



EPA'S CLEAN POWER PLAN

AN ECONOMIC IMPACT ANALYSIS

ANALYSIS PERFORMED BY ENERGY VENTURES ANALYSIS

ON AUGUST 3, 2015

President Obama and the Environmental Protection Agency (EPA) signed the Clean Power Plan (CPP) – a controversial regulation intended to reduce carbon emissions from U.S. power plants. As this report documents, the CPP carries significant cost implications for consumers, states and the nation.

SUMMARY

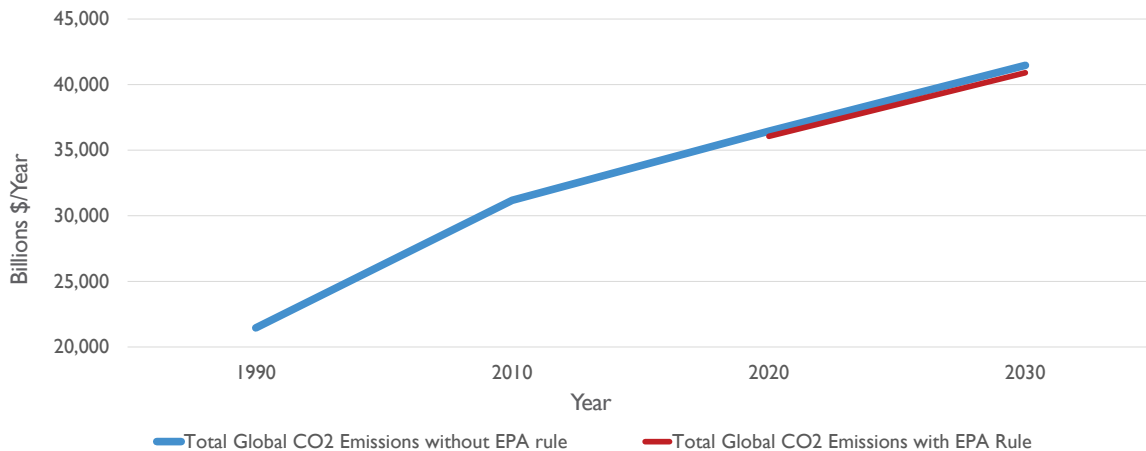
CLEAN POWER PLAN IMPACTS (BY 2030)

- \$214 billion increase in wholesale electricity prices
 - Double digit wholesale electricity price increases in 46 states
 - \$64 billion to replace lost power capacity serving 24 million homes
-

THE CLEAN POWER PLAN (CPP)

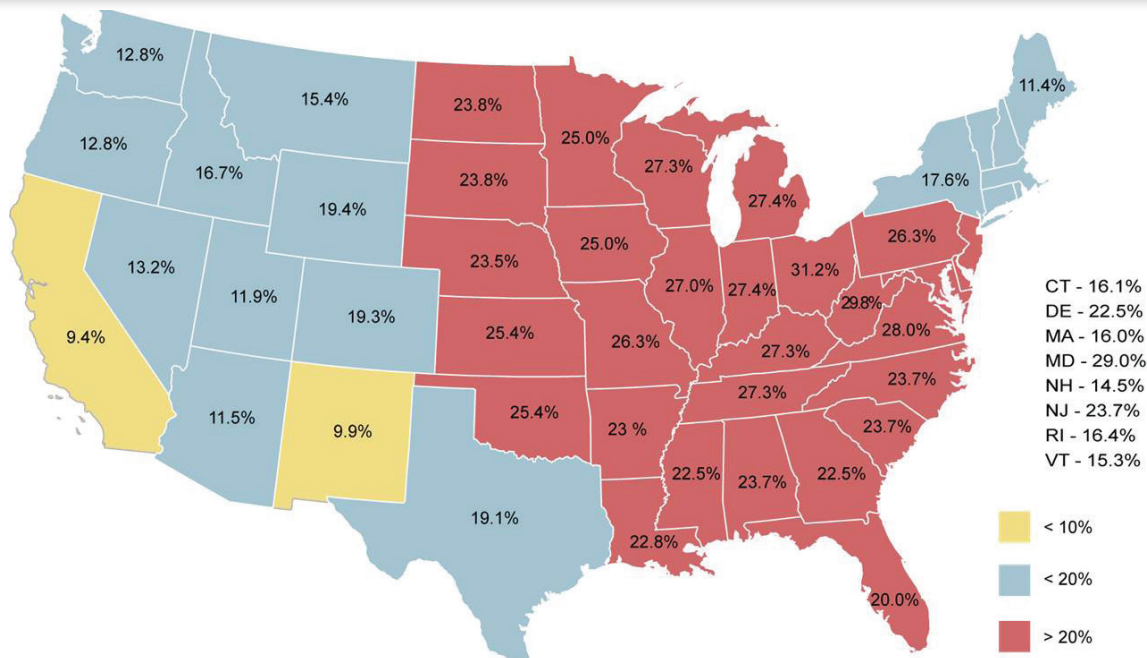
EPA claims the CPP will accelerate the momentum of carbon dioxide reductions in the U.S. by mandating a 32 percent reduction in emissions from the power sector below 2005 levels when the CPP is fully implemented in 2030. Because these reductions will not meaningfully lower global emissions, EPA does not even bother to measure how the rules will improve the climate.

