

# Update to “States Go First: How States Can Save Consumers Money, Reduce Energy and Water Waste, and Protect the Environment with New Appliance Standards”

## Appliance Standards Awareness Project October 2019

In our 2017 report, “States Go First,”<sup>1</sup> we estimated state-by-state potential savings from 21 recommended state-level appliance standards. In 2018 we updated that analysis for our state appliance standards recommendations for 2019. Here we describe our most recent analysis for our state appliance standards recommendations for 2020.

For 2020, we are recommending that states adopt standards for the following 20 products:

- Air compressors
- Air purifiers
- Commercial dishwashers
- Commercial fryers
- Commercial hot-food holding cabinets
- Commercial ovens
- Commercial steam cookers
- Computers and computer monitors
- Electric vehicle supply equipment
- Faucets
- High CRI, impact-resistant, and cold temperature fluorescent lamps<sup>2</sup>
- Portable air conditioners
- Portable electric spas
- Residential ventilating fans
- Showerheads
- Spray sprinkler bodies
- Toilets (water closets)
- Uninterruptible power supplies
- Urinals
- Water coolers

As described below, our new analysis reflects the following:

- The addition of two new recommended standards and updates to the recommended standard levels for four additional products;
- Updated information on annual shipments and current market penetration;
- Updated information on incremental cost for one product; and
- Updated assumptions for energy prices and emissions factors.

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<sup>1</sup> [appliance-standards.org/sites/default/files/States%20Go%20First.pdf](https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf).

<sup>2</sup> We are expanding this lighting category to include two types of fluorescent lamps (impact-resistant and cold temperature) that have the potential to become loopholes in the federal standards.

We also made significant updates to our analysis for spray sprinkler bodies to reflect new information on water savings.

We assumed a compliance date of 2022 for all the standards, and we estimated savings from sales through 2035. Our updated analysis uses 2018\$ for costs and utility bill savings.

### Product scope and standard levels

For our 2020 analysis we have added two new recommended standards for commercial ovens and electric vehicle supply equipment:

- Commercial ovens are used in commercial kitchens and can be powered by either electricity or gas. Most commercial ovens are convection ovens. Our recommended standard for commercial ovens is based on ENERGY STAR Version 2.2, which took effect in 2015 and requires that ovens meet a minimum cooking efficiency requirement and a maximum idle (or standby) energy rate. Convection ovens meeting ENERGY STAR Version 2.2 consume about 15% less energy than standard models.<sup>3</sup> In 2018, 60% of shipments of commercial ovens were ENERGY STAR qualified.
- Electric vehicle supply equipment is used to charge electric vehicles. Our recommended standard for electric vehicle supply equipment is based on ENERGY STAR Version 1.0, which took effect in December 2016. The ENERGY STAR specification applies to Level 1 chargers (which operate at 120 V), Level 2 chargers (which operate at 208 or 240 V), and combined chargers. Electric vehicle supply equipment meeting ENERGY STAR Version 1.0 use about 40% less energy than standard models in standby mode.<sup>4</sup> In 2018, 7% of shipments of electric vehicle supply equipment were ENERGY STAR qualified.

Our recommended standard levels for the other 18 products are the same as those in our analysis for 2019 except for air purifiers, commercial hot-food holding cabinets, portable electric spas, and residential ventilating fans:

- Air purifiers: In our 2017 report we analyzed standards for air purifiers based on ENERGY STAR Version 1.2, which took effect in 2004. ENERGY STAR is in the process of finalizing an updated specification (Version 2.0). The new specification is based on the clean air delivery rate (CADR) for smoke, while the current specification uses the CADR for dust. In addition, while the current specification contains a single efficiency level for all air purifiers, the new specification includes different levels for three capacity bins. For our 2020 analysis we updated our recommended standard to use the new smoke CADR metric and the new capacity bins, but to maintain the same stringency (i.e. almost all air purifiers that meet the current ENERGY STAR specification (Version 1.2) would also meet our recommended standard levels).
- Commercial hot-food holding cabinets: In our 2017 report we analyzed standards for commercial hot-food holding cabinets based on ENERGY STAR Version 1.0, which took

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<sup>3</sup> [https://www.energystar.gov/sites/default/files/asset/document/EPA\\_ES\\_CFS\\_Ovens\\_Factsheet\\_v13.pdf](https://www.energystar.gov/sites/default/files/asset/document/EPA_ES_CFS_Ovens_Factsheet_v13.pdf).

<sup>4</sup> <https://www.energystar.gov/products/other/evse>.

effect in 2003. For our 2020 analysis we updated our recommended standard level to reflect the current ENERGY STAR specification (Version 2.0), which took effect in 2011. As of 2018, 21% of shipments of commercial hot-food holding cabinets met ENERGY STAR Version 2.0.

- Portable electric spas: In our 2017 report we analyzed standards for portable electric spas based on an ANSI standard for portable electric spa efficiency (ANSI/ APSP/ICC 14-2014). The ANSI standard is in the process of being updated to align with recent standards adopted in California. The updated standard includes more stringent limits for standby power consumption and expands the scope to cover inflatable spas. For our 2020 analysis we updated our recommended standard level to reflect the 2019 version of the ANSI standard.
- Residential ventilating fans: In our 2017 report we analyzed standards for residential ventilating fans based on ENERGY STAR Version 3.2, which took effect in 2012. For our 2020 analysis we updated our recommended standard level to reflect the current ENERGY STAR specification (Version 4.1), which took effect in 2015. About 80% of the bathroom and utility room ventilating fans in the Home Ventilating Institute (HVI) database meet ENERGY STAR Version 4.1.

