ADAPTING ENVIRONMENTAL LAW TO GLOBAL WARMING CONTROLS

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INTRODUCTION AND SUMMARY

The United States has begun a debate on global warming that may well end in federal legislation to reduce national greenhouse gas (GHG) emissions. Responsible legislators have already suggested cutting these emissions in half over the next forty years.

Designing such a control program raises important and interesting regulatory design issues by itself. This paper argues that it will also require efforts to fit that new program into the existing structure of environmental law. Those efforts could develop both a simpler and more effective Clean Air Act (CAA) and new cooperative approaches to environmental problems that could address important issues other than GHG control.

I begin by briefly summarizing the sources of U.S. GHG emissions and the policy debate on how best to control them.

I then argue that Congress will have to reconcile any national GHG control program both with long-established CAA requirements to reduce non-GHG air pollutants, and with CAA provisions that could directly undermine the greenhouse effort. Market-based trading programs covering both GHG and other air pollutants could help accomplish this reconciliation. My discussion focuses first on regulation of electrical generating units (EGUs), then on other industrial sources, and finally on CAA provisions that affect both source types. It ends by discussing motor vehicle controls.

The paper then turns to cooperative approaches. In our federal system, states have dominant authority over such important areas of social policy as land use and road construction. GHG control will become easier to the extent states use that authority to promote energy conservation. Environmental law has long

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struggled with mixed success with similar problems of encouraging state action in areas of dominant state control. A new approach to that problem as presented by energy conservation would fit very logically into GHG legislation and could be adopted more broadly if it succeeded.

I do not think that adopting GHG controls would require any material revisions in existing programs to control water pollution, waste disposal, pesticides, or toxic chemicals, though it might, of course, generate new issues for these programs to address.

I. THE BASICS OF GHG CONTROLS

A. *GHG Sources in the United States*

In 2006, the most recent year for which we have data, the United States emitted about seven billion metric tons of greenhouse gases.[1] Carbon dioxide (CO_2) emissions, almost all from burning fossil fuel, accounted for 85% of the global warming impact of these emissions.[2]

EGUs accounted for 39% of the CO_2 emissions and 33% of total GHG emissions. Industry, including non-combustion uses of fuel, accounted for 17% and 14%, while emissions from transportation (overwhelmingly cars and trucks), totaled 31% and 26%.

Commercial and residential uses together accounted for 9% of CO_2 emissions and 8% of total GHG emissions.

The source categories listed above account for virtually all CO_2 emissions. The remaining GHG emissions come 7% from agriculture and 8% from a miscellany of sources. (These agricultural emissions are mostly nitrous oxides from soil cultivation.)

However, agriculture also provides greenhouse benefits in the

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[1] *See* U.S. ENVTL. PROT. AGENCY, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990–2006 (2008), ES 4-6, tbl.ES-2, *available at* http://www.epa.gov/climatechange/emissions/downloads/08_CR.pdf.

[2] These figures and those in the next four paragraphs were computed from *id.* at tbl.ES-2. There are four significant “anthropogenic” (man-made) GHGs, namely carbon dioxide, methane, nitrous oxides, and chlorofluorocarbons and other halogen compounds. Since the latter three have a more potent global warming effect than carbon dioxide, their emissions are adjusted upward to “carbon dioxide equivalence” over a 100-year time horizon when aggregate tables are made.

form of plant growth. A net increase in United States biomass *removed* almost 900 million tons of CO_2 from the atmosphere in 2006, reducing net national GHG emissions to about 6.2 billion metric tons.

Looking at the same figures another way, of the 5.64 billion metric tons of CO_2 emitted in the United States in 2006, 43% came from burning petroleum products, overwhelmingly as transportation fuel; 37% came from burning coal, overwhelmingly to generate electricity; and 20% came from burning natural gas in a wide variety of uses.[3]

B. *Designing a GHG Control Program*

The GHG control plans suggested to date have generally been built around the "cap and trade" system already used successfully to control other air pollutants.

A cap and trade approach would set an upper limit (cap) on annual national GHG emissions (or on emissions of selected GHGs, or from selected types of GHG sources), require covered sources to hold a permit or "allowance" for each ton of covered GHGs emitted, issue allowances each year equal to the cap, and allow free trading of allowances. The cap would decline gradually over time. That approach steers GHG reductions to those who can accomplish them most efficiently, since anyone who can control GHG emissions for less than the allowance price will do so, while those with higher costs will buy allowances to cover their emissions instead.

The allowance requirement will increase the cost of emitting GHGs and thus encourage all types of GHG reductions, including increases in energy efficiency, increased reliance on low-carbon fuels like natural gas, and new use of zero-carbon energy sources or coal plants that capture their carbon emissions and store them underground. Allowances might also be granted for successful efforts to increase the capture of carbon by new "biomass" (trees, plants, and soil organisms.)

The authorities that establish a cap and trade system must decide in advance what sources and what GHGs will be covered, the type of emissions monitoring required, the initial cap level and its rate of decline, whether to pause reduction efforts if allowance

[3] *Id.* at 3-3, tbl.3-3.

prices exceed some predetermined "safety valve" level, and how to distribute allowances.

Emission caps tend to get more efficient and effective as they include more sources, since that maximizes the number of control opportunities. However, for practical and political reasons, GHG control suggestions have taken different positions on whether the cap should include all fuel-burning and thus CO_2-emitting sources, or only the major ones, or only EGUs. A cap that covered gas and petroleum combustion would probably have to apply to the suppliers of these fuels rather than their users, since directly regulating the millions of sources that burn the fuels would be infeasible.

The 50% GHG reduction suggested in several bills would be mathematically impossible without reductions from the electric generation and transportation sectors since these together account for 59% of the current emissions. It would also be mathematically impossible without substantially reducing CO_2 emissions from petroleum and coal combustion.

II. GHG CONTROLS AND THE CLEAN AIR ACT

A. *EGU Controls*

1. *EGU Regulation Under the Existing CAA*

EGUs emit 70% of national emissions of sulfur oxides (SO_2) and 20% of national emissions of nitrogen oxides (NO_x), two pollutants almost exclusively caused by fuel burning.[4]

In 1990, Congress established a cap and trade system to substantially reduce the SO_2 emissions of all sizeable EGUs nationwide.[5]

The CAA also requires EPA to regulate SO_2 and NO_x to achieve national ambient air quality standards (NAAQS) for particulates and ozone, and to improve visibility in national parks and wilderness areas.[6] To carry out these mandates, EPA adopted a

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[4] Computed from U.S. ENVTL. PROT. AGENCY, 1970–2006 AVERAGE ANNUAL EMISSIONS, ALL CRITERIA POLLUTANTS IN MS EXCEL (2008), *available at* http://www.epa.gov/ttn/chief/trends/ [hereinafter 2006 EMISSIONS].