EPA'S PROPOSAL ACHIEVES MEANINGLESS EMISSION REDUCTIONS

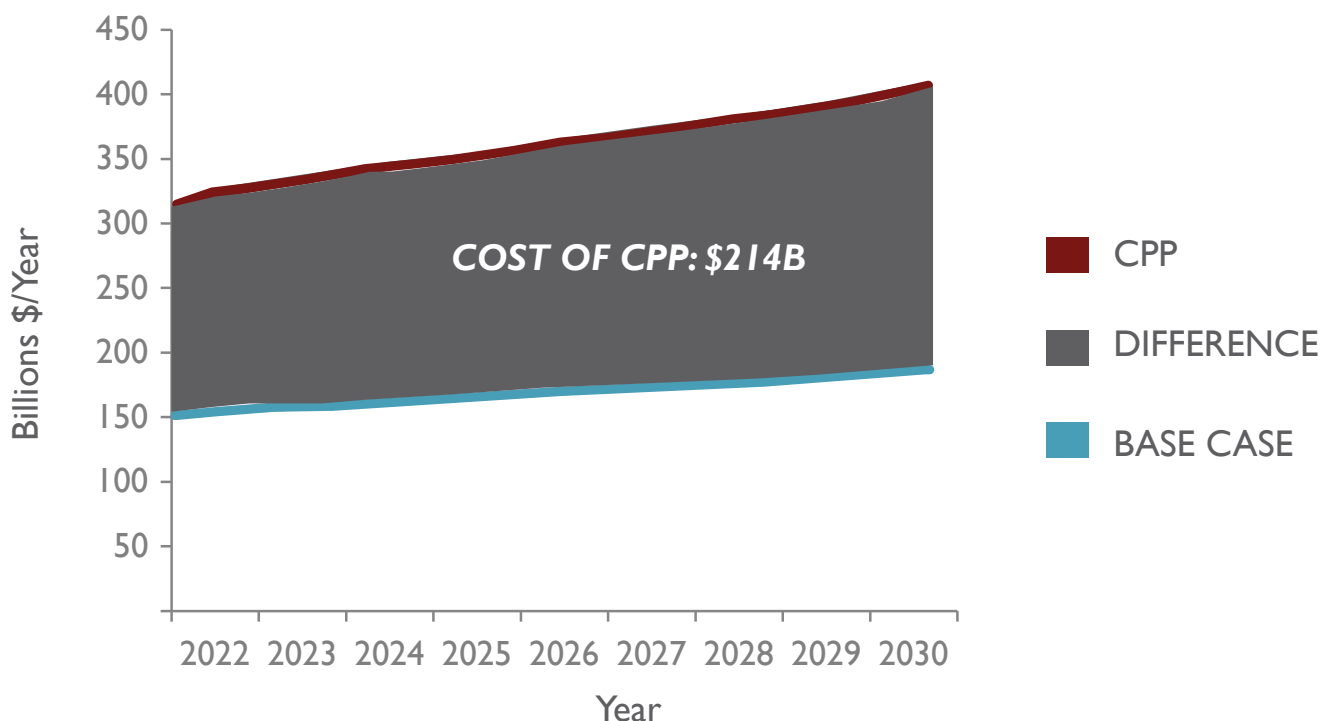


Following the release of the final rule, the National Mining Association commissioned Energy Ventures Analysis (EVA) to quantify the costs of the CPP to energy consumers – specifically, the costs residential, commercial and industrial users would incur as well as the capital investment required to meet future electricity demand under the CPP.

WHOLESALE ELECTRICITY PRICE INCREASES BY 2030



CUMULATIVE WHOLESALE ELECTRICITY PRICES ATTRIBUTIBLE TO CPP (IN 2015 DOLLARS)

