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# 17 The regulatory approach in US climate mitigation policy

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## **Dallas Burtraw**

Resources for the Future

*Climate policy in the United States stalled with the failure to pass comprehensive economy-wide cap and trade in 2010. Despite this setback, policy has continued to form, developing along a separate regulatory track that is on course to allow the US to achieve emissions reductions by 2020 approaching its pledge in Copenhagen. The current regulatory approach to climate policy is directed by the Environmental Protection Agency, which has the authority to regulate greenhouse gases at the national level under the Clean Air Act. This regulatory approach has so far separately targeted the transportation and power sectors, and additional regulations in other sectors are expected. The approach has technical foundations in policies previously implemented by state governments, which it extends through the introduction of national goals. The organic development of policy in the US has an apparent analogue in the international setting as sovereign nations independently prepare pledges and other activities in support of global climate outcomes. The cost of a regulatory approach is likely to be greater than a coordinated effort built on carbon pricing; however, the policy durability of regulation may be as great or greater. Perhaps more importantly, the regulatory approach has initiated a planning process in state capitals that may build a more robust foundation for future policy goals.*

In 2009, with the support of a new president, the US House of Representatives passed comprehensive climate legislation including economy-wide cap and trade. Then, the winds of change shifted and the measure, which was never taken up in the US Senate, was left to expire. Cap and trade was declared politically dead. For over two years the president did not utter a word about the changing climate. Many observers thought that

President Obama's pledge in Copenhagen in 2009 to reduce US emissions by 17% from 2005 levels by 2020 was a forgotten promise.

However, out of view of the international community and most political observers, the Obama administration was pursuing a parallel strategy to address climate change through exercising the regulatory authority of the Environmental Protection Agency (EPA) under the Clean Air Act. This chapter summarises the key aspects of this regulatory approach and its expected accomplishments, and discusses its implications for economic efficiency and the prospects for enduring into the future.

## **1 Increasing the regulatory authority of the EPA**

The EPA's authority to regulate greenhouse gases (GHGs) was established under the Clean Air Act and affirmed in a 2007 Supreme Court decision. The court's decision was precipitated by actions already taken by the states that were developing climate policies. The court decision triggered an agency investigation and formal finding of harm from GHG emissions in 2009. Under threat of private lawsuits (a special and unusual provision of the Clean Air Act), the EPA was obliged to move to mitigate that harm. The agency's first actions were finalised in January 2011 with new emissions standards for light duty vehicles and the inclusion of GHGs in the required emissions permitting for new construction of stationary sources. The vehicle standard initiated a 5% annual improvement in the miles per gallon measure of efficiency for new cars that has been extended through the middle of the next decade. The new mobile source standards are expected to contribute to a reduction in carbon dioxide (CO<sub>2</sub>) emissions of about 4 percentage points toward the goal of a 17 percentage point reduction by 2020.<sup>1</sup> The preconstruction permitting requirement, which locked in the consideration of GHGs along with other air pollutants in air permitting, will not have much effect in

1 This estimate is based on the US Environmental Protection Agency estimates of turnover in the vehicle fleet. Other estimates in this paragraph and those describing the impact of the Clean Power Plan are based on the author's published research using a detailed simulation model of the power sector and a reduced form representation of the rest of the economy. As described in the chapter by Aldy and Pizer in this book, the comparison of mitigation efforts across nations raises many challenging issues including the validity of models used for that exercise.

the next decade because new construction occurs over a long time frame. The important effect of the permitting requirement will be felt in the long run.

In August 2015, as the centrepiece of this regulatory effort, the president finalised the Clean Power Plan, which aims to reduce emissions from existing power plants that are responsible for about 40% of the nation's CO<sub>2</sub> emissions and about one-third of total GHGs. The Clean Power Plan constitutes the biggest contribution to US emissions reduction efforts to date.