[5] *See* 42 U.S.C. § 7651(b) (2000) (establishing the purpose of Title IV of the Clean Air Act, which deals with "Acid Deposition Control").

[6] *See* 42 U.S.C. §§ 7407, 7409, 7491, 7502–7513b, 7657f (2000). EPA has

second cap and trade program for EGU emissions under the Clean Air Interstate Rule (CAIR).[7] By 2015, CAIR would reduce emissions from covered EGUs by over 70% (for SO_2) and over 60% (for NO_x) from their 2003 levels,[8] and far more from their pre-CAA levels at a marginal cost that EPA estimates as about \$1000 per ton of SO_2 reduced and \$1600 per ton of NO_x.[9] Although CAIR would only apply in twenty-eight states, it would cover 80 to 90 percent of national EGU emissions.[10]

In July 2008, the D.C. Circuit struck down all significant aspects of the CAIR rule.[11] However, legislation to re-establish the cap and trade approach seems to have almost unanimous support in principle, though disputes about how much of CAIR to codify and whether to tighten its requirements—perhaps by adding carbon controls—will delay legislation until the next Congress.[12]

2. *The Conflict Between Current CAA EGU Control and Future GHG EGU Control*

Reducing EGU GHG emissions will make reducing EGU emissions of SO_2, NO_x, and other combustion-related pollutants easier.[13] Almost all GHG-free sources of electricity will be zero-emission for all other combustion pollutants. Such GHG-free sources would include coal plants that captured their CO_2, as well as nuclear, solar, wind, or geothermal generation. Improved efficiency in electricity generation and use would also make

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also established NAAQS for SO_2 and NOx specifically, but no major regulatory efforts have been necessary to achieve them.

[7] *See* Clean Air Interstate Rule, 70 Fed. Reg. 25,162 (May 12, 2005).

[8] *See EPA: Clean Air Interstate Rule*, http://www.epa.gov/cair/index.html (last visited Sept. 7, 2008) (describing CAIR to the lay person).

[9] *See* Clean Air Interstate Rule, 70 Fed. Reg. at 25,202–03 (regarding SO_2); Clean Air Interstate Rule 70 Fed. Reg. at 25,209–10 (regarding NOx).

[10] *See* Prevention of Significant Deterioration, Nonattainment New Source Review, and New Source Performance Standards: Emissions Test for Electric Generating Units, 70 Fed. Reg. 61,087 (Oct. 20, 2005) ("[A]pproximately 90 percent of national EGU SO_2 emissions and approximately 80 percent of national EGU NO_x emissions are from EGUs in the CAIR affected region.").

[11] *See* North Carolina v. EPA, 531 F.3d 896, 901 (D.C. Cir. 2008) (per curiam) (vacating CAIR "in its entirety").

[12] *See States Warn EPA 'Backstop' for CAIR Legislative Fix Threatens Fragile Pact*, INSIDEEPA.COM, Sept. 22, 2008, http://www.insideepa.com/secure/docnum.asp?docnum=9222008_backstop&f=epa_2001.

[13] These other pollutants include mercury, and small amounts of volatile organic compounds and directly emitted particulates.

reducing conventional pollutant levels easier, since it would reduce the amount of polluting fuel burned to support any given level of economic activity.

But neither the introduction of some zero-emissions sources nor improvements in energy efficiency will result by itself in greater reductions in conventional emissions if those emissions are capped. Since "capped" sources in the aggregate are free to emit up to the "cap" amounts, they will always do so rather than incur the expense of controls. A reduction in control costs, therefore, will reduce their expenses without reducing emissions, as long as the cap remains unchanged. For example, if a cap allows each of four sources to emit 25 tons of SO_2, and one source becomes zero-emissions to meet GHG requirements, the other three sources can now each reduce their pollution control efforts and emit 33 tons of SO_2 each.

3. *Reconciling CAA Regulation with GHG Control for EGUs*

These basic physical and regulatory facts will require any rational GHG law to adjust the CAA EGU caps to the progress of EGU carbon control.[14] If regulators do not tighten CAA caps as GHG controls progress, EGUs will be able to reduce the intensity of their control efforts on the capped pollutants, since the cap amounts will be divided among fewer remaining emitters. If, on the other hand, regulators tighten CAA caps quickly, they may require additional controls that will become much cheaper in a few years as GHG controls become more effective.

A cap and trade system applicable both to GHGs and to other capped pollutants would provide an elegant way to balance these priorities. Allowances for EGUs to emit conventional pollutants already have a market price. Allowances to emit GHGs will also have a market price.

The same cap and trade law that establishes the need for allowances can control their price through a "safety valve" that requires the government to increase the cap and print more allowances for a given pollutant whenever its allowance price rises above a prescribed level, and, conversely, to reduce the cap and

[14] Even if there were no such policy conflict, any future EGU GHG cap and trade system would need to be reconciled with the existing cap and trade rules simply as a matter of legal drafting to avoid operational conflicts and inconsistencies.

issue less allowances, thus increasing allowance prices, whenever the price falls below that level.

Allowance price determines the marginal cost and therefore the intensity of control efforts, since sources will not buy allowances if they can control their emissions at lesser cost. Congress could therefore provide an automatic balance between investment in GHG controls and investment in conventional pollutant reduction simply by setting the allowance prices at certain levels.

Here is a concrete example. Assume that progress in GHG control should take priority over increasing our investment in reducing conventional pollutant emissions, but that our existing level of investment in those reductions should not decline. Congress could achieve that result by a law that capped utility emissions of GHGs, SO_2, and NO_x, and then froze the price of allowances to emit SO_2 and NO_x at current levels.[15] If SO_2 or NO_x allowance prices declined, EPA would have to reduce the corresponding cap to increase allowance prices by reducing supply. Under this approach, extra reductions in conventional emissions would still be required, but would be tied to declining control costs, which in turn would result either from the installation of GHG controls, or from progress in other methods of emissions reduction.

4. *The Need for Analysis*

Such a unified control effort could of course apportion the control effort between GHGs and other capped pollutants in many different ways. Sophisticated models have long been used to predict the economic, health, and environmental consequences of such differing approaches. It would be irresponsible to design either a GHG control program or an integrated approach without seeing what these models say.

But even without models, it is clear that GHG controls can only make control of other combustion emissions cheaper—perhaps much cheaper, according to some dated studies.[16]

[15] Such a GHG cap would not have to apply directly to EGUs. Exactly the same adjustments could be made if the caps applied "upstream" to the fuel producers, or, indeed, if the GHG controls were imposed as taxes and not through cap and trade.

