

2014

Comparing the Clean Air Act and a Carbon Price

Nathan D. Richardson

University of South Carolina - Columbia, richarnd@law.sc.edu

Arthur Fraas

Follow this and additional works at: https://scholarcommons.sc.edu/law_facpub



Part of the [Environmental Law Commons](#)

Recommended Citation

Nathan Richardson, Art Fraas, Comparing the Clean Air Act and a Carbon Price, 44 ELR 10472 (2014).

This Article is brought to you by the Law School at Scholar Commons. It has been accepted for inclusion in Faculty Publications by an authorized administrator of Scholar Commons. For more information, please contact digres@mailbox.sc.edu.

A R T I C L E S

Comparing the Clean Air Act and a Carbon Price

by Nathan Richardson and Arthur G. Fraas

Nathan Richardson and Arthur G. Fraas are a resident scholar and visiting scholar, respectively, at Resources for the Future.

Summary

Over the last half-decade, a variety of federal legislative proposals for limiting greenhouse gas (GHG) emissions have been put forward, most of which would set a price on carbon. As of early 2013, the one politically plausible policy appears to be a carbon tax, passed as part of a larger fiscal reform package. Meanwhile, the U.S. Environmental Protection Agency has begun regulating GHG emissions from a variety of sources using its authority under the Clean Air Act. It may be necessary to choose between these two policies, however. The Waxman-Markey cap-and-trade bill that failed in 2009 would have preempted much of this authority, and it appears likely that a carbon tax law would do the same. But how can one make this choice?

Over the last half-decade, a variety of federal legislative proposals for limiting greenhouse gas (GHG) emissions have been put forward, with varying levels of enthusiasm in the U.S. Congress, the policy community, and among the public. Those proposals that would set a price on carbon—a GHG cap-and-trade system or a carbon tax—are most favored by economists, but others, like clean energy standards, have at one time or another been the policy *du jour*. As of today, the most politically plausible pricing policy appears to be a carbon tax, passed as part of a larger fiscal reform package.

Over the same period, and especially under President Barack Obama after 2008, an alternative vehicle for climate policy has emerged—U.S. Environmental Protection Agency (EPA) regulation authorized by the Clean Air Act (CAA).¹ Regulation of road vehicles has been strengthened to limit GHG emissions. Other regulation has been formally proposed for new power plants and is under consideration for existing power plants and, perhaps, other emitting sectors. The possible impact of this regulation on U.S. GHG emissions is significant. Research suggests that, along with reductions already taking place because of market factors—especially the post-2008 recession and recent low prices of natural gas—CAA regulation may be sufficient to reach the president’s goal of 17% emissions reductions over 2005 levels by 2020, as stated in Copenhagen in 2010.²

This regulatory pathway is unpopular in Congress, with Republicans and even some Democrats actively seeking to block specific regulations or to adopt legislation stripping EPA of climate-related authority. Many greens, on the other hand, argue that new federal climate policy (like a carbon tax) is compatible with parallel CAA regulation and that existing authority should be preserved.

Congress may or may not pass new climate legislation, and it may or may not pass legislation limiting EPA authority under the CAA. This results in four possibilities for U.S. climate policy.

	EPA authority mostly/wholly preempted	EPA authority mostly left intact
<i>No new climate legislation</i>	1. No federal climate policy	2. EPA regulates under the CAA (status quo)
<i>New climate legislation</i>	3. Carbon price supplants EPA regulation	4. Parallel EPA regulation and carbon price

1. 42 U.S.C. §§7401-7671q, ELR STAT. CAA §§101-618.
 2. Dallas Burtraw & Matt Woerman, U.S. Status on Climate Change Mitigation, RFF Discussion Paper 12-48 (Oct. 2012), available at <http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=22073>.

In the first and fourth scenarios, it is not necessary to compare the merits of the two options—you have both, or you have neither, so no choice is necessary.³ But the second and third scenarios set up a choice. Will such a choice be necessary? The outcome of negotiations over any legislation, especially in an area as politically contentious as climate, is very hard to predict. This is especially true for us—we are not political experts. But evidence suggests that the second and third scenarios are more likely.

Proposals to simply strip EPA authority have failed, despite some support. Some proposals for new carbon legislation would not preempt CAA authority, but by far the most successful such proposal to date—the Waxman-Markey cap-and-trade bill that passed the U.S. House of Representatives in 2009—would have preempted most of EPA's climate-related authority. These events lead us to conclude that either the status quo or new legislation partially or completely preempting the CAA (as applied to GHGs) are the most politically plausible outcomes.

If this is right, then a choice between the two policies will be necessary. But how can one make this choice? What are the key questions and issues to consider? The purpose of this Article is to compare these policies. Even if one disagrees with our assumption that a choice between the policy pathways is politically necessary, this comparison remains a relevant, though not complete, analysis of the plausible outcomes.

Both policies are aimed at the same problem: reducing emissions that contribute to climate change. Economists have long argued that pricing an externality is the most cost-effective way to deal with it, so replacing an ostensibly inferior instrument (traditional regulatory tools) with a carbon price is appealing. But the CAA is not as poor a fit for climate policy as is commonly believed. It is also not monolithic—the statute includes many tools aimed at different kinds of emissions sources. A combination of a carbon price and EPA regulation, as would have existed had Waxman-Markey passed, is possible. Moreover, any carbon price passed by Congress will inevitably require compromises that take it away from blackboard ideals. As a result, whether the existing policy pathway should be traded for a new one is a valid question. The right answer greatly depends on the details of a new policy and of what, exactly, is being given up.

Also, no proposed carbon legislation currently has broad support, and significant parts of EPA's regulatory plans under the CAA remain unknown. In other words, we do not have two concrete, well-defined proposals to compare.

Our aim in this Article is therefore not to determine whether a trade of policies is wise or unwise. Instead, our intention is to give policymakers, stakeholders, and other interested readers an impartial assessment of both policies and, in particular, the features that are important to a comparative evaluation. In other words, we will not give answers, but hope at least to give the right questions to ask.

To do this, we first briefly outline the competing policies.⁴ Next, we describe how a policy trade might happen, drawing on one available example—the 2009 Waxman-Markey cap-and-trade bill. Finally, we discuss the relative merits of the two policy pathways, with particular emphasis on what aspects of a proposed carbon price and the as-yet-undetermined parts of an EPA-led approach are most important to that comparison.

I. Climate Policy Under Existing Legislation

The CAA, as first passed in the 1970s and amended most recently in 1990, is the primary federal vehicle for regulation of air pollution and arguably the most significant statute in American environmental law. It is a complex law, with many regulatory schemes aimed at different types of pollutants emitted from different classes of sources. Congress delegates significant authority in the Act to EPA, not only over implementation and enforcement, but also over the scope of regulation itself. As an expert Agency, EPA is required to regularly reassess threats to health and welfare from air pollution, and to modify its regulations as necessary. This includes the authority to regulate new pollutants as their effects become known.

