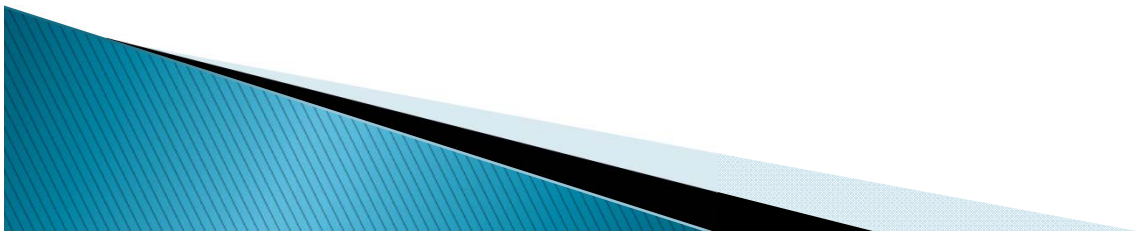
Overview of Executive Order Directive #2

EO B-37-16 Target Framework Workshop
East Bay Municipal utility District
September 6th, 2015

Erik Ekdahl
Office of Research, Planning and Performance
State Water Resources Control Board

Overview

- Welcome & Introductions
- Agenda
- Purpose and goals of today's meeting
- Review of Executive Order Directive #2



Executive Order Directive #2

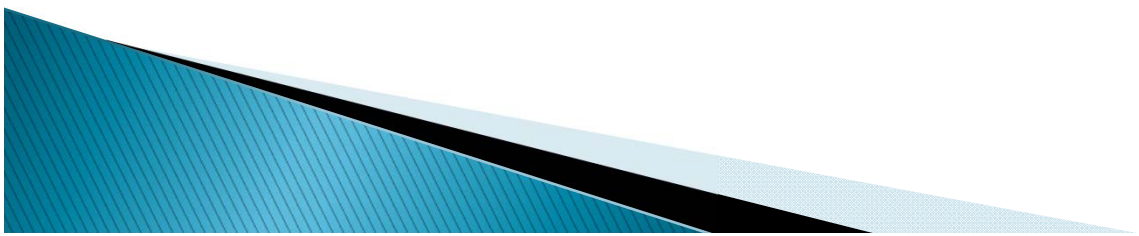
- DWR shall work with the Water Board to develop new water use targets as part of a permanent framework for urban water agencies
- These new water use targets shall build upon the existing state law requirements that the state achieve a 20% reduction in urban water usage by 2020.

Executive Order Directive #2

- These water use targets shall be customized to the unique conditions of each water agency, shall generate more statewide water conservation than existing requirements
- [Targets] shall be based on strengthened standards for:
  - Indoor residential per capita water use
  - Outdoor irrigation, in a manner that incorporates landscape area, local climate, and satellite imagery data
  - Commercial, industrial, and institutional (CII) water use
  - Water lost through leaks

Terminology

- Standard
  - A metric used to indicate a level of water-use efficiency
  - Example: GPCD, evapotranspiration adjustment factor
- Budget
  - The volume (or GPCD) calculated by setting a standard
  - Example: the indoor residential budget = standard x pop. x days/year
- Target
  - The sum of each budget volume/GPCD
  - Unique to each supplier



Water Budgets 101

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Peter Brostrom
Water Use Efficiency Program Manager
California Department of Water Resources

Why a Water Budget Approach?

- Accounts for landscape area and climate (Eto)
- Customized target for each supplier
- Builds upon existing requirements
- Takes into account previous water use efficiency efforts- does not require a baseline.

Definition:

- Water Budgets: tool to quantify or estimate efficient water use.

- Can be implemented at a variety of scales:
  - Parcel
  - Household
  - Business
  - Service area

EO B-37-16 Action #2

- Directs State agencies to establish a long term framework for new water use targets based on water budgets calculated from standards for 4 sectors
  - Indoor residential
  - Outdoor residential
  - CII
  - Distribution System Loss

Indoor Residential Budget

- Indoor residential standard
  - Expressed in gallon per capita per day (GPCD)

(Pop.) x (GPCD) x (365 days/year) = volume

Example: $1000_{(pop)}$ x55GPCD x$365_{(days)}$ = 26,838 CCF

-CCF =Hundred Cubic Feet

Outdoor Water Use Budget

(ETAF) x (Landscape Area) X (ETo)= volume

ETAF is the Evapotranspiration Adjustment Factor

- = landscape plant factor/Irrigation Efficiency
- Used to quantify the type of planting and the level of water use in a landscape

Model Water Efficient Landscape Ordinance(MWELO) uses ETAF to establish water budgets for new landscapes

Landscape Ordinance 1993

1993-Set ETAF based on a landscape with
- 1/3 high water use plants
- 1/3 medium
- 1/3 low

- Average plant factor = 0.5
- Irrigation efficiency = 0.625

ETAF =plant factor/Irrigation efficiency =0.8

New landscapes starting in 1993 designed/install to use 80% of Eto.

