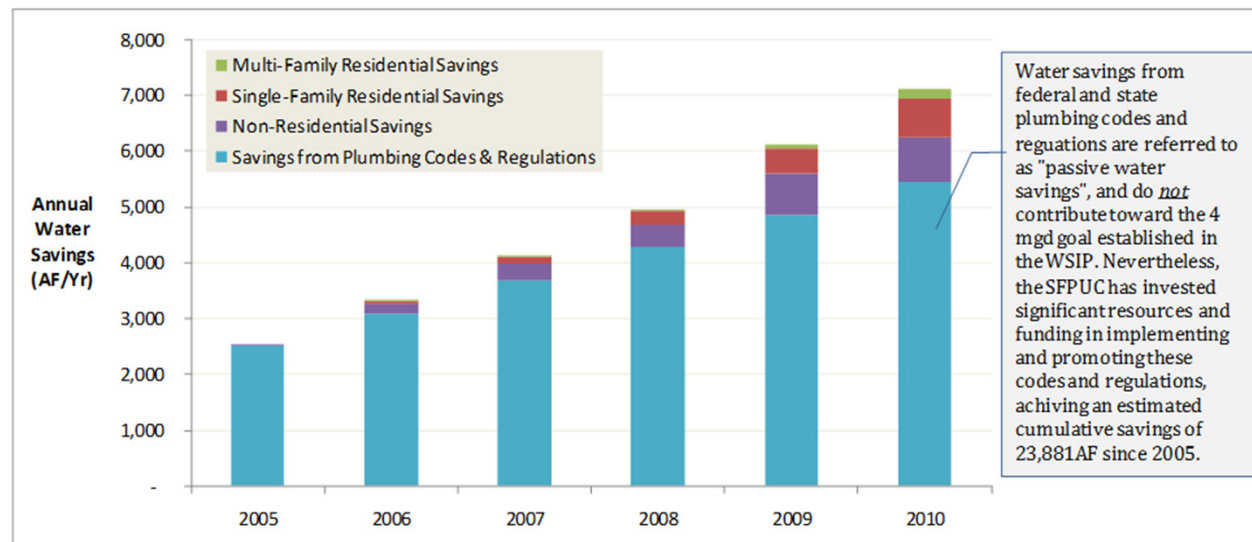
Conservation Plan Every 5 Years

- Identify most feasible and effective conservation measures
- Quantify water savings and costs
- Select most ambitious program for implementation
- Guide conservation program implementation