Until quite recently, the view that this authority extended to regulation of GHGs based on their climate effects was confined to a minority in the legal and policy communities. Under the George W. Bush Administration, EPA itself disavowed authority to regulate GHGs under the Act. In the mid-2000s, some states and environmental groups sued EPA, challenging this view, and eventually prevailed in *Massachusetts v. EPA*.⁵ The U.S. Supreme Court held in *Massachusetts* that GHGs are pollutants within the definition of the CAA, opening the door to regulation.

Under President Obama, EPA has moved to limit GHG emissions from a variety of sources. Briefly describing these actions is useful for understanding not only the current state of GHG regulation, but also the varied set of tools available under the statute, any or all of which might be preempted by new climate legislation.

3. However, it is true that the fourth scenario—coexistence—requires careful analysis of interactions between the two policies, some of which would be similar to the comparative analysis presented here.

4. Note that here we only compare the CAA to new legislation setting a carbon price, not to alternative policies, like a clean energy standard.

5. 549 U.S. 497, 37 ELR 20075, 37 ELR 20075 (2007).

A. Road Vehicles

Title II of the CAA gives EPA extensive authority to regulate emissions from vehicles, or “mobile sources.” EPA first moved to limit GHG emissions from on-road cars and trucks, driven in part by the fact that the parties in *Massachusetts* were specifically seeking such regulation. In late 2009, the Agency issued final “endangerment” and “cause/contribute” findings. The former identified GHGs as a threat to human health and welfare and is the trigger and basis for all subsequent GHG regulation under the Act. The latter identified road vehicles as a source of significant GHG emissions. Together, these actions provide the basis for the regulation of GHG emissions from road vehicles.

Since 2009, EPA and the U.S. Department of Transportation have issued stringent new revised corporate average fuel economy (CAFE) standards for light-duty vehicles through the 2025 model year (MY) and for heavy-duty vehicles through the 2018 MY. These standards require manufacturers to improve the fuel economy of vehicles they produce. Light-duty vehicles are to achieve up to an average of 54.5 miles per gallon (mpg) for vehicles produced in 2025, with a projected reduction in lifetime GHG emissions for MY 2012 to 2025 of around three billion metric tons.⁶

B. Electric Generation

Title I of the CAA gives EPA a variety of tools with which to regulate emissions from “stationary sources.” Fossil fuel-fired power plants comprise by far the largest class of emitters in this group (and in the U.S. economy). EPA has moved to regulate GHG emissions from these sources as well, though it has done so more deliberately than for the transportation sector. Newly constructed and/or upgraded sources face different regulations than existing, unmodified sources.

I. New Source Review

All significant new emissions sources are required to undergo “new source review” (NSR) under the CAA. This process requires operators to show that they have installed “best available control technology” (BACT), a determination made on a case-by-case basis. Beginning in January 2011, EPA has required operators to show that they are using BACT for GHG emissions as well as “conventional” pollutants like sulfur dioxide (SO₂). This regulation was challenged on a variety of legal grounds, but in 2012, the

U.S. Court of Appeals for the District of Columbia (D.C.) Circuit upheld the rule.

2. Title V Operating Permits

Emitters are also required to obtain operating permits under Title V of the CAA. These impose no additional requirements, but rather consolidate existing requirements, including those applicable to GHG emissions, into a single permit.

3. New Source Performance Standards

EPA may also issue new source performance standards (NSPS) under §111 of the CAA. These standards impose minimum national performance criteria for all sources in a given category. In practice, they operate as a floor for the case-by-case NSR process. In late 2010, EPA committed to issue NSPS for GHG emissions from power plants in a settlement agreement with several states. In 2012, it issued (and in 2013 revised) a formal proposal for most classes of new fossil fuel plants, setting a standard that can be met only by natural gas plants or by coal plants with carbon capture and storage (CCS) technology. The effect of this proposal would be to ban construction of new coal plants without CCS.⁷

4. Existing Source Performance Standards

Neither of these regulatory programs (NSR and NSPS) affect existing plants, unless those plants undergo major modifications that trigger the NSR process. For existing sources, the president has directed EPA to lead a process, under §111(d) of the CAA, in which states will issue existing source performance standards (ESPS). This provision of the Act has only rarely been used, and EPA has yet to propose any guidelines for such standards, despite having committed to do so by mid-2012 in the 2010 settlement agreement. In mid-2013, however, President Obama committed EPA to propose §111(d) guidelines by June 2014 and finalize them by June 2015, with states to be given until June 2016 to submit their implementation plans (that is the details of how they will regulate).⁸ As of this writing, EPA appears on schedule to meet this latest commitment.⁹

Legal and economic analysis indicates that EPA could create a relatively flexible set of ESPS with achievable emissions targets and a trading system to reduce costs.¹⁰

6. U.S. EPA, Office of Transportation and Air Quality, *EPA and NHTSA Finalize Historic National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks*, EPA-420-F-10-014 (Apr. 2010), available at <http://www.epa.gov/otaq/climate/regulations/420f10014.pdf>; U.S. EPA, Office of Transportation and Air Quality, *EPA and NHTSA Set Standards to Reduce Greenhouse Gases and Improve Fuel Economy for Model Years 2017-2025 Cars and Light Trucks*, EPA-420-F-12-051 (Aug. 2012), available at <http://www.epa.gov/otaq/climate/documents/420f12051.pdf>.

7. This prohibition takes effect even before the rule is finalized, though EPA could in principle withdraw or alter the ban before that point.

8. See Presidential Memorandum—Power Sector Carbon Pollution Standards, June 25, 2013, available at <http://www.whitehouse.gov/the-press-office/2013/06/25/presidential-memorandum-power-sector-carbon-pollution-standards>.

9. See Andrew Childers, *EPA Proposal to Regulate Carbon Dioxide From Existing Plants Under OMB Review*, Daily Env't Rep., Apr. 2, 2014, available at <http://www.bna.com/epa-proposal-regulate-n17179889328/>.

10. See Nathan Richardson et al., *Greenhouse Gas Regulation Under the Clean Air Act: Structure, Effects, and Implications of a Knowable Pathway*, RFF Discussion Paper 10-23 (Apr. 2010), available at <http://www.rff.org/News/>

Because of the amount of emissions from existing sources and the range of regulatory options available, EPA's decisions on power-sector ESPS are the most significant it will make in regulating GHGs under the CAA.

C. Other Sectors and Tools

Transportation and electric power are by far the largest-emitting sectors of the U.S. economy, so it is natural for EPA to have focused its regulatory efforts on these sectors. The CAA, however, gives the Agency much broader authority. In its 2010 settlement agreement, the Agency committed to issue NSPS and ESPS for the refining sector as well as for fossil electric power. The Agency has not fulfilled this commitment and shows no signs of doing so soon, but it unambiguously has the power to do so, not only for refining, but for many other sectors that emit GHGs. Iron and steel, cement, chemicals, and other manufacturing sectors are the most obvious candidates.

EPA also has authority to regulate emissions from parts of the transportation sector other than road vehicles. Aviation, shipping, and "nonroad" land vehicles are all regulated under the CAA, and these regulations could be extended or expanded to cover GHG emissions.

