“Coal Cost Crossover” Doesn’t Tell the Full Story

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The nation’s coal fleet is important for a number of reasons. It helps to assure the electricity grid is both reliable and resilient, provides fuel security, serves as an insurance policy against electricity shortages and price spikes, produces affordable electricity, contributes to fuel diversity, and supports national security.[i]

Despite these benefits, a recent report by Energy Innovation says that coal should be replaced by renewables: “America has officially entered the *‘*coal cost crossover*’*–where existing coal is increasingly more expensive than cleaner alternatives. Today, local wind and solar could replace approximately 74 percent of the U.S. coal fleet at an immediate savings to customers. By 2025, this number grows to 86 percent of the coal fleet.”[ii]

Really?

The report compares two types of costs to support its conclusion. One is the marginal cost of energy (MCOE) for the existing coal fleet and the other is the levelized cost of energy (LCOE) for new solar and new wind. According to the report, MCOE includes fuel, variable costs, fixed O&M, and capital for pollution controls. LCOE includes these same costs plus capital and financing costs. The report concludes that the LCOE for new wind and solar is less than the MCOE for most of the existing coal fleet. By their calculation, 211,000 megawatts (MW) of coal-fueled generation (almost three-fourths of the coal fleet) was “at risk” last year because wind or solar is cheaper. By 2025, the report says that 246,000 MW, almost the entire coal fleet, will be “at risk.” In addition, slightly more than 140,000 MW of coal capacity are at “substantial risk” of being replaced by wind or solar.

Wind and solar cost less than they used to, thanks in large part to generous federal support, but are renewables so cheap now that they should replace most of the nation’s existing coal fleet?

For the sake of argument, we’ll assume the methodology and data underlying the report are valid. With that caveat in mind, here are a few quick facts that run counter to their narrative that renewables should replace coal.

- Focusing solely on the levelized cost for new renewables obscures the magnitude of the capital investment that would be required to build new wind and solar to replace coal. The cost of adding new renewables to replace “substantially at risk” coal would be $224 billion (land-based wind) to $249 billion (PV solar).[iii] Moreover, replacing 246,000 MW of coal the report characterizes as “at risk” would cost some $394 billion (wind) to $439 billion (solar). Replacing even a single 500 MW coal-fueled generating unit would cost more than $800 million for land-based wind or almost $900 million for PV solar.

- Other studies have compared the levelized costs of both coal and renewables and reached the opposite conclusion. EVA (2018), IHS Markit (2017), and the Institute for Energy Research (IER) (2016) all concluded that existing coal ($40/MWh) is less expensive than new renewables (more than $80/MWh).[iv] Right now, we're working with IER to provide more insight into the levelized costs of existing and new electricity resources.
- The report acknowledges that the "potential stranded asset value of at-risk coal plants reaches into the tens of billions." However, this substantial cost is not factored into the report's comparison. Utility commissions and ratepayers cannot ignore the cost of these stranded assets.
- In terms of grid reliability, renewables are in many ways inferior to coal. The report implicitly acknowledges this fact. For example, "Other resources will be required to complement wind and solar and provide essential reliability services …" (page 4).[v] Replacing coal with renewables "doesn't capture the time-based value of energy and grid services from a dispatchable … coal plant" (page 8). However, these considerations are not captured in the report's comparison.
- The report completely ignores the value of resilience, fuel diversity and fuel security. Coal provides fuel security, which is necessary for resilience, while renewables provide no fuel security. In 2000, more than 70% of the nation's electric generating capacity was comprised of fuel-secure sources. By 2020, the percentage represented by fuel-secure sources is projected to drop to 30%. Replacing more coal with renewables would make the grid even less fuel-secure.

We're all for comparing the pros and cons of different energy resources. What the Energy Innovation report really highlights is the importance of comparing the full value of coal and renewables, as well as other resources.

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[i] ACCCE, "Keeping the Lights on 24/7, The Value of Coal and the Nation's Coal Fleet," March 2019. www.americaspower.org

[ii] "The Coal Cost Crossover: Economic Viability Of Existing Coal Compared To New Local Wind And Solar Resources," Energy Innovation: Policy and Technology LLC, March 2019.

[iii] According to EIA AEO 2019, the capital costs (2018$) of new wind and new solar are $1,624/kW and $1,783/kW, respectively.

[iv] ACCCE, "Keeping the Lights on 24/7, The Value of Coal and the Nation's Coal Fleet," March 2019. www.americaspower.org EVA calculated levelized costs of $34/MWh for existing nuclear, $36/MWh for existing combined cycle natural gas (NGCC), $40/MWh for existing coal, $54/MWh for new solar, and $67/MWh for new wind. IHS Markit found that the levelized cost of existing coal ($40/MWh) is less than the levelized cost of new NGCC ($68/MWh) and renewables ($82/MWh). IER calculated a levelized cost of $40/MWh for existing coal, compared to $55/MWh for new NGCC, $107/MWh for new wind and $140/MWh for new PV solar.[iv] The Energy Innovation report calculates that "going forward costs for the vast majority of coal plants fall between $33-111/MWh, while wind costs … fall between $13-88/MWh …" (page 4 of the report).

[v] PJM analyzed 360 portfolios of electricity resources and the effect of each of those portfolios on electric reliability in the 13-state PJM region. They observed a decrease in operational reliability for portfolios with significantly increased amounts of wind and solar capacity, suggesting an upper bound on solar at 20% because of reliability violations to their system at night. "PJM's Evolving Resource Mix and System Reliability," March 30,2017.