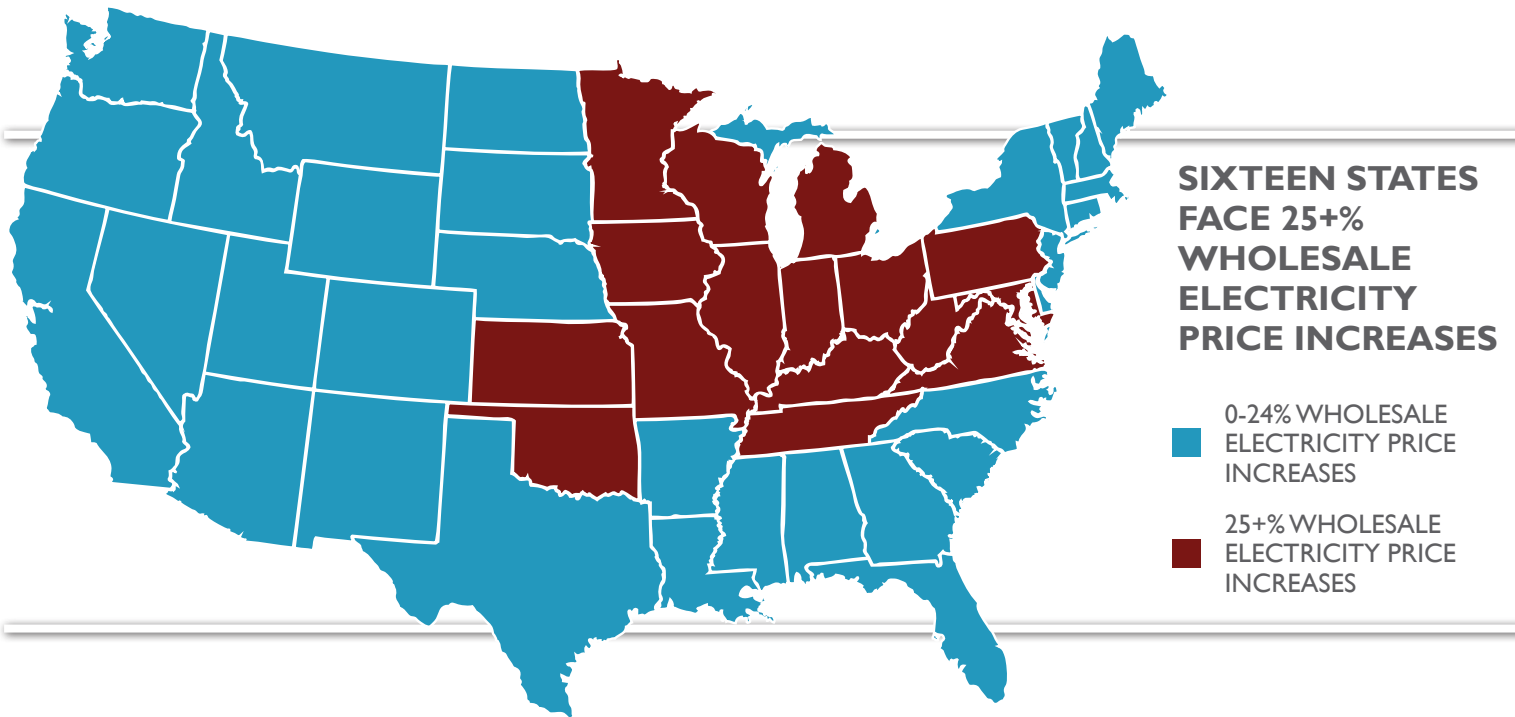


This analysis found that the impacts of the rule on electricity costs will be significant, with consumers paying an additional \$214 billion for electricity between 2022 and 2030 compared to the same period without the CPP. The CPP cost premium begins in 2022 at \$15 billion. Forty-six states will face double digit increases in wholesale electricity cost when the CPP is fully implemented in 2030, with 16 states projected to experience a 25+ percent increase. The analysis also examines the often-concealed, but still necessary, costs of replacing lower-cost power generation prematurely retired due to the CPP. A summary of the methodology can be found in the Appendix.

The CPP represents EPA's attempt to transform the nation's electricity system under the Clean Air Act. In developing the CPP, EPA abandoned the longstanding interpretation of section 111(d) of the Clean Air Act. Rather than set an emission standard based upon what available technology could achieve at individual power plants, EPA constructed a hypothetical electric grid that would yield the level of carbon dioxide emission reductions the administration wants. As a result, the standard set by EPA cannot be met by any existing plant in the coal power generation fleet—an outcome carrying significant implications considering coal generation has historically been the largest source of the nation's base load (24/7) electricity generation and remains so today.

The CPP mandates specific emission reduction targets for each state that many state officials have testified they will not be able to reach. As this analysis shows, efforts to reach the targets will be extremely costly for families and businesses.