The CAA also includes other regulatory tools for stationary (and, in some cases, other) sources; these tools have not been considered good fits for GHG regulation but could, in principle, be used in the future. EPA could classify GHGs as "criteria pollutants" and impose national

ambient air quality standards (NAAQS) under §110 of the Act, as it has done with the six conventional pollutants (e.g., lead, SO₂, and ozone). It could also designate GHGs "hazardous air pollutants" under §112 or attempt to regulate them under §115, a relatively obscure provision targeting international emissions. EPA also has authority under Title VI of the CAA to regulate pollutants that affect the ozone layer, some of which are also GHGs.

Table 1 shows the most significant climate-related regulatory options under the CAA and their current status.

D. Other Environmental Statutes

Though it is by far the most important, the CAA is not the only environmental statute that grants (or could be interpreted to grant) regulatory authority based on risks from climate change. For example, species threatened by climate-related habitat disruption could, in principle, qualify for protection under the Endangered Species Act,¹¹ though the current Administration has disavowed the use of that statute as a vehicle for climate regulation. Under some theories, this would give regulators authority to impose emissions restrictions. The Clean Water Act¹² might grant similar authority to the extent that carbon dioxide (CO₂) emissions threaten U.S. waters with acidification. Although it is not possible to describe and evaluate these extra-CAA regulatory possibilities here,¹³ it is likely that they will at least be considered in negotiations over new climate legislation.

Table 1. Primary Climate-Related Regulatory Options Under the CAA

Program	Sources covered	CAA §	Status
Mobile sources			
Fuel economy stds. (CAFE)	Light-duty motor vehicles	§202	Final
	Heavy-duty motor vehicles	§202	Final
Emissions stds.	Aviation	§231	Unknown
	Maritime and nonroad	§213	Unknown
Stationary sources			
New source review (NSR) permits	Large new sources in all sectors	§165	Final
Title V operating permits	Large existing sources in all sectors	Title V	Final
New source performance stds. (NSPS)	New fossil power plants	§111	Proposed
	New oil/gas refineries	§111	Promised
	New/modified sources in other sectors	§111	Unknown
Existing source performance stds. (ESPS)	Existing fossil power plants	§111(d)	Promised
	Existing oil/gas refineries	§111(d)	Promised
	All other stationary sectors	§111(d)	Unknown
Other			
National ambient air quality stds. (NAAQS)	All sectors	§110	Unlikely
Hazardous air pollutant (HAP) regs.	All stationary sectors	§112	Unlikely
Stratospheric ozone pollutant regs.	All emitters	Title VI	Unknown
International pollutant regs.	All emitters	§115	Unlikely

11. 16 U.S.C. §§1531-1544, ELR STAT. ESA §§2-18.

12. 33 U.S.C. §§1251-1387, ELR STAT. FWPCA §§101-607.

13. See Peter Anderson, *Climate Change Regulatory Authority Beyond the Clean Air Act*, RFF Discussion Paper 12-39 (July 2012), available at <http://www.rff.org/RFF/Documents/RFF-DP-12-39.pdf>.

II. New Legislation: Putting a Price on Carbon

The classic approach economists use to address externalities, like the climate change effects of carbon emissions, is to incorporate the cost of the externality in commodity prices. The incorporation of a carbon price confronts the users/consumers with the cost of the external damages associated with production of the commodity so that they reduce their consumption of carbon-producing goods. It also provides producers with an incentive to find ways to reduce the carbon emissions arising from their production of the commodity. As one scholar puts it, “[c]arbon pricing is the only signal that can cut through the noise and direct diverse economic actors toward smart, green investments.”¹⁴

One can create a carbon price using either of two approaches: impose a carbon tax; or create a market for emissions (e.g., through a cap-and-trade program). The failed Waxman-Markey legislation (discussed below)—which was adopted by the House, but never reached a vote in the U.S. Senate in 2009—would have established a cap-and-trade program. An alternative to Waxman-Markey introduced in the Senate by Sens. Maria Cantwell (D-Wash.) and Susan Collins (R-Maine)—the Carbon Limits and Energy for America’s Renewal Act—would have set up an auction mechanism for selling “carbon shares” to fuel producers.¹⁵

In February 2013, Sens. Barbara Boxer (D-Cal.) and Bernie Sanders (I-Vt.) proposed a bill to tax carbon emissions. The bill would tax emissions of the economy’s largest upstream fossil fuel producers—coal mines, oil refineries, and natural gas-processing plants—but it would not directly include electricity-generating plants that would continue to be regulated by EPA (though fossil plants would be exposed to the tax indirectly through fuel prices). The carbon tax would initially be set at \$20 per ton of CO₂-equivalent and would increase by 5.6% per year over a 10-year period. According to the sponsors, the bill would raise \$1.2 trillion in revenues by 2020.

The adoption of a carbon tax has emerged as an increasingly attractive approach—at least within some circles—as a way to kill two birds with one stone. Not only would it establish a price for carbon, but it could also provide a source of federal government revenue to address a growing

federal budget deficit—particularly with the substantial projected growth in entitlement expenditures. Alternatively, a carbon tax could be structured to replace more regressive taxes (e.g., a payroll tax) or taxes that retard capital investment and the formation of small business (e.g., corporate or business taxes).

III. Waxman-Markey: An Example Trade

Because the CAA is modular, whether to exchange existing authority for new legislation is complex. All parts of the statute need not be preempted, and creative trades that divide authority over various sectors between existing CAA regulation and a new carbon price mechanism are possible, at least in principle. This part describes one such trade, though, of course, many others are possible, up to and including full preemption of CAA authority to regulate based on climate risks.

The 2009 Waxman-Markey cap-and-trade bill (H.R. 2454) narrowly passed the House. No parallel measure passed the Senate, and therefore no bill reached the president’s desk. Nevertheless, the bill does represent the high watermark (to date) for climate legislation, and is therefore a useful model. As noted above, the bill would have created a comprehensive cap-and-trade system covering most U.S. GHG emissions, and also would have stripped EPA of much—but not all—of its existing climate-related authority under the CAA.

Specifically, Waxman-Markey would have eliminated EPA authority to consider GHG emissions in the NSR process, to regulate GHGs as criteria or hazardous pollutants, to regulate GHGs based on their international effects, and to issue GHG performance standards (NSPS and ESPS) for sources subject to the emissions cap.¹⁶ It would have preserved EPA authority to issue performance standards for relatively minor classes of sources not subject to the cap. More importantly, EPA also would have retained authority to regulate transportation-sector emissions with fuel economy standards. CAFE regulation would have continued to require vehicles to meet fleet average standards, though the cap-and-trade system would have included emissions of the upstream producers/importers of petroleum fuels—with downstream effects on fuel prices. Table 2 shows the status of climate-related regulatory options under the CAA had Waxman-Markey become law.

