

Are Existing Coal-Fired Power Plants Less Costly Than New Electricity Sources?

Many people assume that building new sources of electricity (natural gas, wind and solar) must be cheaper than continuing to rely on existing coal-fired power plants. Otherwise, why would utilities retire and replace existing coal-fired power plants?

However, this assumption is not necessarily correct based on [new analysis](#) that compares the levelized cost of electricity (LCOE) from existing and new electricity sources.¹ The analysis finds that, on average, the LCOE for new sources (orange below) is significantly greater than the LCOE for existing sources (green below). Compared to the existing coal fleet, the LCOE is 22 percent greater for new natural gas combined cycle (NGCC), 115 percent greater for new solar and 120 percent greater for new wind.



The Energy Information Administration defines LCOE as “the cost (in real dollars) of building and operating a generating plant over an assumed financial life and duty cycle.” Conceptually, LCOE is calculated by summing all the costs—variable O&M, fixed O&M, capital investments and financing costs—incurred by an electricity source over its lifetime and dividing those costs by the amount of electricity the source is projected to generate. Hence, LCOE is expressed as dollars (cost) per megawatt-hour (electricity generated). Typically, levelized costs have been used to compare different options for new electricity generating

facilities. However, levelized costs are useful in comparing existing power plants to new facilities, especially when decisions are being made to retire existing coal-fired power plants.

The new analysis uses data from the Energy Information Administration's (EIA) Annual Energy Outlook for 2019, EIA Form 860 and Federal Energy Regulatory Commission Form 1. The analysis indicates that, on average, existing power plants have lower fixed costs, but similar variable costs, compared to the electricity sources that might replace them. According to the analysis, "the reason new plants have higher fixed costs is that they begin their operational lives with a full burden of construction cost to recover. Since existing power plants have already paid for some or all of those costs, their ongoing fixed costs are lower, making their LCOE lower."

Imposed Costs

Wind and solar, which are intermittent sources of electricity, have to depend on dispatchable sources in order to provide the same reliable electricity output as coal, NGCC and nuclear. Therefore, the study's LCOE for new wind and new solar include an added cost ("imposed cost") for NGCC and natural gas peaker plants to serve as backup for wind and solar. These imposed costs allow for an apples-to-apples comparison of the levelized costs of intermittent sources and dispatchable sources. However, even without an imposed cost, the levelized cost for existing coal is less than the levelized cost for new NGCC, new wind and new solar.

Caveats

The new analysis compares levelized costs on a national average basis. Actual levelized costs are plant specific. However, national averages show that levelized costs should be an important consideration in retirement decisions. In addition, there are other factors that could affect decisions to retire and replace existing facilities. For example, future environmental regulations would likely increase levelized costs. Power plants that are not fully depreciated at the time of retirement would lead to stranded costs, which could be problematic for ratepayers and investors.ⁱⁱ Finally, it is worth noting that this analysis does not take into account the cost of transmission upgrades that are often necessary to connect new wind and solar to the grid or gas pipeline infrastructure to satisfy an increasing demand for natural gas by the electric power sector.ⁱⁱⁱ

June 3, 2019

ⁱ "The Levelized Cost of Electricity from Existing Generation Resources," Tom Stacy and George Taylor, June 2019, www.americaspower.org.

ⁱⁱ For example, see "Stranded costs mount as coal vanishes from the grid," Jeffrey Tomich, E&E News, May 29, 2019. According to the article, "... consumers are being asked to pay nearly \$1 billion over the next 20 years to pay off the remaining balance on the [Pleasant Prairie] plant and a return to utility shareholders ... [S]hutting down older generation and replacing it with new, cleaner plants could saddle customers with paying for both at the same time."

ⁱⁱⁱ Capex for U.S. natural gas infrastructure is projected to be \$477 billion over the period 2018-2035. "North American Midstream Infrastructure through 2035," The INGAA Foundation, Inc., Prepared by ICF, June 18, 2018.