

# Strong U.S. Energy Efficiency Standards: Decades of Using Energy Smarter

## The U.S. Appliance Standards Program Has a Long History of Success, Bipartisan Support, and Saving Americans Money

Wasted energy means wasted money. National energy efficiency standards set by the U.S. Department of Energy for more than 50 types of household appliances and commercial products in our homes, businesses, and industries help cut that waste: they set a dependable minimum level of efficiency that all Americans can count on to reduce energy and lower their utility bills. For almost four decades, efficiency standards for appliances and equipment have proved to be among the country's most successful energy policy tools, not only saving consumers money and cutting consumption, but also sparking innovation, creating jobs, and reducing pollution. In fact, taking into account all of the benefits that have accrued since national standards were first set, by 2035 U.S. electricity consumption will be reduced by 14 percent, climate-changing pollution will be lowered by the equivalent of the annual emissions from 100 million cars, and America's consumers and businesses will have saved more than \$1 trillion after accounting for costs. All of this would be done while providing the same or higher level of comfort and product performance.<sup>1</sup> The financial savings are spent on other goods and services throughout the economy, which creates jobs—an estimated 340,000 by the end of 2010.<sup>2</sup>

These are a few of the numerous reasons why many consumers, states, energy efficiency advocates, utilities, and manufacturers support energy efficiency standards.

The Department of Energy (DOE) appliance standards program currently covers products that account for about 90 percent of residential energy use, 60 percent of commercial, and 29 percent of industrial usage.<sup>3</sup> These products include everything from common household appliances like refrigerators and air conditioners to commercial and industrial equipment like electric motors and distribution transformers. Efficiency standards have a long history of bipartisan support. In 1987, President Ronald Reagan signed the first federal law establishing energy efficiency standards; President George W. Bush signed legislation strengthening the program in 2005 and 2007; and President Barack Obama has made efficiency standards one of the cornerstones of his energy strategy. Appliance standards are key to advancing the transition of our economy to a clean energy future while reducing emissions of climate-changing pollution.

### CURRENT APPLIANCE & EQUIPMENT ENERGY EFFICIENCY STANDARDS WILL LEAD TO:

 **14%** REDUCTION IN ESTIMATED U.S. ELECTRICITY CONSUMPTION

 **470 MILLION** TONS OF CARBON POLLUTION CUT ANNUALLY

=  **118** COAL-FIRED POWER PLANTS' ANNUAL EMISSIONS

=  **100 MILLION** CARS' ANNUAL EMISSIONS

 **\$1.1 TRILLION** IN CUMULATIVE NET CONSUMER SAVINGS

 **950 TRILLION** BTU REDUCTION IN ANNUAL NATURAL GAS CONSUMPTION

=  ENOUGH TO HEAT **32%** OF U.S. HOMES USING NATURAL GAS

**ALL BY 2035!**



For more information,  
please contact:

**Elizabeth Noll** enoll@nrdc.org

**Meg Waltner** mwaltner@nrdc.org

[www.nrdc.org/energy](http://www.nrdc.org/energy)

[www.facebook.com/nrdc.org](https://www.facebook.com/nrdc.org)

[www.twitter.com/nrdcenergy](https://www.twitter.com/nrdcenergy)

## EFFICIENCY STANDARDS: A MULTITUDE OF BENEFITS

### Americans save big with efficiency standards

Efficiency standards for appliances and equipment have resulted in significant energy savings. Thanks to existing standards, U.S. electricity use was about 7 percent lower in 2010 than it would have been otherwise; this number is projected to grow to 14 percent by 2035 (see Figure 1). The dollar savings add up, too: Total net savings from existing appliance and equipment standards will exceed \$1 trillion by then. And these savings just keep growing.<sup>4</sup> Accounting for energy bill savings from eight common home appliances, a typical household could save almost \$10,000 over the life of the products.<sup>5</sup>