14. See Michael A. Livermore, *Unlocking the Green Economy*, Institute for Policy Integrity at New York University School of Law Policy, Brief No. 2 (2008) at 1, <http://policyintegrity.org/publications/detail/unlocking-the-green-economy/> (last visited May 2, 2014).

15. Note that, unlike Waxman-Markey itself, this bill would *not* have preempted EPA authority under the CAA.

16. The bill would have imposed performance standards, set specifically by statute, on coal plants—but only after CCS technology had been commercially demonstrated.

Table 2. Climate-Related Regulatory Options Under the CAA With Waxman-Markey

Program	Sources covered	CAA §	Status
Mobile sources			
Fuel economy stds. (CAFE)	Light-duty motor vehicles	§202	Retained
	Heavy-duty motor vehicles	§202	Retained
Emissions stds.	Aviation	§231	Retained
	Maritime and nonroad	§213	Retained
Stationary sources			
New source review (NSR) permits	Large new sources in all sectors	§165	Preempted
Title V operating permits	Large existing sources in all sectors	Title V	Preempted
New source performance stds. (NSPS)	New sources in capped sectors	§111	Preempted
	New sources in uncapped sectors	§111	Modified
Existing source performance stds. (ESPS)	Existing sources in capped sectors	§111(d)	Preempted
	Existing sources in uncapped sectors		Modified
Other			
National ambient air quality stds. (NAAQS)	All sectors	§110	Preempted
Hazardous air pollutant (HAP) regs.	All stationary sectors	§112	Preempted
Stratospheric ozone pollutant regs.	All emitters	Title VI	Modified
International pollutant regs.	All emitters	§115	Preempted

Whether any future trade of existing CAA authority for carbon price legislation would follow similar lines is impossible to know. Since 2010, much has been learned about regulatory options under the existing act as EPA has moved to actually use its authority. This has increased anxiety and opposition among many in industry, but has also endeared many environmental groups to CAA climate authority. Both sides' positions therefore appear to have become more entrenched, though public statements likely reflect bargaining positions rather than truly held views.

The Waxman-Markey policy trade does illustrate two important points, however. First, the modular character of the CAA makes partial trades possible. Second, the more politically popular a CAA program is, the less likely it is to be sacrificed in a bargain for climate legislation.

IV. Advantages and Disadvantages

Up to this point, we have merely described these two policy options—new carbon legislation and CAA regulation. But evaluating an exchange (or negotiating one) requires direct comparisons of their relative merits. To that end, this part discusses the relative advantages and disadvantages of the two policies in a variety of areas.

Generally, we assume that the goal of any climate policy is to achieve a specified emissions reduction at the lowest cost (or the greatest emissions reduction at a specified cost), regardless of what sector—or even what country—those reductions come from. But, as the following discussion shows, there are other dimensions to consider in addition to the economic cost of making reductions. Administrative costs and political risk can vary, and policies that look good in the short term may be inferior over the long term.

Also, a climate policy may have other goals: reducing emissions from a particular sector, reducing *domestic* emissions only, encouraging renewable energy or demand-side energy efficiency, or enabling progress in international negotiations, for example. We mention these where relevant, but our ultimate focus is on a policy's ability to achieve the lowest-cost GHG emissions reductions.

A. General Cost-Effectiveness

The consensus view among economists is that the most cost-effective policy for addressing externalities is to put a price on them. In the GHG context, this can be achieved either by setting a price explicitly, as a carbon tax would do, or by establishing a market-based approach like a cap-and-trade system. Economists often contrast a price approach with traditional “command-and-control” regulation, of which the CAA is often given as an example.

The superior cost-effectiveness (defined as cost per unit of emissions reduction) of externality pricing is in large part due to information asymmetry. Regulators (or, more broadly, government) set the cap or price, but producers and consumers have better information about how emissions can most cheaply be reduced in production and consumption of goods and services. Resulting changes in the prices of goods and services lead consumers to adjust their purchases by substituting away from higher priced, carbon-intensive goods. Pricing the externality harnesses market forces to achieve the most cost-effective reductions, rather than relying on regulators' best estimates. The sheer scope of GHG regulation makes flexible, cost-effective approaches extremely important.

Past experience has shown that market-based approaches can achieve emissions reductions at significantly lower cost than initially estimated, and that such approaches could be much more cost-effective than traditional regulation under the CAA.

This comparison assumes that the CAA is inflexible. In some ways, this is true. Many of the tools available to EPA under the CAA are relatively rigid, and require EPA to invest significant technical resources to estimate achievable targets. For example, air quality standards (NAAQS) are, by definition, nationally uniform—the same standards apply everywhere regardless of how costly it is to achieve them. Some programs can even create perverse incentives—NSR, for example, may discourage firms from upgrading older, less-efficient facilities because doing so would trigger an expensive permit process. Technology-based standards, like NSPS, that effectively mandate a specific control technology, at least as traditionally implemented, can stall innovation because of the limited incentive to make further technological improvements.

But the CAA is not as inflexible as it is often characterized. At least some examples of market-based environmental regulation—on which the reputation of such tools for cost-effectiveness is based—are, in fact, CAA programs. The SO₂ cap-and-trade system created by Title IV of the Act and, to a lesser extent, nitrogen oxide (NO_x) trading programs created under the NAAQS provisions are both viewed as cost-effective success stories. To be fair, Congress explicitly and uniquely crafted the Title IV program, and the NO_x programs were built under CAA provisions (NAAQS) that are very unlikely to be applied to GHGs. Also, some court decisions have sharply limited the flexibility of these programs,¹⁷ though the Supreme Court's recent holding in *EPA v. EME Homer City* appears to signal better future prospects for flexibility, at least under NAAQS.¹⁸

Nevertheless, significant regulatory flexibility appears to be available to the Agency in those programs that will constitute the core of a CAA-driven approach to GHG regulation. In the transportation sector, new CAFE standards for MYs to 2025 are calibrated to vehicle size (preserving consumer choice) and allow trading among manufacturers (probably reducing costs and increasing incentives to become more efficient).¹⁹ Legal analysis indicates that the Agency could also pursue flexible, market-based regulation for aviation emissions.²⁰

Most importantly, EPA appears to have broad authority to implement flexible, market-based performance standards for ESPS. Legal analysis indicates that the Agency,

working in concert with states, can implement a tradable performance standard or perhaps even a form of cap and trade with its authority under this part of the CAA.²¹ Indeed the Bush EPA attempted to implement a cap-and-trade system for mercury emissions using the same authority in 2005, though courts struck down that effort for unrelated reasons. Economic analysis indicates that such flexible regulation (a tradable standard) could result in overall cost savings of two-thirds over a similarly stringent inflexible approach.²²

Because ESPS will be the primary regulatory tool for the largest-emitting sector of the economy (fossil fuel electric power), using flexible tools here will have major impacts on the cost-effectiveness of CAA climate policy. Because the Agency has yet to propose ESPS for any sector, whether it will actually adopt a flexible approach is unclear. But it has the option to do so.

