WHITE PAPER

Clean Power Plan: Bigger Risks, More Opportunities Than You Think

By Chris MacCracken, Steve Fine, and Matt Robison

The Bottom Line

1. The Clean Power Plan (CPP) is not just another air regulation—it has the potential to rearrange the U.S. power map. A critical determinant of winners and losers will be the states that are charged with implementing plans.
2. The risks for stakeholders are real. We show how some utilities' generation portfolios could see a 40 percent loss in gross margin, while individual units could see a swing of 30 percent in capacity factor. Utilities can substantially mitigate their costs of compliance if they can understand and achieve the policy designs that work best for their specific situation.
3. We also see new business opportunities emerging not only for existing generation but also for those who can rethink their investment and business plans, and capture revenue from new energy efficiency and renewable sources. We show how one sample incremental wind unit gains 67 percent in gross margin under certain policies.

Executive Summary

The Clean Power Plan is not just another air quality regulation. Rather, its effect could be as broad and deep as if the United States had adopted its first real national energy plan, albeit one with less cohesiveness than a national policy because it will be designed and implemented at the state level.

As such, it will have a profound effect across the power sector. As states put programs and requirements in place to meet EPA's state-based standards for CO2 emissions, a waterfall will reach every corner of the power sector. This waterfall will remake market dynamics and revalue assets from fossil-fuel generators to distributed renewables, from transmission to retail efficiency programs.

Of course, not all state policy decisions will benefit all participants equally: There will be winners and losers, and the effects could go deep. The key to positioning will be to understand exactly what set of policy choices are most desirable to enhance value and what steps can mitigate costs and risks.

In this paper, we make use of our unique insights into the Clean Power Plan as the operator of the premier power sector modeling tool for investor-owned utilities, independent power producers (IPPs), nongovernment organizations, and the U.S. Government; the financial adviser in numerous power plant transactions; and the firm responsible for implementing 40 percent of the nation's energy efficiency programs. We give examples showing how some of the key decisions that states will make in the next two years could drive significant swings in compliance costs, asset values, returns on investment, and business opportunities.

Drawing from market data, we demonstrate how key policy design choices across two sample states can greatly benefit one asset portfolio owner over another or bring them into parity: The "wrong" choice costs a utility a whopping 40 percent of its gross margin, while the "right" one loses them almost nothing. One set of policy choices increases gross margins for an incremental wind unit by 67 percent, siphoning value away from coal units, while others yield only moderate gains. These effects and the projection of load reductions from the growth of energy efficiency (EE) and distributed generation will seriously impact generator revenues and should cause companies to rethink everything from their planned investments to their very business model. Although these threats are significant and real, the good news is some pathways are available to lower costs and take advantage of significant opportunities if stakeholders know where to look.

Clean Power Plan Essential Information

- EPA's proposed Clean Power Plan would regulate CO2 emissions of existing generating units through state-level emission rate standards. EPA estimates that it will reduce total U.S. power sector emissions by 30 percent from 2005 levels by 2030.
- Each state is allowed to determine its own plan design and components to achieve standards set by EPA. To determine the standards, EPA identified and estimated the contribution in each state of four building blocks toward the best system of emission reduction (BSER). They are heat rate improvement, system redispatch from coal to natural gas, increasing generation from renewables and preserved generation from nuclear, and growth in end-use energy efficiency (EE) to displace emitting generation. States can decide how and whether to apply these or other measures.
- The final rule is expected from EPA this summer. EPA is working through more than three million submitted comments, while states and stakeholders are simultaneously trying to determine the components of their compliance plans.
- Initial state plans are due to EPA for review in 2016, with final plans due for states acting alone in 2017 and for states in multistate compliance groups in 2018.
- A detailed review of the plan and its high-level implications can be found in ICF's white paper "EPA's Clean Power Plan—Challenges Ahead for Sources and States."

The Three Biggest Decisions Driving Ultimate Impacts on Stakeholders

EPA and the states will make a number of important implementation decisions that will impact stakeholders in the next two to three years, but the most critical in terms of driving outcomes will be

1. The 2030 emissions goal for each state as determined by EPA.
2. The specific components of each state's plan to meet the goal.
3. The form of the program chosen by each state.