Together with recent changes in US fuel markets, these regulatory initiatives place the US on course to achieve or nearly achieve its Copenhagen pledge, at least with respect to emissions of CO<sub>2</sub>. The expanded supply of natural gas and its substitution for coal in electricity generation already accounts for about 3-4 percentage points of the 17% pledge. This contribution might be interpreted as 'business as usual' and not credited to climate policy, but to some extent it results from other strengthened regulatory measures aimed at sulphur dioxide and nitrogen oxide emissions and new regulation of mercury and air toxics from coal power plants. Changes in the electricity sector also reflect extensive federal investments in energy efficiency programmes. Measures taken by state and local governments, including promotion of renewable and energy efficiency technologies, add 2-3 percentage points more. The 17% reduction in emissions that the US hopes to achieve would occur against a backdrop of nearly 30% growth in real terms between 2005 and 2020 in the US economy (CBO 2014).

## **2 The Clean Power Plan**

Before consideration of the Clean Power Plan, measures put in place at all levels of government would achieve roughly 10 percentage points of reduction in emissions compared to 2005 levels. The Clean Power Plan as initially proposed in 2014 intended to add another 6 percentage points or more, placing the US very close to attaining the Copenhagen goal. The final version of the plan delayed full compliance from 2020 to 2022. It retains incentives for investments in renewable energy and energy efficiency beginning in 2020, but the new date will delay the incentive to shift generation from coal to natural gas that is also expected to contribute importantly to emission reduction. The net effect may be a set back with respect to the 2020 goals of the Copenhagen

pledge. However, the final plan boosts the stringency of emissions reduction goals over the rest of that decade, compared to the proposed plan.

Burtraw and Woerman (2013) estimate that altogether the regulatory measures taken under the authority of the Clean Air Act, if fully implemented, will result in domestic emissions reductions that are greater than would have been achieved under the comprehensive cap-and-trade proposal that failed to pass Congress. The cap-and-trade proposal embodied an emissions reduction target equal to the Copenhagen pledge, but it allowed for international offsets as a means to meet the target, which would have substituted for domestic emissions reductions. The regulatory measures taken under the authority of the Clean Air Act do not provide a role for international offsets, so emissions reductions are achieved all within the US economy.

To an international audience of policymakers and economists, the structure of the Clean Power Plan is noteworthy because the process it inaugurates mirrors one that is taking shape in international negotiations. As in the US, the international dialogue has moved from the design of a coordinated system to the evolution of an organic one that builds on measures that are taken by sovereign jurisdictions. Individual nations will declare independent nationally determined contributions to mitigating emissions. By analogy, under the Clean Power Plan the US states have responsibility for planning, implementing and enforcing strategies to reduce emissions. The Plan prescribes state-specific emissions rate goals and alternative mass-based equivalents (emissions caps), and states may decide which approach to take. While the state-level goals are federally determined, which solves one aspect of the coordination problem, the policy options available to the states are unconstrained. Each state must choose whether to comply with an emissions rate or emissions cap goal, and submit a plan that demonstrates policies that will achieve the EPA's goal for that state. This presents a substantial coordination challenge, especially among states that operate in the same power market. While this coordination challenge will surely exist within the development of international climate policy, leakage of electricity generation and investment under the Clean Power Plan is potentially much more immediate and sizable than what might be observed internationally in the movement of industrial production (Bushnell et al. 2014, Burtraw et al. 2015).

Also the goals among the states are differentiated, as occurs internationally among nations. The goals are based on a national emissions rate target for coal-fired units and another for natural gas combined cycle units, and are calculated on the basis of the resource mix in a given state, including the opportunity to substitute away from fossil fuels to nonemitting generation. Energy efficiency is given credit under a rate-based approach and contributes directly to compliance under an emissions cap. The technical opportunities vary according to the fuel mix, generation fleet, and resource availability among states, just as technical opportunities vary among nations.

### **3 The triumph of law and engineering: Assimilating a key economic idea**

What is missing in the Clean Power Plan compared to the approach that would be taken by most economists in designing a climate policy is cost-effectiveness – that is, explicit attention to equating the marginal costs of emissions reductions measures throughout the sector and the entire economy. In this sense, the Clean Power Plan is a triumph of law and engineering over economics – law because it is implemented subject to the requirements and constraints of the Clean Air Act, and engineering because the relevant portion of the Act is based on a demonstration of technical opportunity. Because the demonstrated options take into account regional variation, there is some rough alignment of marginal cost, but the Plan does not make cost effectiveness a centerpiece.