[16] *See generally* DALLAS BURTRAW ET AL., ANCILLARY BENEFITS OF REDUCED AIR POLLUTION IN THE UNITED STATES FROM MODERATE GREENHOUSE

Accordingly, merging GHG and conventional pollution control into a single analysis would most likely lead to a decision either to accelerate the GHG reduction program in order to realize the associated conventional pollution control benefits, or to stretch out the schedule for control of conventional pollutants to match the GHG control schedule. An acceleration in our conventional pollutant reduction efforts that was not matched to GHG reductions would be justified only if those reductions had far greater benefits than our regulatory system currently recognizes.

B. *Controls on Other Stationary Sources*

1. *The Existing Control Approach*

In 2006, industrial and commercial sources accounted for 21% of national SO_2 emissions and 16% of national NOx emissions.[17] With some small exceptions, EPA has not included these sources in its cap and trade programs unless they voluntarily chose to opt in,[18] arguing, without challenge from any interest group, that there is no evidence that these sources can be controlled as cost-effectively as EGUs.[19]

That exclusion has proved something of a mixed blessing for the sources in question. Uncapped sources of course avoid the costs of cap compliance. But the cap can also provide a shield against the substantive and procedural costs of other CAA controls. As discussed below, those costs can be considerable.

2. *The Potential Conflict for Industrial Sources Between GHG Controls and Existing CAA Controls*

Just as with EGUs, almost anything an industrial source does to control its GHGs will make controlling other combustion pollutants easier, while almost nothing that source does to control other combustion pollutants will affect GHG emissions.

GAS MITIGATION POLICIES IN THE ELECTRICITY SECTOR (2001), *available at* http://ideas.repec.org/p/rff/dpaper/dp-01-61-.html; ENERGY INFO. ADMIN., ANALYSIS OF STRATEGIES FOR REDUCING MULTIPLE EMISSIONS FROM POWER PLANTS: SULFUR DIOXIDE, NITROGEN OXIDES, AND CARBON DIOXIDE (2000), *available at* http://www.eia.doe.gov/oiaf/servicerpt/powerplants/pdf/sroiaf(2000)05.pdf.

17 *See* 2006 EMISSIONS, *supra* note 4.

18 Few, if any, have made this choice.

19 *See* Clean Air Interstate Rule, 70 Fed. Reg. at 25,213–15.

It is therefore quite possible that the same conflicts between GHG control obligations and conventional pollutant control obligations just described for EGUs could arise for industrial sources that were subject to controls for both.

3. *Reconciling the Two Control Efforts*

Applying a GHG cap to industrial sources would not require capping their conventional pollutant emissions as well.[20] But it would strengthen the case for such a cap, at least for the larger sources that would bear the main burden of both programs. Capping these sources would allow the automatic balance between GHG and conventional pollutant controls described earlier to apply to them as well, thus simplifying control burdens and relating them to each other.[21]

Industrial sources probably could not be included in a cap and trade program on the same terms as EGUs. They are generally much smaller. This makes both pollution reduction and monitoring emissions relatively more expensive for them, facts which should affect the terms of their cap inclusion. Specifically:

- Basic economics tells us that free trade in emissions allowances under a cap should end by imposing the same marginal cost of emissions reduction on all covered sources. For reasons of political acceptability, such programs often reduce the need for sources to purchase allowances by distributing these allowances gratis to sources in quantities designed to roughly equalize the marginal control costs that sources will face once they have used their free allowances. However, industrial sources in general cannot reduce conventional emissions as cost-effectively as EGUs. Accordingly, any cap and trade program that followed an

[20] As described earlier, adding a GHG cap to sources whose other combustion pollutants are already capped would require adjusting that earlier cap to prevent older sources from increasing emissions. The emissions limits that generally apply to industrial sources do not present a comparable danger of emissions increases, since they typically limit emissions per unit of fuel burned, or per hour of operations, which means that permissible emissions decline together with fuel consumption or operating intensity.

[21] That would be equally true whether the GHG cap applied to industrial sources directly, or whether it applied to the "upstream" fuel supplier. In each case, the need to hold an allowance to cover the carbon emissions of the fuel would increase the price of carbon emissions by the same amount. It is that price increase that provides the incentive for carbon reductions.

equal marginal cost allocation rule would allocate more allowances in proportion to current emissions to industrial sources than to EGUs.[22]

- Sources determine their compliance with cap and trade systems by quantifying their annual emissions of the regulated pollutants. These systems therefore require accurate emissions monitoring to function well. However, the advanced and expensive monitoring systems required of EGUs are often neither affordable for industrial sources, given their smaller revenues, nor cost-effective, given the lesser amounts of emissions involved. Less expensive systems, perhaps combined with regulatory adjustments to prevent underestimating emissions, would probably provide adequate quantification of the smaller emissions amounts involved.[23]

C. *What About Other CAA Requirements for Capped Sources?*

Modifying the CAA EGU emissions caps, and perhaps extending them to industrial sources, could allow Congress to dramatically simplify the current CAA requirements for

[22] EPA recognized this in its final CAIR rule. *See* Clean Air Interstate Rule, 70 Fed. Reg. 25,162.

[23] A basic cost-effectiveness calculation shows why less precise monitoring for smaller sources can make regulatory sense. Assume that spending an extra $100,000 on a monitoring system reduces the risk of monitoring error by 1%. Applied to a source that emits 10,000 tons a year, that expenditure could prevent 100 tons a year in monitoring errors. But applied to a 100 ton sources, the maximum measuring error prevented would be only one ton.

If we assume the errors avoided were always *underestimates* of true emissions, the more accurate monitor would cost $1000 per ton of excess emissions detected (and presumably controlled) at the larger source but $100,000 per ton at the smaller source. The first figure is well within the emission reduction cost that regulatory agencies generally consider acceptable, while the second is well beyond it.

Even this computation probably overstates the case for expensive monitoring. If measurement errors are not always underestimates, but distributed randomly, it should make no difference in the aggregate whether precise or less precise monitoring methods are used. The danger that underestimates would hinder control estimates could also be minimized by a requirement that sources that used less precise monitoring approaches apply a margin of error to their emissions estimates—for example, booking them at 105% of their measured level rather than at 100%.

This entire discussion assumes, of course, that regulators will forbid monitoring approaches that the source can manipulate for deliberate underreporting of emissions.

combustion emissions from capped sources.

1. *Current CAA Planning and Control Requirements*

The CAA directs both states and EPA to go through repeated planning cycles to adopt and update state implementation plans (SIPs) to meet the NAAQS for ozone and particulates and to protect visibility. Those provisions have generated an uncertain and overlapping set of control requirements in addition to the CAIR rule.

