

Appliance Standards Awareness Project
American Council for an Energy-Efficient Economy
Earthjustice

January 29, 2025

California Energy Commission
Docket Unit
715 P Street, Sacramento, CA 95814

RE: Docket No. 23-AAER-01: Commercial Food Service Equipment

Dear Commission Staff:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficient Economy (ACEEE), and Earthjustice on the California Energy Commission (CEC) docket for commercial dishwashers. We appreciate the opportunity to provide input to the Commission.

We are pleased that CEC is moving forward with rulemakings for various types of commercial food service (CFS) equipment, including commercial dishwashers. For commercial dishwashers, we encourage CEC to adopt standard levels consistent with the latest version of ENERGY STAR (v3.0). We estimate that such standards would save about 100 GWh of electricity, 1,300 BBtu of gas, and 1.9 billion gallons of water annually in California after full stock turnover. Standards equivalent to ENERGY STAR v3.0 would be highly cost-effective for purchasers, with estimated payback periods of less than two years (and in most cases less than one year) and large life-cycle cost savings.

Adopting standards equivalent to ENERGY STAR v3.0 for commercial dishwashers would provide substantial energy, water, and cost savings. ENERGY STAR v3.0 for commercial dishwashers includes lower maximum idle energy rates for covered commercial dishwasher types in comparison to v2.0 while introducing the first washing energy use requirements.¹ The ENERGY STAR Commercial Food Service (CFS) Equipment Calculator shows that v3.0 provides meaningful per-unit savings for all covered types of commercial dishwashers; ² these per-unit savings are summarized in Table A1 in Appendix A of our comments. For example, v3.0 would yield annual per-unit electricity savings of about 3,600 kWh and 1,100 kWh and annual per-unit water savings of about 15,000 and 94,000 gallons for commonly used low-temperature undercounter dishwashers and stationary single tank door dishwashers, respectively.

We estimate that adopting standard levels equivalent to v3.0 would save about 100 GWh of electricity, 1,300 BBtu of gas, and 1.9 billion gallons of water annually in California after full stock turnover (in 2040), as summarized in Table 1. Cumulatively, this would save about 2 TWh of electricity, 25 TBtu of gas, and 35 billion gallons of water through 2050 in California, as shown in Table 1. We estimate that these energy and water savings would result in about \$73 million in annual bill savings in 2040 for

¹ Water consumption requirements were unchanged between v2.0 and v3.0.

²www.energystar.gov/partner-resources/energy-star-training-center/commercial-food-service

California businesses and \$1.42 billion in cumulative bill savings through 2050, as shown in Table 1. Appendix A contains a description of our methodology for these results.

Table 1: Annual electricity, gas, water, and undiscounted bill savings in CA after stock turnover (in 2040) and cumulative savings through 2050 for commercial dishwashers at standard levels equivalent to ENERGY STAR v3.0.

	Electricity (GWh)	Natural Gas (TBtu)	Water (billion gallons)	Bill Savings (million 2023\$)
2040 Annual Savings	104	1.33	1.85	73
Cumulative Savings Through 2050	1,978	25.3	35.2	1,418

Although we were unable to estimate potential savings from less stringent standards, the CFS Equipment calculator suggests that baseline models on the market today already exceed ENERGY STAR v2.0 idle energy requirements for each covered commercial dishwasher type. Since v2.0 does not include washing energy use requirements, this suggests that v2.0 would not provide any machine-related electricity savings. In other words, while adopting v2.0 would provide water savings and water heating-related energy savings, adopting v3.0 would also provide meaningful additional machine energy savings. For example, the per-unit energy savings of about 1,000 to 4,000 kWh per year for low-temperature dishwashers shown in Table A1 is directly attributable to reduced washing energy use.³

Standard levels consistent with ENERGY STAR v3.0 are highly cost-effective for CA businesses. Table 2 summarizes the per-unit incremental cost, first-year bill savings, simple payback period (PBP) and life-cycle cost (LCC) savings for different commercial dishwasher types meeting ENERGY STAR v3.0. Based on the CFS Equipment calculator, incremental costs range from \$0 to about \$3,300 for machines that can cost upwards of ten thousand dollars or more. However, these costs are quickly paid back through reduced operating costs, with first-year bill savings ranging from \$230 to nearly \$7,400 depending on the dishwasher type.

