Codes and Standards Enhancement (CASE) Initiative For PY2014: Title 20 Standards Development

Addendum 2 to Toilets and Urinals CASE Report

Estimate of Missed Savings if Urinal Efficiency Standard is Set at 0.5 gpf as Opposed to 0.125 gpf

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Introduction

In July 2013, The California Investor Owned Utilities Statewide Codes and Standards Team (IOU C&S Team) submitted a code change proposal to the California Energy Commission (CEC) that recommended a water efficiency standard for urinals of 0.125 gallons per flush (gpf).[1] The CEC has asked the IOU C&S Team to provide water and energy savings estimates for a urinal standard of 0.5 gpf as opposed to the IOU C&S Team's proposed standard of 0.125 gpf. The savings estimates for a 0.5 gpf standard are provided in this addendum. However, the IOU C&S Team stands by our previous recommendation of establishing a urinal efficiency standard of 0.125 gpf. Given the current record-breaking drought (the worse in over 100 years), and predictions that the California climate may become more dry in the future, it is critical that California strive to achieve the greatest possible water savings. As discussed in the CASE Report and reiterated herein, 0.125 gpf urinals are widely available, they are affordable, and they meet consumer's expectations in terms of performance and utility. Adopting a urinal standard of 0.125 gpf will result in the most optimal water and energy savings for the state. The proposed 0.125 gpf standard is not only feasible and cost-effective, it is absolutely necessary.

Water and Energy Savings of 0.125 gpf and 0.5 gpf Urinal Efficiency Standards

Table 1 presents the estimated water and embedded electricity savings associated with updating the water efficiency standard for flushing urinals. The annual sales values represent the water and electricity savings associated with products sold during a given year. The stock values represent the water and electricity savings associated with all products that are installed and operational during a given year. Full stock turn-over is expected to occur in 2026.

If California adopts a 0.125 gpf standard, the annual savings in 2015 will be 210 million gallons of water and 2.1 GWh of embedded electricity. By 2026 the savings from the entire installed stock of urinals will be 2.6 billion gallons of water per year and 26.3 GWh of embedded electricity.

If California adopts a 0.5 gpf standard, the annual savings in 2015 will drop to 75 million gallons of water and 0.8 GWh of embedded electricity. By 2026 the savings from the entire installed stock of urinals will only be 938 million gallons per year and 9.4 GWh of embedded electricity savings.

California will miss out on significant water and electricity savings if CEC adopts a 0.5 gpf urinal standard as opposed to the IOU C&S Team's recommended 0.125 gpf standard. During the first year the standard is in effect (2015), the state will miss out on an annual savings of 134 million gallons of water and 1.3 GWh of embedded electricity. By 2026 the state will be missing out on 1.68 billion gallons of water savings per year and 16.8 GWh of embedded electricity savings per year.

Assumptions and calculation methods used to derive the energy savings estimates presented in Table 1 are described in the CASE Report.

[1] 2013 Title 20 CASE Report, Docket# 12-AAER-2c.

Table 1: Estimated California Statewide Water & Energy Savings if Adopting 0.125 gpf or 0.5 gpf Standard

Product Class	Year	Annual Sales		Stock	
		Water Savings (Mgal/yr)	Embedded Electricity Savings (GWh/yr)	Water Savings (Mgal/yr)	Embedded Electricity Savings (GWh/yr)
Urinals Baseline: 1.0 gpf Standard: 0.125 gpf	2015	210	2.1	210	2.1
	2026	226	2.3	2,614	26.3
Urinals Baseline: 1.0 gpf Standard: 0.5 gpf	2015	75	0.8	75	0.8
	2026	81	0.8	938	9.4
Missed Savings if Standard is 0.5 gpf as opposed to 0.125 gpf	2015	134	1.3	134	1.3
	2026	145	1.5	1,676	16.8

IOU C&S Team Urges CEC to Adopt 0.125 gpf Urinal Standard

IOU C&S Team stands by our previous recommendation to establish a urinal efficiency standard of 0.125 gpf. The IOU C&S Team urges CEC to adopt a 0.125 gpf standard for the reasons highlighted below and in the CASE Report submitted in July 2013.

California Stands to Miss Out on 1.68 Billion Gallons of Water Savings per Year if 0.5 gpf Standard is Adopted

The savings associated with the 0.5 gpf and 0.125 gpf standard are presented in Table 1. During the first year the standard is in effect (2015), the state will miss out on an annual savings of 134 million gallons of water, which is the same amount of water used by 918 four-person households.[2] By 2026 the state will be missing out on 1.68 billion gallons of water savings per year, equivalent to the annual water use from 11,480 four-person households.