Example: ETo =50 inches Water budget = (50) x 0.8= 40 inches

Landscape Ordinance 2015

MWELO revised in 2015:

- Landscape plant factor lowered to 0.425
  - Assumes area with:
    - 25% high water use plants
    - 25% medium
    - 50% low
- Two irrigation efficiency standards established
  - 0.81 for drip/micro irrigation
  - 0.75 for sprinkler
- New ETAF
  - 0.55 for residential
  - 0.45 for commercial

Example: ETo=50” Res. Budget=27.5

Supplier Service Area Outdoor Water Budget

- Sum of outdoor water budgets for individual parcels
- Account for different ETo's and ETAF's
- ETAF's
  - Pre 2010 landscapes 0.8
  - 2010 to 2015 0.7
  - Post 2015 0.55 Residential
    0.45 Commercial
  - Special Landscapes 1.0

Example: Single Family Residential Parcels

Parcels	ETo (in)	ETAF (in)	Landscape Area (Sq. ft.)	Volume (CCF)
100	45	0.8	200,000	600,000
30	45	0.7	45,000	118,125
10	45	0.55	20,000	41,250
Total				759,375

Commercial, Industrial and Institutional (CII) Sector Budgets

- Difficult to establish water budgets due to the wide range of water use.
- SB X7-7 Method 2 standard was a 10 % reduction from the SB X7-7 baseline
- Considering 3 different approaches/options that will be discussed this afternoon

Distribution System Loss

- State Board required to establish a threshold for water loss in 2019.

Example calculation:

(30 gallons/day/con.) x (# of con.) x 365 days/year=volume

Water Use Target Calculation

Targets calculated by adding the volume or GPCD from the 4 sector budgets

Indoor Residential	4,570,744	55
Outdoor Landscape	3,729,166	44
CII	1,025,401	12
Water Loss	530,560	7
Target	9,855,871(CCF)	118 (GPCD)

Suppliers comply only with the water use target, the sector budgets are used only to calculate the target.

Initial Proposed Timeframe

- 2025 suppliers document compliance with water use targets
  - 2021-2024- annual reporting on progress towards water use targets

Questions?

- Contact:
- Peter.Brostrom@water.ca.gov
- (916) 651 7034

Projected Impact of Plumbing Codes and Appliance Standards on M&I Water Use

Water Conservation Executive Order B-37-16

Long Term Water Use Targets Workshop

September 6, 2016

Project Objectives

- Forecast impact of plumbing codes/appliance standards on M&I Water Use
- Impacts expressed in terms of:
  - Fixture saturation/average efficiency
  - Change in total M&I water use
  - Change in M&I GPCD
  - Change in R-GPCD
- Assess regional variability

Model Overview

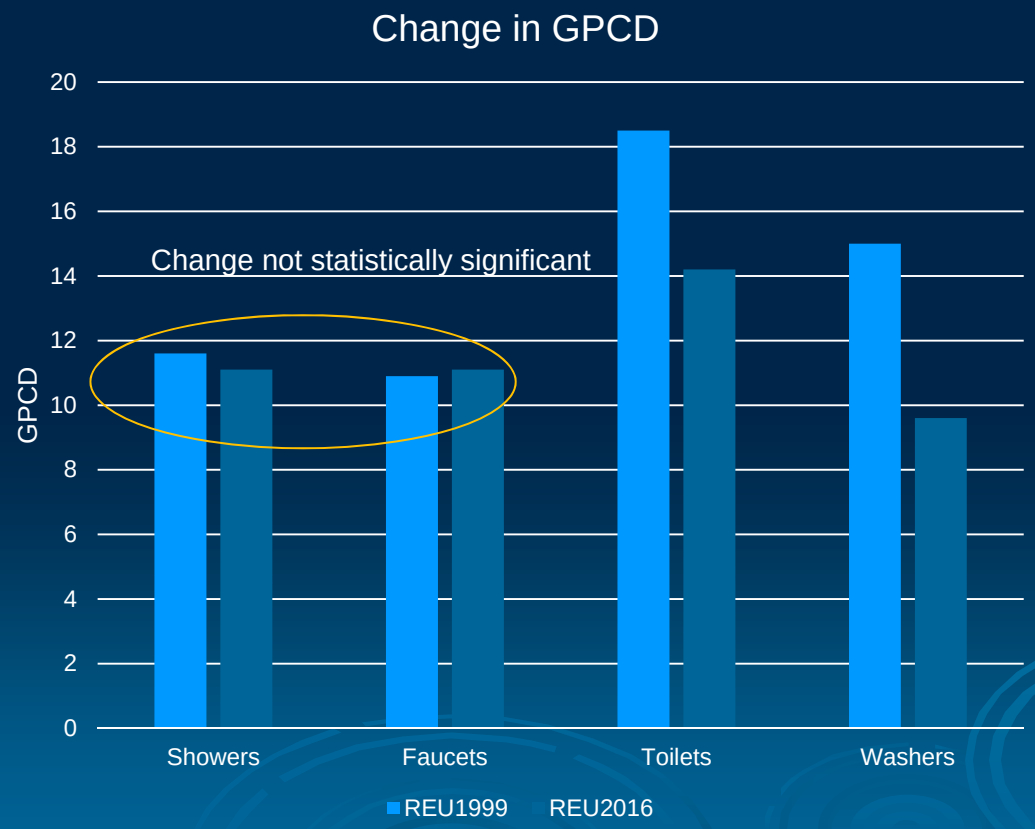
- Dynamic inventory growth and replacement models
- Based on AWE Tracking Tool
- County-level models (58 total)
- Annual time-step
  - Toilets & Urinals: 1990 – 2040
  - Clothes Washers: 2005 – 2040

