Insight

An Inside Look at Greenhouse Gas Regulation

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This week, the Environmental Protection Agency (EPA) released an ambitious plan to reduce greenhouse gases (GHG) emissions from existing power facilities 30 percent by 2030. As proposed, each state would have to meet an individual emissions target, designed to account for EPA assumptions about its existing generation mix and long-term renewable and energy efficiency potential. Though the proposal is designed to make emissions targets manageable and compliance strategies flexible, it will certainly be costly; EPA estimates annual costs of $8.8 billion and hundreds of thousands of compliance hours.

EMPLOYMENT CLAIMS

Rather than find that the rule will decrease employment, EPA estimates approximately 28,000 “job-years” of additional employment in the “electricity, coal, and natural gas sectors” in 2020 and 78,800 jobs for “demand-side energy efficiency employment.”

There are several caveats. Most importantly, there is no existing academic literature to support its job claims. From EPA’s own study, “Employment impacts of demand-side energy efficiency programs have not been extensively studied in the peer-reviewed, published economic literature.” In other words, there is no independent support to their job claims.

What’s more, EPA’s own estimates are inflated. EPA is careful to declare (in a footnote) that a “job-year” is not equivalent to an actual job. For example, 28,000 job-years could mean the equivalent number of full-time employees, 56,000 part-time employees, or some combination of the two. Even if the rule would create this inflated figure of 28,000 jobs, they would last a single year. The weight of job losses and transfers in other parts of the economy undermines EPA’s claims.

POSSIBLE COSTS

EPA estimates total annual compliance costs of $7.5 billion by 2020 and $8.8 billion by 2030, which would make it one of the costliest rules of this decade. These estimates are exclusive of monitoring and recordkeeping costs, which eclipse $68 million by 2020. Initially, monitoring and recordkeeping would generate more than 900,000 paperwork burden hours.

A majority of these costs stem from investments in new, cleaner generating sources, heat rate improvements at coal facilities, and demand-side efficiency measures. For heat rate, EPA assumes coal-fired power plants can improve their rates, or efficiency, by four to six percent. EPA projects this will cost roughly $100 per kilowatt. To upgrade the entire coal fleet, even after predicted retirements, would cost the industry $1.16 billion.

A recent Lawrence Berkeley National Laboratory study suggests that by 2025, demand-side efficiency costs could range from a low of $5.5 billion to more than $12 billion. EPA has identified energy savings, though initially costly, as the most efficient method to reduce GHGs. “Evaluations of the economic potential for carbon dioxide reductions from the United States’ power sector identify demand-side energy efficiency as the lowest cost strategy … as well as the strategy having the greatest reduction potential.”

In EPA’s press release, the agency touted that its proposal would “shrink electricity bills roughly 8 percent.” However, buried deep in EPA’s regulatory impact analysis, they concede “an increase in the national average (contiguous U.S.) retail electricity price between 5.9 and 6.5 percent in 2020.” This is a far cry from shrinking utility bills, which consumers wouldn’t realize until later in the decade. Adding a possible 6.5 percent increase in prices to the 4.8 percent that EPA has already finalized, and consumers could bear a 10.3 percent increase in electricity bills by 2020. For the average consumer, that’s more than $150 in higher annual electricity bills this decade.

POSSIBLE BENEFITS

A large portion of the declared benefits of the rule stem from curbing GHG emissions and producing climate benefits. Since discount rates significantly affect future climate benefits, EPA offers four different figures. They range from $4.9 billion at the five percent rate to $52 billion at the 95th percentile by 2020.

Air pollution co-benefits range from $15 billion to $40 billion by 2020. These stem from reduced emissions of fine particles, ozone, sulfur dioxide, and nitrogen oxides, which in turn

reduce the incidence of respiratory impacts.

EPA claims that by 2030 these figures grow even larger. Just as costs balloon from $7.5 billion in 2020 to $8.8 billion by 2030, the growth in benefits is even more extreme. Possible climate benefits jump to $31 to $94 billion and health benefits could eclipse $60 billion.