California Urgently Needs Water Efficiency and Water Conservation

With dangerously low rainfall and snowpack levels in recent years, communities across the state are working in emergency mode to ensure a reliable supply of water. Furthermore, the impacts of climate change on California's snowpack are projected to create drier conditions, especially in areas already facing scarce water resources. Addressing California's increasing water shortages is a grave and urgent matter; adopting a 0.125 gpf urinal standard is a concrete step in the right direction.

Though the 0.5 gpf standard may be an appropriate national standard, it is not stringent enough for California due to our unique geography and a history of drought unparalleled in other states. Moreover, AB 715 already mandates that urinals sold in California must have an efficiency rating of 0.5 gpf, with 100 percent compliance by January 1, 2014. Establishing a more efficient urinal requirement paves the way for more stringent water efficiency standards in the future. Given that Californians are experiencing the worse drought in recorded

[2] According to EPA, an average household of four people consumes approximately 400 gallons of water each day or 146,000 gallons of water each year http://www.epa.gov/WaterSense/pubs/indoor.html.

history, it behooves CEC to adopt cost-effective standards that will achieve the greatest water savings for the state.

0.125 gpf Urinals Are Widely Available

As of February 6, 2014, there are 275 unique WaterSense labeled urinal fixtures, valves and systems from 21 unique brand names. To be WaterSense labeled, urinals must consume no less than 0.5 gallons per flush. However, 34 percent of the labeled urinal systems exceed the minimum water efficiency level and are rated at 0.125 gpf. The quantity and variety of high-efficiency urinals available for sale is an indication that qualifying products are readily available in California and throughout the United States. Given the current market, it is justifiable for CEC to adopt a standard that goes beyond the voluntary national standard that was developed with heavy industry input 7 years ago. It should also be noted that when the 0.5 gpf WaterSense standard was developed in 2007, 0.125 gpf urinals were are not as prevalent as they are today. It would have been difficult for WaterSense to establish a 0.125 gpf standard at that time given the relative availability of qualifying products. Today, there are many available products that can meet the proposed 0.125 gpf standard.

Low Incremental Cost Between 0.125 gpf and 0.5 gpf Urinals

The IOU C&S Team evaluated the cost of fixtures (bowls) and valves (flush mechanisms) rated between 0 gpf (waterless) and 0.5 gpf that are available on the market and found only a slight increase in incremental cost. The average cost of 0.5 gpf fixtures, valves, and fixture-valve systems was $277, $614, and $884, respectively. The average cost of 0.125 gpf fixtures, valves, and fixture-valve systems was $353, $648, and $786, respectively. This analysis suggests that there is an overall price premium of $77 and $33, respectively, for 0.125 gpf fixtures and valves over the 0.5 gpf alternatives. This represents a premium of about 12 percent. However, the average cost of 0.125 gpf fixture/valve systems was $98 less than the average cost of 0.5 gpf systems. Many manufacturers, such as American Standard, offer 0.125 gpf, 0.5 gpf, and 1.0 gpf urinal systems with similar features for the same price.[3] These systems come with the fixture and the valve for one packaged price. Based on our research, the proposed urinal standard does not impose a significant cost burden to consumers.

Concerns about Residue Build-up in Pipes are not Warranted

To our knowledge there is no evidence that 0.125 gpf urinals cause damage to building pipes. Several years ago, some consumers were concerned that low-flow or waterless urinals could cause build-up in pipes. During the development of the WaterSense specification for high-efficiency urinals, some stakeholders urged that the flush volume should not be lower than 0.5 gpf due to concerns of potential damage to pipes. At that time, 0.125 gpf urinals and waterless urinals were available but they were less prevalent than they are today. Waterless urinals and 0.125 gpf urinals have now been installed at many locations for a period of several years. Though the IOU C&S Team has heard of problems with waterless urinals, we are not aware of issues with pipe build-up from the use of 0.125 gpf urinals.

Conclusion

Adopting a 0.125 gpf urinal standard will result in optimal water and energy savings for the state. Since 0.125 gpf urinals are widely available, comparable in price to 0.5 gpf models, and cost-effective, the IOU C&S Team strongly recommends CEC adopt a urinal standard of 0.125 gpf. The market is ready for a 0.125 gpf urinal

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[3] For example, the American Standard Washbrook Urinals System with Selectronic Flush Valve is available in a 0.125 gpf, 0.5 gpf, or 1.0 gpf configuration; all three packages retail for $938. Model numbers are: 6590.525, 6590.505, and 6501.61.

standard and California should not miss out on the water and energy savings opportunities that abound with a more stringent urinal standard.