Primary Data Sources

- DOF Population/Housing Estimates/Projections
- AHS Microsample Data
- WRF End Use Studies
- CUWCC CII Toilet Database
- CUWCC Urinal PBMP Study

Showerheads & Faucets

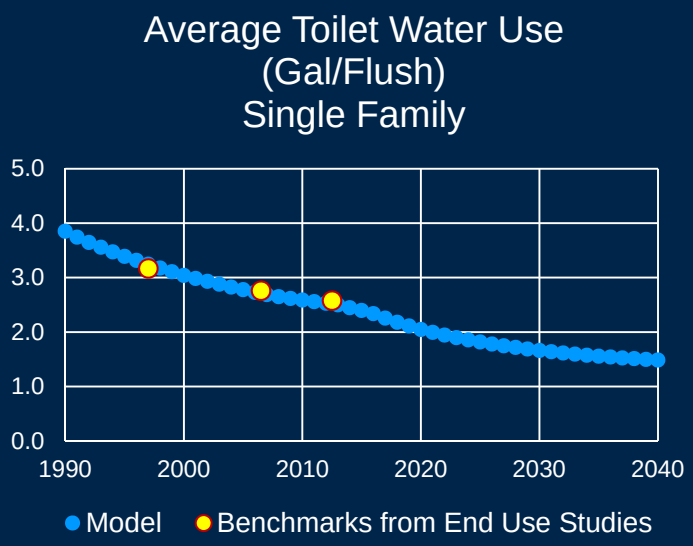
- Limited potential; Not modeled

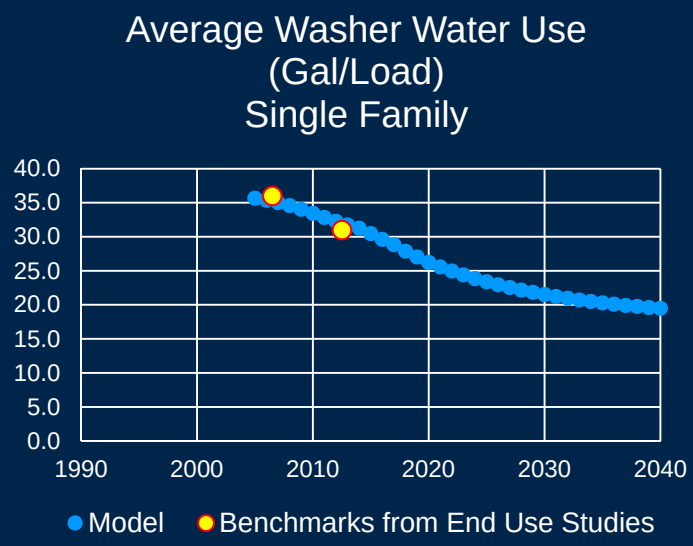


SB 407

- Has potential to accelerate replacement of non-compliant plumbing fixtures
- Three Scenarios Modeled
  - No Effect
  - Equivalent to Retrofit-on-Resale
  - Full Compliance