The EPA in 1997 adopted the ozone standard that drives current control planning. The agency required states to submit their initial control plans in 2007. These plans must provide for attaining the standard by six separate deadlines ranging from 2007 to 2024, depending on the severity of the problem. States with longer attainment deadlines must reduce their emissions in separately quantifiable three-year increments until attainment.[24]

Plans to achieve the particulate standard were due in 2008 and had to provide for attaining the standard by 2010 or 2015, depending once again on the severity of the problem. EPA can issue two one-year extensions of these dates.[25] In 2006, EPA slightly tightened this standard, a step that will lead to further implementation complexities.[26]

Finally, states had to submit plans by the end of 2007 to improve visibility in national parks and wilderness areas; states must update their plans every ten years until visibility in these areas returns to pristine conditions. The first controls must take

[24] *See* 40 C.F.R. 51.903 (2007) (providing a list of the six deadlines). The attainment date for an area runs from the effective date of its nonattainment designation, which for most ozone nonattainment areas was June 15, 2005. *See* 69 Fed. Reg. 23,858 (Apr. 30, 2004). Similarly, plans to attain a NAAQS are generally due for an area three years after its designation. *See* 40 C.F.R. 51.910(a)(1)(i)(B). Finally, the requirement for quantifiable three-year increments of progress is set out at 40 C.F.R. 51.910(b)(2)(ii)(C).

[25] *See* 40 C.F.R. § 51.1002–1005 (setting out the regulatory requirements). As EPA explains, both attainment dates and SIP submission deadlines are measured from nonattainment designations made in 2005. 72 Fed. Reg. 20,599, 20,599–600 (Apr. 25, 2007).

[26] *See* Transition to New or Revised Particulate Matter (PM); National Ambient Air Quality Standards (NAAQS), 71 Fed. Reg. 6,718 (Feb. 9, 2006) (requesting comments on implementation procedures and potential new standards); National Ambient Air Quality Standards for Particulate Matter, 71 Fed. Reg. 61,144 (Oct. 17, 2006) (establishing the revised standard).

effect by 2012.[27]

History shows that many areas will miss these SIP submission and attainment dates, thus creating the need for further adjustments to the planning matrix.

Beyond that, the law itself will require future SIP changes. EPA must periodically update each NAAQS, which triggers a new round of planning and attainment efforts if the standard is tightened. Indeed, last March EPA slightly tightened the ozone NAAQS, thus kicking off a new round of planning requirements beginning in 2009.[28] The particulate standard is scheduled for another revision in 2011.

Both the process costs of repeated planning cycles, and the controls themselves, seem likely to bear particularly heavily on industrial sources. Even in areas where CAIR reductions will be inadequate to attain the NAAQS or protect visibility, EPA has discouraged states from requiring additional EGU emission reductions to make up any CAIR shortfall.[29] To the extent that effort succeeds, the reduced stringency of controls on EGU emissions will lead to the imposition of additional piecemeal controls on non-EGU sources even when reducing EGU emissions would be cheaper.[30]

2. Inconsistencies Between the Integrated Cap Approach and the Current Planning Schedule Approach

The integrated cap suggested here would reduce non-GHG emissions from fuel burning as GHG control and technical progress reduced the cost of controlling them. Although that would assure substantial future emission reductions, the exact timing of those reductions would be somewhat uncertain.

That approach is not consistent with the existing CAA requirements to impose additional controls on fuel burning sources to meet short-term and changing schedules for NAAQS attainment or visibility protection. Preserving the mandate to establish and

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[27] *See* 40 C.F.R. § 51.308(b), (e), (f); 70 Fed. Reg. 39,104, 39,156 (July 6, 2005).

[28] *See* National Ambient Air Quality Standards for Ozone, 73 Fed. Reg. 16,436, 16,503 (Mar. 27, 2008).

[29] *See* Clean Air Fine Particle Implementation Rule, 72 Fed. Reg. 20,586, 20,623–24 (Apr. 25, 2007) (providing the most recent example).

[30] *See* Clean Air Fine Particle Implementation Rule, 72 Fed. Reg. at 20,625, 20,627 (providing indications that this might be happening).

obey such requirements despite the adoption of GHG controls would complicate the regulatory task for all concerned and divert resources from GHG control toward control of conventional pollutants.[31]

3. A Cap-Centered Rather than a Schedule-Centered CAA

These problems could be avoided by making an integrated cap the only federally required control standard for combustion pollutants from capped sources. That cap could rebalance control obligations between EGUs and industrial sources once and for all in a transparent and economically rational way, while the stability of cap requirements would minimize unnecessary process costs and encourage long-term investment in pollution control.[32]

Less ambitious variations on this theme are also possible. For example, controls beyond the cap amounts could be required only if emissions did not decline as predicted, or upon a clear showing that they were needed to avoid environmental harm.

Such approaches would be compatible with a continued requirement to plan to achieve NAAQS and improve visibility, and with requirements to adopt new controls as appropriate for uncapped sources. However, the schedule for NAAQS attainment and visibility improvement would need to be adjusted to harmonize with the reduction schedule for capped sources, in order to make sure that uncapped sources did not end up with an unfair share of the control burden. Similarly, any provision for additional controls on uncapped sources should probably be limited to requiring controls equal in cost-effectiveness to those for capped sources.

It seems clear that such issues will return to the Congressional agenda in the near future. Even before the courts invalidated CAIR, the Bush Administration had proposed national legislation called "Clear Skies" that would have imposed a cap and trade system on all EGUs nationwide.[33] Though this bill did not go

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[31] Additional local controls might be justified to address local emissions concentrations or "hot spots," but there is no reason to believe such hot spots actually exist to any significant degree. *See* Interstate Air Quality Rule, 69 Fed. Reg. 4,566, 4,629–30 (Jan. 30, 2004) (analyzing EPA's CAIR proposal).

[32] States might still be permitted to impose additional requirements if they wished, but would not be required to do so.

[33] For further information, see U.S. ENVTL. PROT. AGENCY, CLEAR SKIES (2006), http://www.epa.gov/clearskies/ (last visited Sept. 16, 2008).

anywhere, a similar provision will almost certainly be central to any future CAA debate.

Any effort to adopt GHG controls seems certain to trigger such a CAA debate for reasons that run far beyond CAIR and are discussed below.

D. *The Clean Air Act Must Be Simplified to Avoid Interference with GHG Controls*

Policy issues quite apart, CAA revisions will be needed to avoid conflicts between the letter of the current CAA and future GHG controls.

In *Massachusetts v. EPA*,[34] the Supreme Court held that GHGs are "pollutants" as defined in the CAA, and all but directed EPA to establish GHG emissions standards for motor vehicles. The decision may well require GHG regulation under several other CAA provisions as well. But the many separate provisions that make up the CAA were enacted between seventeen and thirty-seven years ago to address problems very different from GHG control. At least four of these provisions—concerning "new source review", "Title V permits", "new source performance standards", and NAAQS—would hinder any GHG control effort to which they applied.

1. *New Source Review*

The "new source review" (NSR) provisions of the CAA require any new major source of any non-hazardous pollutant regulated under the CAA to get a permit before it begins construction, and to install "best available technology" to control all such pollutants before it begins operation.[35] Getting those permits takes from six months to a year and a half or even longer.