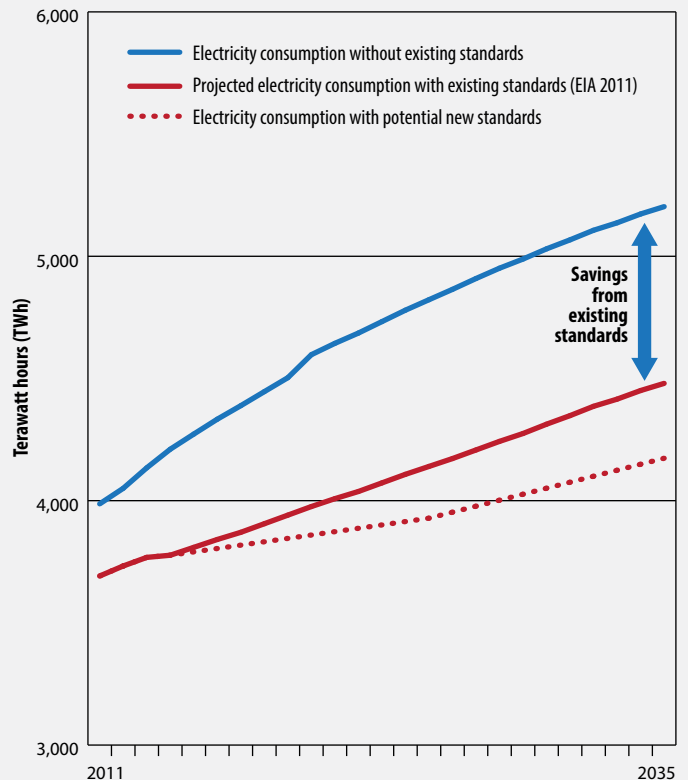
### It's not just about energy bill savings; it's also about protecting health

Cutting energy consumption reduces the harmful pollution from generating electricity by burning fossil fuels. Existing standards will reduce carbon dioxide pollution by 470 million metric tons (MMT) per year by 2035—equivalent to the annual carbon emissions of almost 100 million cars or 118 average coal-fired power plants.<sup>6</sup> Standards also help reduce other power sector pollutants, including nitrogen oxides, sulfur dioxide, and mercury. All of these pollutants have a wide variety of negative effects on public health, such as a worsening of asthma symptoms, exacerbation of allergies, premature deaths, neurological impacts, and increased risk of heart attacks.<sup>7</sup> Appliance efficiency standards reduce this harmful pollution while saving consumers money, underscoring that healthier children and a healthier economy go hand in hand.

### Consumers get energy savings and high-performing products

Energy efficiency means using less energy while getting the same or better energy performance, whether we need a cold drink from the refrigerator or hot water for a shower. Research has shown that standards deliver just that. For example, since the first standards for refrigerators were set, they have gotten bigger and quieter and offer added features, all while keeping the lettuce just as fresh and our energy bills down. A new refrigerator meeting the 2014 standards uses about a quarter of the energy of its 1973 counterpart, offers 20 percent more storage, and costs half as much.<sup>8,9</sup> And a recent analysis by the American Council for an Energy-Efficient Economy (ACEEE) and the Appliance Standards Awareness Project (ASAP) that looked at how performance and features have changed over time for 10 products found that performance has generally stayed the same or improved, and that manufacturers are now offering a greater range of product features to consumers even as standards have taken effect.<sup>10</sup> Meanwhile, a separate ASAP study showed \$300 in annual utility bill savings for five household appliances compared to the same items purchased in 1992, as shown in Figure 2.

**Figure 1: U.S. Electricity Savings from Existing and Potential Standards**



Source: ACEEE and ASAP<sup>11</sup>

## Lighting Standards Spur Jobs and Innovation

Energy efficiency standards for everyday light bulbs, phased in beginning in 2012, have given bulbs their first major technology update since the days of Thomas Edison. U.S. lighting manufacturers are creating American jobs to meet the new demand for efficient lighting here at home. The standards have jump-started domestic industry investment in research, development, and production of more efficient lighting products, the result of which is new jobs created. In 2010, the U.S. energy efficient lighting sector employed more than 14,000 workers in assembly and manufacturing, research, engineering, marketing, and other professions, according to the Brookings Institution.<sup>12</sup> For example, dozens of companies in Ohio contributed 1,500 jobs to this growth, and this number does not include more recent job growth at companies like GE and TCP.<sup>13</sup> These and other companies are creating much-needed jobs that lead to lower energy bills for homes and businesses, and cut pollution that harms Americans' health.