Model Benchmarks

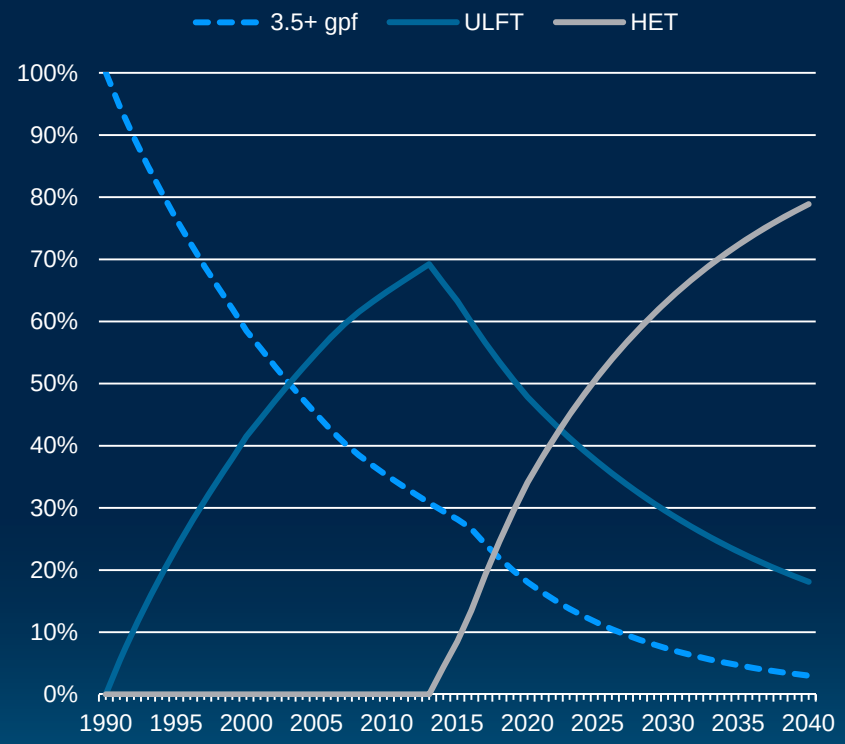




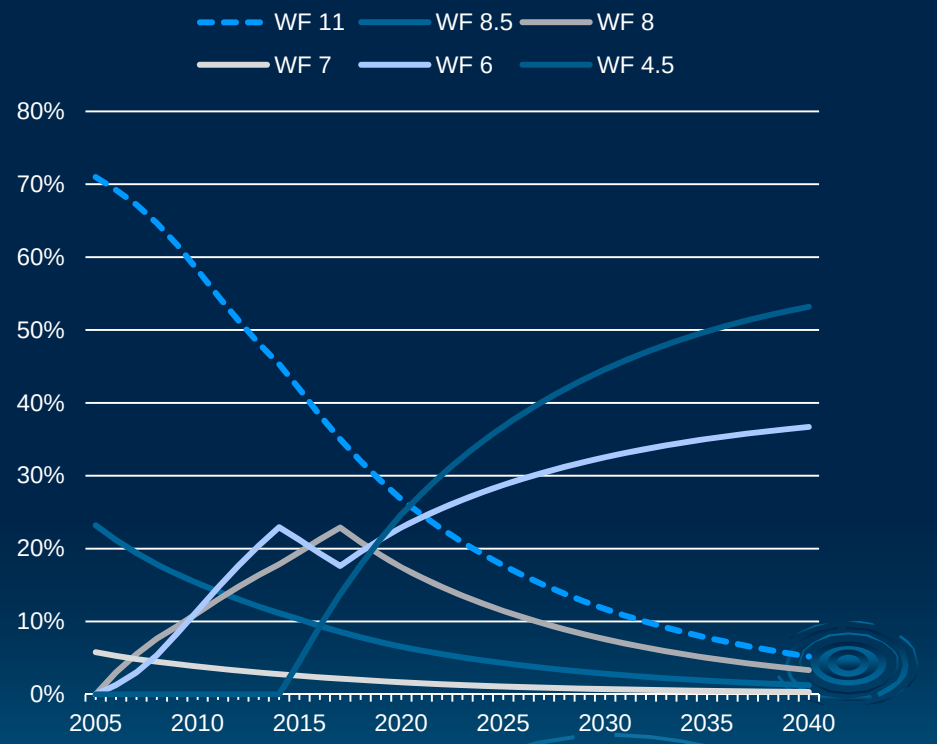
Model is +/- 2.5% of Toilet Use Benchmarks

Model is +/- 3.2% of Washer Use Benchma

Fixture Saturation



Residential Toilets



Residential Clothes Washers

Results: M&I Water Use

- Aggregate Savings: 465 to 538 TAF by 2040
- M&I GPCD Reduction: 9 to 10 GPCD by 2040
- 2/3 from toilets & urinals; 1/3 from clothes washers
- Savings by Sector:
  - Single-family (57%)
  - Multi-family (20%)
  - Non-residential (23%)