A source is "major" if it has the "potential to emit" more than 250 tons of any regulated pollutant per year. For twenty-eight named source categories, including pulp mills, cement plants, oil refineries, steel mills, and municipal incinerators that can burn more than 50 tons of refuse a day, the major source threshold is

[34] Massachusetts v. EPA, 127 S. Ct. 1438 (2007).

[35] 42 U.S.C. § 7475 (2000). Similar, tighter provisions apply to sources in nonattainment areas to the extent they emit the nonattainment pollutant. *See* 42 U.S.C. §§ 7502(b)(6), 7503.

100 tons.[36] A source is "new", not just if is built from scratch, but also if it makes any physical change that causes a "significant increase" in its potential to emit regulated pollutants.[37] Though EPA has discretion to define "significant increase," it is hard to see how the agency could define it to exceed the 250 or 100 ton levels that make a source major in the first place.

Each individual GHG will become a "pollutant regulated under the CAA" when EPA issues emissions standards for it. At that point NSR may apply to every "new source" with the potential to emit more than 250 (or 100) tons of that GHG per year.

These are extraordinarily low numbers. In a notice exploring the implications of CAA GHG regulation, EPA estimated that including GHG sources in NSR would increase tenfold the annual number of permits issued to completely new sources, from 200 to 300 to 2,000 to 3,000.[38] EPA admits this understates the actual impact, since (a) it only considers sources whose *actual* emissions exceed the NSR thresholds, even though NSR is triggered whenever a source's *possible* emissions (its "potential to emit") exceed that threshold and (b) it does not consider permits for "modifications" to existing major sources, even though these have historically been the focus of NSR concern.[39] Including these factors, I believe, might well expand NSR coverage to one hundred times, not ten times, its present level.

Stopping construction and modification of that many sources while they got NSR permits would be administratively impossible even if it had major benefits. Those benefits at best would be very small. Source by source permit proceedings are the slowest and most procedurally costly way to establish emissions standards. They are particularly ill-adapted to GHG controls, which, except for large EGUs, will rely at first on site-specific improvements in energy efficiency that an outside permitting authority will be ill equipped to command.[40]

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[36] 42 U.S.C. § 7479(1).

[37] 42 U.S.C. § 7479(2)(c) (saying that a source is "new" if it is "modified" and that it is "modified," according to 42 U.S.C. § 7411(a)(4), if it is changed so that its emissions increase. Although the statute does not say the increase must be "significant", the D.C. Circuit read it to include that condition. Alabama Power Co. Inc. v. Costle, 636 F.2d 323, 357–361 (D.C. Cir. 1979)).

[38] Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44,354, 44,499 (July 30, 2008).

[39] *Id*.

[40] Under long-standing EPA policy, which the courts have upheld, NSR

Cap and trade programs have demonstrably reduced pollution far more effectively and at far less cost than source by source controls. That approach seems even better suited to GHG control. Since GHG emissions have no local effects and therefore cannot create hot spots, there is no need to supplement the cap and provide for stricter GHG controls in some places than in others in order to address local conditions.

Finally, under a cap and trade system new source by source controls would not produce additional emissions reductions. As explained earlier, when overall emissions are capped, a reduction in emissions at one capped source will simply allow another capped source to emit more as long as the cap itself remains unchanged.

For these reasons, NSR should not apply to GHG sources. Indeed, once the majority of emissions from other combustion sources had been capped, the same logic would support eliminating NSR for such other combustion emissions as well.

2. *Title V*

Subchapter V of the CAA (Title V) requires every emissions source to apply for and obtain an operating permit if it emits, or has the "potential to emit", more than 100 tons a year of any regulated air pollutant.[41] EPA estimates that if GHG became regulated CAA pollutants "more than 550,000 additional sources would require Title V permits" as opposed to the current universe of about 15,000–16,000 Title V sources."[42] As EPA also notes, all these sources would be legally required to apply for permits within a year after becoming covered, while permitting authorities would be required to issue all the permits within eighteen months.[43]

Since the main purpose of a Title V permit is to codify in source-specific form the CAA requirements already applicable to a source, and since most of these sources have either no such requirements, or very few, little purpose would be served by the permitting effort even if it would be administratively practicable,

permits cannot be used to force a basic change in the type of energy used by the proposed source. Sierra Club v. EPA, 499 F.3d 653 (7th Cir. 2007).

[41] 42 U.S.C. 7661(2)(B) (cross-referencing the definition of "major stationary source" provided in 42 U.S.C. 7602(j)).

[42] Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. at 44,511.

[43] *Id.*

which it plainly would not be.

3. *New Source Performance Standards*

The CAA, using language almost identical to the motor vehicle emissions control provisions interpreted in *Massachusetts*, requires EPA to set maximum emissions limits ("new source performance standards" or NSPS) for new stationary emissions sources.[44] Accordingly, the *Massachusetts* decision will almost certainly require an effort to establish controls on GHG from new stationary sources as well.[45]

The CAA assumes that these controls will apply individually to each covered source and will require that source to use "the best system of emission reduction which . . . the Administrator determines has been adequately demonstrated."[46] It is not friendly to a cap and trade approach that regulates overall emissions from a defined universe of sources.[47]

However, as noted earlier, individual source GHG controls currently seem feasible only for large coal-fired power plants. Accordingly, the NSPS regulatory process has little prospect of requiring meaningful new controls for non-EGU sources. Even if it could require such controls, new NSPS controls, like new NSR controls, would not result in any additional emissions reductions under a cap and trade approach. In short, the NSPS provisions should be made inapplicable to GHG, and perhaps, as noted earlier, to other combustion pollutants from capped sources also.[48]

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[44] 42 U.S.C. § 7411(b)(1)(A); *cf.* 42 U.S.C. § 7547 (using almost identical language to call on EPA to set emissions standards for off-road engines); 42 U.S.C. § 7571 (calling for emissions standards for aircraft); 42 U.S.C. § 7545 (calling for regulation of the "emission products" of motor vehicle fuels).

[45] Indeed, a lawsuit to compel EPA to issue power plant standards is pending. *See* New York et al. v. EPA, No. 06-1322 (D.C. Cir. 2007).

[46] 42 U.S.C. § 7411(a)(1).

[47] EPA adopted a cap-and-trade approach to implementing such standards in its Clean Air Mercury rule. Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units, 70 Fed. Reg. 28,606, 28,616 (May 18, 2005) (to be codified at 40 C.F.R. pts. 60, 72, 75). The courts rejected that rule without addressing the validity of the cap and trade approach. New Jersey v. EPA, 517 F.3d 574 (D.C. Cir. 2008).

[48] Some have argued for special tight controls on new major sources of GHGs to guard against the possibility that the cap might not be tight enough to require the installation of emission reduction technology. However, even this result could be achieved without source by source controls by setting a tight cap for new sources as a class and then allowing them to comply by emissions trading.