There are limits, however. EPA's ability to allow emissions trading between sectors is unclear, and even if doing so is legal, technical barriers may prevent it in practice. The Agency also may not be able to include some flexible compliance options, like credits for renewable generation or demand-side energy efficiency or emissions offsets that would be possible under new carbon legislation.²³ Further, because the Agency would need to set sector- or subsector-level emissions targets, this approach remains information-intensive relative to an approach that sets a uniform national carbon price. Once relatively obvious "low-hanging fruit" opportunities for emissions reductions are identified and exploited, it will become more difficult for EPA to avoid costly missteps. Perverse incentives from NSR could also erode the benefits of flexible ESPS if interactions between the two are not addressed.²⁴

As we have stated in the past,²⁵ our research indicates that, contrary to commonly held views, the CAA can be a flexible and cost-effective tool for GHG regulation, at least over the short term. The cost-effectiveness of the CAA relative to new carbon legislation depends on important details. If EPA adopts flexible, multisector ESPS that survives legal challenge, initial CAA cost-effectiveness could be similar to that of a carbon price. This is less likely if the CAA is compared to new carbon price legislation, including broad flexibility options like international emissions offsets (though many question the validity and verifiabil-

17. Because the Title IV program was explicitly set out by Congress, the court found, in its recent Clean Air Interstate Rule decision, that EPA could not alter the program as a part of its efforts to achieve further reductions in SO₂ emissions. In addition, recent court decisions severely constrain any interstate trading program—like the NO_x trading program or the Clean Air Interstate Rule—set up under the requirements of NAAQS.

18. *Environmental Protection Agency v. EME Homer City Generation*, 572 U.S. ___ (2014).

19. The trading is authorized by separate statute.

20. See Nathan Richardson, *Aviation, Carbon, and the Clean Air Act*, 38 COL. J. ENVTL. L. 67 (2013).

21. See Gregory Wannier et al., *Prevailing Academic View on Compliance Flexibility Under §111 of the Clean Air Act*, RFF Discussion Paper 11-29 (July 2011), available at <http://www.rff.org/RFF/Documents/RFF-DP-11-29.pdf>.

22. See Dallas Burtraw et al., *Retail Electricity Price Savings From Compliance Flexibility in GHG Standards for Stationary Sources*, 42 ENERGY POL'Y 67 (2012).

23. For a detailed discussion of flexibility options available (and not available) under the CAA, see Nathan Richardson, *Playing Without Aces: Offsets and the Limits of Flexibility Under Clean Air Act Climate Policy*, 42 ENVTL. L. 735 (2012).

24. For example, firms may choose not to take cost-effective actions to comply with ESPS if they fear it will trigger costly NSR.

25. See Nathan Richardson et al., *The Return of an Old and Battle-Tested Friend, The Clean Air Act*, 176 RESOURCES (2010), <http://www.rff.org/Publications/Resources/Pages/The-Return-of-an-Old-Battle-Tested-Friend-176.aspx> (last visited May 2, 2014).

ity of such offsets). Over the long term, however, the cost-effectiveness advantages of new carbon legislation are likely to predominate.

Questions to ask:

- Will regulation of existing sources under the CAA be flexible, allowing trading between emitters? Will it allow trading between sectors?
- Does the legislative proposal provide flexibility, such as international offsets, not available under the CAA?
- If new legislation is not passed now, how long will CAA alternatives remain in place? In other words, when will carbon legislation again be politically plausible?

B. Scope

A carbon price could, in principle, cover all GHG emissions throughout the U.S. economy. This has two advantages. First and most obviously, only covered sources have an incentive to reduce their emissions. Second, the broader the scope, the greater the availability of opportunities to reduce emissions at low cost on the part of both producers and consumers. A broader scope means greater emissions reductions at a given price, or a lower price for a given level of emissions reductions.

The scope of the CAA is more limited, however. Some sectors, such as agriculture, are largely outside the reach of the CAA because they are neither mobile nor stationary sources according to CAA definitions. Such “non-point” sources may also be difficult to reach with a carbon price mechanism because emissions are hard to measure and track—a carbon price embedded in fuel and fertilizer prices helps, but some practices, such as tilling and feedlots, are hard to reach with price incentives.

Also, the CAA generally requires a sector-by-sector approach. EPA must develop, propose, review comments, finalize, and implement performance standards or other regulation for each sector. These must each also survive any related litigation. EPA has broad authority to define sectors, but excessively broad definitions are impractical and possibly illegal. This means that it will take many years before the scope of CAA-driven climate policy can match that of new carbon legislation, even if the maximum scope of both is similar in principle.

On the other hand, EPA has already moved to regulate one of the two largest sectors (road vehicles) and is on the path toward regulating the other (fossil electric power). Together, these sectors account for the majority of U.S. emissions (about 67%).²⁶ Only if very low-cost emissions-reduction opportunities are available in other sectors will incorporating them change the cost and/or

amount of achievable reductions very much. However, under CAA regulation, no trading between these two sectors is possible. Because their marginal cost of emissions reduction is almost certainly different, this reduces cost-effectiveness.

As noted above, new carbon legislation could access international offsets. Doing so effectively increases the scope of the policy, accessing even cheaper emissions reductions than are available in any sector of the economy.

Questions to ask:

- How broad is the scope of the carbon legislation? Is it economywide or does it cover only major emitting sectors?
- Has EPA shown willingness to regulate sectors beyond fossil electric power and road vehicles? (To date, it has only expressed an intent to regulate petroleum refineries, but not other sectors, and recent indications are that even refinery standards may be put off indefinitely.²⁷)

C. Stringency

Congress is free to set whatever emissions cap or carbon tax level it wants to. The CAA also does not specify stringency. Instead, it establishes goals or targets based on health or welfare, and requires EPA to regulate adequately to meet them. In some programs, such as NAAQS, these requirements are ultimately driven by scientific judgments based on health or welfare effects. Other provisions require technology-based standards. For the CAA programs most relevant to GHG regulation (CAFE and NSPS/ESPS), EPA has relatively broader discretion over stringency. In contrast to health- or welfare-based CAA programs, the Agency is permitted to consider technical feasibility, compliance costs, the “remaining useful life” of sources, and, presumably, overall program cost-effectiveness. However, like all Agency decisions, EPA action under the CAA must fall within the bounds of reasonableness given the limitations of its statutory authority.

This flexibility means there is relatively little a priori basis for separating new carbon legislation from CAA regulation on stringency grounds. Neither pathway will necessarily lead to a weak or strong policy; ultimately, any judgment will have to be based on the specific program/legislation. The policy goal should be compliance costs approximately equal to the expected marginal damages from carbon emissions. This is relatively easy to assess for a carbon tax because the tax rate can be compared to an

26. U.S. EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks*, EPA 430-R-12-001 (2012), available at <http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2012-Main-Text.pdf>.