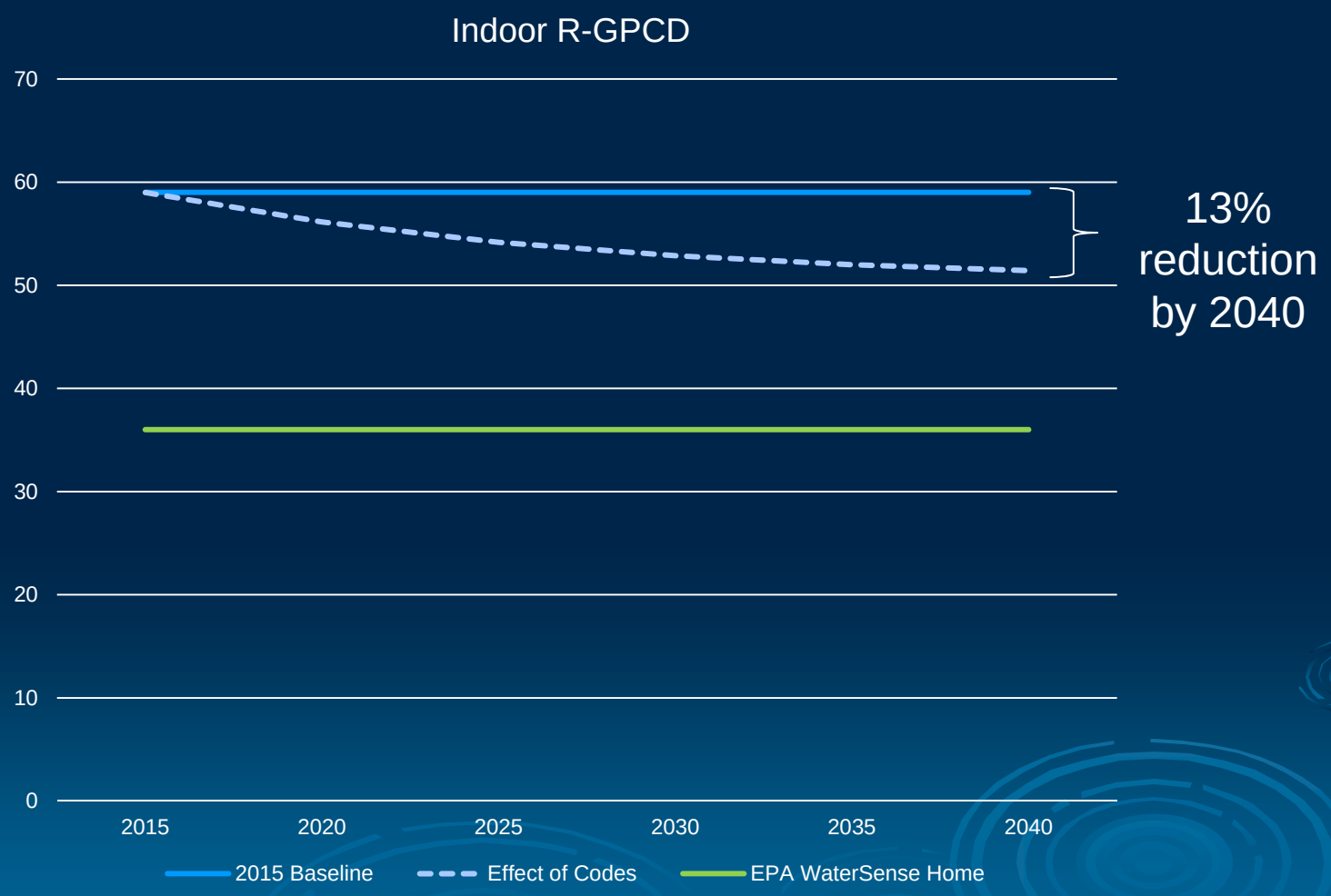
Results: R-GPCD

- Reduction in R-GPCD of 7 to 8 gallons by 2040

	R-GPCD Reduction Relative to 2015				
	2020	2025	2030	2035	2040
Statewide	2.9	4.8	6.1	7.0	7.6

* Based on SB 407 Scenario 2

Effect on Indoor R-GPCD



Regional Variation

Hydrologic Region	Number of Counties	Average R-GPCD Reduction	Standard Deviation	Minimum	Maximum
Central Coast	5	7.6	0.2	7.4	7.8
Colorado River	1	7.3	0.0	7.3	7.3
North Coast	6	7.6	0.1	7.5	7.8
North Lahontan	2	7.7	0.1	7.6	7.8
Sacramento River	16	7.5	0.3	6.7	7.9
San Francisco Bay	8	7.8	0.2	7.6	8.1
San Joaquin River	8	7.4	0.1	7.2	7.6
South Coast	6	7.4	0.2	7.0	7.7
South Lahontan	2	7.9	0.6	7.3	8.5
Tulare Lake	4	7.5	0.1	7.4	7.6
Statewide	58	7.6	0.3	6.7	8.5

Framework for Indoor Residential Standard

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Erik Ekdahl
Office of Research, Planning and Performance
State Water Resources Control Board

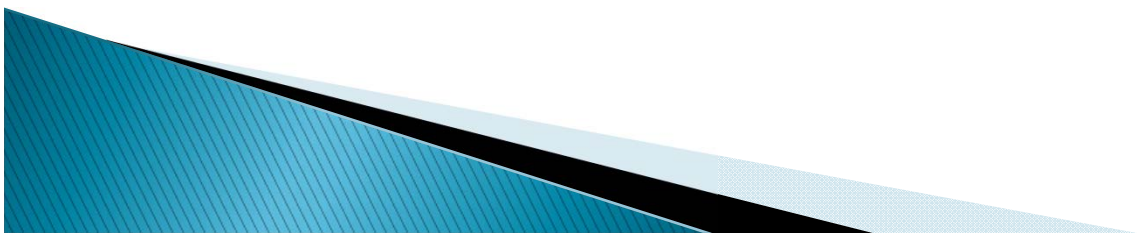
Review

- Single family and mixed residential indoor water use accounts for significant portion of state's overall water consumption.