Emissions Goal

The 2030 emissions standard set by EPA, along with the interim 2020–2029 goals, set the bottom line of the plan in each state. In the proposed rule, those standards vary greatly across states—even neighboring states. For example, neighbors North Dakota and South Dakota both start at similar 2012 EPA-estimated fossil emissions rates, between 2,300 lb/MWh and 2,400 lb/MWh, but required reductions under South Dakota's 2030 goal of 741 lb/MWh far outstrip those of North Dakota's final goal of 1,783 lb/MWh. In the East, Virginia would drop from EPA's 2012 calculated rate of 1,438 lb/MWh to 810 lb/MWh, a 44 percent reduction, while neighboring West Virginia's cut would be from 2,056 lb/MWh to 1,620 lb/MWh, a relatively more modest 21 percent.

The 2030 standard sets the table for everything that follows for each state:

- How aggressive it must be in building its plan.
- How much wiggle room it has in mixing and matching program components.
- What incentives it will have to consider different program types or multistate compacts to achieve compliance in the lowest-cost, most feasible way.

Plan Components

Similarly, the determination that each state will make on the components of the plan from among (or outside of) EPA's BSER building blocks will drive the relative position, opportunities, and challenges for various stakeholders. In the BSER calculation, for example, EPA assumes a relatively robust compliance opportunity in the majority of states for existing combined cycles (CCs) to run at a 70 percent capacity factor to drive redispatching to gas from coal, but analysis has shown that actual generation levels could vary significantly. Renewables also are assumed to achieve widely varying levels of penetration, but the states must develop the drivers to bring them in as well. In the Virginia/West Virginia example above, Virginia has at its disposal, according to EPA's building blocks, potential for redispatch to gas and deployment of renewable energy (RE), whereas West Virginia has no access to redispatch and would rely more heavily on RE and heat rate improvement. EPA used these assumptions to set the standards for each state, but the state must determine how to use those assumptions and other options to achieve the standards. Given the varying interests in those options among stakeholders, the relative mix contemplated in each state's plan will be a vital decision.

Form of Program

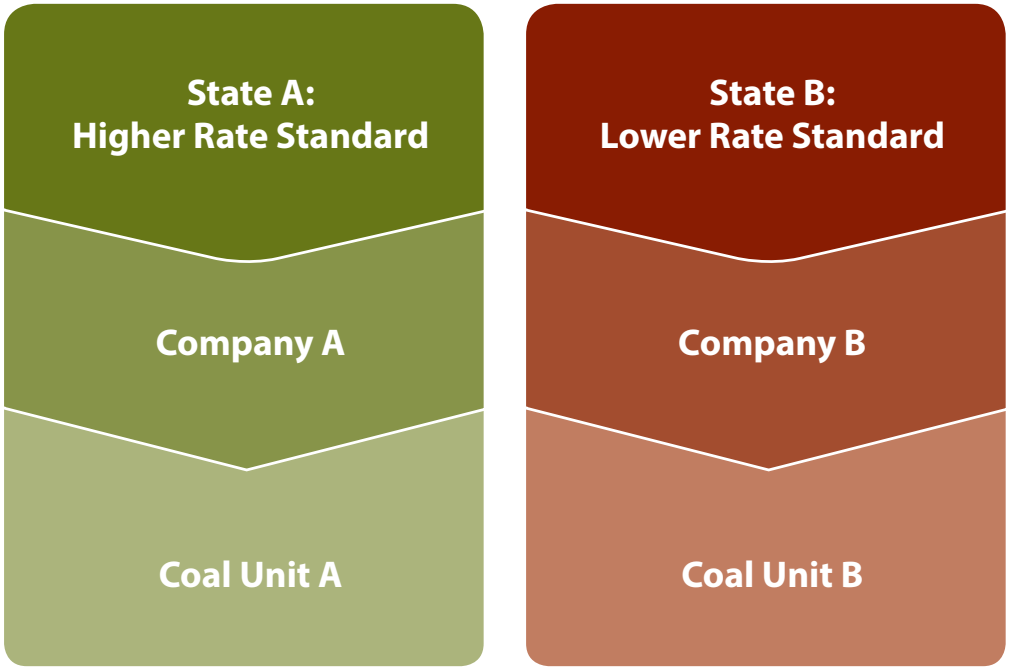
States must pair the components of the plans with the proper program designs to achieve them. EPA assumed trading of credits around emission rate standards in its analysis, but it will allow states to translate those standards to an emissions mass cap instead. Advantages and disadvantages exist to both approaches, and the choice can have a big impact on stakeholders. For example, a rate standard can be more flexible because it allows for growth in absolute emissions over time. Yet, a mass cap may simplify the tracking and accounting for sources and regulators such as avoiding the need for evaluation, management, and verification of efficiency projects to grant them credits for sale into a market-based program. For their plans, states may use one of these trading-based mechanisms alone, as part of a portfolio of enforceable requirements in combination with a collection of complementary programs—such as mandated portfolio standards for EE and RE—or not at all. Each state will determine its optimal mix of programs to achieve EPA's standards. The decision whether to join other states in a regional compliance program is a related and equally important decision.