Estimated simple payback periods range from 0 to 1.8 years, which is much shorter than the estimated product lifetime (10 years). The simple PBPs for commonly purchased low-temperature undercounter, low-temperature stationary single tank, and high-temperature undercounter dishwashers are all less than one year. Our estimated LCC savings for all product categories are significant, ranging from about \$1,800 to nearly \$60,000 depending on the category.⁴ For example, the LCC savings for common low-temperature undercounter and stationary single tank products are about \$8,000 and \$21,000, respectively.

³High-temperature dishwashers also have electricity savings associated with reduced electric booster heating.

⁴We assumed a 5% discount rate for operating costs after the purchase year.

Table 2: Estimated per-unit incremental cost, first-year bill savings, simple PBP, and LCC savings for commercial dishwashers at standard levels equivalent to ENERGY STAR v3.0.

Type		Incremental Cost (\$)	First Year Bill Savings (\$)	Simple PBP (years)	LCC Savings (\$)
Low-temperature	Undercounter	234	1,006	0.2	8,047
	Stationary Single Tank Door	1,469	2,599	0.6	20,587
	Single Tank Rack Conveyor	0	2,348	0	19,815
	Multiple Tank Rack Conveyor	970	3,503	0.3	28,556
High-temperature	Undercounter	156	230	0.7	1,771
	Stationary Single Tank Door	3,309	1,886	1.8	12,378
	Single Tank Rack Conveyor	2,050	1,658	1.2	11,610
	Multiple Tank Rack Conveyor	970	7,386	0.1	59,678
	Pot, Pan, Utensil	1,710	1,855	0.9	13,346

We do not believe that adopting commercial dishwasher efficiency standards consistent with ENERGY STAR v3.0 would cause market disruptions or impact performance. EPA’s 2023 ENERGY STAR unit shipment data⁵ show that over half of commercial dishwasher sales already meet ENERGY STAR v3.0 requirements. Furthermore, there are more than 360 commercial dishwashers currently certified by

⁵www.energystar.gov/partner-resources/products_partner_resources/brand-owner/unit-shipment-data

ENERGY STAR, including dozens of models of each of the most commonly sold types;⁶ many of these certified commercial dishwashers use less energy and water than the ENERGY STAR requirements. Colorado has also already adopted v3.0 in their appliance efficiency regulations.

We are also not aware of any performance-related issues with ENERGY STAR certified commercial dishwashers. All commercial dishwashers must pass the NSF 3 test for food safety, which includes requirements for minimum rinse temperature and cleaning performance. A recent report submitted by the California Investor-Owned utilities also notes that all commercial dishwashers provide fast and effective cleaning and that the cleaning efficacy for both efficient and less efficient products is generally the same.⁷ Taken together, we do not expect any cleaning performance issues would arise from the adoption of standard levels consistent with ENERGY STAR v3.0.

Thank you for considering these comments.

Sincerely,

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⁶There are about 80 certified undercounter, 100 stationary single-tank, 65 single-tank conveyor, and 35 multi-tank conveyor models. Accessed December 13, 2024. data.energystar.gov/Active-Specifications/ENERGY-STAR-Certified-Commercial-Dishwashers/pk8q-dim8/about_data

⁷CA IOU CASE Report. p. 37. efiling.energy.ca.gov/GetDocument.aspx?tn=254440&DocumentContentId=89825

