

Existing Authorities in the United States for Responding to Global Warming

by Curtis A. Moore

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Editors' Summary

The Obama Administration could unilaterally act to curb global warming under a wide variety of existing laws, delivering cooling benefits and beginning to save lives within a few days to a few years. Eliminating both black carbon, ozone, methane, and other warming agents, with lifetimes of a few days to a few years, and carbon dioxide, with a lifetime of 50 to 3,000 years, would provide long-term and short-term security alike. The number of authorities, from the Clean Air Act and the Antiquities Act to Superfund, is vast and comprehensive. The effects of employing them would be great and immediate.

I. Background

With the election of a president who appears to be genuinely committed to addressing global warming, as opposed to predecessors who promised to do so during their campaigns and then reneged on their pledges,¹ many Americans are supporting enactment of new laws. Unfortunately, neither the proposed international agreement, the Kyoto Protocol, nor bills now pending in the U.S. Congress, will produce cooling when and where it is most needed: now, and in the Antarctic, the Arctic, and other snowy and icy areas.

But President Barack Obama and his Administration do not need new laws. Existing authorities are not merely adequate to respond to global warming, but ample. The powers are contained not in only one or two statutes, but many. And neither the president nor his appointees need to await congressional action, but instead can, with literally a few strokes of their pens, provide speedy relief. Moreover, in the process of providing near-term climate benefits, millions of lives could be saved and billions of illnesses avoided.

Domestic and international measures alike focus almost wholly on reducing emissions of carbon dioxide (CO₂) from burning coal and other carbon-rich fuels. Yet, CO₂ is not the principal cause of today's warming, nor will reducing emissions provide near-term cooling effects.

A. CO₂ Is Forever

The severity of damaging human-induced climate change depends not only on the magnitude of the change but also on the potential for irreversibility. This Article shows that the climate change that takes place due to increases in CO₂ concentration is largely irreversible for 1,000 years after

1. While running for president, George H.W. Bush declared that “[t]hose who think we’re powerless to do anything about the greenhouse effect . . . are forgetting about the White House effect.” Keith Schneider, *The Environmental Impact of President Bush*, N.Y. TIMES, Aug. 25, 1991. In 1992, Bill Clinton campaigned on a promise to require tougher fuel economy standards for cars and trucks, but once in office “quickly downplayed the idea for fear of alienating the auto companies and United Auto Workers union.” Although President Clinton signed the Kyoto Protocol, which would have committed the United States and other industrialized nations to reducing their greenhouse gas (GHG) emissions about 5% from 1990 levels by 2012, he declined to submit it to the U.S. Senate for approval. Ronald Brownstein, *Rematch for Clinton's Split Decisions, Democrats Begin to Re-Fight Some of President Bill's Losing Battles*, L.A. TIMES, June 8, 2007. President Clinton also said that he would develop “revenue-neutral” incentives to encourage conservation, tax automobiles that are less fuel-efficient, encourage further development of solar energy alternatives, and pass a national bottle bill that would place a refundable fee on recyclable bottles, cans, and other containers. Gwen Ifill, *Clinton Links Ecology Plans With Jobs*, N.Y. TIMES, Apr. 23, 1992. During the 2000 campaign, George W. Bush pledged to support legislation that would require power plants to reduce emissions of carbon dioxide (CO₂) and suggested “that he—unlike Al Gore—favored mandatory emission reductions from power plants.” But after 52 days in office, announcing that “we’ve got an energy crisis in America,” President Bush broke this promise, abruptly dropping his plan. David Whitman, *The Hard Coal Facts*. U.S. NEWS & WORLD REP., Mar. 26, 2001.

emissions stop. Following cessation of emissions, removal of atmospheric CO₂ decreases radiative forcing, but is largely compensated by slower loss of heat to the ocean, so that atmospheric temperatures do not drop significantly for at least 1,000 years. Among illustrative irreversible impacts that should be expected if atmospheric CO₂ concentrations increase from current levels near 385 parts per million by volume (ppmv) to a peak of 450-600 ppmv over the coming century are irreversible dry-season rainfall reductions in several regions comparable to those of the “dust bowl” era and inexorable sea-level rise. Thermal expansion of the warming ocean provides a conservative lower limit to irreversible global average sea-level rise of at least 0.4-1.0 meters (m) if 21st century CO₂ concentrations exceed 600 ppmv and 0.6-1.9 m for peak CO₂ concentrations exceeding ≈1,000 ppmv. Additional contributions from glaciers and ice sheet contributions to future sea-level rise are uncertain but may equal or exceed several meters over the next millennium or longer.²

Yes, by 2100, CO₂ will be the dominant cause of warming—but it isn't today. Most current warming is due to the considerably less well-known “forcers,” such as black carbon (diesel soot and woodsmoke), tropospheric ozone (smog), and methane (natural gas and gases from sewage treatment plants, animal feedlots, and abandoned coal mines). CO₂'s lifetime is 50 to 3,000 years, while those of the forcings range from a few days to a few years, so cutting emissions will deliver cooling benefits immediately, not the centuries required for CO₂.

