Faucets, Toilets & Urinals

Codes and Standards Enhancement (CASE) Initiative
For PY 2014: Title 20 Standards Development

Comments regarding draft regulations:
Faucets, Toilets & Urinals

Docket: #14-AAER-1, Water Appliances

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1 Introduction

On July 29th, 2013, the California Investor Owned Utilities (Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas (SCG), San Diego Gas & Electric (SDG&E)), herein referred to as the CA IOUs, submitted two Codes and Standards Enhancement (CASE) Reports: one for toilets and urinals and one for faucets. On May 6th, 2014 the California Energy Commission (CEC) hosted a workshop to discuss its Staff Report and solicit feedback from stakeholders. This document, submitted on behalf of the CA IOUs, provides supplemental research and analyses that addresses the Staff Report and comments made at the CEC Staff Workshop on May 6th, including responses to the key arguments against adopting more stringent standards and a compromise standard that will allow the state to realize larger water savings while allowing additional time to address outstanding issues. We thank CEC for the opportunity to be involved in this process and encourage CEC to carefully consider the recommendations outlined in this document.

2 Executive Summary

On January 17, 2014 Governor Brown proclaimed a State of Emergency and directed state agencies to take all necessary actions to prepare and respond to drought conditions. While we commend the CEC for responding to the Governor's directive by prioritizing updates to the Title 20 standards for toilets, urinals, and faucets, the CA IOUs have found that the CEC proposal does not establish a strong path forward for water efficiency. The CEC staff-proposed standards for toilets and urinals are already state law, as enacted by AB 715 (Laird 2007). In other words, the state will not achieve any additional water savings from CEC's proposed standards, except for those pertaining to faucets. The CA IOUs have demonstrated in its CASE Reports and addenda that more stringent efficiency standards for all products in all categories (including faucets) are cost effective and available in the market today. Establishing more stringent efficiency standards may be the most cost effective intervention for our state's water resource constraints, particularly when compared to solutions that increase potable water supply, such as increasing storage and conveyance.

The CA IOUs encourage CEC to embrace this opportunity to save the largest water savings possible within its authority by adopting more stringent water efficiency standards. To aid in the implementation of such standards, the CA IOUs offer a three-tiered alternative proposal to phase-in the stringency over several years. The Tier 1 standard (which would take effect 1 year after adoption) would align with CEC's proposed standards with the addition of testing and labeling requirements for toilets. The Tier 2 standard (which would take effect 3 years after adoption) would set higher efficiency standards for faucets, urinals and toilets, resulting in an additional annual savings of 20 billion gallons of water—equivalent to the amount of water used annually by three-fourths of the City of Anaheim—and 354 GWh of direct and embedded annual energy savings after stock turnover, which is more than 3 times the savings from the standards the CEC is currently proposing. The Tier 3 standard would set an additional requirement for single flush, tank-type toilets, and-would result in an additional 18 billion gallons of water savings per year and an embedded electricity savings of nearly 190 GWh per year. See a summary of the water and energy savings estimates from the tiered proposal in Table 1. In total, the additional savings from the more stringent, cost-effective and feasible standards is equal to the amount of water used annually —including residential, business and industry—by the cities of Burbank, Beverly Hills and San Francisco combined (Census 2012; Mercury News 2014).

Table 1: Summary of Water and Energy Savings from Tiered Proposal

	Tier 1 (Effective 1 year after adoption) *Incremental to Existing State Law*	**Tier 2 (Effective 3 year after adoption)** *Incremental to Tier 1*	**Tier 3 (Effective 4 year after adoption)** *Incremental to Tier 2*	**TOTAL** *Total savings from all tiers relative to state law*
Water Savings (million gallons per year after stock turnover)				
Faucets	6,080	16,167	0	22,247
Urinals	0	1,676	0	1,676
Toilets	0	2,447	18,862	21,309
TOTAL	*6,080*	*20,290*	*18,862*	45,232
Electricity Savings (GWh per year after stock turnover) Includes electricity savings from embedded energy and hot water savings				
Faucets	93	312	0	405
Urinals	0	17	0	17
Toilets	0	25	189	214
TOTAL	*93*	*354*	*189*	636
Natural Gas Savings (million therms per year after stock turnover)				
Faucets	20	115	0	135
TOTAL	*20*	*115*	*0*	135

3 Alternative Proposal – Tiered Approach

The code change proposal presented in the CASE Reports and subsequent addendums remains the best recommended proposal. We are offering an alternate proposal, but stand by our previous proposal as the best recommendation we can make to CEC.

The CA IOUs recognize that some uncertainty remains around the magnitude of water and energy savings that are achievable through more stringent standards. We also understand that some stakeholders are concerned about how the more efficient fixtures will be integrated with existing plumbing systems in buildings. The absence of reliable data leaves all parties speculating about the nature and severity of the potential negative impacts of reducing fixture flow rate on building plumbing systems. At the same time, however, California's water shortage and the threat it poses is unquestionable and more stringent standards will cost-effectively save additional water and energy, even in low-savings scenarios. Understanding the importance of water and energy efficiency, while acknowledging that some barriers remain, the alternative proposal will allow the state to establish a long-term strategy for water efficiency for the products under consideration while allowing additional time to address some of the concerns stakeholders have with establishing more stringent standards.