Appendix A. Methodology and Assumptions for Savings Estimates

Our general methodology is based on estimates of per-unit savings and annual shipments. We first estimated national annual electricity, natural gas, and water savings for commercial dishwashers at efficiency levels reflecting ENERGY STAR v3.0 based on estimated annual shipments in the year the standard takes effect (assumed to be 2027); per-unit energy and water savings; and average product lifetime (assumed to be 10 years for all categories). Our analysis inputs, summarized in Table A1, are based on data from ENERGY STAR: our estimates for per-unit savings are based on the recently updated ENERGY STAR CFS Equipment Calculator⁸ and our estimates for national shipments and the portion of sales already meeting v3.0 (53%) are based on ENERGY STAR’s 2023 unit shipment data.⁹ For our LCC estimates, we assumed a purchase year of 2027 and discounted future bill savings (i.e., for 2028-2036) using a 5% discount rate. We assumed that both annual shipments and baseline product efficiency remain constant over time. In reality, both shipments and base case efficiency tend to increase over time. Thus, we implicitly assumed that these two factors cancel each other out.

Table A1. Analysis inputs for commercial dishwashers.

Dishwasher Type		Per-Unit Electricity Savings (kWh)	Per-Unit Natural Gas Savings (MMBtu)	Per-Unit Water Savings (thousand gallons)	California Shipments (thousand)
Low-Temperature	Under Counter	3,643	14.8	11	4.6
	Stationary Single Tank Door	1,102	94.0	68	
	Single Tank Conveyor	2,336	75.9	55	
	Multi Tank Conveyor	4,052	109.5	79	
High-Temperature	Under Counter	399	6.3	5	2.6
	Stationary Single Tank Door	4,874	40.9	29	
	Single Tank Conveyor	5,940	24.8	18	
	Multi Tank Conveyor	28,896	94.2	68	
	Pot, Pan, Utensil	9,474	8.8	6	

⁸www.energystar.gov/partner-resources/energy-star-training-center/commercial-food-service

⁹www.energystar.gov/partner-resources/products_partner_resources/brand-owner/unit-shipment-data

Low- and High-temperature	Single Tank Door	2,988	67.4	48	1.4
	Single Tank Rack Conveyor	4,138	50.4	36	
	Multiple Tank Rack Conveyor	16,474	101.8	73	

We used the equation below to calculate savings in each year of the analysis:

$$\text{Annual savings} = \text{Number of installed units} \times \text{Per-unit savings}$$

where the number of installed units is:

$$\text{Before full stock turnover: Annual shipments} \times (\text{Number of years after compliance date} + 0.5)$$

$$\text{After full stock turnover: Annual shipments} \times \text{Average product lifetime}$$

In calculating the number of installed units meeting the new standards prior to full stock turnover, we accounted for products being purchased throughout the year. Thus, in any given year we counted only one-half year of savings from products purchased in that year.

We calculated California water, electricity, and natural gas savings by allocating national product sales to California. We assumed that shipments scale with state population, resulting in 11.6% of national commercial dishwasher shipments being allocated to California. We calculated water bill savings using regional water and wastewater prices for the Western region derived from a 2020 American Water Works Association/Raftelis survey and water price trends for each year of the analysis period from DOE’s recent clothes washer final rule analysis.¹⁰ We calculated electricity and gas bill savings using California electricity and natural gas prices for the commercial sector. We used price projections from the US Energy Information Administration’s (EIA’s) Annual Energy Outlook (AEO) 2023 to calculate electricity prices for each of the NERC regions for each year of the analysis period relative to 2023 prices.¹¹ We then applied these projections for the NERC regions to 2023 California electricity prices.¹² Since California spans more than one NERC region, we calculated weighted-average projected changes in electricity prices based on electricity sales. For natural gas, we used price projections from EIA’s AEO 2023 to calculate prices for the Pacific Census region for each year of the analysis period relative to 2023 prices. We then applied these regional price projections to 2023 California natural gas prices to project future California gas prices.¹³

¹⁰“Energy_Water Price Trends” sheet of LCC spreadsheet. www.regulations.gov/document/EERE-2017-BT-STD-0014-0513.

¹¹www.eia.gov/outlooks/aeo/

¹²EIA-861 Annual Electric Power Industry Report. www.eia.gov/electricity/data/state/

¹³www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PRS_DMcf_a.htm