27. See *Environmentalists End Bid for Refinery Climate NSPS as EPA Delays Rule*, INSIDEEPA.COM, Mar. 2014, available at http://insideepa.com/index.php?option=com_user&view=login&return=aHR0cDovL2luc2lkZWVwYS5jb20vMjAxNDA0MTcyNDY3OTMzL0VQQS1EYWlseS1OZXdzL0RhaWx5LU5ld3MvZW52aXJvbm1lbnRhbGlzdHMtZW5kLWJpZC1mb3ItcmVmaW5lenktY2xpbWF0ZS1uc3BzLWVzLWVwYS1kZWxheXMtcmVsZS9tZW51LWlkLTK1Lmh0bWw/cz1kgb==.

estimate of marginal damage.²⁸ EPA conducts cost-benefit analysis of its major regulations, but the resulting standards may be influenced by factors other than damage estimates.

Question to ask:

- How stringent is new carbon legislation, relative to what EPA requires (or will require) from CAA-regulated sectors? Do compliance costs of either policy better approximate estimated marginal damages?

D. Revenue

The primary reason why new carbon legislation—in most accounts, a carbon tax—is viewed as politically plausible in the near term is the fact that it can raise a lot of revenue: \$120 billion annually for a \$25/ton tax.²⁹ This revenue could be used to reduce budget deficits, to fund desired or needed government activity, or to replace other taxes with distortionary effects on the economy. A cap-and-trade program would also generate revenue if allowances are auctioned, rather than freely allocated. Even if environmental benefits are the driving reason for new legislation, generating revenue is a valuable side benefit. Opinions vary greatly on the best use of revenue, with deficit reduction, replacement of distortionary taxes, or rebates directly to citizens the most frequently advocated options. But all agree that government revenue is an important benefit and an advantage of policy options that produce it.

EPA regulation under the CAA cannot generate federal revenue. Congress did not delegate its tax power to the Agency in the statute (and, historically, has almost never made such a delegation). EPA does have authority to issue fines for failure to comply with its regulations, but this power probably could not be used to “tax” emissions. EPA also almost certainly lacks authority to auction permits for a cap-and-trade system. In short, EPA cannot create a carbon tax, and if its regulations involve tradable permits or allowances, those allowances will almost certainly be given away freely (grandfathered) to regulated emitters.

States with implementation authority under CAA programs like ESPS may generate revenue—they have independent authority and are not limited by the CAA in this regard. For the same reason, however, states do not need CAA regulation to raise revenue with carbon policy, as illustrated by California’s use of revenue-generating auctions as part of its cap-and-trade program. In fact, new legislation setting a national carbon price could erode revenues from these state-level climate policies.³⁰

28. Estimating marginal damages of carbon emissions is hard, but no more so for either policy.

29. See Ray Kopp et al., *Considering a Carbon Tax: Frequently Asked Questions*, Resources for the Future (2012), available at http://www.rff.org/centers/climate_and_electricity_policy/pages/carbon_tax_faqs.aspx#Q2.

30. See Lawrence H. Goulder & Robert N. Stavins, *Challenges From State—Federal Interactions in U.S. Climate Change Policy*, 101 AM. ECON. REV. 253 (2011). For more on interactions between a carbon tax and state-level climate policies, see Dallas Burtraw & Karen Palmer, *Mixing It Up: Power*

In summary, a national carbon tax will generate revenue. A cap-and-trade program might. CAA regulation cannot generate federal revenue. States can generate revenue from climate policies whether or not carbon is regulated under the CAA, though this ability may be undercut by a national carbon price or incompatible EPA regulation.

Question to ask:

- Does new carbon legislation generate new revenue and do something useful with it?

E. Administrative Simplicity

A carbon tax could be very simple to administer, especially a carbon tax on upstream sources of carbon emissions. A relatively small number of oil and gas, industrial, and electric generation firms are responsible directly or indirectly for the large majority of U.S. emissions. The U.S. Treasury already administers tax systems covering coal mines and oil and natural gas producers, so the adoption of a carbon tax administered by Treasury on these energy producers would be relatively straightforward.

A carbon price is not necessarily simple, however. A cap-and-trade system might or might not be administratively complex, depending on its design. And either a carbon tax or a cap-and-trade program could be burdened with complex carve-outs and concessions to special interests, such as allowance allocation schemes or tax exemptions, that not only make it more difficult to administer, but reduce its cost-effectiveness and/or capacity to generate revenue.

CAA regulation will certainly be quite complex, however. As described above, many programs under the Act are applicable to different classes of sources. Each requires multiple rulemakings, and each is likely to be litigated. Implementing regulations for even a single group of sectors takes years—longer if delayed by litigation. EPA has limited resources and must therefore proceed sequentially. Each regulation also creates ongoing administrative burdens not only for EPA, but also for the states, which share in implementation of most CAA regulations. In particular, assessing the equivalency of various state policies with ESPS guidelines set by EPA will be a difficult and burdensome process for both EPA and the states.

Moreover, regulation that works well in theory may not work well in practice, at least initially. Regulators and regulated firms learn from experience, developing both institutions and relationships. Litigation over regulation develops precedents that guide future regulation.

For CAA regulation, some of this work has already been done. CAFE standards, for example, are well-understood by both regulators and the auto industry. On the other hand, key parts of CAA climate regulation are not yet well-understood. ESPS have only rarely been issued in the past, and only for relatively small classes of emitters.

Implementing standards for a large sector like fossil electric power will be a challenge requiring cooperation among EPA, states, and regulated firms. Making this system flexible also means making it more complex.

Regulators will eventually work through these challenges—probably with the help of the courts—and the resulting regulatory structure is likely to involve separate trading approaches in some select sectors with technology-based standards in others.

Questions to ask:

- Is the new legislative proposal relatively simple and easy to administer, or is it burdened with complex programs and carve-outs for different sectors?
- Are the agencies charged with administering the carbon price proposal capable of doing so effectively?

F. *Litigation and Legal Risk*

New carbon legislation faces very little legal risk—only a finding that such legislation is unconstitutional could prevent its implementation, and such a finding has no apparent basis. In other words, Congress clearly has the authority to tax and regulate GHG emissions.

Equally clearly, the CAA gives EPA regulatory authority over GHG emissions. The Supreme Court's holding in *Massachusetts* confirms this. But the limits of that authority, and some entire programs likely to be used by EPA to regulate carbon, are untested. And almost every step the Agency has taken to date has been subjected to legal challenge. This will certainly continue.

Litigation of CAA regulation offers a win-win outcome for rent seekers. First, as discussed briefly above, it is likely to delay EPA regulation—litigation increases the administrative costs to EPA of developing regulation, and can delay its implementation. Even if individual regulations are not stayed during litigation, uncertainty over the outcome of cases may lead EPA to delay further steps, such as similar regulation on other sectors.

Second, EPA regulations may be overturned by courts. EPA may overreach and/or misinterpret the CAA, leading it to waste effort developing regulations that courts eventually overturn or that the Agency must modify. Though our analysis and that of others lead us to believe that CAA tools can be quite broad and flexible, it is possible that courts will disagree. Legal analysis of ESPS under §111(d) of the statute, however convincing it may appear, has not been tested in court because that section of the statute has only rarely been used. Some other elements of a CAA approach are similarly untested.