Figure 1 and Figure 2 present the annual water and energy savings (after stock turnover) of the proposed three-tier standards. These savings are estimated using the medium-low scenario for water savings from faucets (shown in Table 2) and described in greater detail in Section 4.2 of this document. It should be noted that even in the scenario assuming no hot water savings from faucets (see the low scenario in Table 2) cold water savings will still be significant. For the details of the tiered proposal, see Table 3.

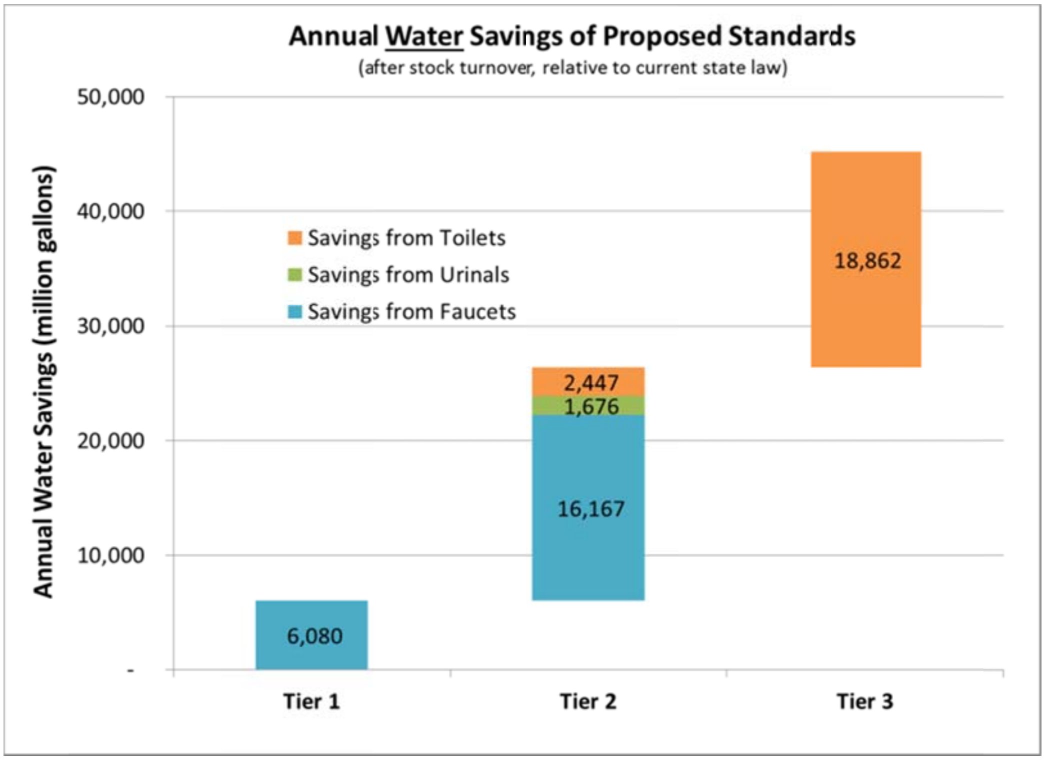

Figure 1: Estimated Annual Water Savings from Standards Proposal

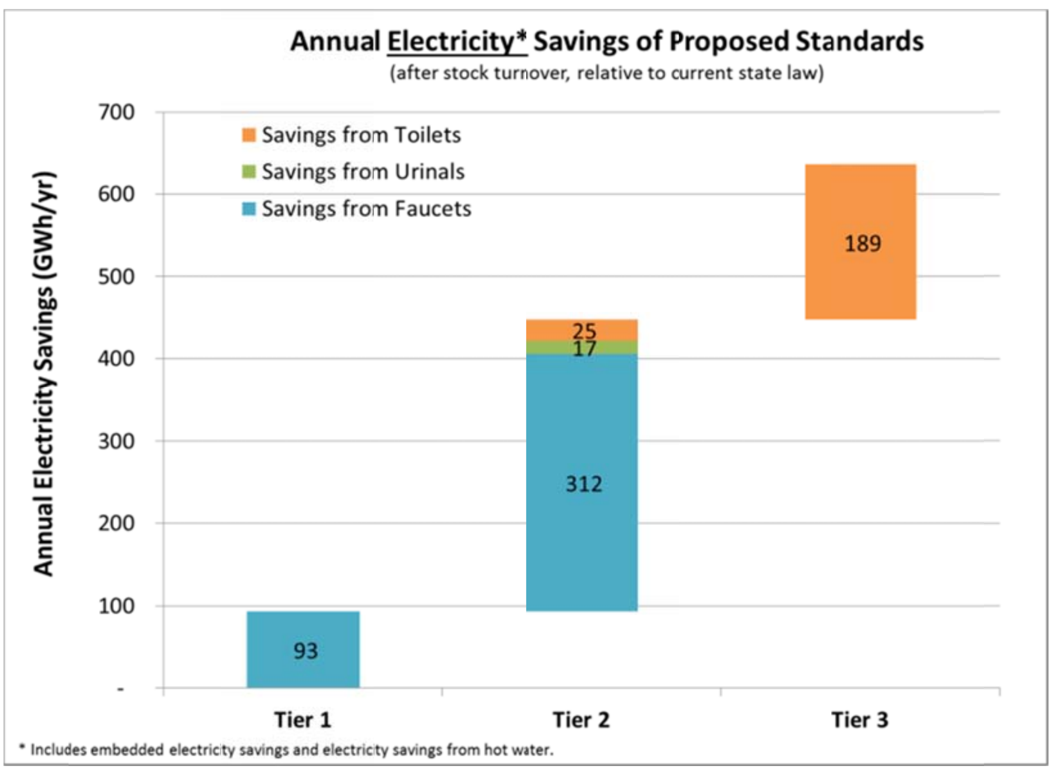

Figure 2: Estimated Annual Electricity Savings from Standards Proposal

Table 2: Scenarios for Water Savings from Lavatory Faucets

	Assumption	Additional Savings from 1.0 GPM vs. 1.5 GPM (Million Gallons Per Year)
Scenario A – High Estimated		
% Cold water	50%	12,437
% Hot Water	50%	
% all scenarios where more water is wasted from waiting for hot water, negating savings	0%	12,437
	Total	**24,873**
Scenario B – Medium-High Estimate		
% Cold water	50%	12,437
% Hot Water	50%	
% all scenarios where more water is wasted from waiting for hot water, negating savings	25%	9,327
	Total	**21,764**
Scenario C – Medium-Low Estimate		
% Cold water	30%	7,462
% Hot Water	70%	
% all scenarios where more water is wasted from waiting for hot water, negating savings	50%	8,706
	Total	**16,167**
Scenario D – Low Estimate		
% Cold water	30%	7,462
% Hot Water	70%	
% all scenarios where more water is wasted from waiting for hot water, negating savings	100%	-
	Total	**7,462**

Table 3: Alternative Standards Proposal – Tiered Approach

Tier	Faucets	Urinals	Toilets
Tier 1 (Effective 1 year after adoption)	**Residential Lavatory Faucets** ▪ Maximum flow rate: 1.5 gallon gpm @ 60 psi; 0.8 gpm @ 20 psi **Kitchen Faucets** ▪ Maximum flow rate: 1.8 with the allowance to increase to 2.2 temporarily **Public Lavatory Faucets** ▪ Maximum flow rate: 0.5 @ 60 psi	**Urinals** ▪ Maximum flush volume: 0.5 gpf	**All Toilets Waste Extraction Performance** ▪ 350 grams or higher ▪ All toilets tested at 350, 400, 500, 600, 800, 1000 grams or to failure ▪ Waste extraction rating reported for Title 20 compliance ▪ Waste extraction rating included on label **Single-flush toilets** ▪ Maximum flush volume: 1.28 gpf **Dual-flush toilets** ▪ Maximum flush volume: 1.6 gpf ▪ Effective flush volume: 1.28 gpf