4. *National Ambient Air Quality Standards*

The CAA requires EPA to set NAAQS for any "air pollutant" that may reasonably be anticipated to damage health or welfare[49] and is emitted from "numerous or diverse mobile or stationary sources."[50] Once a NAAQS has been set, the CAA requires each state to come up with a SIP to achieve it within ten years for all air within its borders, with only limited ability to adjust for the impact of out-of-state sources beyond its control.[51]

These statutory provisions assume that states will be able to achieve the NAAQS by their own efforts, or, at a minimum, that the United States as a whole will be able to achieve them. They make literally no sense for pollutants like GHGs whose atmospheric levels are set by emissions all over the world, with the United States share now a quarter of the total and declining. No state could adopt a SIP that would meaningfully affect the GHG concentrations in the air over its territory.

But since at least some GHGs are indisputably emitted from numerous or diverse sources, the current letter of the law might require EPA to set a NAAQS for these GHGs, thus kicking off an entire cycle of state and federal planning efforts unrelated to the basic cap and trade approach.[52]

E. *Motor Vehicles*

1. *Factual Background*

Motor vehicles emit 58% of national NO_x emissions, as well as 36% of emissions of "volatile organic compounds" (VOCs),[53] an important contributor to ozone.

The CAA framework for regulating motor vehicles has

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[49] 42 U.S.C. § 7409(b)(1).

[50] 42 U.S.C. § 7408(a)(1).

[51] 42 U.S.C. § 7502 (other sections provide longer attainment deadlines for specific enumerated NAAQS, but these provisions would not apply to GHG).

[52] However, as EPA's notice on GHG regulation explains, the letter of the law can sometimes be ignored when following it would lead to results that the courts variously characterize as "absurd, futile, strange or indeterminate." Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. at 44503. That precedent might excuse EPA from setting GHG NAAQS despite the statutory language.

[53] *See* 2006 EMISSIONS, supra note 4. About 40% of this total comes from non-highway vehicles.

remained basically unchanged since 1970. EPA sets emissions standards varying by vehicle type that apply to cars, trucks, or pieces of off-road equipment throughout its "useful life."[54]

Manufacturers have almost always chosen to use add-on controls like catalytic converters to meet these standards rather than adopting an inherently low-emissions power system.

EPA also regulates fuel composition to reduce emissions and to protect the add-on control device against damaging fuel components.[55]

2. *Motor Vehicle GHG Control*

There are no add-on technologies for automotive GHG control. Instead, GHG control will be accomplished either through fuel economy improvements, or by switching to zero net carbon power trains.

Some zero net carbon power trains, such as hydrogen fuel cells or battery power, would be completely pollution-free at the vehicle level. But other zero-carbon approaches, such as use of biofuels, would continue to produce conventional pollutant emissions that would continue to require conventional regulation. We do not know at present the extent to which future vehicles will rely on these various energy sources. Accordingly, reducing GHG by changes in vehicle power trains would not necessarily call for revising our current approach to controlling non-GHG vehicle pollutants.

Nor would improved fuel economy call for such revisions. Fuel economy improvements reduce GHG emissions by reducing the amount of fuel burned to travel a mile. Although that would tend to reduce emissions of all pollutants, a rational manufacturer will not produce vehicles that emit less than the law allows. We can expect manufacturers in these circumstances to cut back on their control efforts so as to meet the prescribed control standards at less cost.

Congress if it chose could offset that tendency and maintain the manufacturers' level of effort by tightening the current emissions standards. That would not affect the overall structure of

[54] 42 U.S.C. §§ 7521, 7525, 7541, 7547. The "useful life" period is generally defined as 100,000 miles. 42 U.S.C. § 7521(d)(1). This is much shorter than the actual useful life of most vehicles.

[55] 42 U.S.C. § 7545 (2000).

the control approach. An approach that required each individual vehicle to meet fixed emissions standards for conventional pollutants would indeed discourage manufacturers from using zero-emission vehicles to control GHG. Under a car by car approach, a manufacturer that sells zero-pollution vehicles together with conventional vehicles will be worse off than if compliance with standards were determined by averaging the emissions of all vehicles produced. In the second case the full environmental benefit of the zero-emissions vehicle would be credited, while in the first it would not.

However, as EPA's regulatory notice explains, EPA already makes wide use of averaging among vehicles and other market-based approaches to control conventional emissions, thus removing or at least reducing any inconsistency in approach between conventional pollution control efforts and future GHG controls.[56]

F. *Controlling Hazardous Air Pollutants*

I have restricted my discussion until now to CAA provisions where the case for statutory amendment simply to fit a GHG program into the current regulatory landscape seems inescapably worth considering. Even that restricted approach yields an ambitious program of CAA reform that includes all but one of the CAA programs that will require significant future investment.[57] The excluded program is the effort to control hazardous air pollutants (HAPs). There are good arguments not related to GHG control for Congress to consider simplifying this program as well.

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[56] Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. at 44,439.

[57] Since any such absolute statement will evoke disagreement, let me itemize the CAA programs *not* covered by the discussion in the text.

- EPA has established NAAQS for carbon monoxide and lead, but attaining them has not required any major planning efforts.
- In some areas there is a need to control VOCs to achieve the ozone standard. However, most VOCs come either from motor vehicles, which are already subject to standards, or from small miscellaneous sources like paint and solvent use. Such sources are already well controlled, and maintaining that effort in its present form would not affect or be affected by GHG control efforts.
- A separate CAA program governs the phasing out of chemicals that deplete the stratospheric ozone layer. Some of these ozone depleters are also potent GHGs. However, the ozone depletion program can readily be adjusted to ban those chemicals, once again without any broader CAA implications.

The 1990 CAA required EPA to require all "major sources" of HAPs to apply very tight emission controls.[58] EPA has now issued the ninety-six regulations[59] that the statute required, though many of these rules have not fared well in the courts and will need to be redone.[60]

When the rules have been redone, the case for a strong federal HAP control program will get much weaker except where motor vehicles are concerned.

In 1996, the most recent year for which estimates are available, only a quarter of national HAP emissions came from major stationary sources subject to national regulation. Another quarter came from smaller "area" sources, and half from on-road and off-road motor vehicles.[61] Since EPA's ninety-six regulations have all addressed major sources, the major source share in total emissions would certainly be lower today.

With major sources increasingly well controlled, smaller "area sources" emitting less than 10 tons per year, which even in 1995 emitted as many HAPs as bigger sources, will rise in relative importance. The CAA gives EPA a very open-ended and discretionary power to regulate these sources.[62] However, the impracticality of extensive federal controls over small sources can be expected to limit EPA's use of that discretion.