However, the EPA has preserved perhaps an even higher order principle from environmental economics — the opportunity for flexible compliance. States can choose to use a tradable emissions rate approach (emissions rate averaging) to achieve compliance, or they can adopt a mass-based equivalent. States can choose from a complete menu of policy approaches to achieve these goals, including cap and trade or emissions taxes, or they can convene a resource planning exercise that is familiar in many states where electricity generation is still regulated.

The flexibility under the Clean Power Plan is of central importance because it gives the regulated entities the tools to negotiate to a cost-effective outcome. Such an outcome is not built in, but it is available and it is likely to be pursued within and among many groups of states. In this sense, the Clean Power Plan differs from traditional prescriptive

approaches to regulation and it embodies an important lesson from several decades of economic thinking.

It is also noteworthy that the Clean Power Plan empowers and reinforces the actions of first movers in climate policy among states and local governments. Often these first movers have taken actions that demonstrate the technical opportunities that are the basis for the regional goals. Ten US states have existing cap-and-trade programmes. Twenty-nine states have renewable technology support policies and about 25 have funded energy efficiency policies.<sup>2</sup> This bottom-up leadership has been central to the development of national policy because the accomplishments at the state level are encapsulated in the EPA's findings of technical possibility that underpin the regulation. Paradoxically, comprehensive policies may eliminate the incentive for bottom-up leadership. For example, because cap-and-trade programmes establish a specific tradable quantity of emissions, they have the unanticipated characteristic of imposing not only an emissions ceiling but also an emissions floor (Burtraw and Shobe 2009). With the quantity of emissions established at the national level, measures taken by subnational governments such as energy efficiency measures that overlap an emissions trading program result in 100% leakage (Goulder and Stavins 2011). This characteristic undermines initiatives that might be taken by regulatory agencies, subnational governments or individuals – the type of decentralised initiatives that form the technical foundation for the current regulation.<sup>3</sup>

#### **4 Process and public participation**

In contrast to a comprehensive policy that might undermine the contribution of subnational and individual efforts, the Clean Power Plan has launched a substantial process of public participation through planning activities in every state capital that must

2 [www.dsireusa.org](http://www.dsireusa.org) (accessed August 14, 2015).

3 This is not the necessary outcome when governments introduce a price on carbon and simultaneously promote complementary policies to direct technological development. For example, a tax on carbon will maintain its signal for innovation even as other measures promote directed incentives for technological development. The same outcome is achieved in a cap-and-trade program if there is a price floor in place. All three North American cap-and-trade programmes (California, Quebec and RGGI) have a price floor.

include interactions with the public. This emphasis on process is a strategy borrowed from the states, and appears to mirror international developments. Keohane and Victor (2013) suggest that for a global climate policy regime to succeed, it is likely to require the learning and coalition-building that is achieved through an incremental process. The public engagement through the Clean Power Plan is unprecedented and deliberate. The outcome of such a process is certainly not guaranteed to be efficient. Conceivably, though, it may help build a decentralised public consensus for action on climate that would not be inherent in national-level comprehensive legislation, and certainly was not part of the debate around cap and trade in the US six years ago.

If fully implemented, the Clean Power Plan will position the US to achieve its Copenhagen pledge with respect to CO<sub>2</sub> emissions. After 2020 it will also yield additional emissions reductions that will contribute to the nation's pledge going into the Paris negotiations for reductions of 26-28% by 2025. But achieving comparable reductions in all greenhouse gases or fully realising the 2025 target will require additional regulations (Hausker et al. 2015). The next ones are expected to be regulation of emissions from heavy-duty trucks, regulation of methane emissions associated with the natural gas industry (including gas extraction and transportation), and regulation of emissions from aircrafts. Others will include regulation of industrial gases. These measures could achieve the Copenhagen pledge and go beyond it. It is not yet clear that policy options using existing regulatory authorities have been identified that will achieve the 2025 target. However, the US is much closer to these targets than many thought possible just a couple of years ago.