Tier 2 (Effective 3year after adoption)	**Residential Lavatory Faucets** ▪ Maximum flow rate: 1.0 gallon per minute (gpm) @ 60 psi; 0.5 gpm @ 20 psi	**Urinals** ▪ Maximum flush volume: 0.125 gpf **Replacement valves** ▪ Maximum flush volume: 1.0 gpf	**All Toilets Waste Extraction Performance** ▪ 600 grams or higher ▪ All toilets tested at 600, 800, 1000 grams or to failure **Dual-flush toilets** ▪ Maximum flush volume: 1.28 gpf ▪ Effective flush volume: 1.06 gpf **Replacement valves** ▪ Maximum flush volume: 1.6 gpf
Tier 3 (Effective 4 year after adoption)			**Single-flush toilets (Tank-type only)** ▪ Maximum flush volume: 1.06 gpf

4 Residential Lavatory Faucets

4.1 Alternative Proposal

After careful consideration of the Staff Report and comments made at the CEC Workshop, the CA IOUs encourage the CEC to establish a two-tiered standard for lavatory faucets that would 1) establish a maximum flow rate of 1.5 gpm @ 60 psi and a minimum flow rate 0.8 gpm @ 20 psi to be effective 1 year after adoption, and 2) establish a maximum flow rate of 1.0 gpm at 60 psi and a minimum flow rate 0.5 gpm @ 20 psi to be effective 3 years after adoption. Inclusion of the Tier 2 standard will result in additional annual savings of 16 billion gallons of water — two-thirds the amount of water used annually by the City of Long Beach (Census 2012; Mercury News 2014)— and 312 GWh of direct and embedded energy after stock turnover. See the sections below for evidence that supports the conclusion that lower flow faucets save water and energy.

4.2 Water Savings: Clarifications about Consumer Satisfaction and the Impacts of Hot Water Delivery Time

The Staff Report cites the possibility that consumers may be dissatisfied with longer wait time for hot water to arrive at the faucet and "waiting a long time to get hot water delivered may actually cause water waste that would negate the savings" as the primary reasons for proposing the higher flow rate of 1.5 gpm at 60 psi. The Staff Report, however, does not include a reference to any studies or resources that confirm the assertion position that longer wait times would negate water savings. The CA IOUs acknowledge that there is some additional waiting time for hot water due to the ½ gallon per minute difference between 1.5 gpm and 1.0 gpm faucets at 60 psi, however, 1) there are studies that support consumer satisfaction with 1.0 gpm faucets and 2) research and analysis demonstrates any additional wait times will not definitively negate all the water savings, as there will still be savings from higher efficiency fixtures even when assuming no water is saved during hot water draws.