Tables from CASE Report Updated for 0.5 gpf Urinal Standard

Table 1 (above) provides the estimated statewide savings impact of adopting a 0.5 gpf standard as opposed to a 0.125 gpf standard. The tables below provide additional information that may be of use to CEC. The values labeled "Urinals: 1.0 to 0.125 gpf" are consistent with the values presented in the CASE Report. The values labeled "Urinals: 1.0 to 0.5 gpf" are new values that apply if the state adopts a 0.5 gpf standard. The table numbers match the table numbers in the CASE Report

Table 5.2. Average Water & Energy Use for Non-Qualifying Products

Product Class	**Unit Water Consumption (gal/yr)**	**Embedded Electricity Consumption (kWh/yr)**
Urinals: 1.0 to 0.125 gpf	3,323	33
Urinals: 1.0 to 0.5 gpf	3,323	33

Table 5.5. Average Water & Energy Use for Qualifying Products

Product Class	**Unit Water Consumption (gal/yr)**	**Embedded Electricity Consumption (kWh/yr)**
Urinals: 1.0 to 0.125 gpf	585	6
Urinals: 1.0 to 0.5 gpf	2,340	24

Table 7.1. California Statewide Non-Standards Case Water & Energy Use

Product Class	Year	**Annual Sales**		**Stock**	
		Water Consumption (Mgal/yr)	Embedded Electricity Consumption (GWh/yr)	Water Consumption (Mgal/yr)	Embedded Electricity Consumption (GWh/yr)
Urinals: 1.0 to 0.125 gpf	2015	268	2.7	3,165	31.8
	2026	290	2.9	3,347	33.6
Urinals: 1.0 to 0.5 gpf	2015	310	3.1	3,660	36.8
	2026	335	3.4	3,871	38.9

Table 7.2 California Statewide Standards Case Water & Energy Use

Product Class	Year	Annual Sales		Stock	
		Water Consumption (Mgal/yr)	Embedded Electricity Consumption (GWh/yr)	Water Consumption (Mgal/yr)	Embedded Electricity Consumption (GWh/yr)
Urinals: 1.0 to 0.125 gpf	2015	59	0.6	2,955	29.7
	2026	63	0.6	733	7.4
Urinals: 1.0 to 0.5 gpf	2015	235	2.4	3,584	36.0
	2026	254	2.5	2,932	29.5

Table 7.3. Estimated California Statewide Water & Energy Savings Standards Case

Product Class	Year	Annual Sales		Stock	
		Water Savings (Mgal/yr)	Embedded Electricity Savings (GWh/yr)	Water Savings (Mgal/yr)	Embedded Electricity Savings (GWh/yr)
Urinals: 1.0 to 0.125 gpf	2015	210	2.1	210	2.1
	2026	226	2.3	2,614	26.3
Urinals: 1.0 to 0.5 gpf	2015	75	0.8	75	0.8
	2026	81	0.8	938	9.4
Missed Savings if adopting 0.5 gpf	2015	134	1.3	134	1.3
	2026	145	1.5	1,676	16.8

Table 7.4 Estimated California Statewide Greenhouse Gas Savings for Standards Case

Product Class	Year	Annual GHG Savings (MT of CO2e/yr)	Stock GHG Savings (MT of CO2e/yr)
Urinals: 1.0 to 0.125 gpf	2015	920	920
	2026	993	11,475
Urinals: 1.0 to 0.5 gpf	2015	330	330
	2026	357	4,119
Missed Savings if adopting 0.5 gpf	2015	590	590
	2026	637	7,356

Table 8.1. Costs and Benefits Per Unit for Qualifying Products

Product Class	Year	Design Life (years)	Lifecycle Costs per Unit (Present Value $)			Lifecycle Benefits per Unit (Present Value $)		
			Incremental Cost	Additional Costs	Total PV Costs	Water Savings	Additional Benefits	Total PV Benefits
Urinals: 1.0 to 0.125 gpf	2015	12	$92	$0	$92	$274	$0	$274
Urinals: 1.0 to 0.5 gpf	2015	12	$0	$0	$0	$98	$0	$98
Missed Savings if adopting 0.5 gpf	2015	---	---	---	---	$176		$176

Table 8.2. Lifecycle Costs and Benefits for Qualifying Products

Product Class	Lifecycle Benefit/Cost Ratio	Net Present Value		
		Per Unit	For First Year Sales ($million)	Stock Turnover NPV (million)
Urinals: 1.0 to 0.125 gpf	2.98	$182	$14	$145
Urinals: 1.0 to 0.5 gpf	n/a (no incremental cost)	$ 98	$7.5	$ 81