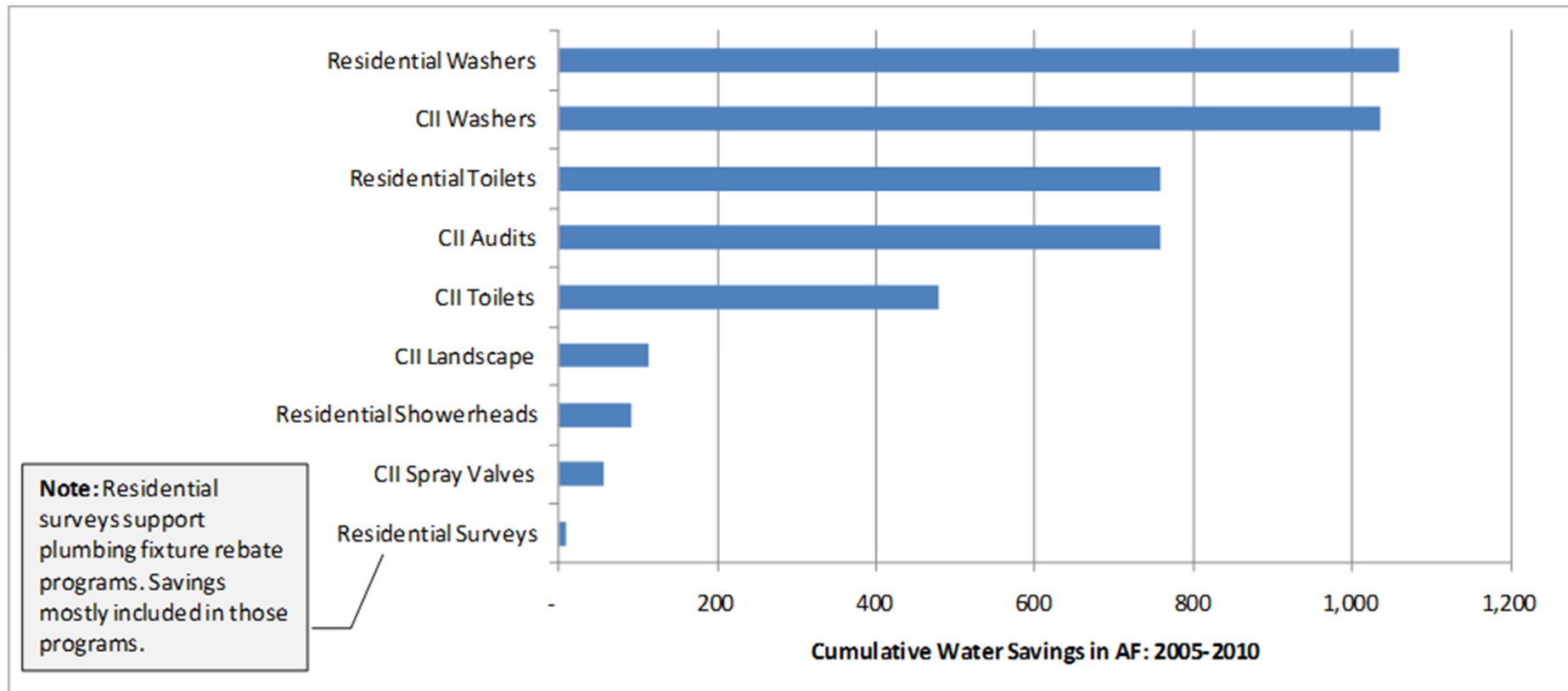


End Use Conservation Model

- Forecast In-City Retail Water Demand 2015-2035 with and without Conservation Measures
- Forecast Water Savings & Costs (by measure and customer class)
- Estimate water savings from codes/ordinances as well as historical program production