In other words, the facts themselves are steadily moving the center of gravity for HAP regulation from the federal government to states.[63] The law could profitably be amended to reflect this shift, by placing less weight on mandatory federal regulation and more on encouraging states to take the lead in emission reduction. That, in a much broader form, is the subject to which we now turn.

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[58] *See, e.g.*, 42 U.S.C. § 7412(k).

[59] U.S. Envtl. Prot. Agency, National Emission Standards for Hazardous Air Pollutants (NESHAP), http://www.epa.gov/ttn/atw/mactfnlalph.html (last visited Sept. 16, 2008).

[60] *See, e.g.*, NRDC v. EPA, 489 F.3d. 1250 (D.C. Cir. 2007).

[61] U.S. ENVIRONMENTAL PROTECTION AGENCY, NATIONAL AIR QUALITY AND EMISSIONS TRENDS REPORT, (1999), *available at* http://www.epa.gov/air/airtrends/aqtrnd99/pdfs/Chapter5.pdf.

[62] 42 U.S.C. § 7412(d)(5).

[63] The CAA does require EPA to set acceptable risk levels for HAP emissions from each major HAP source and to require corresponding emission controls. 42 U.S.C. § 7412(f). Since few of these risks will occur beyond the local emissions area, reducing risk from individual major HAP sources also seems a task far more adapted to state than to federal regulation.

III. NEW PROCEDURES TO ENCOURAGE STATE ACTION

A. *Introduction*

Success in GHG reduction will depend in large part on improvements in national energy efficiency. But national energy efficiency depends in turn on state energy efficiency, which seems to vary widely. State per capita CO_2 emissions (a rough proxy for energy efficiency) are about 13 tons per year (tpy) in California and New York, 21 tpy in Michigan and Illinois, 35 tpy in Texas, and 47 tpy in Louisiana.[64]

These results are not surprising, since many policies over which states have almost exclusive control can greatly affect energy efficiency. Any list would have to include land use policy, which can encourage either sprawl or more clustered development; transportation policy, which can affect both the need to travel and whether it takes place by single-passenger automobile or some other means; building and zoning codes, which can make it easy or hard to construct energy-efficient buildings and communities; and utility regulatory practices which can encourage or discourage investment in energy conservation. Even with a GHG cap to give the right price signal, the chances of success in GHG reduction will depend in part on moving these policies in a pro-efficiency direction.

How then might a *federal* policy encourage such *state* action?

Federal environmental laws have often required states to develop and submit to EPA plans to use their powers to address particular environmental problem areas. That approach has worked acceptably when Congress has given EPA power to impose its own plan directly if the state plan proves unacceptable. The fear of seeing its own authority displaced can motivate a state to act.

But in the energy conservation field, any such attempt to displace state power will not work. Congress has always denied EPA the authority to override state land use or transportation

[64] WORLD RESOURCES INSTITUTE, CLIMATE ANALYSIS INDICATOR TOOL (CAIT) (2008) (the results from this database are summarized in relevant part in *Hodas, Changing Course Toward an Energy-Efficient Future,* 39 TRENDS 2 (ABA Sec. of Env't, Energy and Nat. Resources, Chicago, IL) at 8, 9. For another survey that uses a totally different methodology to reach the same result, see AMERICAN COUNCIL FOR AN ENERGY EFFICIENT ECONOMY, THE STATE ENERGY EFFICIENCY SCORECARD FOR 2006, *available at* http://www.aceee.org/pubs/e075.htm.

policies, even when changes in such policies seemed essential to address our remaining water pollution problems, and very useful for air pollution control and wildlife preservation.[65] The political barriers were simply too great. (Indeed, some aspects of these state and local authorities may be constitutionally protected.) And on the analytical merits, these areas involve so many inherently local interests, and the assessment of so much local information, that state and local governments will always have a comparative advantage in addressing them.[66] These same factors may also protect state power to set building codes and regulate public utilities from wholesale federal displacement.

B. *A New Approach to Encouraging State Action*

This background suggests that we need a federal approach that forcefully *encourages* states to improve energy efficiency without telling them how to do it. This would not just reflect concern for state autonomy and local preference. There are so many different ways to improve energy efficiency, and so many ways to combine them into an overall policy, that we could probably all learn useful things by encouraging a variety of approaches. Indeed, in some areas of energy conservation, success may depend on the type of integrated approach that only state or local government can provide. For example, successful mass transit may depend on successful promotion of denser housing development, and vice versa.[67]

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[65] Run-off from land converted to agricultural or urban uses now causes over half the water pollution in the country, while habitat loss is the leading cause of wildlife decline. *See* William F. Pedersen, *Using Federal Environmental Regulations to Bargain for Private Land Use Control*, 21 YALE J. ON REG. 1, 10–15, 13 n.36 (2004). These problems cannot be addressed without addressing land use. Although changes in land use are far less necessary to achieving clean air, reducing traffic levels would undeniably also reduce levels of automotive air pollution.

[66] For a general discussion and justification of this reluctance, see Pedersen, *supra* note 65, at 15–45.

[67] As two law professors wrote in recommending a similar program of diverse state plans to pursue common national goals:

> [E]ffective government services and regulations must be continuously adapted and recombined to respond to diverse and changing local conditions . . .This adaptability is just what the separate, centralized agencies of the New Deal, and the doctrines authorizing delegation of rulemaking power to them, lacked. . . .
>
> [T]the success of any one government program or regulation depends not only on its local adjustment, but also on the availability of other,

Yet despite this diversity of possible means, the desired end—an improvement in state energy efficiency—can, in principle, be accurately measured, so that the success of each individual state approach can be measured and compared with the success of other states. These characteristics of energy efficiency improvement would fit seamlessly into a new four part approach to encouraging state action without displacing state authority.

Here are the four parts:

1. *Require Every State to Submit to the Federal Government a Plan to Improve Energy Efficiency*

Since these plans would be designed to help us learn from experience, they should not be subject to any tight pre-approval review that passes judgment in the absence of experience. Such review has often proved an exercise in futility, particularly for areas firmly under state jurisdiction, where the federal government has little ability to predict, and less ability to control, the result. Though some minimal standards for plan approval would be necessary, they should be summary and undemanding.[68]

However, the federal government should provide (directly or through private contractors) detailed guidance on how to write such plans, focusing first on removing legal barriers to private efforts (for example, changing building codes), and second on more affirmative regulatory changes. The federal government could also provide financial support both for writing the plans and

> equally well-adjusted services and rules. . . .
>
> Looked at this way, effective government is first and foremost local government; local government itself is a complex service product composed of discrete programs so mutually dependent that difficulties or successes in one may suggest or require changes in the others, or in the connections among them.

Michael C. Dorf & Charles F. Sabel, *A Constitution of Democratic Experimentalism,* 98 COLUM. L. REV. 267, 315 (1998).