#### Annual shipments and current market penetration

For our 2020 analysis we used up-to-date estimates of annual shipments for the assumed compliance date of 2022. For products with an ENERGY STAR specification, we used shipment information from the ENERGY STAR Unit Shipment Report for 2018.<sup>5</sup> For electric vehicle supply equipment we used a forecast of electric vehicle sales through 2028 and assumed an annual growth rate of 15% post-2028.<sup>6</sup> The other sources we used for estimates of annual shipments are the same as those we used for our 2017 report, except for portable electric spas. For portable electric spas, we previously had used an estimate of shipments from 2014. For our 2020 analysis we updated our shipments estimate for portable electric spas based on analysis from a recent California rulemaking.<sup>7</sup>

We also incorporated the most recent data on the estimated market share of products already meeting our recommended standard levels. For products with an ENERGY STAR specification, we used data on market penetration from the ENERGY STAR Unit Shipment Report for 2018. (For air purifiers, we had previously estimated market penetration using the AHAM Verifide product list. For our 2020 analysis we updated our estimate of market penetration based on the ENERGY STAR Unit Shipment Report.) For the plumbing products (faucets, showerheads, toilets, and urinals), we used data from the DOE Compliance Certification Database.<sup>8</sup> For the

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[https://www.energystar.gov/ia/partners/downloads/unit\\_shipment\\_data/2018/2018%20Unit%20Shipment%20ata%20Summary%20Report%20.pdf?e993-3589](https://www.energystar.gov/ia/partners/downloads/unit_shipment_data/2018/2018%20Unit%20Shipment%20ata%20Summary%20Report%20.pdf?e993-3589).

<sup>6</sup> <https://evadoption.com/ev-sales/ev-sales-forecasts/>.

<sup>7</sup> <https://efiling.energy.ca.gov/GetDocument.aspx?tn=222413&DocumentContentId=31256>.

<sup>8</sup> [www.regulations.doe.gov/certification-data/#q=Product\\_Group\\_s%3A\\*](http://www.regulations.doe.gov/certification-data/#q=Product_Group_s%3A*).

remaining products, the market penetration estimates in our 2017 report represent the most recent available data.

### Incremental costs

For air purifiers, we updated our estimate of incremental cost based on information from ENERGY STAR.<sup>9</sup> We also used information from ENERGY STAR on the incremental cost for commercial ovens and electric vehicle supply equipment.<sup>10</sup>

### Energy prices and emissions factors

We updated our assumptions for energy prices based on state-by-state electricity and natural gas prices for 2018 and 2017, respectively, and EIA's energy price projections in AEO 2019.<sup>11</sup> For emissions factors for NO<sub>x</sub>, SO<sub>2</sub>, and CO<sub>2</sub>, we used EIA's projections for each of the NERC regions from AEO 2019.

### Spray sprinkler bodies

In our 2017 report we assumed per-unit percentage savings for spray sprinkler bodies of 10% based on information from the supporting analysis for the WaterSense specification. The percentage savings for spray sprinkler bodies depend on the water pressure at the inlet of the spray sprinkler (with higher water pressures corresponding to greater savings). EPA had limited data on average water pressures at the time of the analysis for the WaterSense specification, which suggested that average water pressure was about 40 psi.

For our 2020 analysis we updated our estimate of percentage savings based on analysis from the California Energy Commission (CEC) for standards recently adopted in California. Specifically, the CEC analysis used data from more than 300 California water utilities which showed average system operating pressure to be 81 psi.<sup>12</sup> CEC estimated average water pressure at the inlet to a spray sprinkler to be 61 psi after accounting for pipe losses and irrigation valve losses.<sup>13</sup> We confirmed that an average system operating pressure of 81 psi is representative of the U.S. as a whole by examining data from the American Water Works Association (AWWA) for 26 water utilities across the country for 2014 and 32 water utilities for 2015. The average system operating pressure for the cities in these data sets was 82 psi for both 2014 and 2015. Based on this information we updated our analysis to use the per-unit percentage savings in the CEC analysis of 18%.

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<sup>9</sup> [https://www.energystar.gov/sites/default/files/asset/document/appliance\\_calculator.xlsx](https://www.energystar.gov/sites/default/files/asset/document/appliance_calculator.xlsx).

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[https://www.energystar.gov/sites/default/files/asset/document/commercial\\_kitchen\\_equipment\\_calculator\\_0.xlsx](https://www.energystar.gov/sites/default/files/asset/document/commercial_kitchen_equipment_calculator_0.xlsx); personal communication from Daniel Lawlor (The Cadmus Group) to Chris Granda, June 20, 2019.

<sup>11</sup> [https://www.eia.gov/electricity/sales\\_revenue\\_price/pdf/table4.pdf](https://www.eia.gov/electricity/sales_revenue_price/pdf/table4.pdf); [www.eia.gov/naturalgas/annual/pdf/table\\_024.pdf](https://www.eia.gov/naturalgas/annual/pdf/table_024.pdf); [www.eia.gov/outlooks/aeo/](https://www.eia.gov/outlooks/aeo/).

<sup>12</sup> <https://efiling.energy.ca.gov/GetDocument.aspx?tn=227860&DocumentContentId=59234>. p. 13.

<sup>13</sup> Ibid. p. A-11.

We also updated our analysis for 2020 to incorporate savings from spray sprinkler bodies used in the commercial sector. (Our analysis for our 2017 report estimated savings for the residential sector only.) Specifically, we used shipment estimates from the CEC analysis which showed that commercial shipments are 31% of residential shipments.<sup>14</sup>

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<sup>14</sup> Ibid. p. A-7.