GHG REDUCTIONS AND RETIREMENTS

EPA is touting considerable reductions in greenhouse gas emissions: 730 million metric tons of pollution by 2030. These reductions are achieved by investing in new generation from natural gas, nuclear, and renewable, and retiring from operation older, less efficient coal facilities. EPA estimates, "46 to 50 [gigawatts] of additional coal-fired generation may become uneconomic," and be removed from operation as this rule is implemented. This amounts to nearly 15 percent of the existing coal fleet, a production loss that will need to be recovered elsewhere.

Forced retirements are not limited to coal – the rule will induce 71 gigawatts (GW) of retirements, including from the cleanest combined cycle natural gas facilities. This capacity will be partially replaced by 32 GW of natural gas combined cycle, simple combustion turbine, and non-baseload wind capacity (which will require accompanying storage technology to be a reliable power source).

The remainder of this retirement deficit must be offset by considerable investments in demand side management and efficiency. EPA suggests an average 11 percent improvement in end-use efficiency is possible across states. The U.S. has already made major strides in improving efficiency, and per-capita electricity demand dropped four percent from 2008-2011. A considerable amount of this improvement, however, has come from federal-level efficiency standards.

This combination of retirements, limited capacity additions, and efficiency must leave states with sufficient reserve capacity and flexibility to satisfy high levels of peak summer electricity demand. Unfortunately, initial projections suggest that this regulation will cut reserve capacity ten percent, exposing the economy to considerable increases in peak summer electricity prices, straining power availability in some regions (particularly in regions heavily dependent upon intermittent power sources), and yielding rolling brownouts.

IMPORTANCE OF FLEXIBILITY

To achieve maximum greenhouse gas emissions reductions at minimal cost, EPA claims this

regulation is designed to afford maximal flexibility for states. Each state is free to design their own Clean Power Plan that reflects an ideal mix of efficiency gains, load balancing, retirements, and new installed capacity. Alternatively, states may elect to participate in a state or regional cap-and-trade program.

While the route to achieving compliance appears flexible, the larger construct of the regulation will be limiting. Individual states will have to reduce emissions by a prescribed amount and achieve that reduction by 2030 – leaving a 10-15 year window for compliance. This will certainly limit the efficacy of compliance pathways, particularly for states that have to rely heavily on new generation. For states employing cap-and-trade, EPA allows just two years to conceive, legislate, and deploy the network.

STATE IMPACTS

EPA is not clear about how the costs and benefits of the rule are apportioned geographically. With a rule this complex, where states could join regionally to reduce emissions, there won't be a clear answer until states submit their plans. EPA did give clues by including the primary regulated entity: fossil-fired power plants. Based on Census data, AAF apportioned national costs based on the proportion of fossil-fired power plants. The table below displays an estimate of possible state compliance costs.

State	Compliance Costs (in millions)
Texas	$812
Louisiana	$464
California	$403
Pennsylvania	$398
Ohio	$337
New York	$331
Illinois	$265
Florida	$243
Wisconsin	$221
Colorado	$215

EPA has specific interim (2020-2029) and final goals for each state by emissions rates and overall pollution. Each state has a different standard, partly based on their fuel generation mix.

It's unclear whether EPA accepts existing renewable and zero-carbon generation to count toward emissions reductions. If we count the existing output from zero carbon sources of power, some states on this list might already be considered in compliance with their 2030 target; California's substantial build out of nuclear, hydro, wind, and solar could allow the state to actually increase emissions two percent on a fleet-wide basis between now and 2030.

CONCLUSION

To no one's surprise, this proposal carries high costs, burdens states with a short compliance timeline, and could threaten the reliability of national electricity markets. This proposal, when finalized, will utterly transform the way we produce and use energy, and add another layer of bureaucratic control over an energy market struggling to adjust to the needs of a modern economy.