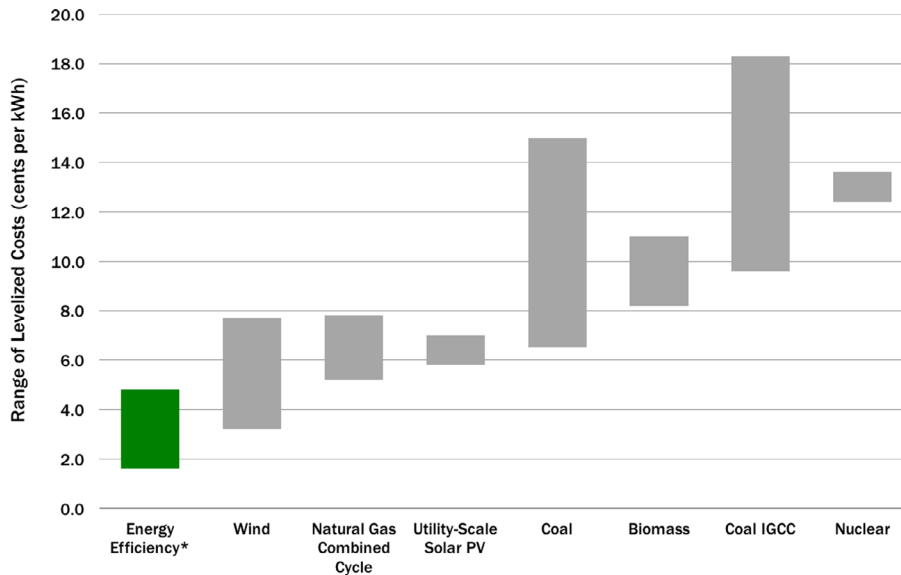


How Much Does Energy Efficiency Cost?



* Source: Energy efficiency program portfolio data from Molina, *The Best Value for America's Energy Dollar: A National Review of the Cost of Utility Energy Efficiency Programs* (Washington, DC: ACEEE, 2014) <http://aceee.org/research-report/u1402>. All other data from Lazard 2015. <https://www.lazard.com/media/2390/lazards-levelized-cost-of-energy-analysis-90.pdf>. High-end range of coal includes 90% carbon capture and compression.

Many states are considering expanding energy efficiency efforts to help customers reduce bills, replace retired power plants, create local jobs, and reduce pollution. A key question many are asking is: How much will energy efficiency cost? Recent studies from Lawrence Berkeley National Laboratory (LBNL) and ACEEE help to answer that question. While energy efficiency investments reduce energy use and energy bills, the energy efficiency measures do have an up-front cost, a cost that is ultimately covered by energy bill savings. The table on the right summarizes the data from LBNL's most recent analysis. On average, across all sectors, LBNL finds that energy efficiency programs are costing program administrators about 2.4 cents per kWh saved over the lifetime of the energy efficiency measures installed.¹

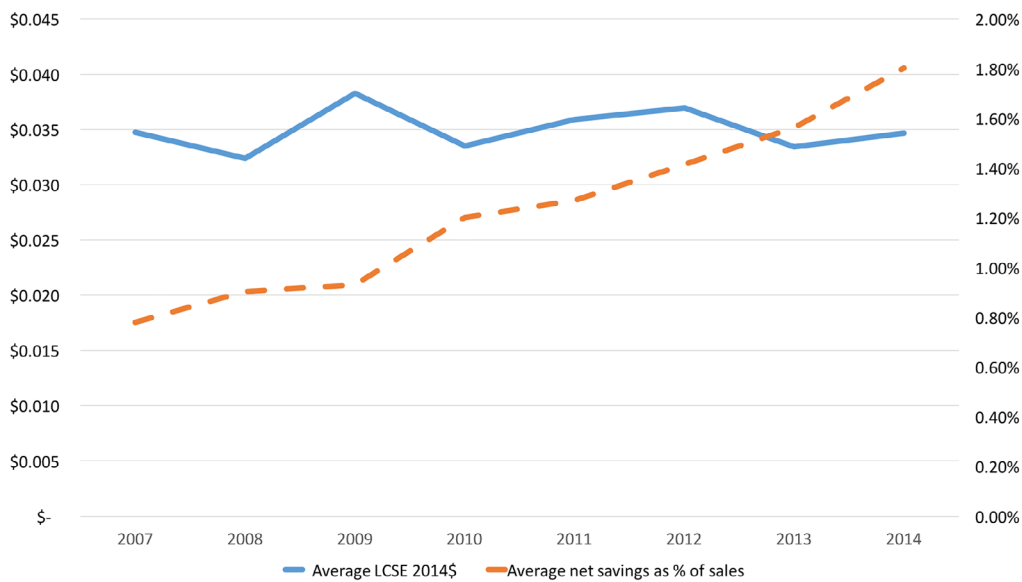
Several ACEEE analyses have found slightly higher costs. For example, a review of energy efficiency programs in 20 states found an average program administrator cost of \$0.028 per kWh saved.²