## Efficiency standards produce jobs

Not only does the innovation prompted by standards create employment, efficiency standards add jobs to the U.S. economy when consumers and businesses spend the money saved on energy bills on other, more labor-intensive goods and services. Existing efficiency standards generated about 340,000 jobs by the end of 2010, the last time such an analysis was conducted.<sup>14</sup> ACEEE and ASAP have projected that approximately 100,000 jobs could be created by 2030 from additional standards in the pipeline.

## Preventing blackouts

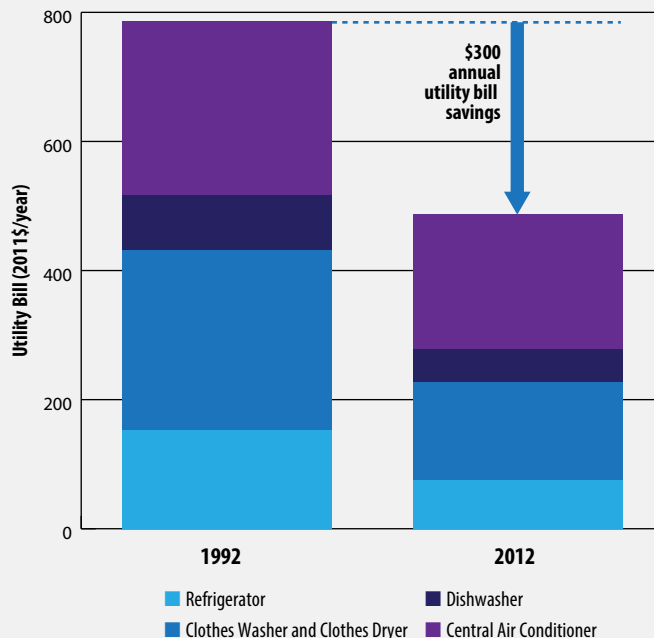
Efficiency standards help to prevent power blackouts that strike during times of peak electricity demand. On a hot summer afternoon, air conditioners are running at full blast, while computers, lights, and other appliances demand energy simultaneously and strain the electric system. Appliance standards, and in particular standards for air conditioners, help cut electricity consumption, including peak demand. Existing efficiency standards will decrease peak electricity demand by 240 gigawatts in 2035, more than twice the capacity of all the nuclear power plants in the United States, reducing the risk of rolling brownouts or outright blackouts.<sup>15</sup>

## LOOKING UNDER THE HOOD: HOW THE PROCESS WORKS

### Appliance standards are set to achieve maximum technically feasible and cost-effective savings

Generally speaking, federal law requires DOE to review existing standards every six years and to evaluate new product categories as opportunities for energy savings emerge. DOE is required to set standards at the maximum levels that are “technologically feasible and economically justified.” To determine whether a standard meets these criteria, DOE analyzes potential consumer savings, the impact on manufacturers, and the nationwide benefits, developing this analysis through an open and transparent multistage process that allows for input from stakeholders including manufacturers, utilities, efficiency and environmental advocates, and consumers. NRDC has been

**Figure 2: Annual Utility Bill to Operate Five Household Appliances That Just Meet Current Efficiency Standards vs. the Same Items Purchased in 1992**



a leader in advocating for improved standards since the program began. After thorough analysis using the best data available, and responding to comments and input from interested parties, DOE sets a technology-neutral minimum efficiency level that will take effect generally three to five years later, leaving manufacturers to innovate and find new ways to achieve even greater energy savings. While most standards go through the formal rule-making process, other pathways are sometimes used, such as negotiations that bring together industry and advocates to develop a proposed standard. Efficiency standards are always set at levels that are cost-effective for consumers, meaning that energy bill savings will outweigh any incremental increase in product cost, often by a wide margin. The economy-wide benefits of pollution emissions reductions are another important benefit from cost-effective appliance standards.

