

This presentation premiered at WaterSmart Innovations

watersmartinnovations.com



Beyond CalGREEN Water Efficiency Potential Over and Above Green Building Codes

Peter Mayer, P.E., WaterDM

Elizabeth Lovsted, P.E., Eastern Municipal Water District



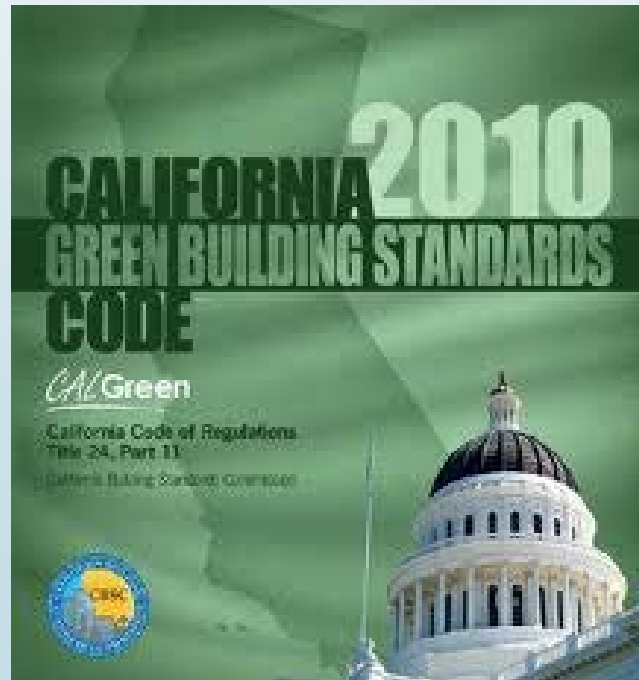
Project to Develop Water Efficient Guidelines for New Development

Grant funded project developed voluntary guidelines for new development in the Eastern Municipal Water District service area that, if implemented, could reduce overall water use in new residential and non-residential buildings beyond what is currently required by state and local codes and requirements (i.e. CALGreen)



What is CALGreen?

- ▶ CALGreen = *California Green Building Standards Code of California Code of Regulations*
- ▶ *Mandatory green building code for California*
- ▶ *Goal is 20% reduction beyond baseline*



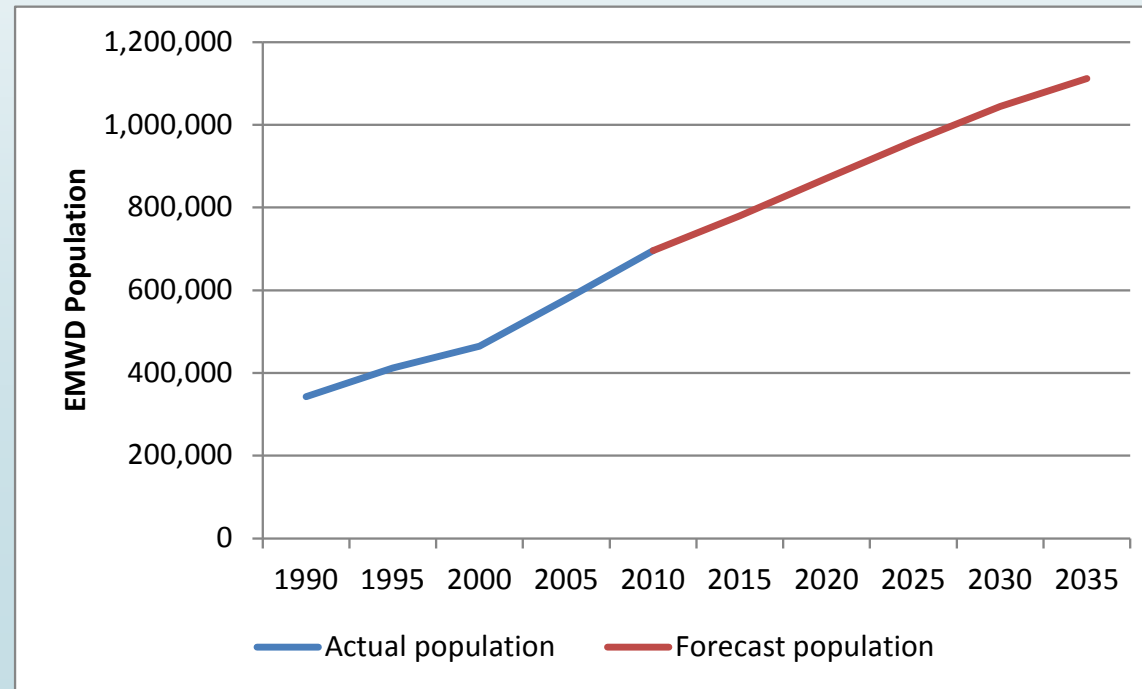
CALGreen Residential Indoor Requirements