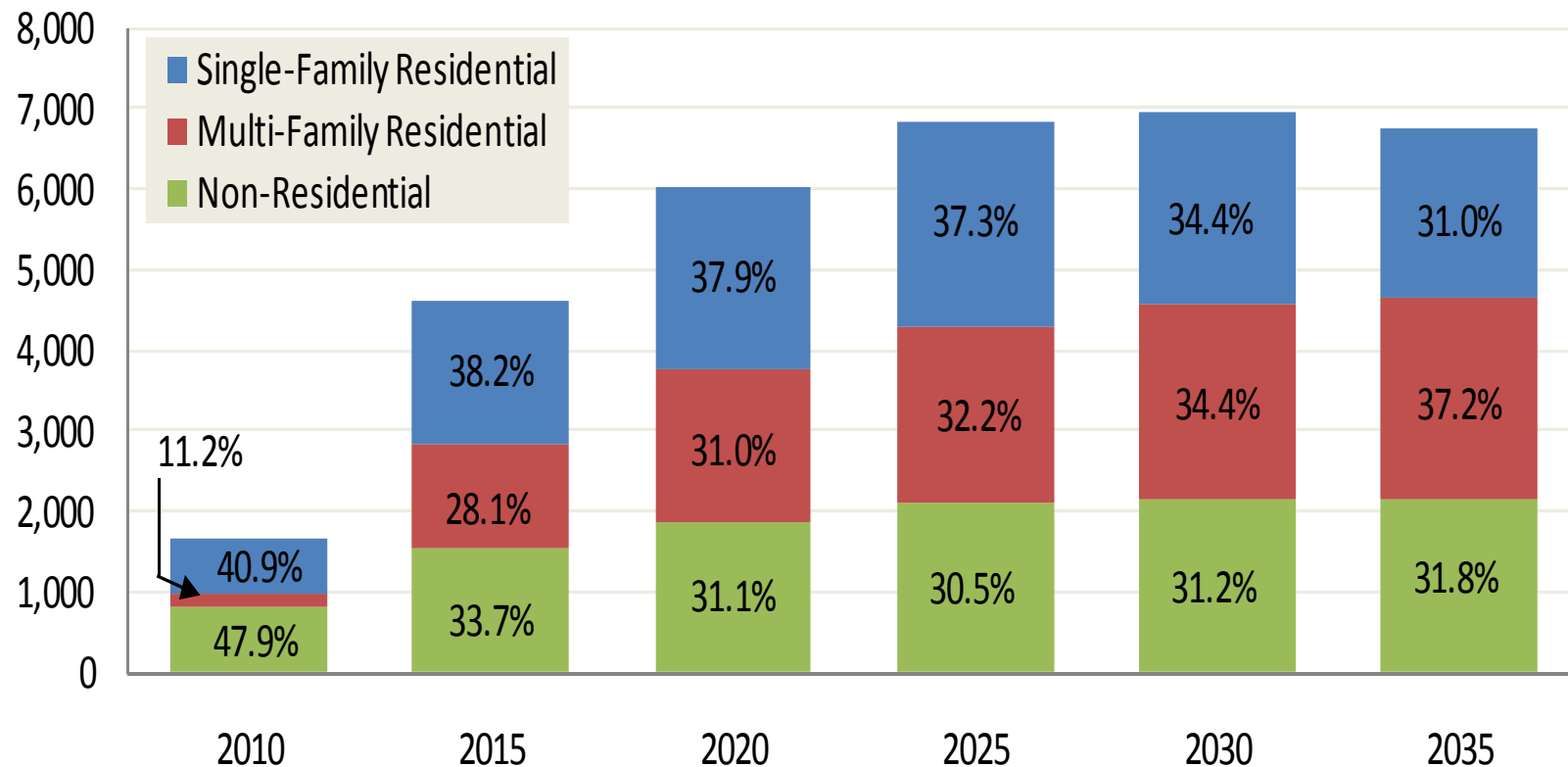


Major Water Savings Attributed to Clothes Washers & Toilets



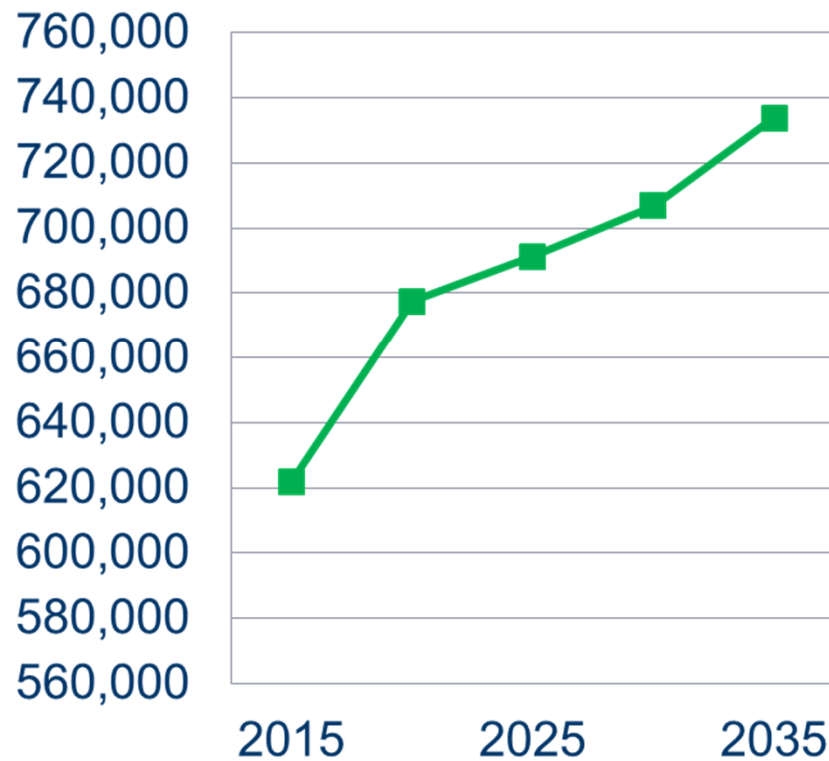
Projected Water Savings by Customer Sector