Regarding the first point, consumers are satisfied overall with the performance of 1.0 gpm low-flow faucets. The WaterSense (2007) specification indicated that "these products have shown a high level of satisfaction," and also cites survey results from the Seattle Public Utilities regarding a pilot program that distributed free aerators in which only 2 percent of participants were dissatisfied with the 1.0 gpm aerators. Moreover, two residential indoor water conservation studies conducted by Aquacraft (2000, 2004) surveyed consumer satisfaction among participating single family households in three study areas using the following flow rates: 1.0 gpm and 1.5 gpm aerators in 37 households in Seattle, WA (2000), and 1.0 gpm (lavatory) and 1.5 gpm (kitchen) aerators in 26 households in Tampa Bay, FL (2004). Survey findings reveal that participants were satisfied overall with the low-flow faucet aerators that were installed as part of each study, averaging at least 4 out of 5 on level of satisfaction (5 being most satisfied). The level of satisfaction among participants increased between the studies, from 22 percent "liking the new aerators more than their old faucet fixtures" in 2000, to 40 percent in 2003, and to 60 percent in 2004. This suggests that the performance of low-flow faucet aerators has increased over time, leading to the assumption that technological innovation and/or behavioral shifts have influenced consumer perception of the performance of low-flow faucets and aerators. While the 2000 study does indicate some issues with longer wait times for hot water, this is not a universal issue, and no such issues were reported in the 2004 study.

Regarding the second point in the Staff Report about wait times resulting in wasted water, there is evidence to suggest longer wait times does not negate all water savings. First, not all water used in lavatory faucets is hot water. Between 30% (WaterSense 2007) and 50% (EBMUD 2003) of faucet water use is estimated to be cold water. These values do not distinguish between lavatory and kitchen faucets, but the estimates are used in the absence of additional information for lavatory faucets in isolation. Even when using the lowest estimates for cold water use, the 1.0 gpm standard would result in an additional 7.5 billion gallons of water saved annually from cold water alone—the amount of water used annually by the City of Antioch (Census 2012; Mercury News 2014).

To further address the concern about potential wasted water, there are two considerations that suggest most consumers will realize a net water savings with 1.0 gpm fixtures. The first consideration is that only one-quarter of respondents reported waiting for hot water to arrive in order to perform typical tasks such as hand and face washing and brushing teeth (Hoeschele and Weitzel 2012). It is unclear that these results speak to the speed at which the consumers receive hot water, or whether waiting for hot water is a choice the consumers are making. Even if it is the former, given the variety of building conditions of the respondents and the variables determining hot water draw discussed below, it is unclear that the contribution of faucet flow to the wait times and that replacing their existing faucets with 1.0 gpm faucets rather than 1.5 gpm would result in additional claims regarding longer waiting times.

The second consideration is that in the scenarios where consumers choose to wait for hot water for their tasks, there are number of variables that determine the time it takes for hot water to reach residential lavatory faucets (CEC 2005, Wilson 2009, Hoeschele & Weitzel 2012)[1]. In terms of comparing specific flow rates of 1.5 gpm and 1.0 gpm, the half-gallon per minute difference will result in a longer wait time; however a third less water is flowing per minute. As Klein (2005) describes, flow rates of 1.0 gpm may result in water waste of ten gallons per day (if the wait time is one minute for each of the 10 faucet draw events over a period of a day). Incidentally, assuming the same building conditions, 2.0 gpm faucets will roughly waste the same amount of cold water if the average wait time is 30 seconds (at 10 faucet draw events).

There will be temperature losses in the pipes due to the inverse relationship between flow rate and temperature drop. As flow rate decreases temperature drop increases. A 2005 Public Interest Energy Research (PIER) Program study evaluated how flow rates impact temperature drop. Researchers measured temperature drop when 135°F water moves through 100 feet of pipe. They concluded that reducing flow rate from 2.0 gpm to 1.0 gpm can increase temperature losses by 0.5 - 3.4°F. The magnitude of the temperature loss depends on the factors cited above (see footnote), and the amount of additional wasted water from the installation of a 1.0 gpm depends significantly on consumer preferences and behavior. In some cases with a 1.0 gpm faucet, consumers may compensate for the temperature losses by adding slightly less cold water at the tap. In some cases, consumers may desire to wait for the water to meet their desired temperature, in which case water may not be saved when compared to the faster flow rate of 1.5 gpm.