- SBX7-7 Method 2: 55 gallons per capita per day (GPCD) by 2020

Proposed Formula

- Population x standard (GPCD) x days/year
- Resulting budget can be expressed as either a volume or GPCD

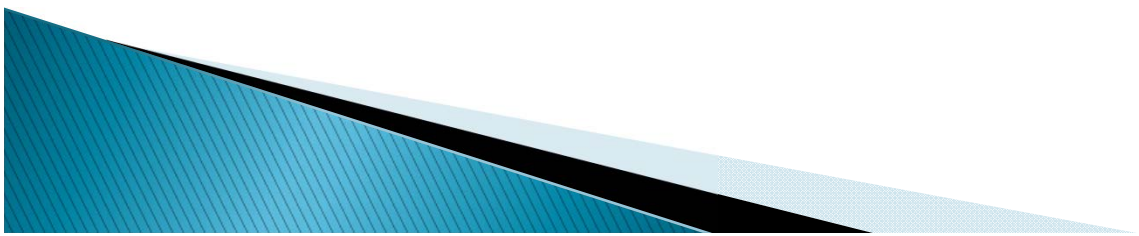


M3 Study

- Current statewide use: 59 GPCD (M-cubed)
  - Additional studies will help confirm current indoor use
- Plumbing codes and appliance upgrades will further lower indoor water use through 2040
- Residential
  - Will decrease by 6.1 GPCD by 2030
  - Will decrease by 7.5 GPCD by 2040

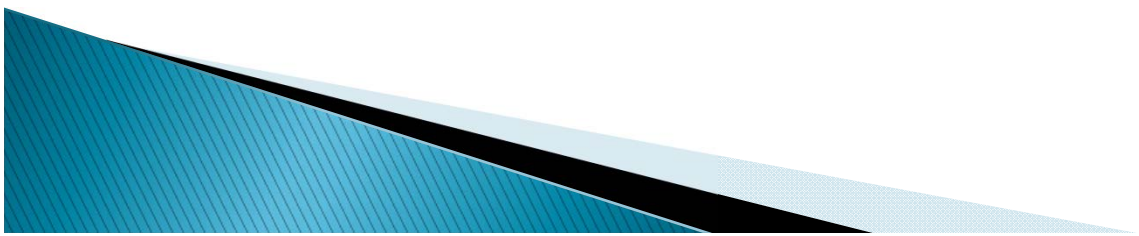
Proposed Standard

- SB7-7 set existing standard as 55 GPCD
- Propose standard:
  - 55 GPCD in 2021
  - Revise downward based on additional studies
- State will reevaluate in 2025 to reassess 2030 standard



Seeking Feedback

- How to build upon existing state law?
  - Should the state seek additional efficiency from the indoor standard?
  - For example, set 2030 standards higher than projected trajectory (business as usual) model results?
  - If so, what should state aim for, and by when?



Framework for Outdoor Landscapes

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Peter Brostrom
Water Use Efficiency Program Manager
California Department of Water Resources

Review

- (ETAF) x (ETo) x (Landscape Area) =volume
- SBx7-7 Method 2 outdoor landscape calculated using residential and dedicated irrigation landscape using the ETAF based on the year the property was developed.
- 3 suppliers are currently using Method 2

Outdoor Landscape Area Measurement

- Few agencies had the landscape area data in 2010 to select target method 2
- New remote sensing technologies have made landscape area measurement more feasible
- Close to 100 agencies now have landscape data
- The State's FY 16-17 Budget appropriated funds to measure urban landscape area across the entire state
- Plan to conduct a 30 agency pilot this fall, followed by a statewide program

Setting Landscape Standards

- Outdoor standard will start with existing SBx7-7 outdoor standard using the MWELO ETAF that was in place when the property was developed:

pre 2010	0.8
2010 to 2015	0.7
2016 to present	0.55 residential
	0.45 commercial
Special Landscape	1.0

Future Standards

- EO directs that the water savings from the new targets exceed SB x7-7
- Will evaluate data from the pilot program and from agencies who have the data to consider how much to lower the outdoor standard in the future.

Other Considerations: Irrigated vs. Irrigable

Lower income community. Red outlines show landscapes that are not being irrigated.

Other Considerations cont.

- Which Landscapes should be included in the landscape budget?
  - Residential
  - Dedicated Irrigation
  - CII mixed meters
  - Recycled water

Other considerations cont.