Water Savings (AF)

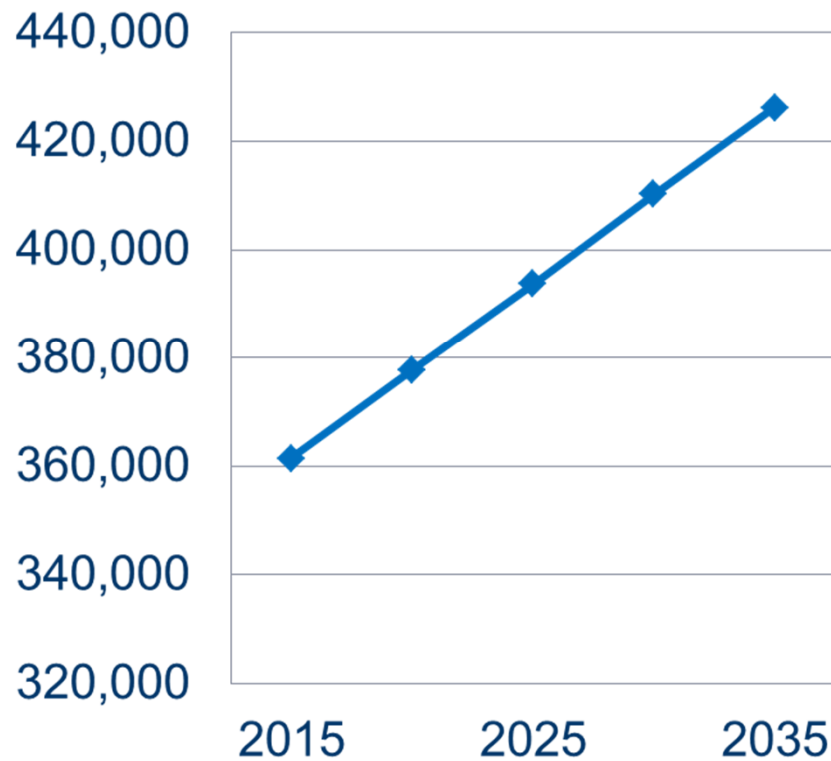


Future San Francisco Projections

Employment



Households

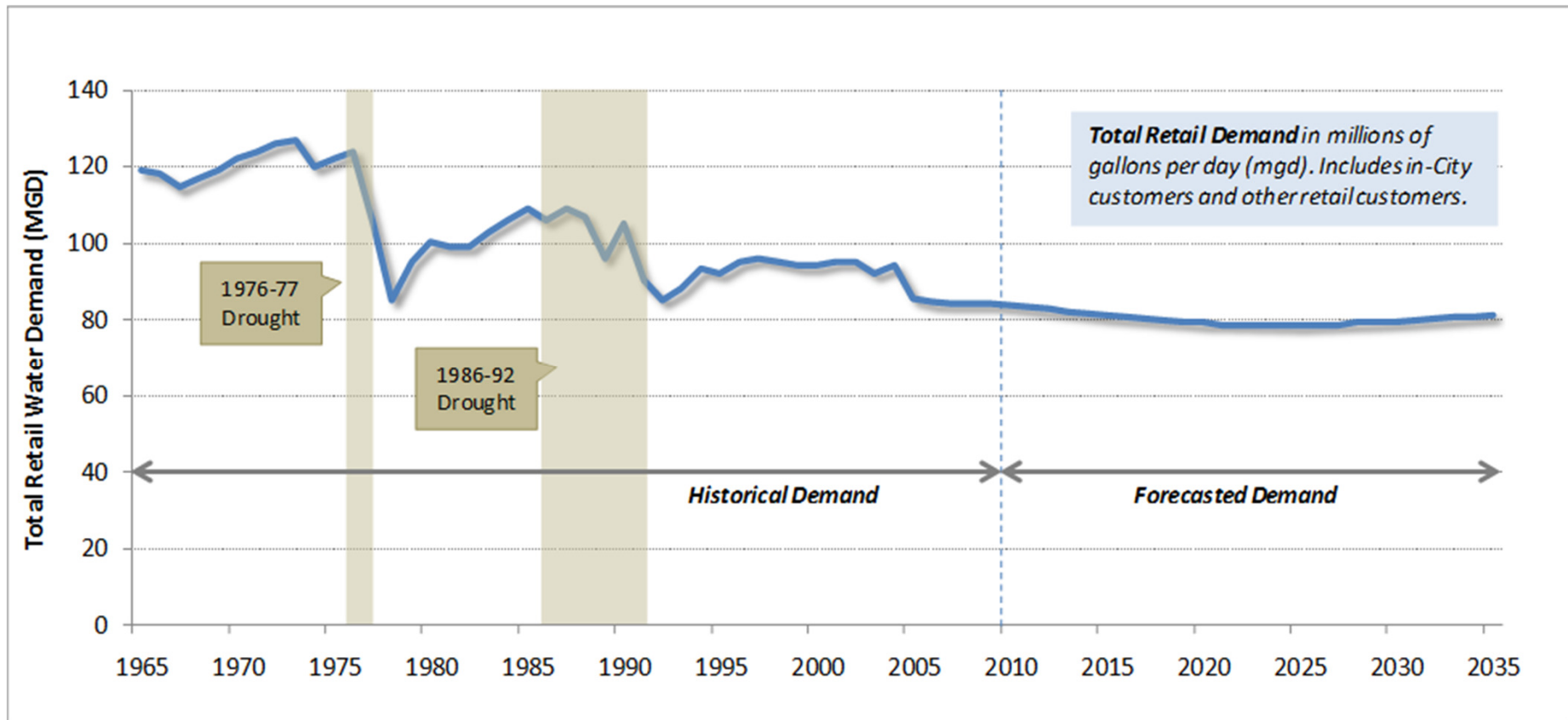




Conservation Reduces Demand Despite Population Increases



Retail Customer Water Trends



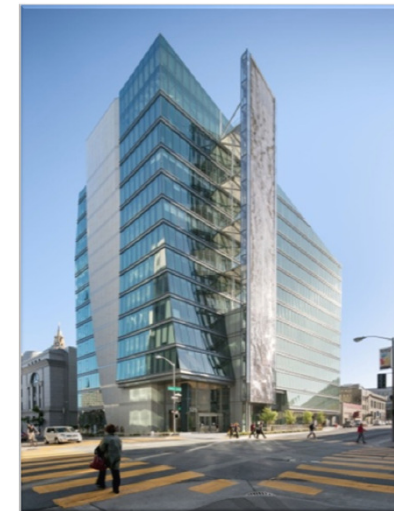


City of San Francisco Leak Inspection Program

- Continuously enhancing practices to identify leaks and reduce unaccounted for water
- Unaccounted for Water Study to identify and quantify water losses: less than 9% of total in-City demand (7% from unbilled authorized and unauthorized consumption, 2% from meter under-registration)
- Recently installed Automated Water Meter Program (AWMP), for all of San Francisco's 178,000 retail water meters with wireless advanced metering technology

Developing New Local Water Supplies

- **Groundwater:** pump water for potable purposes during normal and drought years
- **Recycled Water:** produce recycled water for irrigation and toilet flushing
- **Non-potable Program:** treat water onsite for non-potable applications



San Francisco's Strong Partnership with Water

- Conservation for the past 20 years has helped limit the amount of rationing
- Conservation helps with future demands for water
- Need to diversify portfolio with “No Regrets” approach: recycled water, groundwater, onsite water systems
- Continued water supply planning
- Maintain public support for water projects