[68] According once again to Dorf and Sabel:

> [T]he central tenet of experimentalism is that experience matters, or, more precisely, that the best way to assess the viability of plausible but imprecise ideas is to test them in practice under conditions that permit learning from the experience. Experimentalism would be superfluous if its results could be anticipated by reflection. That is why we [the authors] are, broadly speaking, at pains [in their reform suggestions] to make it hard to stop an experiment before the fact simply by imagining possible harms. . .

Id. at 407.

for substantive conservation efforts.

2. *Give States Broad Power to Achieve Their Goals*

Unearthing and amending state and local requirements that have hindered energy efficiency improvement could be one major benefit of the diverse approaches that a state by state planning requirement would encourage. But federal laws and policies may have also hindered improvement, and should likewise be unearthed and amended. Accordingly, states should be allowed to request waivers of federal legal requirements in order to improve energy efficiency and should receive them relatively freely. Such waivers could be conditional, consisting of amendments to the requirement in question that would remove or diminish its adverse impact on energy efficiency while avoiding or minimizing any impact on its ability to achieve its original goals.[69]

3. *Monitor, Rank, and Publicize Accomplishments*

In recent years programs of targeted information disclosure, such as California's Proposition 65 and the federal Toxics Release Inventory, have proved able to reduce even legally permitted releases of certain chemicals. Those programs apparently succeed best when they focus attention on an issue of latent social concern that is relatively easy to understand and address. Once such an issue has become newsworthy, such factors lead those responsible to take the readily available corrective action rather than stand against an aroused public.[70]

Energy efficiency fits that model very well. It is relatively easy to understand, can produce direct benefits to the public both by reducing energy costs and by making emission reductions easier, and can be improved in many different readily available ways.

Yet though recent GHG proposals generally authorize massive subsidies to states to pay for energy efficiency

[69] For a more detailed discussion of the benefits of such waivers, the degree to which they should be allowed, and the dangers of abuse and the appropriate safeguards against it, see William F. Pedersen, *Contracting with the Regulated for Better Regulations*, 53 ADMIN. L. REV. 1067, 1090–91, 1094–1104, 1108–23 (2001).

[70] For a more general discussion, see William F. Pedersen, *Regulation and Information Disclosure: Parallel Universes and Beyond*, 25 HARV. ENVTL. L. REV. 151, 161 (2001).

improvement and other greenhouse-friendly measures, they do almost nothing to make sure that the money will be well spent—specifically, that success or failure will be measured and that competitive forces will be invoked to improve performance over time. To pick one example almost at random, the Lieberman-Warner Climate Security Act would grant extra GHG emissions allowances—essentially a subsidy—to states that encourage energy efficient new buildings, or that reform their utility regulatory practices to encourage demand reduction. Other allowances would be granted to states according to a set statistical formula, but on condition that they use the resulting revenues for any one of a wide variety of greenhouse mitigation efforts. Program evaluation and comparison provisions are notably absent.

To correct, this, the next generation of GHG proposals should require the federal government to monitor and evaluate state improvements in energy efficiency and at set intervals rank the programs and publicize the results. Programs should probably be ranked in a number of different ways to make it easy to identify the best performers in each separate type of efficiency improvement.[71] It might be advisable to provide an opportunity for notice and comment on these rankings before they became final, both for quality control and to raise the profile of the message.

The goal would be to overcome inertia and set off a "virtuous cycle" in which the policy discoveries of the most successful states became ever more widely adopted.

4. *Reward Success*

The development of meaningful state plans could be further encouraged by tangible rewards for the best performing states. Such states could be allocated extra GHG emissions allowances to sell or distribute as they wished, or they could get an extra share of the financial support that any GHG control statute would almost certainly authorize.

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[71] This effort would proceed by trial, error, and trial again, since it would involve

> almost literally creating the infrastructure of decentralized learning. . . . The agencies must be able to take account of local diversity and resulting differences in the direction of local innovation in order to provide effective measures of performance in core programs . . . As a consequence, the agencies' measures must themselves be diverse and composite.

Dorf & Sabel, *supra* note 67, at 345–46.

In addition, states already receive a considerable amount of federal money related to land use planning and energy use, most notably in the form of transportation funds. The formula for distributing those pre-existing funds could be rebalanced to reward states with the best record in developing *and implementing* energy conservation plans.

C. *Implications of This Approach for the Rest of Environmental Law*

A successful state energy conservation plan would almost certainly provide collateral environmental benefits. In particular, reductions in land development from more clustered housing would decrease water pollution from urban run-off and increase wildlife habitat.

In a broader perspective, if the four-step approach suggested above worked for energy conservation, it might be adapted to other environmental problems such as reforming utility regulatory practices to encourage distributed generation and intermittent energy sources; changing agricultural practices to reduce GHG emissions and encourage carbon sequestration; controlling emissions of hazardous air pollution from small sources; and reducing water pollution from farming, forestry, and urban development.

In each of these cases, the issue is easy to understand, should be of at least latent public concern, and can be addressed by the state in many different ways. Beyond that, the degree of success in addressing it could in principle be accurately measured. With these preconditions met, there seems no reason why the four-part approach suggested above for energy conservation could not apply to these other areas as well.

IV. CONTEXT AND IMPLEMENTATION

A. *Context*

I did not write this paper specifically to implement the Log-Jam Project principles. However, my conclusions reflect those principles very well.

The principles include openness about the tradeoffs between different environmental goals and methods; use of market-based and information-based approaches to environmental problems; and devolution of decisions to states where possible.

In parallel fashion, I recommend adjusting our current CAA goals and methods to be consistent with the goals and methods of GHG control; greater use of market-based CAA controls that would mesh with a market-based GHG control program; and a federal energy efficiency program that would leave the center of gravity of many efficiency efforts largely at the state level and rely on information disclosure and fiscal incentives to promote them.

B. *Implementation*

Six major legislative changes would need to be enacted, or, at a minimum, seriously considered, to carry out the suggestions in this paper. Specifically, Congress would need to:

1. Adopt a national cap and trade program for non-GHG EGU emissions with stringency levels and compliance deadlines keyed to the stringency levels and compliance deadlines of the GHG control program
2. At least consider adopting a similar cap and trade program for the non-GHG, but combustion-related, emissions of other large sources.
3. Drastically simplify the current CAA requirements for SIPs to achieve all NAAQS by a set deadline, and reconcile those deadlines with the reduction schedules of the cap and trade programs.
4. Amend the CAA to make NSR, NSPS, and NAAQs requirements inapplicable to GHG emissions, and perhaps to make NSR and NSPS inapplicable to other sources as well.
5. At least consider reducing federal requirements and increasing state discretion in the control of HAPs.
6. Include in any GHG control bill a separate title requiring states to submit energy conservation plans and requiring the federal government to analyze and rank the performance of these plans after they generate a track record, publicize the results, and provide fiscal rewards to the best performers.