Complying with EPA's

CLEAN POWER PLAN Policy Options for States

Under EPA's proposed carbon dioxide regulations for power plants, states have a remarkable opportunity to craft individual compliance plans best tailored to their needs. ***Karen Palmer*** *and* ***Anthony Paul*** *offer insights on the most important considerations and effective approaches.*

Power plants are responsible for more than one-third of greenhouse gas emissions and a slightly higher share of carbon dioxide (CO_2) emissions in the United States. On June 2, 2014, in a landmark step toward a national climate policy, the US Environmental Protection Agency (EPA) announced the Clean Power Plan, its proposal for regulating CO_2 emissions from existing power plants under Section 111(d) of the Clean Air Act. The proposal plays an important role in the US Intended Nationally Determined Contribution, recently submitted by President Obama to the UN's climate negotiation process. A distinguishing feature of the plan is the central role of states.

The proposed Clean Power Plan embodies a federal–state partnership under which EPA sets emissions reduction goals and states make policies to meet them. Given the many potential regulatory paths open to states and the limited experience at most state air and environmental offices with regulating CO_2 emissions, the flexibility accorded to states under the Clean Power Plan presents a challenge. At the same time, it provides an important opportunity for states to choose from a variety of options that can be tailored to best suit their needs.

As part of the proposal, EPA has laid out four building blocks that it says comprise the "best system of emissions reductions" and that form the basis for each state's emissions rate goal as proposed by EPA. However, the proposed rule encourages flexibility by suggesting many potential mechanisms that states could use for compliance. In fact, states are free to choose any regulatory approach that they can demonstrate to EPA will achieve the goals, whether employing a comprehensive approach through a single climate policy or a portfolio of policies that together can bring a state into compliance. Elements of a portfolio could be implemented in conjunction with a comprehensive policy; however, a comprehensive policy can address all sources of emissions and provide stringency sufficient for any level of emissions or emissions rate reduction without any other policy in place.

At a high level, the advantages of flexible, comprehensive policies are twofold: cost-effectiveness and administrative simplicity. These policies work by creating goals and incentives for emissions reductions or, in some cases, clean technology adoption. But they leave it to the market to find the least-cost way to achieve the desired environmental outcome. Comprehensive policies are also robust to unexpected changes in market conditions or technology costs because they do not pick a particular technology for reducing emissions. Administrative simplicity springs from the comprehensive nature of the policies; one policy alone is sufficient.

In our research, we examined three forms of incentive-based, comprehensive policies: a mass-based policy, a rate-based policy (which we also refer to as a tradable performance standard, or TPS), and a clean energy standard (CES). Each of these comprehensive policies imposes a cost and, in some cases, an electricity production (or consumption) incentive on different types of generators or consumers based on emissions, production, or consumption.

Setting State Goals: Rate versus Mass?

A state compliance plan may either retain the emissions rate-based goal published by EPA or convert it to a mass-based goal, essentially setting a limit on tons of CO_2 emissions. Each form of the goal has advantages and disadvantages.

A rate-based goal allows for flexibility in that emissions can automatically adjust to unanticipated changes in the amount of covered generation due to factors such as unusual weather trends or unexpected changes in population or economic growth. This flexibility would reduce the cost of reaching the goal in the case of faster-than-expected growth and enhance environmental benefits in the case of slower-than-expected growth.

A mass-based goal provides environmental certainty and would lead to outcomes opposite those of rate goals: greater environmental benefits under fast growth and reduced cost in the case of slow growth. It also offers relative simplicity in demonstrating compliance with a state's implementation plan because the state would simply show the mass of emissions produced, versus separately measuring emissions and generation (and potentially energy efficiency savings) components of an emissions rate target.

The main issue a state must consider when choosing between a rate- and a mass-based goal is the uncertainty about how the power sector will evolve between now and 2030. It is also important to recognize that the form of the state goal and the form of the policy to achieve that goal need not be the same. A state can combine a rate-based goal with a mass-based policy and vice versa.

Mass-Based Policies

A mass-based policy for emissions reductions (sometimes referred to as a cap-and-trade policy) is the most flexible type of policy to reduce CO_2 emissions. The basic mechanics of a mass-based trading policy are simple. A regulator chooses an emissions budget (cap) denominated in tons of CO_2, which is why we refer to this policy mechanism as mass-based. The budget can change over time and typically is structured to decline over time, creating increasing emissions reductions. At regular intervals, the government distributes, either through an auction or through direct allocation, a quantity of emissions allowances that typically, over the course of a year, equals the annual emissions budget chosen by the regulator. Each allowance corresponds to one ton of CO_2 emissions. Any covered generator that emits CO_2 must acquire an allowance for each ton of emissions and surrender to the government sufficient allowances to cover all of its emissions at the end of the compliance period. The allowances are fully tradable and generators with emissions greater than the number of allowances initially purchased at auction may acquire more allowances from others who have them in excess. Assuming that the regulator has chosen an emissions budget that is below the level of emissions that would occur in the absence of any program, the allowances will be scarce and acquire a positive price as they are purchased at auction or traded. A tighter budget will lead to higher allowance prices and therefore more emissions reductions than a looser budget. If states choose to join together, they can simply aggregate their state-level budgets to construct a multistate budget.