### REFRIGERATORS



BETWEEN 1987 AND 2010, REAL PRICES DECREASED BY ABOUT 35%

35%

WHILE AVERAGE ENERGY USE DECREASED BY MORE THAN 50%

50%

### CLOTHES WASHERS



BETWEEN 1987 AND 2010, REAL PRICES DECREASED BY ABOUT 45%

45%

WHILE AVERAGE ENERGY USE DECREASED BY 75%

75%

### DISHWASHERS



BETWEEN 1987 AND 2010, REAL PRICES DECREASED BY ABOUT 30%

30%

WHILE AVERAGE ENERGY USE DECREASED BY 50%

50%

Source: ASAP<sup>17</sup>

## Standard, ENERGY STAR™, EnergyGuide: What's the Difference?

As required by law, federal energy efficiency standards establish a mandatory minimum level of energy efficiency for a range of household, commercial, and industrial products. The complementary ENERGY STAR program is a voluntary certification program that identifies the top-performing products on the market (generally the top 25 percent) and allows manufacturers to add the blue ENERGY STAR logo to their products. ENERGY STAR specifications are often updated more frequently than federal standards, depending on the product category, and once updated also take effect more quickly. ENERGY STAR helps consumers easily identify products that will provide additional energy savings beyond the minimum efficiency levels required by law. Finally, many products also have a yellow EnergyGuide label. This label is mandatory for certain product categories (e.g., refrigerators, furnaces, water heaters, and dishwashers) and gives consumers information on how the product model compares with others in terms of operating cost, efficiency, and/or annual energy use. EnergyGuide labels, ENERGY STAR, and minimum efficiency standards work together to help move the market to greater levels of energy efficiency. While information provided by ENERGY STAR and EnergyGuide are very important in aiding consumer decision-making, without minimum standards, energy savings would be left on the table.

## Why do we need standards?

Without standards, cost-effective energy efficiency opportunities would be lost, leading to unnecessarily high energy bills, increased energy consumption, and more harmful pollution. Even though any incremental cost of more efficient appliances is paid back and then some through energy bill savings over the life of the product, various barriers often prevent these savings from being achieved. A classic example is what economists call split incentives. For instance, a landlord buying a furnace might look only at the initial price, rather than the cost over the life of the product, potentially sticking his tenants with higher energy bills. Or a homeowner may not have time to research a new water heater's long-term cost when his old one breaks; instead he may simply choose whichever one is on the repairman's truck. By setting minimum energy-savings levels for these and other products, standards help capture at least minimum cost-effective energy efficiency opportunities that might otherwise be missed.

## National energy efficiency standards provide certainty for manufacturers

The federal appliance efficiency program provides certainty and clarity on the standard-setting process and avoids a patchwork of state regulations. This allows manufacturers to implement improvements and innovations at their production facilities in coordination with updated standards well in advance of their effective date. As a result, manufacturers make better products and the energy savings often come at lower cost than estimated. A recent study of nine appliance rulemakings found that while DOE anticipated small increases in the prices of the covered products, manufacturer selling prices actually decreased by \$12 on average.<sup>18</sup>

## States play a key role in the process

One important feature of the appliance standards law is that national energy efficiency standards preempt state-level ones under most circumstances—meaning that states cannot establish different requirements from those set nationally. This provides certainty to manufacturers that they won't have to comply with different standards in different states. However, states can set standards for products that are not yet subject to national standards. California has led the way historically, continually finding new opportunities for cost-effective energy savings. California is currently considering standards for 15 new products that could save its consumers and businesses \$1.2 billion in annual energy costs.<sup>19</sup> The state is home to one in eight U.S. consumers, so its standards often pave the way for federal standards. While California has been a leader, in the past decade more than a dozen other states have set standards for products ranging from DVD players to swimming pool pumps.