- Depending on which sectors are included as part of the landscape budget, suppliers may need to clearly identify how CII landscapes are being irrigated.
  - Separate areas irrigated through the following accounts:
    - CII mixed meters
    - Dedicated irrigation
    - Recycled water
    - Raw water deliveries

Questions?/ Comments

Contact:
Peter.Brostrom@water.ca.gov
(916) 651 7034

Framework for Water Loss Control Actions and Standards

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Max Gomberg
Climate and Conservation Manager
State Water Resources Control Board

Multi-Agency Effort to Reduce Leaks

- State Water Board, Public Utilities Commission, and Department of Water Resources to fund, assist, and direct leak detection and repair actions
  - Use Drinking Water State Revolving Loan Fund (DWSRF)
  - Accelerate data collection
  - Accelerate system management and infrastructure replacement
- Energy Commission to certify innovative water loss detection and control technologies

Financial Assistance

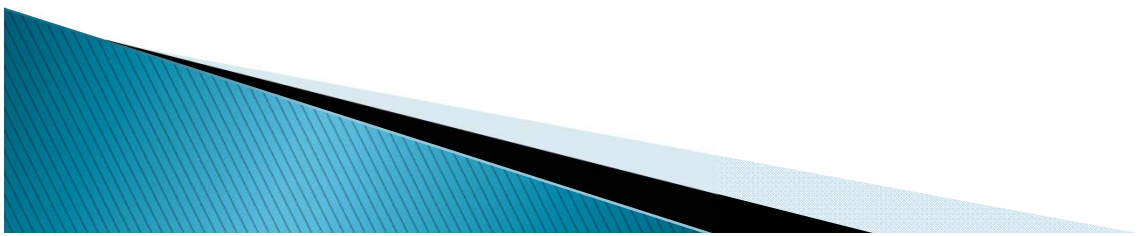
- $3.2 million from DWSRF to American Water Works Association for water loss data collection and auditing assistance
- Prioritize subsequent DWSRF funds for smaller systems with high loss volumes?
- Energy Efficiency funds available for water loss reduction projects with demonstrable energy savings

Energy Commission Proceeding

- Workshops will be scheduled for DATE
- Technical questions should be directed to Leah Mohney, at (916) 653-5851or Leah.Mohney@energy.ca.gov
- Should the state provide a list of available water loss detection and control technologies along with their cost?

Options for Acceleration of Data Collection

- Require large water suppliers to conduct component analysis to identify cost-effective water loss detection and control actions
  - CPUC to require specific water loss control investment budget proposals in General Rate Cases
- Prioritize DWSRF funding for smaller systems that voluntarily provide water loss data
- Require agricultural water suppliers to provide specific water loss assessment and reduction strategies in Agricultural Water Management Plans



Existing Requirements Under SB 555

- SB 555 applies only to urban water suppliers
- DWR currently developing rules for validations of water loss audits
- Annual water loss audit data submission to DWR beginning October 2017
- State Water Board rulemaking to set water loss standards to commence in 2019

Framework for Commercial, Industrial and Institutional Standards (CII)

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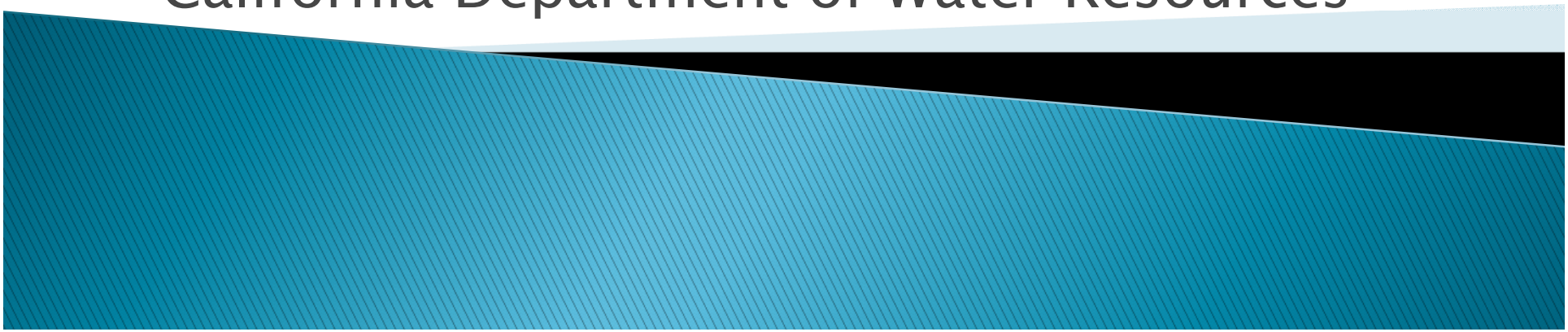
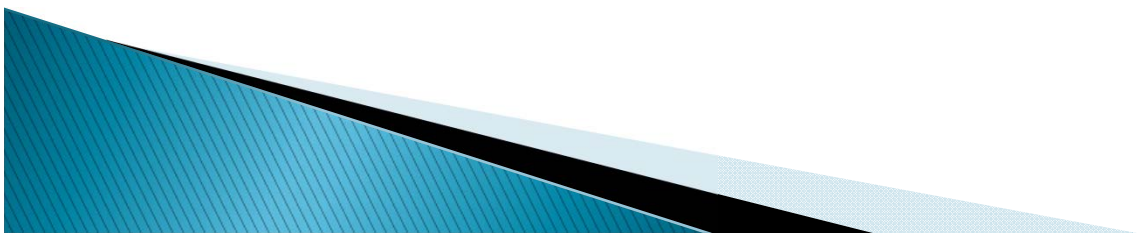