Category	CALGreen Requirement
Toilets	1.28 gallons per flush (includes single flush and dual flush fixtures with an effective flush volume of 1.28 gal.)
Bathroom faucets	1.5 gpm max. flow rate
Kitchen faucets	1.8 gpm max. flow rate
Showerheads	2.0 gpm max. flow rate at 80 psi
Clothes washer	If installed by the developer/builder, - a maximum volume allowance of <u>15 gallons per load.</u>
Dishwasher	If installed by the developer/builder, - will not use more than <u>5.8 gallons per cycle.</u>

Outdoor use is covered by *AB 1881 – Model Water Efficient Landscape Ordinance 2006*

Eastern Municipal Utility District

- ▶ Residential is largest demand sector
- ▶ 2010 population of 695,932 is forecast to grow to 1,111,729 by 2035.
- ▶ EMWD plans to add 77,300 new residential accounts between 2015 and 2035
 - ▶ 73,400 single-family and 3,900 multifamily accounts



Residential Water Use Comparison

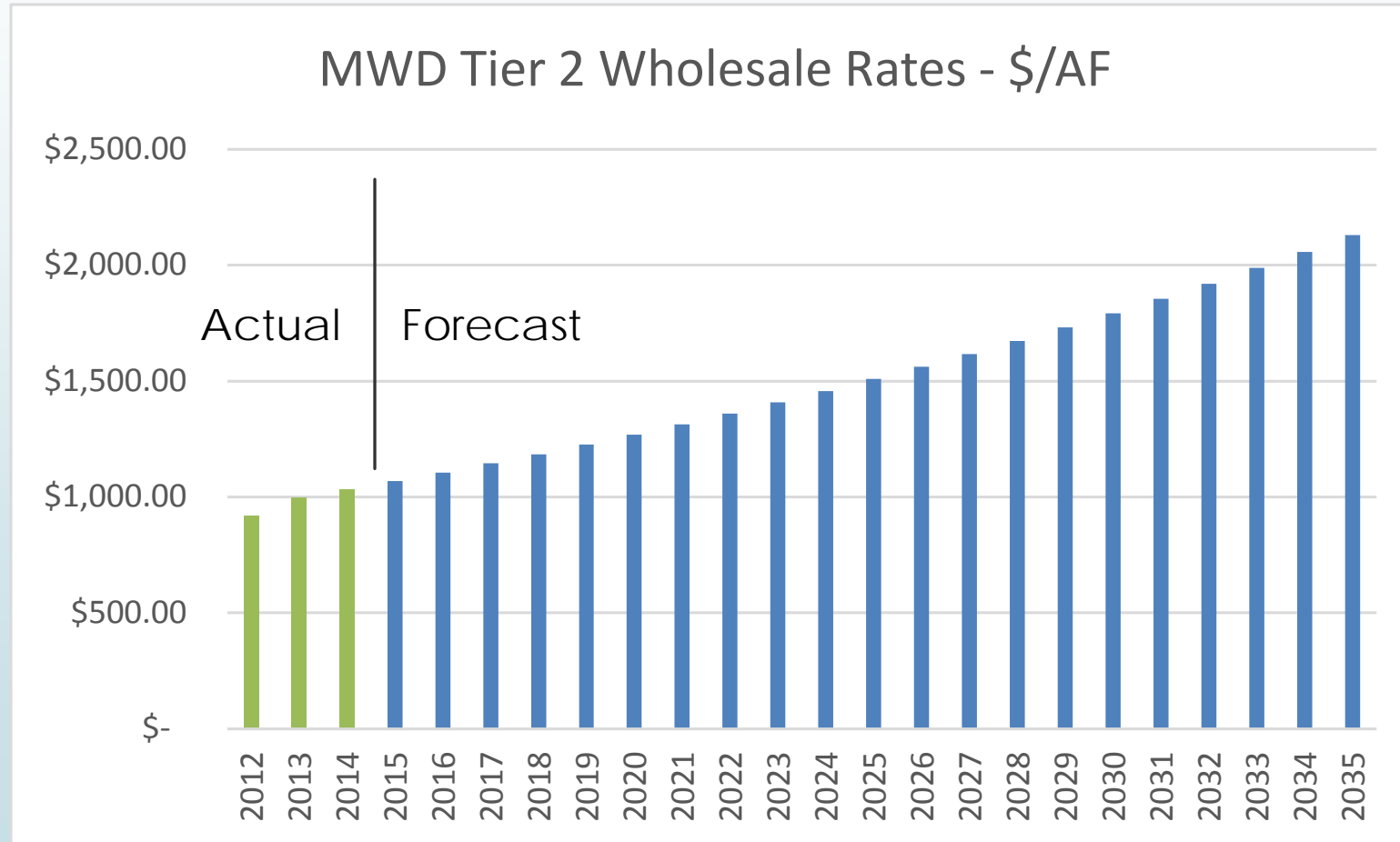
Existing, New, CALGreen

Category	Older Existing Homes (1999 Residential End Uses of Water)	Baseline New Homes (2011 Analysis of Water Use in New Single Family Homes)	CaIGREEN Homes	CaIGREEN Homes