## A new gas furnace standard is decades overdue

The current standard for the natural gas furnaces that heat our homes has remained essentially unchanged since 1987, despite vast improvements in technology since then. With about 40 percent of residential energy use going toward heating, this is an area overdue for improvement.<sup>23</sup> DOE missed a deadline to set a standard in 1994; when it finally issued a strong one in 2011, the standard was tied up by a legal challenge and now is back at DOE.<sup>24</sup> In the meantime, consumers continue to be stuck with inefficient furnaces. DOE projected that its 2011 standard would have saved Americans an estimated \$10.7 billion in lower heating bills over the next 30 years, saving enough natural gas to heat 62 million homes for a year and avoiding as much pollution as is produced by 30 coal-fired power plants annually.<sup>25</sup> As the extreme temperatures of the January 2014 polar vortex drove home, heating bills are expensive. Getting the furnace standard back on track is a big deal—especially for low- and fixed-income families, which spend a higher proportion of their earnings on energy bills.

## SIGNIFICANT PROGRESS, BUT MORE OPPORTUNITIES AWAIT

History has shown that energy efficiency is the low-hanging fruit that keeps growing back. For example, standards for refrigerators have been updated multiple times, and after each update, new cost-effective opportunities have emerged thanks to technological progress and manufacturing ingenuity. Additional energy savings remain on the horizon, both from the introduction of standards for new product categories and from updated standards that reflect technological advances in existing product categories.

To date, the Obama administration has set efficiency standards that will bring consumers more than \$420 billion in net savings.<sup>20</sup> In 2013, as part of his Climate Action Plan, President Obama set a goal of reducing carbon dioxide emissions by 3 billion metric tons by 2030 from appliance and building efficiency standards. The goal is substantial, but the administration is well on its way to meeting it, with more than 2 billion metric tons accounted for from standards already finalized.<sup>21</sup> However, there is still significant potential for consumer savings and emissions reductions from standards just around the corner. ASAP estimates that about another 800 million metric tons of climate-changing emissions reductions could be achieved

by 2030 from products analyzed in its 2012 report “Efficiency Boom,” which evaluated energy-savings opportunities from standards.<sup>22</sup> Upcoming rulemakings with significant potential savings include commercial and industrial pumps and fans, residential furnaces, and commercial air conditioners, among many others.

## Energy efficiency standards can create a better future

As the cheapest, cleanest, and quickest-to-implement energy policy, efficiency is a critical component in our national effort to meet our energy demands and climate goals, now and in the future. Efficiency standards for appliances and equipment already have cost-effectively saved the United States a considerable amount of energy, lowered emissions of greenhouse gases and other pollutants, and saved consumers billions of dollars, and they will continue to do so. As appliances evolve and improve, new opportunities to reduce energy waste through standards will continue to emerge, eliminating the need to build additional power plants and avoiding the associated pollution while cutting customer utility bills.