Uncertainty exists in the exact percentage of consumers will experience the extreme impacts on wasted water and energy associated with the building's hot water distribution system. The CA

[1] E.g., design of the hot water distribution system, which includes the distance between the water heater and tap (i.e. pipe length), pipe size (e.g., ½ inch, ¾ inch, 1 inch), the flow rate of the faucet (e.g., 2.0 gallons per minute (gpm), 1.5 gpm, 1.0 gpm, 0.5 gpm), type of water heater (e.g., storage, tankless), inlet and outlet water temperatures, ambient air temperature and climate, type of piping material (e.g., copper, PEX), how much time has passed between hot water draws, and whether the pipes and/or water heater are insulated

IOUs developed a few scenarios to help quantify the implications, shown in Table 2. The conclusion is that even if in the lowest savings scenario where no there is no water savings associated with any hot water draw events at 1.0 gpm, the savings from cold water is still significant and justify a standard at this level. For the lowest savings scenario the resulting savings per faucet would be approximately 200 gallons per year, resulting in over $15 savings over the life of the product. Given the incremental cost for 1.0 gpm aerators of $0.50, the measure is still cost-effective.

5 Urinals

5.1 Revised Proposal

After careful consideration of the Staff Report and comments made at the CEC Workshop, the CA IOUs encourage the CEC to establish a two-tiered standard for urinals that would 1) establish a maximum flush volume of 0.5 gpf to be effective 1 year after adoption, and 2) establish a maximum flush volume of 0.125 gpf to be effective 3 years after adoption. Unless the CEC exclusively adopts the less stringent 0.5 gpf urinal standard as opposed to the CA IOUs' recommended 0.125 gpf standard, California will miss out on significant water and embedded electricity savings. In particular, the state will miss out on an annual savings of 134 million gallons of water and 1.3 GWh of embedded electricity beginning the first year the standard is in effect. By 2026 the state will miss out on 1.68 billion gallons of water savings per year, equivalent to the annual water use by the City of Hillsborough (Census 2012; Mercury News 2014).

As supported by the IOUs' CASE Report, the 0.125 gpf standard is both cost-effective and feasible. First, the incremental cost between 0.125 gpf and 0.5 gpf urinals is quite low. Research indicates that the average cost difference between the two types of urinals is approximately 12 percent. For example, the average cost of 0.5 gpf fixtures and valves is $277 and $614 respectively. The average cost of 0.125 gpf fixtures and valves is $353 and $648 respectively. This indicates an incremental cost difference where 0.125 gpf fixtures and valves are respectively $76 and $34 higher than their 0. 5 gpf counterparts. Furthermore, some manufacturers like American Standard offer 0.125 gpf, 0.5 gpf, and 1.0 gpf urinal systems with similar features for the same price. These systems come with the fixture and the valve for one packaged price. Second, urinals with a maximum flush volume of 0.125 gpf are widely available to consumers. There are approximately 275 WaterSense labeled urinal fixtures, valves, and fixture/valve systems from 21 unique brand names, with 40 percent of the WaterSense labeled fixtures exceeding the minimum water efficiency level. The large quantity and variety of ultra-high-efficiency urinals available for sale is an indication that qualifying products are readily available. Given the current market, it is justifiable for the CEC to adopt a standard that goes beyond WaterSense, the voluntary national standard developed 7 years ago when 0.125 gpf urinals were are not as prevalent.

In response to the comments communicated by stakeholders regarding potential drainline clogging with the installation of 0.125 gpf urinals, there is no research-based data that indicates these urinals cause significant damage to building pipes. The City of Los Angeles has had a one pint urinal (0.125 gpf) ordinance in effect since 2010 and has not had any reported problems, as confirmed by James Kemper from Los Angeles Department of Water and Power at the CEC staff workshop on May 6, 2014. In 2010, the Seattle Public Utilities (2010) performed a survey of high efficiency toilets, and seven out of nine facilities managers had no reported issues for the 0.125 urinals installations. Two reported higher maintenance costs and cleaning needs due to urinal splashing and clogging concerns, although these issues were described as urinal design issues rather building pipe issues. We are continuing to perform outreach to assess the extent of these additional maintenance costs, but in the interim when considering the lifetime water savings, the measure will likely continue to be cost-effective.

While we do not have sufficient evidence to confirm that drainline clogging is a widespread issue, potential problems can be mitigated with a proper maintenance plan. In the tiered proposal, the 0.125 gpf standard would take effect 3 years after the standard is adopted. This is sufficient time to develop maintenance guidelines and to train facility managers on maintenance best practices.

6 Toilets

6.1 Revised Proposal

After careful consideration of the Staff Report and comments made at the CEC Workshop, the CA IOUs encourage the CEC to establish a three-tiered standard for toilets as highlighted in Table 3.

Table 3: Tiered Proposal for Toilets

Tier Level	Single-flush Toilets	Dual-flush Toilets
Tier 1 (effective 1 year after adoption)	▪ 1.28 gpf maximum flush volume. ▪ Waste Extraction Performance: minimum 350 gram. All toilets sold tested for failure with rating required for compliance reporting and on packaging	▪ 1.6 gpf maximum flush volume, 1.28 gpf effective flush volume. Maximum and effective flush volumes required for reporting and on packaging. ▪ Waste Extraction Performance: same as single-flush toilets
Tier 2 (effective 3 Years after adoption)	▪ Waste Extraction Performance: minimum **600** grams	▪ **1.28** gpf maximum flush volume, **1.06** gpf effective flush volume. ▪ Waste Extraction Performance: minimum **600** grams.
Tier 3 (effective 4 years after adoption)	▪ **1.06** gpf maximum flush volume (tank-type only).	