			w/o Clothes Washer (2011 Analysis of Water Use in New Single Family Homes)	with Clothes Washer (2011 Analysis of Water Use in New Single Family Homes)
Average Gallons per Household Per day (gphd)				
Toilet	45.2	27.5	16.2	16.2
Clothes Washer	39.3	28.9	28.9	11.9
Shower	30.8	29.9	34.3	34.3
Faucet	26.8	25.2	18.1	18.1
Leak	21.9	19.7	19.2	19.2
Other	7.4	3	0.4	0.4
Bathtub	3.2	3.5	3.1	3.1
Dishwasher	2.5	1.9	1.6	1.6
Total gphd	177	140	122	105

Water Efficiency Measures Beyond CALGreen

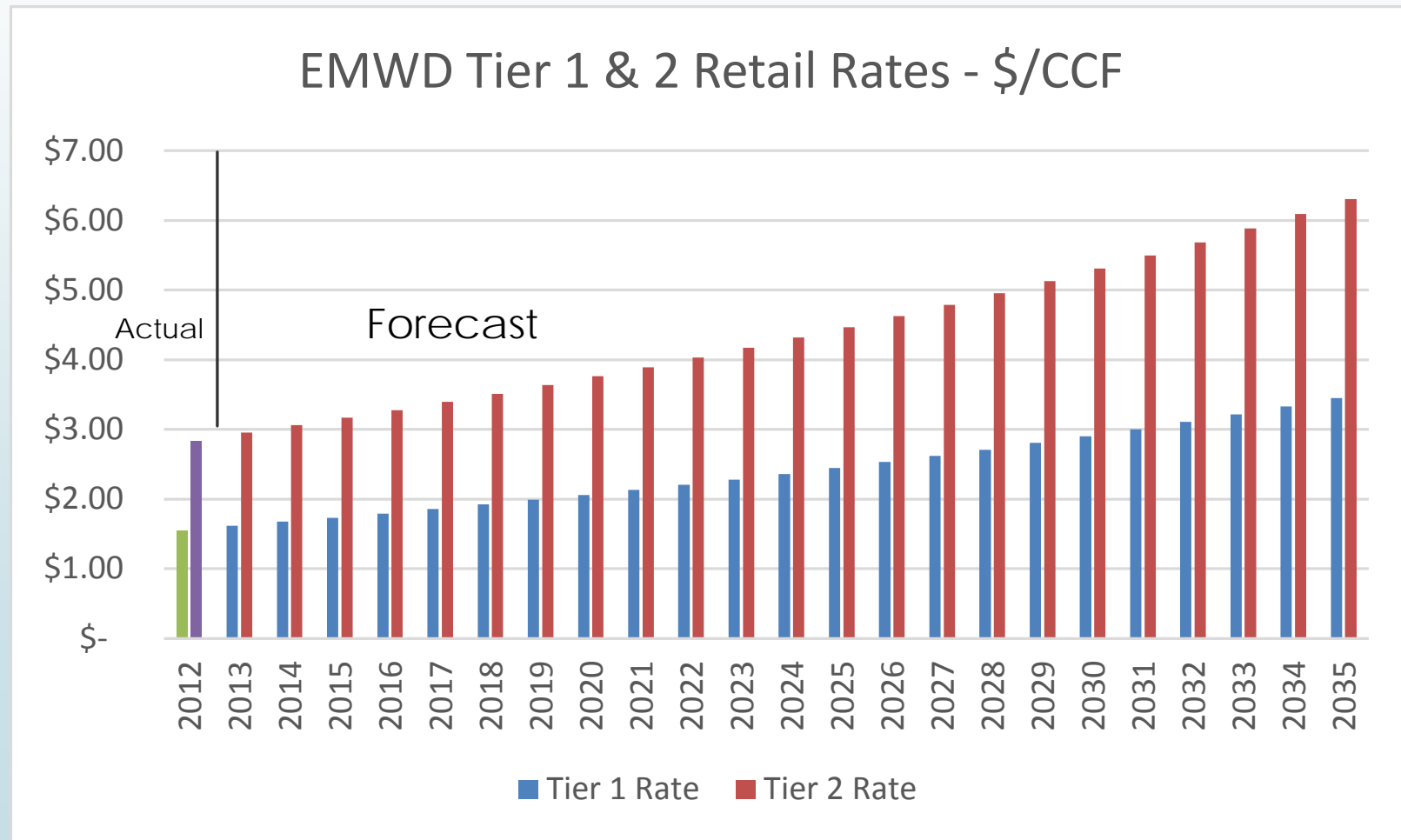
Measure	CALGreen	Beyond CALGreen
Toilet	1.28 gpf	1.0 gpf, WaterSense
Clothes washer	<i>If installed</i> , - max volume 15 gallons per load	All new washers have max volume of 15 gpl
Showerhead	2.0 gpm max flow at 80 psi	1.5 - 1.75 gpm max flow rate at 80 psi
Bathroom faucets	1.5 gpm max flow	0.5 gpm max flow
Leak detection	None	a) Use existing meter b) AMI leak alerts c) In-home leak detection system
Outdoor	None in CALGreen. AB 1881	a) Prescriptive; or b) Goal oriented water budget, landscape size, plant materials, irrigation system pressure, irrigation controller, sprinkler flow and precipitation rates