TRENDS IN WHOLESALE ELECTRICITY PRICES UNDER THE CPP - 2022 AND 2030 WHEN COMPARED TO BASE CASE



STATE	'22 (%)	'30 (%)	STATE	'22 (%)	'30 (%)	STATE	'22 (%)	'30 (%)	STATE	'22 (%)	'30 (%)	STATE	'22 (%)	'30 (%)
AL	11	24	ID	10	17	MN	13	25	NV	8	13	TX	9	19
AR	11	23	IL	13	27	MO	13	26	NY	8	18	UT	11	12
AZ	5	12	IN	13	27	MS	10	23	OH	15	31	VA	14	28
CA	3	9	KS	13	25	MT	9	15	OK	13	25	VT	5	15
CO	12	19	KY	13	27	NC	11	24	OR	7	13	WA	7	13
CT	7	16	LA	11	23	ND	12	24	PA	13	26	WI	13	27
DE	12	23	MA	6	16	NE	12	24	RI	6	16	WV	15	30
FL	6	20	MD	13	29	NH	5	15	SC	11	24	WY	14	19
GA	10	23	ME	5	11	NJ	12	24	SD	12	24			
IA	13	25	MI	13	27	NM	7	10	TN	13	27			

“The proposal could significantly raise electricity prices harming the competitiveness of Utah’s industry and economy. Consumers will face higher utility costs, disproportionately affecting lower-income and rural families.”

- Gary Herbert, Governor of Utah

A \$214 BILLION PRICE TAG

Environmental Protection Agency (EPA) Fails to Capture Full CPP Costs

EVA examined the consumer economic impact of the CPP by modeling several key metrics for the lower 48 states. In addition to wholesale price profiles, EVA calculated the cumulative capital investment required to meet future electricity demand against a base case without the CPP. EVA calculated a carbon price or penalty that would reach the carbon emissions reductions that EPA set for each state based on mass emissions targets. The shift from low-cost coal generation to higher-cost natural gas generation will increase the power sector natural gas demand significantly. In combination with non-power sector natural gas demand (e.g. industrial feedstock, proposed LNG exports), which will be higher than EPA estimated, EVA expects a higher increase in natural gas prices than those assumed by the EPA.