Key Decisions Drive Big Swings in Costs, Risks, and Revenues: Some Examples

These key decision drivers do not, of course, act in isolation—they combine to impact stakeholders. To demonstrate some of these effects, we developed a case study using two real-world neighboring states and their relevant company and generating unit data.

To keep these states and companies anonymous, we refer to them as State A and State B. State A contains Company A that operates coal generating Unit A. Company B in State B operates coal generating Unit B. The two states, companies, and units are similar in many respects, with the key difference being that State A has a higher rate standard than State B, which means a lower cost of compliance for Company A than for Company B.

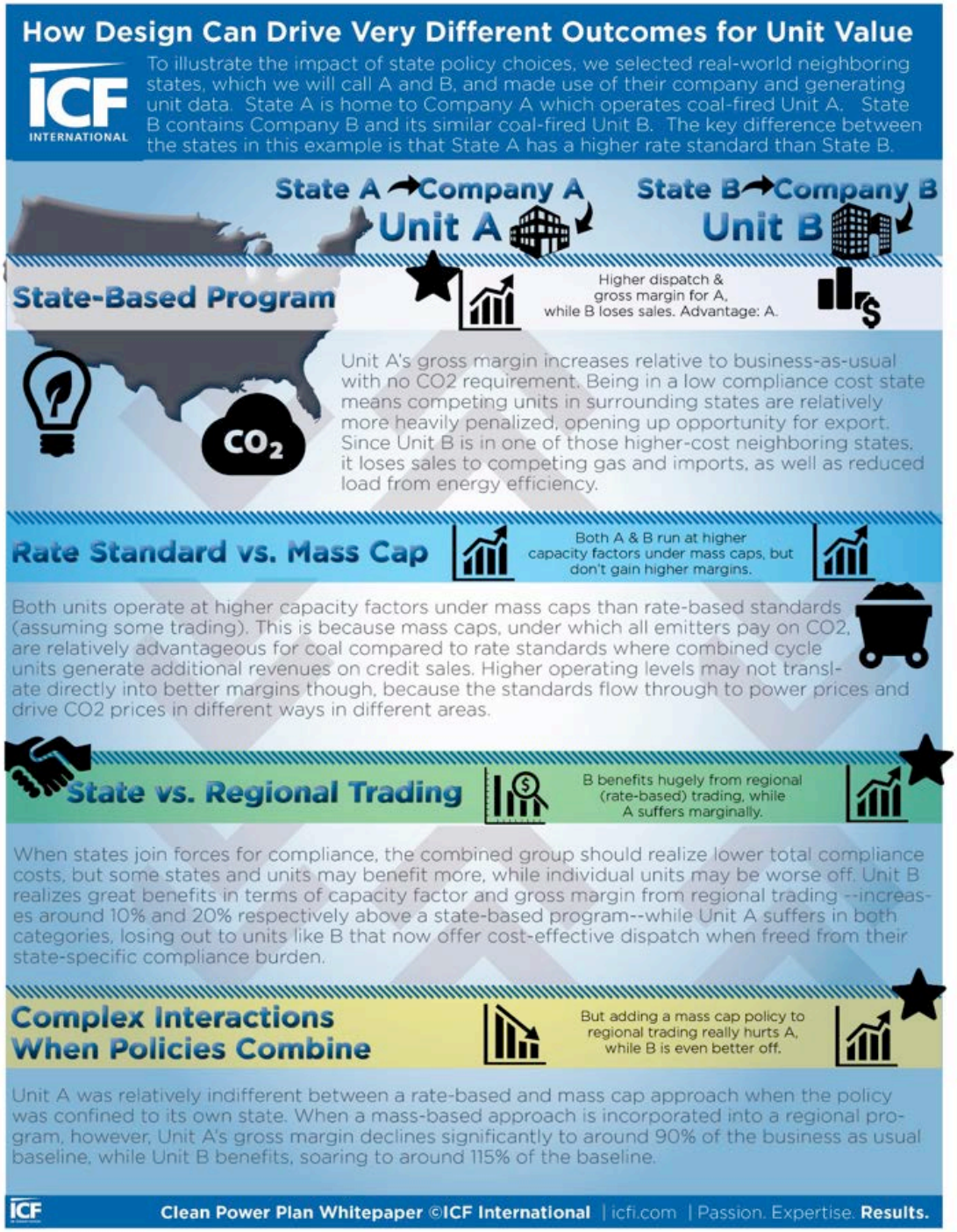
Case Study Structure



Significant Unit-level Impacts

Starting the analysis first at the unit level, the graphic below shows the impact of key policy drivers on sample individual generating units.

[1] All analysis and modeling described makes use of IPM®, ICF's proprietary engineering/economic capacity expansion and production-costing model of the power and industrial sectors. EPA used this model to help evaluate the Clean Power Plan. The projections described here are based on EPA assumptions and draw on actual units and states. Individual market participants are kept anonymous.



Material Fleet-Level Impacts

The graphic shows how policy decisions can significantly change the prospects of one unit. When all of these effects are summed across a utility's entire portfolio of generating assets, they can be either amplified or muted, significantly informing each company's strategy.

