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# Here’s how EPA sees the future power grid

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05/08/2024 06:30 AM EDT

EPA's power plant rules came with a story about how the nation's electric grid could develop over the next two decades.

The so-called regulatory impact analysis uses charts and graphs to predict how the new rules — which curb carbon from new gas and existing coal-fired plants — might work with other policies and market forces to shape America's power mix.

EPA calls the projections “illustrative in nature," partly dependent on how states implement the rule for coal plants. Overall, the analysis shows a trend toward renewable energy and away from fossil fuels, with President Joe Biden's sweeping 2022 climate law driving the transformation.

But there are some subtle changes between what EPA saw a year ago — when it proposed the rules — and what it is projecting now.

The final rule's impact analysis sees gas losing a fraction of its dominance in the 2030s as global trading grows. One result: a few coal plants lingering on the grid into the 2040s. That means a few more coal plants than originally predicted will add carbon capture and storage systems to comply with the rule, according to EPA's analysis.

EPA also now expects almost no new gas plants to burn high blends of hydrogen to comply with the rules.

EPA reaches these and other conclusions by running an energy economy model known as the integrated planning model (IPM). It takes its data mostly from the U.S. Energy Information Administration (EIA) and the National Renewable Energy Laboratory. The process involves establishing a baseline for what would happen without the rule, and then modeling potential interactions and changes.

Experts say it’s a good way to identify “optimal” or least-cost power sources for different parts of the country. But the model's inability to account for political decisions is a major limitation.

Julie McNamara, deputy policy director of the Union of Concerned Scientists' Climate and Energy Program, said IPM exists “in a world that doesn't have states that are working hard to keep coal plants online and saddle ratepayers with the cost.“

“The clear economic choice for the power sector mix — the steady, indeed rapid, shift away from coal — is not showing up across the board in reality,” she said.

Here are some takeaways from EPA's analysis.

**Coal**

EPA’s power plant rule requires existing coal units and new “baseload” gas plants that run frequently to capture 90 percent of their carbon emissions for permanent storage.

That’s a costly proposition. Edison Electric Institute, which represents investor-owned utilities, says carbon capture and storage (CCS) retrofits cost about $1 billion on average. That cost is somewhat offset by the 2022 climate law’s tax credit for permanent storage, which helps EPA argue that CCS is a cost-effective basis for its rule.

The Inflation Reduction Act credit — which offers $85 a ton of carbon stored — is available during the first 12 years that a unit operates as long as it begins construction by 2033. But EPA expects most coal plants to instead retire.

That finding was particularly stark in last year’s analysis for the draft rule, which predicted only 12 gigawatts of coal plants would add CCS by a high-water mark of 2030.

This year’s modeling is a little different.

The final rule EPA unveiled last month gives coal plants two additional years to start capturing carbon emissions — 2032 instead of 2030. Because of the vagaries of the IPM model runs, the standard is first reflected in modeling for 2035.

While EPA’s standard isn’t going to spur a CCS renaissance at U.S. coal plants, it will increase uptake of the technology, according to the agency's analysis. In the baseline scenario, EPA shows only 11 GW of coal with CCS by 2035, but with the rule that climbs to 19 GW.

That’s still not a significant share of the 1,482 GW of overall energy capacity EPA projects for that year. But it is almost 60 percent more than EPA initially projected for 2035 under the draft rule.

That means EPA expects a few more coal plants to operate long-term than it did last year. But even coal that retrofits with carbon capture will leave the grid by 2045 — EPA shows only 1 GW of coal with CCS online by that year.

“The impact of this rule is still a phase-out of unabated coal generation,” said Ben King, Rhodium Group’s associate director for energy and climate. “That is the most impactful thing that EPA can do, both from a climate perspective and from a public health perspective.”

**Gas**

Coal’s longer, slower death on the grid isn’t a function of any changes EPA made between its draft and final rules. Instead, it’s mostly down to where the EIA sees gas prices going.

EPA uses data from the Energy Department’s independent statistical arm to project that U.S. gas prices for power plant delivery will hover at $2.77 per million British thermal units (MMBtu) in 2040. Last year, EPA expected that price to be $2.10 per MMBtu.

Prices with the rule are marginally lower in both cases than the baseline. And EPA projects that costlier gas could help a few coal plants hang on for more years in some places.

Amanda Levin, director of policy analysis at the Natural Resources Defense Council, said coal and gas compete “to be the last electron needed to meet energy demand in a certain region."

“So if you increase the price of natural gas, it makes coal more competitive,” she said.

EIA’s analysis, which was released last year after EPA completed its initial power plant rule modeling, predicted that natural gas prices would climb — especially after 2035 — as the U.S. sells more of its liquefied natural gas abroad.

The oil and gas industry disputes that more gas exports will lead to higher domestic prices — an issue that gained salience earlier this year when the Biden administration paused export permitting for future terminals to consider the interests of U.S. consumers and climate impacts.

Rob Jennings, American Petroleum Institute’s vice president of natural gas markets, said the industry has kept up with increasing demand and kept prices low over the past 15 years by ramping up production.

“Limiting U.S. natural gas supply and the development of needed infrastructure — not LNG exports — pose the greatest threat to maintaining a well-supplied domestic market," Jennings said in a statement to E&E News.

EIA’s revised price projections led EPA to model less gas generation in later years of the final rule. The agency now predicts 926 terawatt-hours (TWh) of gas generation by 2040, down from the 1,173 TWh of gas generation it expected with last May’s proposal.

EPA also expects fewer new baseload gas plants to ultimately use CCS.

In last year's analysis, EPA estimated that the climate law's tax credits — along with the draft power plant rules — would result in 8 GW of gas with CCS by 2040. Green hydrogen was expected to be the favorite compliance option for the rule, with EPA projecting 13 GW by 2040.

But EPA’s current modeling shows no gas with CCS in the absence of regulation.

EPA expects its rule to result in 4 GW of new combined-cycle gas with carbon capture by 2035. That dwindles to 1 GW in 2040 and 2045, as the Biden tax credit phases out and renewable power grows in dominance.

**Hydrogen**

Last year, EPA proposed a dual standard for baseload gas plants. Owners of these gas turbines could either slash emissions to levels consistent with 90 percent carbon capture in 2035, or they could meet an alternative standard based on burning high blends of low-greenhouse-gas hydrogen.

EPA projected that more gas plants would opt for the hydrogen pathway than would install CCS. The draft rule's analysis estimated that the climate law's incentives for hydrogen would amount to a $3 per kilogram subsidy. By 2038, EPA expected that the power plant rule would "provide investment certainty to produce hydrogen for use in power sector applications, resulting in lower realized costs."

Those factors led EPA to project that the cost of hydrogen delivered to power plants by 2038 would be $0.50 per kg.

But EPA's analysis for the final rule changes that delivered cost to $1.15 per kg through 2045. The rule also no longer includes a standard based on hydrogen.

While utilities can still use hydrogen co-firing as a compliance option for gas, EPA shows only a negligible amount of hydrogen use in the late years of the rule.