Because of their short lifetimes, forcings are not candidates for so-called cap-and-trade approaches and, hence, omitted (with the exception of one, methane, or natural gas) from the list of greenhouse gases (GHGs) under the Kyoto Protocol and congressional proposals. That is an advantage, because avoiding cap and trade allows some of the most contentious issues to be set aside for later and more lengthy resolution. For forcings, however, the slate is largely blank, because the most that has been proposed in either U.S. House of Representatives or U.S. Senate legislation are studies, even though there is no doubt that forcings not only cause global warming, but cause millions of deaths and billions of illnesses.

Black carbon increases warming by darkening surfaces, whether of rain droplets, soils, or snow and ice, thus increasing the amount of sunlight that is absorbed. It also is toxic, killing and injuring those who breathe it. In developing nations, between 1.6 and 5 million children are killed each year by indoor exposure to black carbon formed when dung, wood, coal, and other fuels are burned for cooking or heating.

Tropospheric ozone, or smog, which causes global warming, also kills, and when levels increase even slightly, school absences and respiratory illnesses jump sharply. Increases in another forcer, carbon monoxide (CO), kill those suffering from congestive heart disease.

Many of the forcings are wasted resources. Methane, for example, can be captured, then used to generate electricity or sold, as it is at a Portland, Oregon, sewage treatment plant.

Two others, diesel soot and CO, result from incomplete and inefficient burning of coal, gasoline, and diesel. Burning them completely not only cuts emissions but reduces fuel costs as well.

In the view of former General Counsels for the U.S. Environmental Protection Agency (EPA), to establish a global cap-and-trade system, a new international agreement and a new federal law are required. Not so with the forcings. President Obama could, with no need to wait for an international agreement or a new law from Congress, demonstrate U.S. leadership with a few strokes of his pen. He could, for example:

- Designate spending to clean up diesels “eligible project costs,” thus qualifying them for 90% U.S. funding under the federal highway and transit programs. Emissions could be slashed 90% or more, either through retrofits with add-on devices called traps (which capture soot and destroy it) or by switching engines to natural gas. The United States now pays 90% of the cost of everything from paving to planting flowers in medians and along roadsides, but not a dime to save lives from soot.
- Acting under a variety of laws, reduce emissions of methane and other gases from landfills, sewage treatment plants, animal feedlots, abandoned coal mines, oil and gas facilities, and other significant sources, all already subject to a variety of existing federal laws. Methane is a powerful global warming gas in its own right, but also reacts in the air to form smog, another warming agent, and in the upper atmosphere to yield water vapor, yet another cause of increased heat trapping. But bacteria will convert wastes, whether from hogs or humans, into energy that can then be used to generate electricity or fuel vehicles, recouping costs in as little as two years.
- Designate the U.S. territory in the Arctic a protected area under the Antiquities Act, as President Jimmy Carter did for Alaska lands and Presidents William J. Clinton and George W. Bush did for vast reaches of the Pacific Ocean. No congressional approval is required, and protected status would trigger a variety of environmental benefits, ranging from safeguarding the habitats of Arctic seals, polar bears, and other species likely to fall victim to global warming to curbing air pollution that causes immense areas of Alaska, Greenland, and Siberia—not to mention the snow pack of the Rockies—to thaw and melt.
- Amend the so-called endangerment finding under which EPA is preparing to regulate CO₂ and other gases listed under the Kyoto Protocol to include the forcings as well. (It is distinctly possible, however, that this step may be unnecessary since, as noted above, almost all forcings and their precursors are already regulated to protect health or other values.)

2. See Susan Solomon et al., *Irreversible Climate Change Due to Carbon Dioxide Emissions*, 106 PROC. NAT'L ACAD. SCI. 1704 (2009).

Global warming from CO₂ emissions will be essentially irreversible for 1,000 years or more, even after emissions are halted. As Dr. Susan Solomon, senior scientist for the National Oceanographic and Atmospheric Administration and head of a group reporting in the Proceedings of the National Academy of Sciences, said: “We have to think about it much more like nuclear waste than, like say, smog or acid rain,” adding “What we’re doing with carbon dioxide is forever.”³

There are undoubtedly ways for humanity to scrub CO₂ from the air, eliminating it long before it would be destroyed by nature. To buy time to find those ways, and to slow the rate at which the Arctic and the rest of the world’s stores of snow and ice are melting, the first and most urgent step is to curb emissions of forcers.

Already regulated under many different laws, albeit not for climate purposes, rules could be modified to include global warming. China, India, and other developing nations could join the effort to slash emissions of forcers, thus both slowing global warming and protecting the lives and health of their citizens. Almost certainly, those nations and most others in the world also have existing laws like those summarized below that could quickly and easily be deployed to reduce global warming.

B. Summary

This review is largely illustrative of the manner in which existing authorities could be used to attack global warming, and is not an exhaustive analysis. Huge areas of law are unaddressed by this document, ranging from fish and wildlife protection, restrictions on the use of federal lands, use of agriculture statutes, e.g., crop and milk subsidy programs, mandated purchases by armed services and other federal entities, and many, many others.