The chart below next extends the case study to the company's generation fleet level. It shows the impacts of the same set of policy scenarios on the entire generation portfolios of the owners of Units A and B: Companies A and B, coal-intensive fleets located in States A and B.

. . . the consequences of the state making the "wrong" policy choice from Company B's perspective are severe—a loss of 40 percent of gross margin across its portfolio.

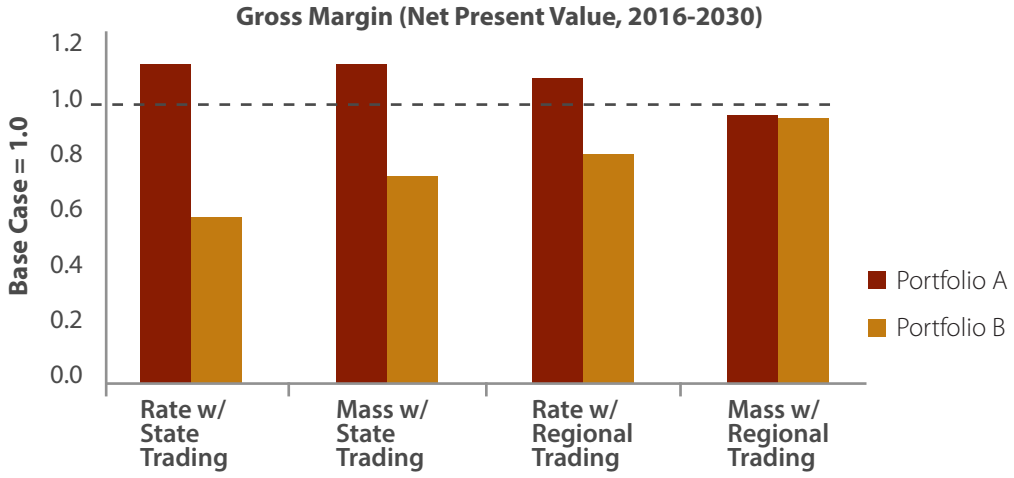
As is evident in the chart, the low compliance costs in State A favor Company A's relatively homogeneous coal portfolio in most cases—in fact, the company can actually achieve a 14 percent higher gross margin than a business-as-usual baseline. The company even do just as well under a state-based mass cap. A regional trading regime would yield a slightly lower margin, while a combination of regional trading with a mass cap would actually meaningfully erode the company's competitive position and yield only 90 percent of the previous gross margin.

This outcome would be especially concerning to Company A, because Company B experiences an even more dramatic series of effects based on state policy choices but in the opposite direction. It has coal units with lower efficiencies and sits in a higher compliance cost state, so it faces a real threat: a dramatic reduction in value in a rate-based state-only case. In fact, the consequences of the state making the "wrong" policy choice from Company B's perspective are severe—a loss of 40 percent of gross margin across its portfolio. By contrast, that value returns almost to business-as-usual levels under a mass- and region-based design—a significantly better outcome for the company in terms of cost of compliance.