The findings of this analysis suggest EPA has substantially understated the CPP's costs to consumers in at least three ways:

- First, EPA fails to acknowledge the higher cost of natural gas required to substitute for the coal-generation displaced in base load power.
- Second, EPA fails to recognize the cost impact on natural gas customers outside the power sector.
- Third, EPA does not fully account for the cost consumers will pay for power generation and transmission infrastructure necessary for replacing the coal generation that will be prematurely retired by the rule.

In sum, EPA underestimates the penalty consumers will pay to replace lower cost coal electricity generation with higher cost and more variable sources of power. There are substantial cost implications for replacing lost generating capacity that are unaccounted for in EPA's rule.

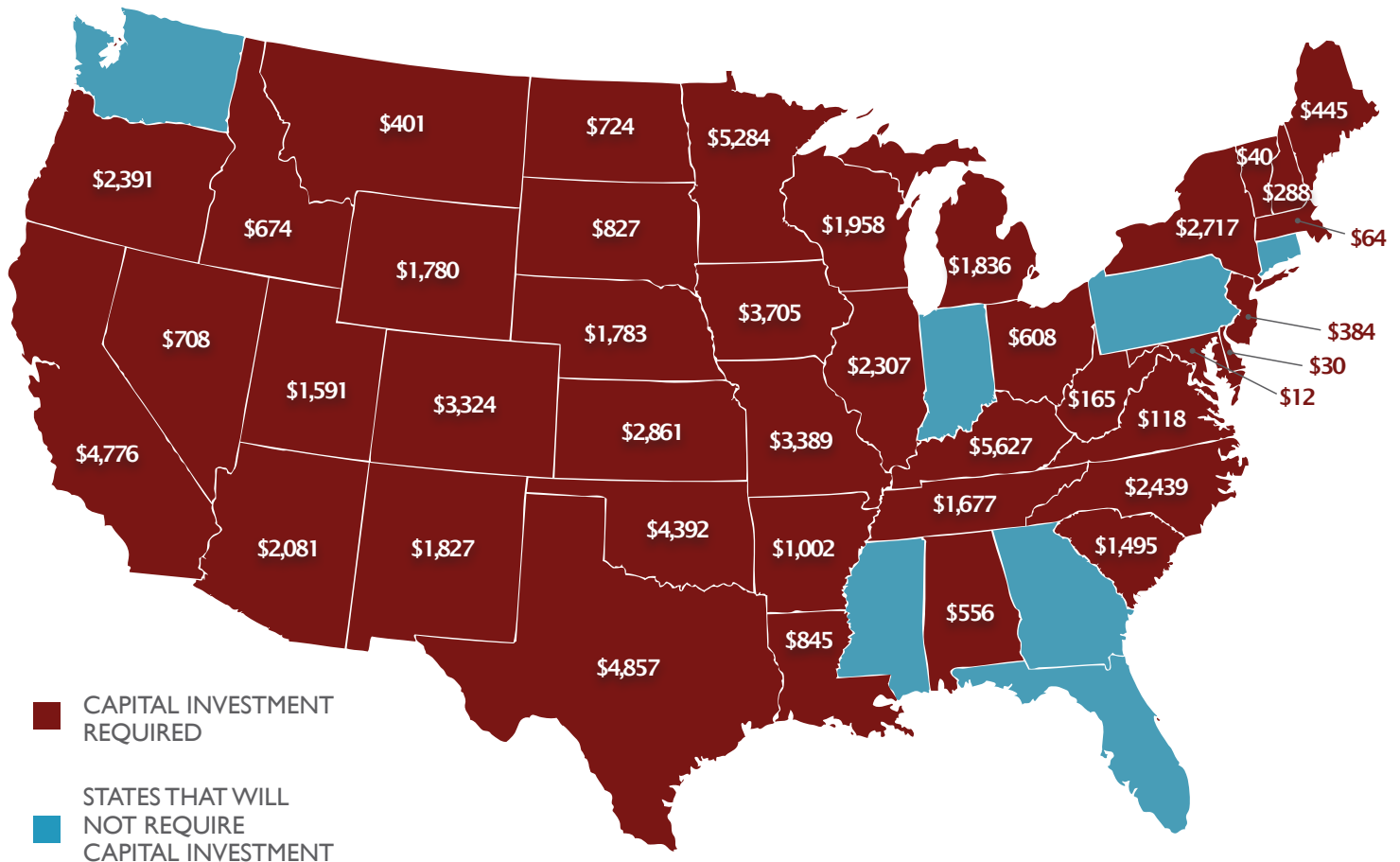
Impact on Nationwide Wholesale Electricity Prices