Rate-Based Tradable Performance Standards

A flexible rate-based system, which we will refer to as a tradable performance standard, sets an emissions rate standard that the regulated sector must meet on average. It obligates generators that emit at a rate above the standard to buy tradable allowances from those who make power at an emissions rate below the standard. Those generators that are cleaner than the standard are awarded allowances based on how far below the standard they are and how much they produce. For example, if the standard is set at 1,000 pounds per megawatt hour (MWh), a generator operating at 990 pounds per MWh would receive 10 allowances for every MWh produced. Generators that emit at rates above the standard are charged based on how far above they are and how much electricity they produce.

If states choose to join together under a TPS, all the cooperating states could adopt a uniform emissions rate goal, or there could be geographic differentiation, whereby states would retain their own emissions rate goals but allow interstate trading. However, if the cost-effectiveness benefits of state cooperation lead to reduced electricity prices and greater consumption, then emissions could rise as a result of cooperation. Emissions might also rise even if demand does not change, if generation gravitates to the states within the trading region that have the higher emissions rate goal.

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Clean Energy Standards

A clean energy standard is another form of comprehensive carbon emissions abatement policy. A CES is a portfolio standard, like a renewable portfolio standard (RPS), that stipulates a minimum percentage of power demand must be met by qualified clean energy technologies. A CES creates tradable clean energy credits denominated in MWh and awards them to a broader array of generation technologies with low carbon intensity than are credited under an RPS. Local distribution companies are obligated to hold a minimum percentage of credits based on sales. They buy the credits from the generators that earn them based on production.

The core difference between a CES and an RPS is the treatment of nuclear, natural gas, and coal or gas with carbon capture and storage. An RPS treats all these zero- and low-carbon generation technologies the same way as traditional coal-fired boilers: it gives them no credit. A CES can give equal credit to nuclear generation and renewable generation and credit each MWh of generation by natural gas at a lower rate. The crediting rates for clean generating sources can be set in different ways.

Technology-based crediting would provide a credit based on technology type, typically giving nonemitting generators a full credit per MWh, gas combined-cycle units a half credit, and coal and gas generators with carbon capture and storage 90 or 95 percent of a credit, respectively. These crediting rates are roughly concordant with the relative carbon intensities of the different generation technologies compared with that of a coal boiler.

Intensity-based crediting defines clean energy credits based on emissions performance relative to an emissions rate standard. This approach rewards emissions rate reductions within the natural gas generation fleet in addition to providing incentives for more generation from non-emitting sources.

A well-designed CES will share most of the properties of a TPS or mass-based policy that uses an output-based approach to allocating allowances. The main difference is that a CES goal is expressed as a percentage of electricity consumption (MWh), instead of in emissions or emissions rate terms, and the credits are denominated in MWh.

It may be easier for states that want to work together to implement a joint mass-based policy than it is to combine multiple rate-based approaches.

Making the Policy Choice

The cost-effectiveness of each approach described here will depend on the extent to which the particular policy influences the range of relevant choices within the sector about the fuels and technologies used to produce electricity, as well as the level of electricity production itself. From a state's perspective, it also may depend on what policies neighboring states implement and the extent of power trading across state borders. All these issues are important for states to contemplate as they formulate their plans for compliance with the Clean Power Plan once the rule is finalized by EPA later this year.

Among the three policy options, a mass-based approach has many virtues, including ease of measuring compliance and simplicity in administration. It also may be easier for states that want to work together to implement a joint mass-based policy than it is to combine multiple rate-based approaches. One consideration when designing such a policy is determining how to allocate the value of emissions allowances: to electricity producers, electricity consumers, or government for purposes outside the electricity sector.

Economics research suggests that using the revenue from such a policy to offset distortionary taxes on capital and labor may be the most efficient policy. The opportunities for such efficiency-enhancing tax reforms have been studied extensively in the federal context but less so at the state level. The government also may choose to use allowance revenue to pay for research and development related to clean energy technologies or to refund the value to consumers in a way that is divorced from energy consumption choices. Several of the options for allowance allocation that are popular for distributional or political reasons affect economic incentives within the power sector, with implications for cost-effectiveness and incidence of the policy. This makes the allocation of allowance value an important consideration.

FURTHER READING

Palmer, Karen, and Anthony Paul. 2015. A Primer on Comprehensive Policy Options for States to Comply with the Clean Power Plan. Discussion paper 15-15. Washington, DC: RFF.