In terms of competitiveness, a state-only rate-based regime would not only increase margins for Company A but also dramatically sink its rival. Moving to a regional trading mass cap is a relative disaster from the company's viewpoint, losing 17 percent of gross margin and putting its competitor Company B back in the game with virtually identical margins.

The bottom line: The interactions of the policy choices drive dramatic swings in profitability and competitive position between the two companies.

Figure 1—Effects of Policy Designs Across Entire Company Generating Portfolio



Beyond Compliance: Finding Opportunities, Making Up for Lost Revenue, and Increasing the Value of Your Business

As significant as these impacts and opportunities may be, every company with affected sources also will be facing even bigger strategic questions that go beyond the trade-offs among existing sources of generation. To achieve the best outcome possible and avoid ceding significant ground in the market, companies with a stake in the sector will need to consider everything from dispatch to investment planning to their very business model. They will need to move beyond asking "What's the best way for us to comply with this regulation?" to "How can we respond to these changes in a way that will increase the value of our business?"

. . . Under EPA assumptions, EE will drive reductions in load of 11 percent on average. . . displacing a substantial source of generator revenues. . . the opportunity will lie in capturing new revenue for those developing the EE projects, and it will be equally substantial.

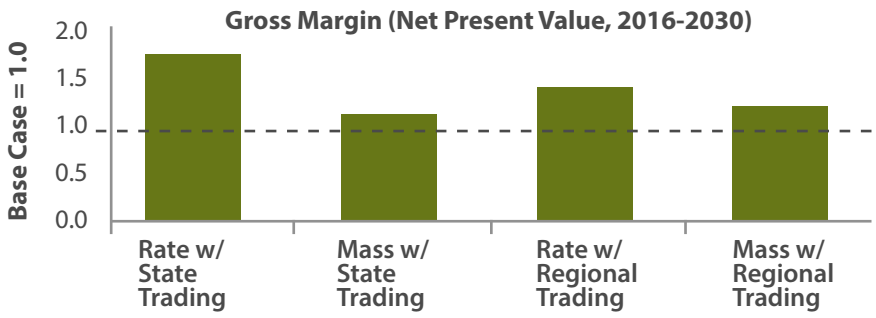
For example, EE, to the extent that it is available, will displace existing generation and potentially the need for new investment, raising the question of how companies maintain or grow their revenue. In its BSER calculation, EPA assumes that EE will drive reductions in load of 11 percent on average from business-as-usual levels across the United States in 2030—with some states reaching more than 20 percent—displacing a substantial source of generator revenues. However, the opportunity will lie in capturing new revenue for those developing the EE projects, and it will be equally substantial. Distributed generation sources may have the same load impacts as EE but will in turn create an opportunity for ownership of supply to industrial and other sources.

The scale of some of the potential opportunities in RE and EE—depending of course on the policy choices that states make—can be seen in reexamining the case of State B from the case study. In our modeling, we show that a new wind unit in State B will garner at least 10 percent greater gross margin relative to the business-as-usual case regardless of which of the four policy design cases the state chooses (Figure 2). Incremental wind assets become more valuable under almost any circumstances. If the state acts alone and chooses the rate-based trading approach, the wind unit gains more than 60 percent in gross margin, including revenues from credits sold to coal generators. At the same time, certain coal units in the state lose 40 percent of their gross margin, as shown earlier for Portfolio B. This loss would also lead to a massive uptick in asset value for the wind unit and

a similar loss for the coal units. Therefore, successfully promoting the rate-based approach in its state and understanding the changing dynamics of renewable energy credit markets may net the developer a significant gain over opportunities under alternative designs.

This kind of effect will not exist in all states of course—the challenge will be to understand the dynamics in each state. But clearly, opportunities will present themselves under the Clean Power Plan. Affected sources and other stakeholders will have to understand policy design measures and their implications for specific states to take advantage.

Figure 2—Policy Can Drive Significant Value Gains for Wind



If the state. . . chooses the rate-based state trading approach, the wind unit gains more than 60 percent in gross margin. . .

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Conclusion

The Clean Power Plan has the potential to be a significant disruptor of markets and company business models. Fundamental decisions by states in the coming two years will have significant implications for participants across the power sector, leading to major swings in the value of generating units and portfolios as well as the attractiveness of investments in new assets.

The good news: Although these changes will bring costs and risks, they also will bring opportunities for creating market advantages and positioning certain players to succeed. To realize these opportunities, stakeholders should pay close attention to the development of state policies and carefully evaluate their current position and what mix of policies would best position them for the future.

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