Forecast Cost of Future Water Supply from MWD



Assumes a modest 3.5% annual rate increase.

Forecast Retail Water Rates for EMWD Customers



Estimated Per Household Water Savings Beyond CALGreen

		Per Household Use (gphd)	Per Household Savings (gal/yr)	Savings at 2035 (AF)
Baseline	CalGREEN w/o CW's	122.0	0	0
Residential - Beyond CALGreen	CalGREEN with CW's	107.0	5,475	1,299
	1.0 gpf toilet standard	118.3	1,351	320
	1.6 gpm showerhead standard	120.6	500	119
	0.5 gpm bathroom aerator std.	120.0	730	173
	Leak alert. 20% leak reduction.	118.0	1,460	346
	Leak alert. 40% leak reduction.	114.1	2,884	684
	Cust. Feedback. 10% indoor reduction	109.8	4,453	1,056
	Reduce indoor water budget to 50 gpcd	120.3	621	147
	Reduce indoor water budget to 40 gpcd	118.6	1,241	294

	Encourage installation of high efficiency clothes washer	Encourage 1.0 gpf toilets	Low flow showerheads, 1.5 – 1.75 gpm max flow rate at 80 psi, and shorter showers	Encourage efficient faucets for the lavatory – 0.5 gpm	20% leakage reduction target	40% leakage reduction target	Reduce the outdoor water budget allocation for new homes to 60% of ET	Reduce the outdoor water budget allocation for new homes to 55% of ET	Reduce the outdoor water budget allocation for new homes to 50% of ET
Avg. water savings per household (CCF/year)	7.3	1.8	0.7	1.0	2.0	3.9	13.2	26.3	39.5
Total households impacted by 2035	77,300	77,300	77,300	77,300	77,300	77,300	77,300	77,300	77,300
Cumulative water savings in 2035 (AF)	13,631	3,364	1,245	1,817	3,635	7,180	24,506	49,013	73,519
EMWD - max. justifiable expenditure per household	\$ 100	\$55	\$ 20	\$ 30	\$60	\$ 120	\$400	\$800	\$1,200
Customer - max. justifiable expenditure	\$ 200	\$25	\$ 15	\$ 20	\$45	\$85	\$500	\$1,000	\$1,500
EMWD - Present worth of water savings	\$12,709,508	\$ 3,136,173	\$ 1,160,686	\$1,694,601	\$ 3,389,202	\$ 6,694,835	\$ 22,849,257	\$ 45,698,515	\$ 68,547,772
Customer - Present worth of water savings	\$ 8,970,943	\$ 2,213,652	\$ 819,264	\$1,196,126	\$ 2,392,251	\$ 4,725,516	\$ 29,484,714	\$ 58,969,428	\$ 88,454,141
EMWD - Present worth of costs	\$(1,082,833)	\$(3,021,202)	\$ (1,098,619)	\$ (1,647,928)	\$(3,295,856)	\$(6,591,713)	\$(21,972,376)	\$(43,944,751)	\$(65,917,127)
Customer - present worth of costs	\$(2,165,665)	\$(1,373,273)	\$ (823,964)	\$ (1,098,619)	\$(2,471,892)	\$(4,669,130)	\$(27,465,469)	\$(54,930,939)	\$(82,396,408)
EMWD - Benefit/Cost Ratio	11.7	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0
Customer - Benefit/Cost Ratio	4.1	1.6	1.0	1.1	1.0	1.0	1.1	1.1	1.1