These legal risks are a significant threat to efficient (cost-effective) CAA climate policy. They can be mitigated if EPA takes a conservative approach, but doing so may mean less-flexible, less-stringent, or simply less regulation. Another approach is to be bold in interpreting CAA authority, but to make the most legally risky parts of rule-

makings severable, so that adverse results in court do not force the Agency to start from scratch.

Question to ask:

- Do the president and EPA appear willing to accept legal risks associated with building a flexible and cost-effective regulatory program?

G. *Updating Environmental Goals Over Time*

Because of the cumulative nature of global warming gases and the increase in global population and economic wealth over time, emissions of GHGs in future years are likely to impose larger damages than do current emissions. Thus, one can identify an optimal path of increasing carbon prices to address the projected increase in damages with emissions in future years. In addition, policy is never made with complete information. Over time, and with experience, the quality of information improves. For environmental policy, better science leads to better knowledge of risks, and additional economic data results in a better understanding of compliance costs. Updating policies to reflect new information will therefore make them better and more cost-effective. Policies that are not updated can become stagnant, overcome by changing reality and even by other policies. Thus, a policy that, at its outset, envisions updating to reflect new information on climate risks and compliance costs has clear advantages.

For example, the Title IV SO₂ trading program created by the 1990 Amendments to the CAA has been widely acclaimed as a great success, with substantial cost savings compared to more traditional regulation. Although the SO₂ program yielded a substantial cost-effective reduction in SO₂ emissions from electric power plants, new information on the health benefits of reducing SO₂ emissions emerging in the 1990s suggested that further significant emissions reductions would yield additional benefits that substantially exceeded the costs of further control. In short, more-stringent regulation than required by Title IV was justified. But the Title IV program was a unique creation of Congress—it delegated little discretion to EPA. In particular, EPA could not change the stringency of the program in response to this new information. Instead, EPA used other CAA provisions to adopt a more stringent SO₂ emissions cap for plants in the eastern United States. Although the resulting regulatory programs achieved further reductions in emissions, the judicial and regulatory decisions associated with the last eight years of litigation have undermined the Title IV trading system. One possible lesson from this experience is that Congress should provide some mechanism for updating legislated regulatory programs in response to new information.

For many of the regulatory provisions in the CAA, EPA serves as an expert Agency with authority to assess and respond to new information. In particular, the NSPS and ESPS programs must be regularly updated on a sched-

ule set by statute. In fact, the sector-by-sector approach required by the CAA implies at least some updating, as each successive sector is regulated based on the best available information at the time. If EPA does not adequately base regulations on the best available information, or does not reassess its regulations in light of new information, it can be sued. CAA-driven climate policy is therefore better equipped to adapt to the new information that will surely become available than simple carbon price legislation, like a fixed, unchanging carbon tax.

EPA is often slow to react, however—it has often failed to meet the eight-year schedule for updating NSPS. EPA action often comes only in response to petition or litigation. Over the medium to long term, political turnover in the executive branch can make EPA action unpredictable or inconsistent.

Congress is also slow to revise environmental regulation. The last significant update to the CAA was in 1990, and before that, 1977. If Congress is able to break the deadlock and pass carbon tax legislation, the resulting legislation could be in place without revision for a long time. The likelihood, based on past experience, that Congress will be unwilling or unable to revise legislation should be taken into account when evaluating any legislation. To address this issue, the legislation can provide for updating.

Since climate policy will probably require midcourse corrections, then delegation to an expert agency offers one way to achieve updating. Thus, Congress could pass a carbon tax and delegate to the implementing agency (e.g., Treasury) the authority to adjust the tax rate, dependent on new scientific and economic information. Or, authority to revise the policy could be delegated to a new, independent institution. However, such a delegation is probably unlikely—the power to tax is closely held.

If Congress is unwilling to delegate the authority to modify the tax rate, it could instead include automatic triggers in the legislation. The tax rate/cap level could change over time at a rate specified in the statute, approximating assumptions about future information. Policy change could be automatically triggered by objective, observable facts: it could become more stringent if atmospheric GHG concentrations exceed a certain level, or less stringent if economic growth falls below or unemployment exceeds a set point. Or it could be set at a lower level (e.g., at a level equal to the domestic cost of carbon), but ramp up to a more-stringent level (e.g., a level equal to the global social cost of carbon) if other countries adopt climate policies. One could surely devise other options.

Including such triggers may make it more difficult to pass legislation—for example, antitax advocate Grover Norquist withdrew his initial acceptance of a revenue-neutral carbon tax after concluding that, once created, it would undoubtedly increase over time (presumably without reductions in other taxes that would preserve its revenue neutrality). An automatic updating provision would only add to this concern. On the other hand, the associated political opposition of including such a provision is prob-

ably easier to overcome than the inertia associated with reopening and renegotiating settled law in the future in response to new information, as would eventually be necessary under a fixed carbon tax.

To be sure, a future Congress could override automatic or delegated policy changes. But updating mechanisms shift the default rule for policy updates. Instead of relying on Congress to update policy in reaction to new information, Congress must act to prevent such updates. Given recent experience, congressional inaction seems more likely than congressional overreaction. In any case, Congress could override not only future policy changes included in new legislation, but also the authority to update that has already been delegated to EPA. Congress can always change the law.

If updating mechanisms are included, a CAA approach is no longer inherently superior in terms of its ability to adjust to new information, and the choice of policy pathway must depend on other considerations.

Question to ask:

- Does the proposed carbon legislation include mechanisms for updating stringency in response to new information, or does stringency at least increase over time?

H. Capture and Political Compromise

Any policy is vulnerable to capture by special interests or to being undermined by political horse-trading. A cap-and-trade system with allowance handouts to politically powerful industries, or a carbon tax that excludes those same industries, will be less cost-effective than a clean and simple blackboard-ideal policy. Of course, some degree of political compromise is probably necessary.³¹ How much, and the extent to which those compromises will damage policy effectiveness, is hard to say.

But EPA is also sensitive to political pressure and rent-seeking. Congressional opposition to its proposals is important because Congress is responsible for its annual appropriations. Congress could even move to strip EPA of its authority to regulate GHGs without replacing that authority with new climate legislation. Bills that would do so have already been introduced and have passed the House. Though they have failed in the Senate, they have attracted some Democratic support. Presidential signature or a veto-proof majority would ultimately be required, but either is possible in the future. Any carbon regulations implemented already by EPA could be invalidated by such legislation. This is an important source of risk for a CAA approach.

Of course, any legislation, including a new law creating a carbon price, could be revised or repealed by a future

31. This observation has led Robert Stavins to argue in favor of a cap-and-trade system over a carbon tax because necessary political compromises will not affect its environmental effectiveness.

Congress. But it is politically more difficult to repeal recent legislation than an old law, like the CAA.

Politically powerful interests may also be able to exert influence on EPA directly. EPA is part of the executive branch, led by a president who is sensitive to his/her political constituencies and to the political effects of agency decisions. Future presidents may be able to reverse or modify Agency CAA climate rules more easily than future Congresses can repeal or modify legislation simply by directing EPA to loosen or eliminate those regulations (though some evidence that doing so is reasonable would be required).