The statewide savings estimates for the tiered standards for toilets are provided in Table 4. The CA IOUs estimate that if the CEC adopts the proposed Tier 2 standard, the state will realize a savings of 2.5 billion gallons of water per year and 25 GWh of embedded electricity savings per year after full stock turnover.

If the CEC adopts the Tier 3 standard, it is estimated that the state will realize a savings of at least 21 billion gallons of water per year and 214 GWh of embedded electricity savings per year after full stock turnover. To calculate Tier 3 saving, the CA IOUs used the assumptions documented in the CASE Report using a baseline efficiency of 1.28 gpf and standards-case efficiency of 1.06 gpf.

Table 4: Statewide Water and Energy Savings of Proposed Tier 2 and Tier 3 Toilet Proposal

Year	Annual Sales		Stock	
	Water Consumption (Mgal/yr)	Embedded Electricity Consumption (GWh/yr)	Water Consumption (Mgal/yr)	Embedded Electricity Consumption (GWh/yr)
Savings from Tier 1 Proposed Standard (Current California Law to Tier 1)				
First Year	0	0	0	0
After Stock Turn-over	0	0	0	0
Savings from Tier 2 Proposed Standard (Current California Law to Tier 2)				
First Year	84	0.8	84	0.8
After Stock Turn-over	114	1.1	2,447	25
Savings from Tier 3 Proposed Standard (Current California Law to Tier 2)				
First Year	731	7	731	7.3
After Stock Turn-over*	990	10	21,309	214

* Incremental statewide stock savings between Tier 2 and Tier 3 is 18,862 Mgal/yr and 189 GWh/yr.

6.2 Dual-flush Toilets

There is wide availability of tank-type, dual-flush toilets in the market. As of May 19, 2014, 35 percent of the tank-type toilets listed in the Maximum Performance (MaP) database with an effective flush volume of 1.28 gpf or less are dual-flush toilets. All of the major toilet manufacturers and most of the smaller manufacturers offer dual-flush toilets. Undoubtedly, dual-flush toilets are gaining popularity in the market.

Though the intent of dual-flush toilets is to save water by enabling users to select a flush option that uses a reduced volume for certain toilet events, there is a difference in the amount of water used among different types of dual-flush toilets. For example, using the same assumptions about duty cycle (i.e. number of times toilets are flushed on an annual basis) that are documented in the CASE Report, and assuming a ratio of 2 reduced-volume flushes to one full-volume flush, the CA IOUs estimate that a dual-flush toilet with a flush volume of 1.6 gpf / 0.8 gpf will use 2,875 gallons per year. However, the estimated annual per unit water use for a dual-flush toilet with a flush volume of 1.28 gpf / 0.8 gpf is 2,588 gallons. This is a difference of 287 gallons of water used in a year. For comparison, a single-flush 1.28 gpf toilet is expected to use 4,313 gallons per year (See Figure 3).

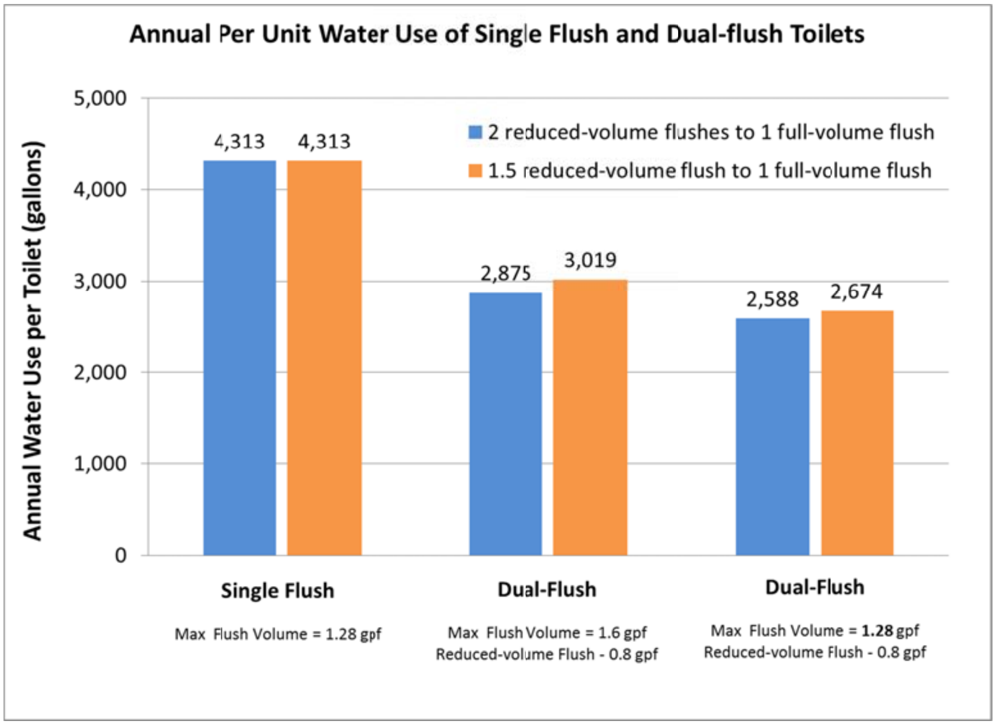

Figure 3: Annual Per Unit Water Use – Single Flush and Dual-flush Toilets

As documented in the CASE Report, the 2:1 ratio of reduced-volume flushes to full-volume flushes has not been verified through field studies of actual usage patterns. Studies have found that the flush ratio is highly variable, and that the 2:1 ratio likely overstates the frequency that people select the reduced-volume flush option. Figure 3 presents the annual per-unit water use assuming a ratio of 2:1 and a ratio of 1.5:1. The statewide savings analysis assumed a ratio of 2:1 because it results in more conservative water savings estimates. In reality, if people use the reduced-volume option less frequently then the water use from dual-flush toilets would be higher than our estimates suggest.