EVA estimates that, based on average annual wholesale power price projections, electricity customers will see a 21 percent increase in their power bill compared to what they would have paid without the CPP in 2030. This represents a nationwide increase of approximately \$214 billion over the non-CPP base case. Added to this total will be the projected \$64 billion cost to replace an estimated 41 gigawatts (GW) of power plant capacity forced to close prematurely by the CPP. This wholesale cost too will eventually be passed on to ratepayers.

For example, wholesale electricity prices are expected to climb 23 percent in Arkansas, 27 percent in Illinois, 25 percent in Iowa, 24 percent in Nebraska and 31 percent in Ohio.

The wholesale price increases result from adding a carbon penalty (i.e. price) to the cost of dispatching electricity that is sufficient to displace lower cost coal electricity generation in the amount necessary to achieve EPA's emissions reduction targets. Most natural gas capacity will also pay a carbon penalty to cover their lower CO₂ emissions.

THE COST OF NEW REPLACEMENT POWER CAPACITY THROUGH 2030 (IN MILLIONS)



TOTAL COST OF COMPLIANCE: \$64.4 BILLION

“[W]e can clearly see higher costs to Kansans in the premature retirement of generating units, increased use of higher variable cost natural gas generation and increased costs for transmission investment. KETA finds it difficult to accept EPA’s hard-to-measure, largely intangible benefits as justification for tangible and substantial cost increases.”

- Kansas Electric Transmission Authority Members

Impact on Electricity Generation

EVA's analysis projects the CPP will cause the closure of 41 GW of coal-based generating capacity, with some plants closing after 2022 as the rule becomes stricter. The 41 GW lost is enough capacity to serve about 24 million homes, or nearly three times the needs of Texas. The CPP is expected to displace 40 percent of total coal generation.

Impact by Sector

The consequences for costs are evident in the looming price increases for electricity. EVA's analysis projects that by 2030, when the CPP is fully implemented, the wholesale price for electricity will spike electricity prices nationwide by 21.2 percent above the non-CPP base case.

Commercial and industrial consumers of electricity will naturally experience the same price increases, which are likely to be passed on to consumers in increased prices for goods and services. Furthermore, the greater natural gas demand by the power sector will increase natural gas prices that will be felt beyond the power sector. Residential, commercial and industrial natural gas consumers' bills would increase by \$6-8 billion/year under the EPA Clean Power Plan to recover higher gas commodity purchase prices. In addition, if the industry requires additional investment in pipeline capacity to meet the power sector's growing gas demand, these costs would also be passed onto consumers.

Impact on Capital Investment

The CPP will impose an additional cost on consumers that is often overlooked: the price of major capital investments necessary to meet the emission targets set by EPA. These investments – for transmission and energy infrastructure – will ultimately figure into the economics of every state and every consumer's utility bill. In short, when an electric utility makes the investment to build new generating capacity and the required infrastructure to replace operating plants, those costs in most every scenario are eventually passed along to the consumer.

EVA estimates that cumulative costs for new generation capacity associated with compliance nationally will reach just over \$64 billion by 2030. This major capital investment will be required as operational power plants are forced to retire prematurely in order to meet the strict emissions targets – and timeline – set by the CPP. The substantial replacement cost will, of course, be passed through to consumers.