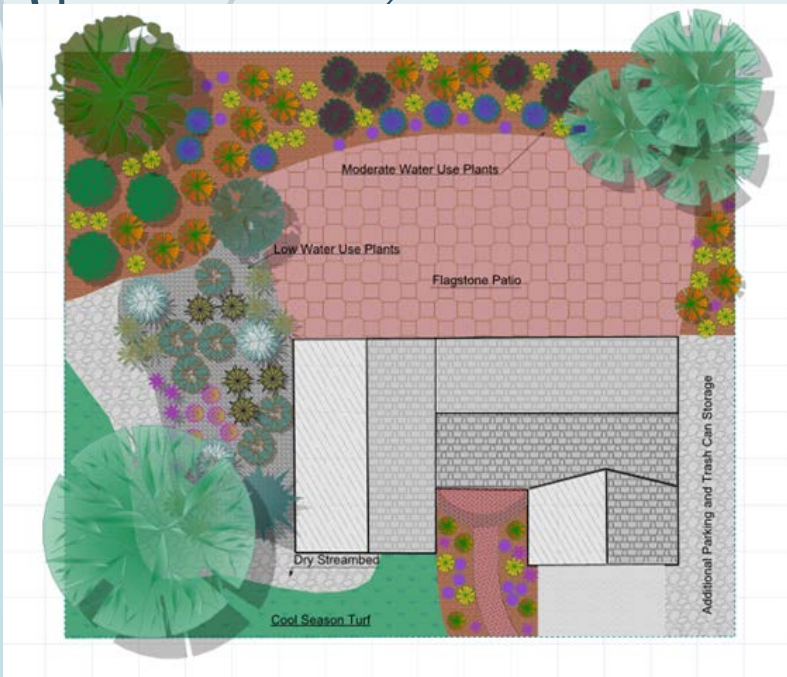
Significant Demand Reductions for New Customers Are Possible Beyond CALGreen

- ▶ High Efficiency Clothes Washers – **13,361** AF by 2035
- ▶ 1.0 gpf toilets – 3,361 AF by 2035
- ▶ LF showerheads (1.5 gpm) and Faucet Aerators (0.5 gpm) – 3,062 AF by 2035
- ▶ 20% reduction in leakage – 3,635 AF by 2035
- ▶ 40% reduction in leakage – 7,180 AF by 2035
- ▶ Reduce outdoor water budget to 60%, 55%, or 50% of ET – **23,506** AF – **73,518** AF by 2035

Each of these measures was determined to be cost effective from both the utility and the customer perspective.

Water Efficient Guidelines for New Development

- ▶ Detailed guideline document prepared by Aquacraft under grant from US BOR
- ▶ Indoor section includes detailed information on leak detection approaches.
 - ▶ Use existing meter.
 - ▶ AMI and leak alert software
 - ▶ In-home lead detection systems
- ▶ Outdoor guidelines include sample landscape plans for achieving reduced ET % targets.
- ▶ A checklist is provided to help ensure water efficiency has been maximized.



Made Possible by a Grant from the US Bureau of Reclamation

Water Efficiency Guidelines for New Development was made possible by a generous grant from the United States Bureau of Reclamation.



For More Information or to Obtain a Copy of the Water Efficient Guidelines for New Development

Contact

Elizabeth Lovsted - lovstede@emwd.org, 951-928-3777 x. 4307
or

Peter Mayer – peter.mayer@waterdm.com, 720-318-4232

Thank you!