## **5 Efficiency and durability of the regulatory approach**

The efficiency of the regulatory approach is difficult to gauge. The cost of vehicle standards depends on the value of fuel savings, which varies directly with the price of gasoline. In the electricity sector, the cost of the Clean Power Plan depends on the ability of states to plan or negotiate to a cost-effective outcome. If they do so, modelling indicates the marginal cost of emissions reductions would be around \$20 per tonne of CO<sub>2</sub> reduced (in 2010 US dollars) (Burtraw et al. 2014). If they fail, the marginal costs will vary by a great deal around the country. In the future, the Clean Air Act will require the propagation of new regulations across additional sectors. The marginal abatement

costs introduced in other sectors might be calibrated with those introduced under the Clean Power Plan and with the government's estimate of the social cost of carbon (Interagency Working Group 2015). This would give cost effectiveness a prominent if not central role in policy design, thereby achieving most of the efficiency that would be associated with a comprehensive carbon price.

How durable will the regulatory approach be? The US Clean Air Act is a venerable institution that is credited with significant improvements in the nation's air quality, and there is a legal requirement that it address climate change in the future. Hence, the Clean Power Plan is unlikely to be politically overturned even if there were a sweeping shift in election outcomes. More likely, a new administration that opposed the Plan would slow the development of new regulations and starve the budget of the regulatory agency, which could erode the short-run effectiveness of US climate policy significantly. The regulatory effort is already facing legal challenges aplenty, potentially affecting its reach in the power sector, but not stopping it.

Importantly, the requirements of the Clean Air Act to regulate and the specific proposal of the Clean Power Plan have unalterably changed the investment climate in the US electricity sector, whatever the status of the Plan may be going forward. A seemingly irreversible major outcome is the lack of new investment in coal generation capacity and the declining role for coal. Generation from existing coal nonetheless remains significant and it is the major focus of the Clean Power Plan. The authority of the Clean Power Plan to regulate these emissions sources is likely to survive.

Whether a legislated carbon price would accelerate or slow the decarbonisation of the US economy compared to the regulatory approach depends primarily on its price level, although another consideration is the salience of the policy for decision makers. A legislative mandate aimed directly at climate-related goals could be more forceful and comprehensive than the regulatory authority implied by the Clean Air Act. A legislative approach would be entirely politically determined, and only indirectly influenced by technical and economic feasibility. Through legislation, the Congress has unconstrained latitude to implement a direct emissions cap or carbon fee. In contrast, the design and stringency of regulation is indirectly influenced by political considerations, but it is directly based on findings of technical and economic feasibility. If political dynamics

are not aligned to promote a robust carbon price, the regulatory process will continue to move forward, at perhaps a slow, but steady pace.

Some observers have offered that comprehensive carbon pricing could be adopted in exchange for removing the potentially inefficient role of current regulation. Congress has the authority to preempt the development of further federal regulations and even some at the state level, which might be possible politically if it were coupled with comprehensive federal policy. Whether this would achieve the most robust carbon policy, the most stringent or the most efficient is uncertain. Innovation must play an important role in addressing climate policy; prices and regulation have different potency in this regard in different sectors and over different time frames.

Whether a regulatory or a legislative approach would be more stringent or enduring is entirely uncertain. Technology-based policies may be less fickle than politically based ones. It is certainly true that a legislative approach could be simpler and more coherent. However, if that approach were coupled with preemption of regulatory authorities it would likely ignite internecine political warfare. An outcome that seems politically achievable and that economists might hope for is the introduction of a comprehensive policy that leaves in place but mostly eclipses the steady but slow-moving regulatory authority that has formed the basis of US emissions reductions to date.

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## **About the author**

**Dallas Burtraw** is the Darius Gaskins Senior Fellow at Resources for the Future. Burtraw has worked to create more efficient and politically rational control of air pollution from the electricity sector and has written extensively on electricity industry deregulation and environmental outcomes. He has particular interest in the spectrum of incentive-based approaches leading to formal environmental prices. Burtraw recently estimated the distributional effects of carbon pricing in the U.S. His research

also assesses the costs and benefits of regulation. He has evaluated opportunities for efficiency improvements in the electric power sector from greenhouse gas regulations under the Clean Air Act. He has studied the role for policy interactions including subnational efforts within a federalist system and provided technical guidance in the design of the subnational cap-and-trade programs in the US. Burtraw holds a PhD in Economics and a Master's degree in Public Policy from the University of Michigan.