To estimate statewide savings, the CA IOUs used the same assumptions documented in the CASE Report and assumed that 25 percent of the tank-type toilets sold in the state are dual-flush toilets. In the absence of sales data, if the percent of dual-flush models provide an indication of the market, the assumption of 25 percent market share may be a conservative estimate given 35 percent of the 1.28 gpf toilets are dual-flush. For example, dual-flush flushometer toilets are gaining popularity for commercial applications, and the CA IOUs' proposed dual-flush standard will result in savings from flushometer toilets. However, for this analysis we did not include savings from flushometer toilets.

The statewide savings estimates provided in Table 4 are likely conservative estimates, not only because flushometer toilets are excluded but also because we have also chosen to use the more conservative ratio of reduced to full-volume flushes. In addition, our market share estimates are also on the low side.

The incremental cost of moving from a dual-flush toilet with a maximum flush volume of 1.6 gpf to a dual-flush toilet with a maximum flush volume of 1.28 gpf would be beneficial to consumers. While there are not many data points available, online price data from several online retailers and distributers for dual-flush toilets reveals that 1.6 gpf are on average $100 more expensive than their 1.28 gpf counterparts (see Table 5).

Table 5: Cost Comparison of Dual-flush Toilets

Manufacturer	Brand	Max. Flush Rate	Cost	Retailer
Caroma	Bondi 305	1.6	$ 405	amazon.com
Kohler	Cavata	1.6	$ 249	Lowes.com
Caroma	Sydney 270	1.6	$ 503	plumbing-deals.com
		Average	**$ 386**	
Glacier Bay	Model #N2430E and Store SKU# 635 678	1.28	$ 168	Homedepot.com
Caroma	Sydney Smart 270	1.28	$ 399	ecobuildingproducts.com
Gerber	Maxwell	1.28	$ 293	Homedepot.com
		Average	**$ 287**	

The IOU Team has not found any data to support or refute claims that 1.28 gpf toilets are not well-suited for older buildings. Toilets that consume 1.28 gpf have been available for a long time, and they have been installed in a wide variety of buildings, including older buildings.

6.3 Waste Extraction Performance

All toilets offered for sale in California should have their waste extraction performance tested for at 350, 400, 500, 600, 800, and 1000 grams and manufacturers should report test data for Title 20 compliance. Reporting waste extraction performance will generate data about the performance of toilets offered for sale in the state. We also suggest that the waste extraction rating be published on the product label so consumers have the waste extraction performance information readily available when making purchasing decisions.

One stakeholder suggested that Title 20 should reference ASME A112-19.2-2013 Section 7.10 Waste Extraction Test as opposed to the Maximum Performance (MaP) Testing Toilet Fixture Performance Testing Protocol. The Waste Extraction Test in ASME A112-19.2 is almost identical to the Map Protocol Version 5, except the ASME test is a pass/fail test that only measures toilet's ability to clear 350 grams of test media. The MaP Protocol, however, calls for the test to be repeated at the intervals mentioned previously. The CA IOUs would support referencing the ASME protocol if Title 20 specified that steps (f) through (k) of Section 7.10.3 be conducted at 350, 400, 500, 600, 800 and 1000 grams or until failure.

There are a number of organizations, including those listed below, that have established waste extraction threshold requirements in excess of 350 grams:

- Santa Clara Valley Water District (600 g MaP score)[2]
- City of Palo Alto (600 g MaP score)[3]
- Redwood City (500 g MaP score)[4]
- Contra Costa Water District (500 g MaP score)[5]

[2] Santa Clara valley requires 600 g MaP score and 1.08 gal/flush for tier 2 incentive http://www.valleywater.org/Programs/residentialHETprogram.aspx

[3] City of Palo Alto only gives incentives for MaP premium 600 grams and less than 1.08 gal/flush http://www.cityofpaloalto.org/gov/depts/utl/residents/resrebate/resiwater/default.asp#High-Efficiency%20Toilet

[4] http://www.redwoodcity.org/publicworks/water/toiletrebateindex.html

7 California Urgently Needs Water Efficiency and Water Conservation

7.1 California Drought

California's record-breaking drought is evident in every corner of the state. All 11 regions of California are now officially in a drought, ranging from "severe drought" in some regions (3 on a scale of 1 to 5, with 5 being the worst) to "Extreme Drought" in most regions (4 on scale) to "Exceptional Drought" (5 on scale) in the central regions (U.S. Drought Monitor 2014). Even the rainforests of Northern Humboldt and Del Norte counties are experiencing levels of drought seen in the deserts of southern California (see Figure 4 below for drought map). The final Department of Water Resources snowpack survey readings for the year (May 1) measured water levels in the state's snowpack at 18 percent of the year-to-date average (Department of Water Resources 2014). This is of grave concern since snowpack provides a third of the water for farms and cities. Furthermore, California's major reservoirs are at less than 50 percent of total capacity and 66 percent of historical average, and the U.S. Geological Survey reports that 69 percent of its 230 stream flow gauges in California are "below normal" flows (U.S. Geological Survey 2014).