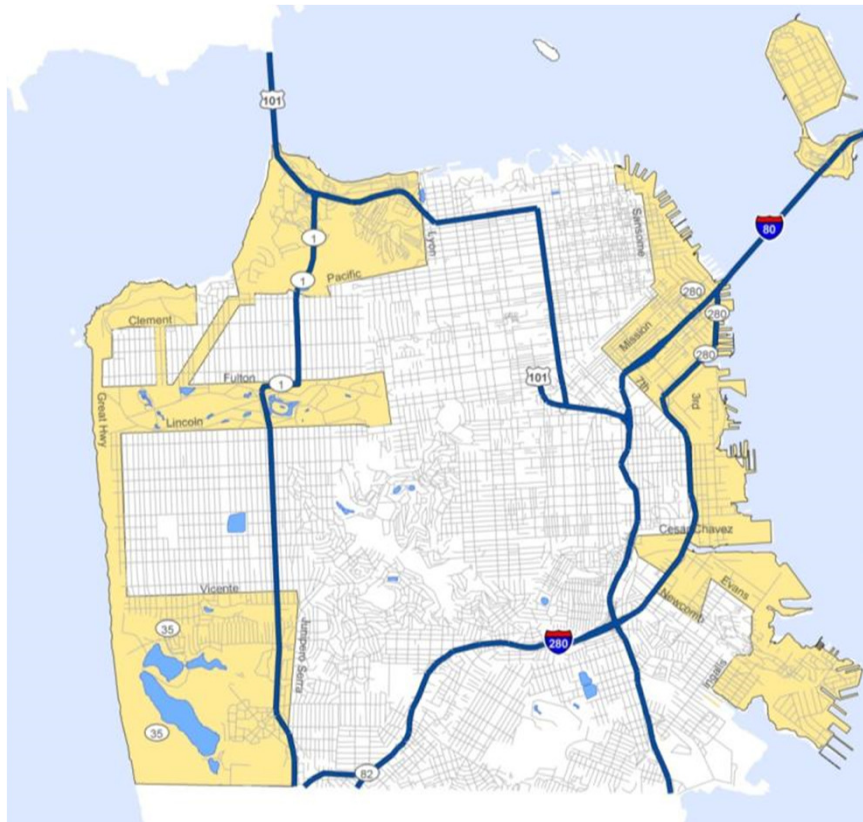
Thank You

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BACKUP SLIDES

San Francisco's Recycled Water Ordinance



- Over 40,000 square feet (3,716 m²) new or remodeled building must install dual plumbing
- Over 10,000 square feet (920 m²) irrigated landscape must plumb for recycled water



San Francisco Water Shortage Allocation Plan

- Drought Response Plan
 - Declare a water shortage (process and declaration)
 - Allocation method and process (process of allocating water, appeal process, and enforcement)
- Public meeting to adopt Drought Response Plan
- 3 drought stages for San Francisco



Drought Stages of Action for San Francisco- Stage 1

- Stage 1: Voluntary
 - Trigger point for water system shortage: 10-20%
 - Target Water Use Reduction: 5-10% rationing
 - Actions: voluntary rationing, customers alerted to water supply conditions, reminder of water use prohibitions
 - Education on conservation programs



Drought Stages of Action for San Francisco- Stage 2

- Stage 2: Mandatory
 - Trigger point for water system shortage: 21-50%
 - Target Water Use Reduction: 11-20% rationing
 - Actions: All Stage 1 actions implemented, all customers receive an “allotment” of water (water use from previous year)
 - Actions: water use above “allocation” level will be subject to excess use charges, installation of flow restrictor devices and shut-off water



Drought Stages of Action for San Francisco- Stage 3

- Stage 3: Mandatory
 - Trigger point for water system shortage: >50%
 - Target Water Use Reduction: >20% rationing
 - Same actions as in Stage 2 with further reduced allocations

Ordinance Leads to Design Change

- Use of Native and Drought-Tolerant Plants and No-Mow Grass, and Explore Permeable Paving
- Landscape medians with drought-tolerant plants