“The proposed emissions reductions will be impossible for Arizona’s rural Electric Cooperative members to attain. The impact to the citizens of this state and the economy cannot be overstated.”

- David Gowan, Arizona House of Representatives Speaker-Elect

Significant Costs Justify Concerns

Concerns about increased consumer prices in the wake of the CPP's implementation have prompted more than half of the states to take legal action to stop the implementation of the CPP in court. Many states have explicitly cited as their chief objection the fact that "citizens will be forced to pay higher energy bills as power plants shut down." The Federal Energy Regulatory Commission (FERC), Energy Information Administration (EIA) and several regional transmission organizations have also acknowledged that the CPP will lead to higher rates and associated costs. The findings in this analysis demonstrate that these and related concerns expressed by a wide range of elected and appointed officials are well founded.

CLEAN POWER PLAN IMPACTS (IN 2015 DOLLARS)

US Wholesale Electricity Price Increase above the baseline (No CPP)

2022 – 10%

2030 – 21%

US Wholesale Electricity Price Increase (\$2015 billion/yr.)

2022 – \$15b

2030 – \$32b

Incremental Cumulative Power Capital Investments

2022 – \$7.5b

2030 – \$64b

Natural Gas Prices (\$/mBtu)

Today – \$2.85

2022 – \$4.40

2030 – \$5.95*

*A 208% increase above today's NG price

CONCLUSION

With the CPP, the Obama Administration and EPA have set state targets for reducing carbon dioxide emissions from the nation's existing fleet of power plants. The cuts are ambitious and carry economic consequences for consumers and industry that have not been fully acknowledged by EPA. These costs will be borne by states and their citizens well before the initial deadline for meeting the rule's emission targets.

The EVA analysis confirms and quantifies these costs and consequences, shedding needed light on EPA's costly power plan that forces Americans to forfeit their low cost electricity to serve EPA's purpose of transforming the nation's electric grid. The analysis shows that, whatever benefits EPA claims, the financial impact of the CPP for all consumers of electricity will be significant and should be carefully weighed as states consider how to proceed.

“South Dakota ratepayers are penalized for merely living in the same state as affected EGUs [electric generating units] while their actions are not connected with, and thus have no effect on, affected EGU emissions in the state.”

- Brian P. Rounds, South Dakota Public Utility Commission

APPENDIX

EPA'S CLEAN POWER PLAN | AN ECONOMIC IMPACT ANALYSIS

METHODOLOGY

For this study, EVA evaluated the state mass-based limitations, including new unit complement, in EPA's Final Clean Power Plan assuming no interstate trading (similar to EPA's modeling assumption) - using one of the six approved state alternatives (see below). The EPIS AURORA economic dispatching model was used to determine the lowest system cost compliance mix, calculate the state annual carbon penalties, aggregate unit fossil fuel demand to project final annual fuel prices using EVA's natural gas/regional coal supply curves and provide hourly wholesale power prices by energy trading hub and state. Not only does this economic dispatching approach depict more accurately how the US electric power system works than the ICF Integrated Planning Linear Programming Model used by EPA, but it also can provide more detailed disaggregated information for assessing the program impacts on individual states and companies.