Given the gravity of the situation, state water officials are beginning to implement drastic water reduction measures. For the first time in 37 years, the amount of water farmers, municipalities, and other large water users are legally allowed to pump from rivers and streams is being limited (or curtailed) by the State Water Resources Control Board. The California Farm Water Coalition estimates that due to the severe drought, farmers will leave about 800,000 acres idle this year; this will undoubtedly cause food prices to rise (California Farm Water Coalition 2014).

On January 17, 2014 Governor Brown proclaimed a State of Emergency and directed all state agencies to take all necessary actions to prepare and respond to drought conditions. We commend the CEC for responding to the Governor's directive by prioritizing updates to the Title 20 standards for toilets, urinals, and faucets. According to the best available data, the CEC's proposed standards do not maximize cost-effective and feasible water savings, however.

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[5] http://www.ccwater.com/conserve/rebates_rtoilets.asp

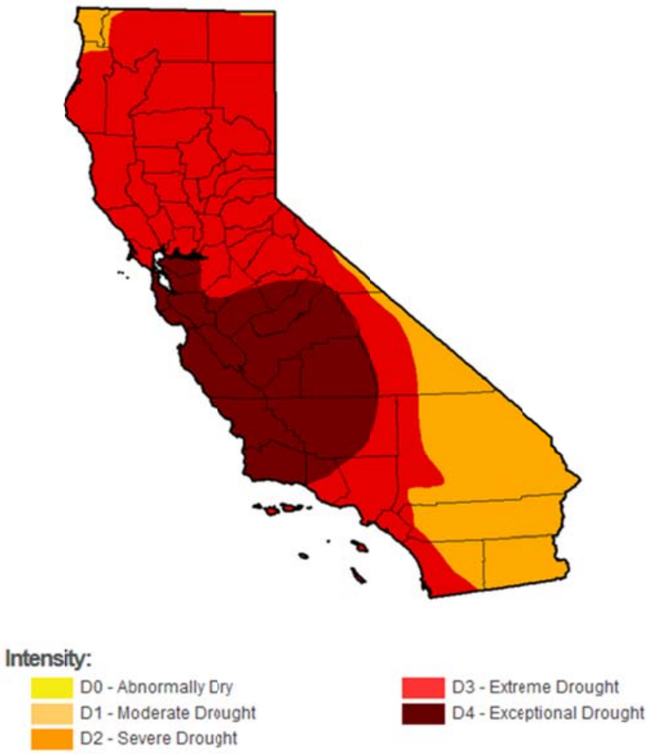

Figure 4 California Drought Classification by Region
Source: United States Drought Monitor

7.2 Stringent Water Efficiency Standards are a Viable and Less Expensive Solution

Establishing more stringent water efficiency standards is a cost-effective intervention for reducing California's water demand. It may even be the *most* cost-effective intervention, particularly when compared to solutions that aim to increase and maintain reliable water supplies. For example, several of California's coastal cities are considering seawater desalination. Though it can produce a reliable source of water, desalination is a very expensive technology that has an impact on the local aquatic environment as well as consumers and ratepayers, as energy is the largest single cost for a desalination plant and can vary from one-third to more than one-half the cost of produced water. Alternatives to new desalination facilities like pumping water from deep aquifers or conveying water from locations with more plentiful water resources are also costly – both in terms of cost and energy use. Upgrading infrastructure for water conveyance and storage will cost tens of billions of dollars. The water efficiency standards that the CA IOUs are proposing, on the other hand, will save Californian's billions of dollars in reduced expenditures on water bills.

8 Technical Correction to CASE Report

Due to a revised understanding about the market share of 1.28 gpf toilets and 0.5 gpf urinals, the savings estimates for toilets and urinals presented in the CASE Report need to be updated. There should be no savings attributed to the 1.28 gpf standard for single-flush toilets or the 0.5 gpf standard for urinals because these proposed standard are already state law, as enacted by AB 715.

The savings estimates for toilets presented in this document supersede the savings estimates from the CASE Report.

9 Conclusions

In these comments, the CA IOUs have offered an alternative proposal that will allow the state to establish a long-term strategy for water efficiency for the products under consideration while allowing additional time to address some of the concerns stakeholders have expressed about the more stringent standards. We urge CEC to consider this proposal. However, if CEC does not support a standard that phases in more stringent standards over time, we will consider dropping our support of new standards altogether. The CA IOUs would rather postpone the adoption of efficiency standards than lock the state into standards that do not establish a clear path forward towards cost-effective water and energy savings.

Thank you for the opportunity to participate in this important rulemaking.

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