## ENDNOTES

- 1 Amanda Lowenberger et al. "The Efficiency Boom: Cashing In on the Savings from Appliance Standards." American Council for an Energy-Efficient Economy (ACEEE), March 8, 2012.
- 2 Rachel Gold et al. "Appliance and Equipment Efficiency Standards: A Moneymaker and Job Creator." ACEEE, January 26, 2011.
- 3 U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy, "Saving Energy and Money with Appliance and Equipment Standards in the United States." DOE/EE-1086, May 2014. <http://energy.gov/sites/prod/files/2014/05/f16/Saving%20Energy%20and%20Money2.pdf> (accessed October 20, 2014).
- 4 Lowenberger et al. "The Efficiency Boom."
- 5 Appliance Standards Awareness Project, "Household Savings Learn More." <http://www.appliance-standards.org/content/household-savings-learn-more> (accessed October 20, 2014).
- 6 Ibid.
- 7 Diane Bailey, "Gasping for Air: Toxic Pollutants Continue to Make Millions Sick and Shorten Lives." Natural Resources Defense Council, July 2011, <http://www.nrdc.org/health/files/airpollutionhealthimpacts.pdf> (accessed October 20, 2014).
- 8 Joanna Mauer et al. "Better Appliances: An Analysis of Performance, Features, and Price as Efficiency Has Improved." ACEEE, May 20, 2013.
- 9 Steven Nadel and Andrew deLaski, "Appliance Standards: Comparing Predicted and Observed Prices." ACEEE, July 30, 2013. [http://www.appliance-standards.org/sites/default/files/Appliance\\_Standards\\_Comparing\\_Predicted\\_Expected\\_Prices.pdf](http://www.appliance-standards.org/sites/default/files/Appliance_Standards_Comparing_Predicted_Expected_Prices.pdf).
- 10 Ibid.
- 11 Lowenberger et al. "The Efficiency Boom."
- 12 Mark Muro, Jonathan Rothwell, and Devashree Saha. "Sizing the Clean Economy: A National and Regional Green Jobs Assessment." Brookings Institution, July 13, 2011.
- 13 Ibid.
- 14 Gold et al. "Appliance and Equipment Efficiency Standards."
- 15 Lowenberger et al. "The Efficiency Boom."
- 16 Mauer et al. "Better Appliances."
- 17 Appliance Standards Awareness Project, "Better Appliances: An Analysis of Performance, Features, and Price as Efficiency has Improved." [http://www.appliance-standards.org/sites/default/files/Better\\_Appliances\\_Fact\\_Sheet\\_0.pdf](http://www.appliance-standards.org/sites/default/files/Better_Appliances_Fact_Sheet_0.pdf) (accessed November 18, 2014).
- 18 Nadel and deLaski, "Appliance Standards."
- 19 Pierre Delforge, "California Could Save \$1.2 Billion Per Year by Setting Efficiency Standards for 15 New Products," NRDC Switchboard Blog, posted on May 20, 2013, [http://switchboard.nrdc.org/blogs/pdelforge/california\\_could\\_save\\_12\\_bill.html](http://switchboard.nrdc.org/blogs/pdelforge/california_could_save_12_bill.html) (accessed Oct. 27, 2014).
- 20 Appliance Standards Awareness Project, "Appliance Standards Question and Answers: Progress Toward 3 Billion MT CO2 Reduction." July 2014, [http://www.appliance-standards.org/sites/default/files/Progress\\_toward\\_3\\_billion\\_CO2\\_reduction\\_0.pdf](http://www.appliance-standards.org/sites/default/files/Progress_toward_3_billion_CO2_reduction_0.pdf) (accessed October 21, 2014).
- 21 Ibid.
- 22 Lowell W. Ungar et al. "Government Works: Federal Agency Actions on Energy Efficiency." ACEEE, September 2014, <http://aceee.org/files/pdf/white-paper/government-works-0914.pdf> (accessed October 21, 2014).
- 23 U.S. Energy Information Administration, "Heating and Cooling No Longer Majority of U.S. Home Energy Use." March 17, 2013 [http://www.eia.gov/todayinenergy/detail.cfm?id=10271&src=%E2%80%B9%20Consumption%20%20%20%20%20Residential%20Energy%20Consumption%20Survey%20\(RECS\)-b1](http://www.eia.gov/todayinenergy/detail.cfm?id=10271&src=%E2%80%B9%20Consumption%20%20%20%20%20Residential%20Energy%20Consumption%20Survey%20(RECS)-b1) (accessed October 21, 2014).
- 24 Meg Waltner. "Cold Snap Highlights Need for Updated Furnace Efficiency Standards." NRDC Switchboard Blog, January 7, 2014, [http://switchboard.nrdc.org/blogs/mwaltner/cold\\_snap\\_highlights\\_need\\_for.html](http://switchboard.nrdc.org/blogs/mwaltner/cold_snap_highlights_need_for.html) (accessed September 2, 2014).
- 25 Kit Kennedy, "The U.S. Department of Energy Retreats on Natural Gas Efficiency - but Temporary Setback Could Set the Stage for Higher Standards," NRDC Switchboard Blog, posted on January 15, 2013, [http://switchboard.nrdc.org/blogs/kkenedy/the\\_us\\_department\\_of\\_energy\\_re.html](http://switchboard.nrdc.org/blogs/kkenedy/the_us_department_of_energy_re.html) (accessed Oct. 27, 2014).