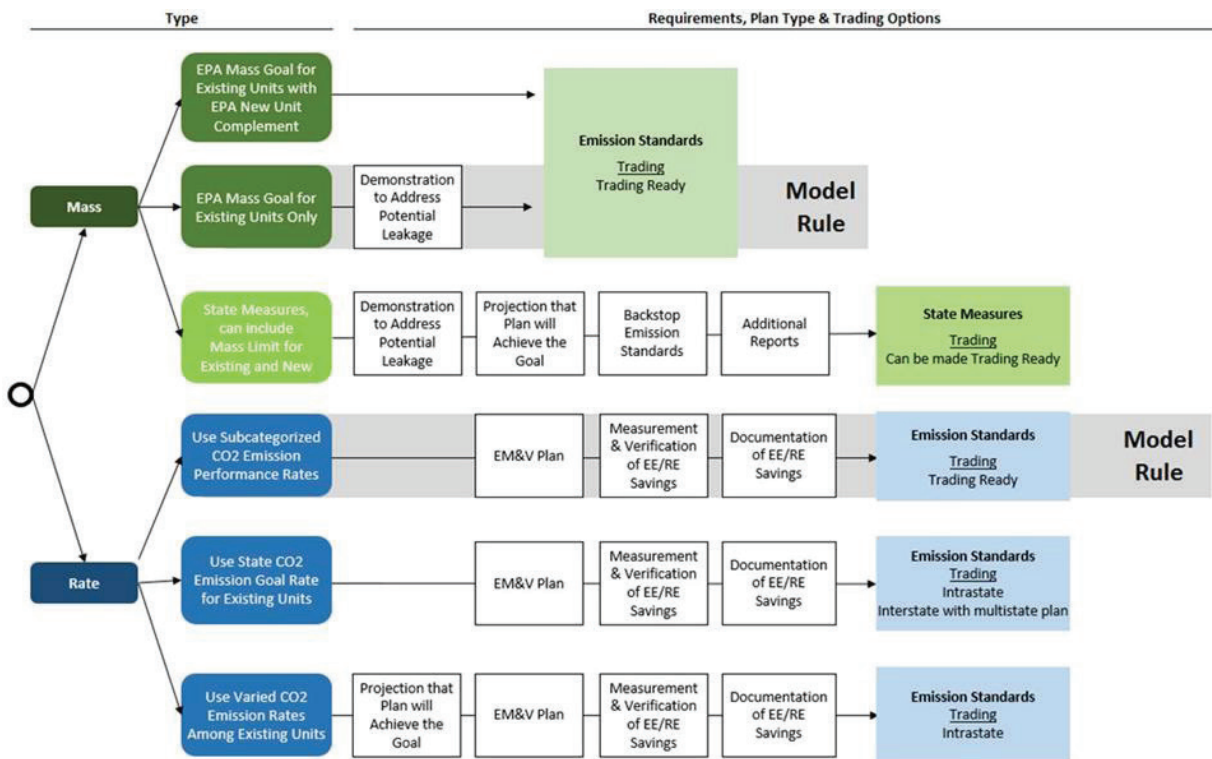


Figure I EPA State Implementation Plan Options under the Final Clean Power Plan (Source: EPA)

The EVA study has made several assumptions that are important to understanding and using its final results. These assumptions and modeling limitations include:

- All affected sources will be able to plan, permit, finance and implement their compliance plans by 2022. This final rule is being litigated in the US Court of Appeals and it is uncertain if the challengers will be successful in winning a stay while awaiting a final decision. Many believe that their decision will be appealed to the US Supreme Court and it may not be until 2018-2019 before the litigation is finally decided. After passing through litigation, states will need time to develop their implementation plans, pass them through public comment and submit to EPA for their final review and approval. After which, affected utility sources will need time to plan, permit, finance and implement their compliance plans. Given it takes 5-8 years to build new replacement generation capacity, and often more than 10 years to build transmission capacity, this study's assumption that all the replacement capacity and new renewable capacity builds will be online by 2022 would be optimistic if litigation takes a long time to resolve.
- This study focused on a state mass-based limitation including new unit complement with no inter-state trading. Should states elect to pursue a rate-based limitation and/or participate in inter-state trading programs, the lowest cost resource compliance plan would likely be different.
- This study, like prior published studies, calculated the lowest cost state compliance strategy assuming perfect unlimited intra-state trading and no carryover banking. In prior emission allowance trading programs (e.g. Title IV Acid Rain, Annual NO_x, Seasonal NO_x) many sources have elected not to participate in trading programs which in turn would change the projected state outcome. Allowance banking can and will have significant effects on utility compliance plans that are not captured in this study. Finally, several affected utilities may elect to more aggressively pursue lower cost options to protect their market share.