Sector	Program Administrator Cost of Saved Electricity (2014 cents/kWh)
Residential	2.0
Commercial, industrial, and agricultural	2.6
Low-income	13.8
All sectors	2.4

Source: Hoffman et al., *The Total Cost of Saving Electricity through Utility Customer-Funded Energy Efficiency Programs* (Berkeley: Lawrence Berkeley National Laboratory, 2015) <https://emp.lbl.gov/sites/all/files/total-cost-of-saved-energy.pdf>. They report in 2012\$; we adjust to 2014\$ using the GDP implicit price deflator.

These costs are substantially less than the cost of meeting electricity needs with new power plants, as shown in the figure above.

Likewise, a forthcoming ACEEE report on 14 program administrators with particularly high energy savings finds an average cost to the program administrator of about 3.5 cents per kWh saved, as shown in the figure below. Interestingly, the cost



Source: Baatz et al., Big Savers (Washington, DC: ACEEE, 2016). LCSE is the levelized cost of saved energy.

per kWh has not changed appreciably from year to year, even as energy savings as a percentage of total electricity sales steadily mounted.

In the documentation accompanying the Clean Power Plan, EPA estimates that energy efficiency programs will cost program administrators 58 cents up front per kWh saved in the first year for low savings levels, with costs declining to 46 and then 35 cents as programs ramp up (we have updated these values to 2014\$).³ These figures compare all the costs to the kWh saved in just one year and not to savings over the entire lifetime of the efficiency measures. Translating to cost per kWh saved over the lifetime of the measure, the figures work out to 7.5 cents/kWh saved initially, ramping down to 6 cents/kWh and then 4.5 cents/kWh.⁴

The EPA costs are derived from a 2009 ACEEE study, but EPA doubled the costs for the initial savings and then reduced them by 20% and 40% as savings reached 0.5% of sales and 1.0% of sales respectively. EPA argues that initial costs will be higher, even though the ACEEE analysis it used includes several states that were just getting started and therefore include start-up costs. Also, the more recent data in the figure above show steady costs per kWh as savings rise. EPA calls

its estimates conservative.⁵ To us, it appears that the agency wanted a relatively high cost in order to show that even if costs are high, energy efficiency is cost effective.

In our view, based on the data summarized above, EPA is overly conservative. Most likely, energy efficiency will cost program administrators under 4 cents per kWh saved, much less than a new power plant. EPA's very conservative numbers are higher, but still show an energy efficiency cost that is likely to be less than most new power plants.

¹LBNL also finds that program administrators on average pay about half the total costs, with program participants paying about as much as the administrators.

²Part of the difference between the LBL and ACEEE estimates is that ACEEE includes performance incentives that utilities earn for energy efficiency; LBNL does not.

³EPA's numbers were in 2011\$ and were \$0.55, \$0.44, and \$0.33 per kWh saved in the first year. We made the adjustment to 2014\$ using the GDP implicit price deflator.

⁴We translate based on a 10-year average measure life and a 5% real discount rate. EPA used a 10.2-year measure life. EPA's primary analysis used a 3% real discount rate, but it also reports results with a 7% real discount rate.

⁵EPA, *Demand-Side Energy Efficiency Technical Support Document*, August 2015, <http://www.epa.gov/sites/production/files/2015-11/documents/tsd-cpp-demand-side-ee.pdf>. See page 69.