CII Water Budget Standard

- CII sector very diverse
  - EBMUD has 87 different classifications of CII water Use
  - Wide ranges of water use within classifications
  - Diversity and wide range of use makes it difficult to set CII standards or establish water budgets

CII Water Budget Approaches

1. Calculate a water budget based on total CII Water Use
2. Separate CII Indoor and Outdoor and develop a separate standard for CII Indoor
   (CII Indoor= Total CII – Outdoor CII Estimate)
3. Exclude CII water use from a volumetric water budget and instead require implementation of performance measures



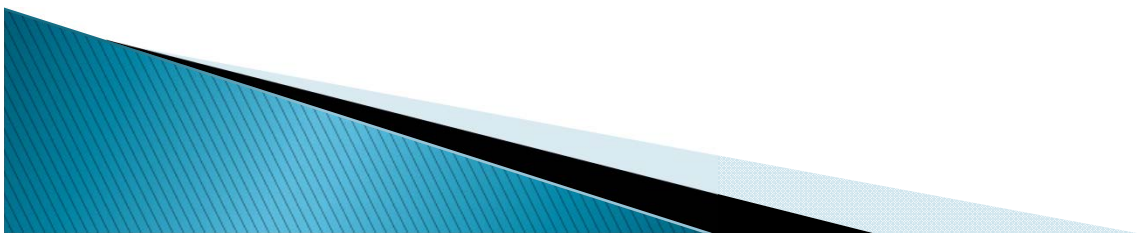
CII Approaches I and II

Considering two options for setting standards for the volumetric approach:

1. provisional standard

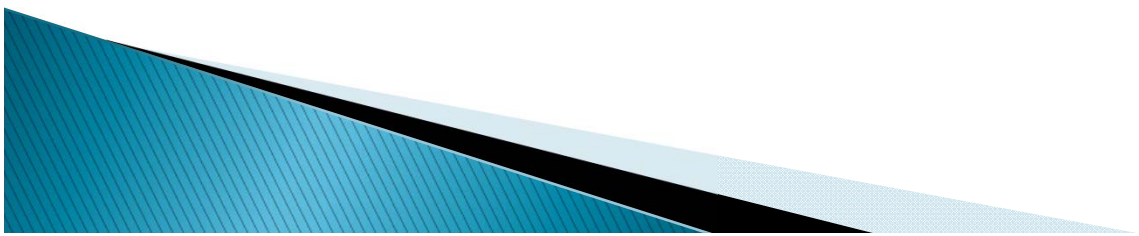
   Example: percentage reduction from a 2013 baseline

2. Develop a methodology by which a supplier could self-assess potential CII reductions and establish a CII standard unique to their service area



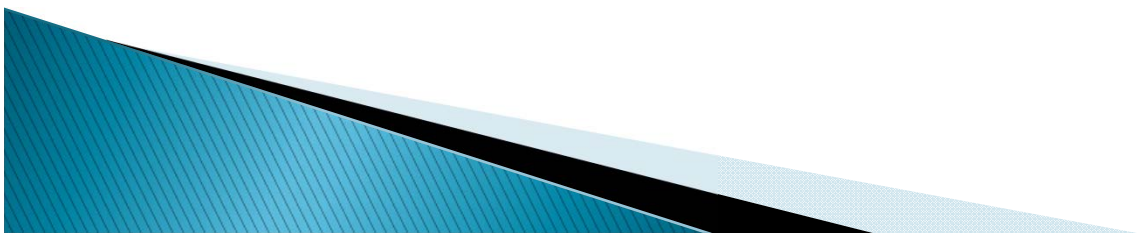
Performance Measure Approach

- Performance measures could include:
  - Classification of CII water use
  - Dedicated meters for landscapes over a certain size
  - Water audits and/or management plans for CII water users over a specified threshold



Feedback and Input

- Should CII water use be separated into outdoor and indoor components?
- Is it possible for water suppliers to develop a self assessed CII water budget standard?
- Can performance measures lead to water savings?
- Are there additional performance measures that should be considered?



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