Moreover, even final EPA decisions can be challenged in court. Although, in theory, courts should adjudicate these suits without regard to the political power of the plaintiff, in reality, politically and financially powerful interests are more likely to have the resources and desire to litigate. And even if they are not successful, the process of litigation itself can delay regulation, and the threat of litigation can lead regulators to be less ambitious. Finally, the many separate rulemakings over an extended period required for EPA climate regulation results in many opportunities for political influence.³²

The best course is to evaluate carefully the inevitable compromises included in any particular carbon legislation and to weigh those compromises with the likely alternative outcome under CAA regulation.

Questions to ask:

- What political compromises to favored industries or interests are included in new carbon legislation?
- How much do those compromises reduce the cost-effectiveness of the program vis-à-vis CAA regulation?
- What is the likelihood that Congress will strip EPA authority over GHGs or that the next president will undo regulatory actions that have been taken?

I. *International Competitiveness and Emissions Leakage*

One drawback of unilateral climate policy is that it can damage the competitiveness of U.S. firms that compete globally, with adverse effects on growth and job creation in the United States. This can also erode environmental benefits, as firms in countries without climate policy increase production and, therefore, their emissions.³³

The academic literature suggests that leakage and adverse competitive effects from a small carbon tax are likely to be modest. Nevertheless, pressure to include measures aimed at mitigating these effects in any policy proposal may be considerable. For example, firms in energy-intensive, trade-exposed (EITE) sectors might be wholly or par-

tially exempted from compliance responsibilities or might receive compensating subsidies. Or “border adjustments” (tariffs) could be imposed on trade with countries that lack equivalent climate policies—though these are internationally controversial and possibly illegal under trade law.

Such measures could be included in any new carbon legislation. Although such direct measures are unavailable under the CAA, EPA could, and probably would, adjust the stringency of its regulation to account for competitiveness and leakage effects.

The sector-by-sector nature of CAA regulation not only allows but requires the Agency to treat sectors differently. Many CAA programs, including ESPS, allow the Agency to consider compliance costs in setting regulation. This may extend to international competitiveness considerations. Leakage is an environmental issue that EPA would be likely to consider. Even the order in which EPA regulates sectors is relevant here—by regulating EITE sectors last, EPA effectively excludes them from compliance duties for a time.

Congress has more and better tools for dealing with competitiveness and leakage than EPA does. But EPA is not required to ignore them.

Questions to ask:

- If needed, does new carbon legislation include measures for reducing leakage and competitiveness losses in EITE industries?
- Are these measures overly broad, compromising the effectiveness of the policy?

J. *International Signals*

Climate change is a global problem, and reducing emissions of the GHGs that cause it is a global responsibility. The United States, one of the largest emitters, has been slower than most other developed economies to commit to emissions reductions. Doing so would provide an important signal and could influence other countries to follow suit through bi- or multilateral agreements.

But this signal depends on the strength and clarity of U.S. action. If U.S. policy is relatively weak, or is perceived to be so, it will not be influential. Similarly, if U.S. policy is meaningful but difficult to understand, other countries may undervalue it. The CAA is available off-the-shelf with powerful, flexible tools to achieve significant emissions reductions over the next decade. But the CAA is a complicated statute, especially for those with little experience with American law. It is incremental, technocratic, and relatively difficult to explain and understand. On the other hand, EPA does estimate and monitor emissions reductions associated with its regulations, and this monitoring—so long as it is credible—may make understanding the details of U.S. regulation less important.

In any event, regulating sector-by-sector, over time makes it harder to make credible emissions reduction com-

32. On the other hand, this requires special interests to spread their resources, possibly reducing their long-term effectiveness.

33. Reduced U.S. fuel consumption leads to lower global fuel prices, with similar leakage effects.

mitments. Even if CAA regulation is quite stringent, it may be harder to convince foreign negotiators that it will lead to more significant emissions reductions than it would be to convince them under new legislation with relatively modest goals—though of course new legislation might itself be complex and difficult to evaluate.

Because climate change is a global problem requiring global limits on GHG emissions, unilateral action by the United States will achieve only limited benefits in the absence of substantial global GHG reductions. One advantage of a legislated program like a carbon tax is that it can be structured to achieve initially only modest reductions in GHGs and provide for a ramping up to more-stringent emission reductions only if other countries also agree to achieve commensurate reductions in GHG emissions. This structure in a legislated program would both provide a signal and offer an incentive for further international agreement to limit GHG emissions. A CAA regulatory program probably cannot be structured in a similar way to ramp up the stringency in a way that is directly tied to international agreements to restrict GHG emissions.³⁴

Questions to ask:

- Does new carbon legislation provide a ready basis for international negotiations?
- Will other countries be able to understand and value CAA climate policy? Are other countries taking a sector-by-sector, industry-by-industry regulatory approach that parallels CAA regulation?

V. Conclusions

CAA provides the set of tools being used today to build climate policy at the federal level. New carbon legislation might be politically possible, and the prospects for such legislation appear to be greater over the long term.

New legislation has important advantages. The CAA is an old statute and was not designed with climate problems in mind or, with a few limited exceptions, with an appreciation of the ability of market mechanisms to address environmental problems cost-effectively. In comparison, new legislation setting a carbon price would almost certainly be built around cost-effective market mechanisms. It could be simpler to administer and broader in scope, could access international emissions either through offsets or by motivating negotiations, and it could raise revenue. In addition, new carbon legislation could have symbolic advantages in

that it could send a strong and unmistakable signal that the United States is addressing climate change. For these reasons and others, an ideal carbon policy would certainly reduce emissions at lower cost than a regulatory approach, especially over the long term.

But new legislation will not be ideal, and the CAA should not be underestimated. It is a flexible set of tools that, though not perfect, has been proven effective by experience. It might be less vulnerable to being compromised by inefficient political capture and horse-trading. Relative to a simple carbon tax, an important advantage is the ability of expert agencies to update regulation over time to respond to new information about environmental risks and economic costs. In short, the CAA works today, can be adapted to fit the climate problem relatively well, and can evolve over time.

So, should the statute in the hand be traded for the one in the bush? It depends. Ideal carbon legislation—an administratively simple, economywide, uniform price, set at a level approximating marginal damages from carbon emissions, without handouts to politically powerful industries, and with a robust mechanism for updating the cap or tax in response to new information—would be superior to the current CAA. But such ideal legislation is extremely unlikely in reality.

Until we know what compromises are necessary to get carbon legislation through Congress, it is impossible to say in the abstract whether it is wise to give up existing regulatory tools. Even once we do know what form of carbon legislation is on the table, the choice will not be easy—not only because judgment calls are difficult and may come down to personal priorities, but also because comparative evaluation is extremely complex. We only hope here to have supplied the right questions to ask once such a proposal emerges.

34. The CAA generally directs EPA to regulate so as to protect health and/or welfare, not to strategically influence other countries' environmental regulations.