This review also goes beyond CO₂ and other global warming pollutants listed under the Kyoto Protocol as GHGs.⁴ It includes the many other causes of warming, such as black carbon, tropospheric ozone, and chlorofluorocarbons.⁵ This is because, in the words of authors at the Goddard Institute for Space Studies,

climate forcing by non-CO₂ GHGs (1.4 W/m²) is nearly equal to the net value of all known forcings for the period 1850–2000 (1.6 W/m²). Thus, assuming only that our estimates are approximately correct, we assert that the processes

producing the non-CO₂ GHGs have been the primary drivers for climate change in the past century.⁶

The most important points to be drawn from these illustrative materials are:

- There is vast potential in the use of existing authorities to attack global warming. There is no need to delay action until Congress passes new laws.
- Using existing authorities to reduce levels of short-lived causes of global warming would avoid the controversy and delay associated with enacting a “cap-and-trade” regime, while protecting existing laws from weakening changes.
- Because the short-lived causes of global warming also kill and injure humans, and cause non-climate environmental damages—poisoning soils and cutting crop yields, for example—an action program targeting them should appeal to both developing and developed nations alike.
- The planet is racing toward “tipping points,” or positive feedbacks that result in abrupt, often violent, and irreversible change. Examples include avalanches, bolts of lightning, and the twin towers, which stood, stood, stood, then abruptly collapsed. Reducing short-lived causes of warming is the only way to avoid such tipping points.

The number of authorities is vast and comprehensive. The effects of employing them would be great and immediate. Some would question whether an Administration that chooses to ignore these opportunities is truly committed to curbing global warming or merely repeating platitudes for the sake of winning votes.

Congress and the Obama Administration are beginning a likely long, slow march toward confronting global warming. As is so often the case with legislation, the result could well be not a safer future, but instead one that is vastly more dangerous.

1. Virtually all proposals, whether inside or outside Congress, focus on compelling cuts in emissions of CO₂, widely, but wrongly, considered the principal cause of global warming.
2. CO₂ has a lifetime of 50 to 3,000 years, so slashing emissions would have no near-term benefit.
3. There are other causes of global warming with lifetimes of a few minutes to a few years.
4. Short-lived pollutants are, in the aggregate, the cause of most warming currently being experienced, though CO₂ will be the dominant cause in the future.
5. Reducing black carbon, ozone, and other non-CO₂ causes of global warming will bring faster cooling,

3. Video Interview of Susan Solomon, National Oceanic and Atmospheric Administration (NOAA), by Jack Penland, *Irreversible Warming*, *ScienceCentral* (Jan. 26, 2009), <http://www.sciencentral.com/video/2009/01/26/irreversible-warming/>.

4. The GHGs listed under Annex A of the Kyoto Protocol are (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆). United Nations Framework Convention on Climate Change (UNFCCC) Annex A, 31 I.L.M. 849 (May 9, 1992), available at http://unfccc.int/essential_background/kyoto_protocol/items/1678.php.

5. See Michael C. MacCracken, *Moderating Climate Change by Limiting Emissions of Both Short- and Long-Lived Greenhouse Gases* (2009) (to be published in PROCEEDINGS OF THE 42ND SESSION OF THE INTERNATIONAL SEMINARS ON PLANETARY EMERGENCIES), available at http://www.climate.org/PDF/MacCracken_Erice.pdf.

6. James Hansen et al., Goddard Institute for Space Studies, *Global Warming in the 21st Century: An Alternative Scenario*, http://www.giss.nasa.gov/research/features/200111_altscenario/ (last visited Dec. 12, 2009).

reduce human death and illness, and increase crop yields and forest productivity.

6. Because the planet is racing toward so-called tipping points, the need for immediate and substantial cuts in short-lived causes of global warming is urgent.

The gravest threat, certainly in the near term, is not gradual warming, but, figuratively, falling over a cliff. Change in nature is rarely gradual. Snow crashes down a mountainside in an avalanche, lightning thunders through the air at the speed of light, and the Twin Towers stand, stand, stand and then collapse on themselves as a small unknown tipping point is passed. Only reducing short-lived causes of global warming can avoid this cataclysmic threat.

C. Using Existing Laws and Authorities to Attack Global Warming

Existing laws and other authorities that could be used to attack global warming include the following:

- **The Clean Air Act (CAA)**⁷: At least seven different approaches could be used, ranging from adoption of new ambient standards to issuing guidelines to define control technologies.
- **The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**⁸: Among the most flexible of federal laws, this could be used to, for example, designate elements and compounds that cause global warming as hazardous substances, triggering requirements for the reporting of and responses to releases, as well as liability for damages.
- **The Resource Conservation and Recovery Act (RCRA)**⁹: Expansive definitions in RCRA enable the law to extend into activities that generate wastes of all sorts—air and water pollution, for example. In addition, RCRA contains a little-known requirement that generation of wastes—again, of all sorts, not just that destined for dumps or incinerators—be “minimized.”
- **The Clean Water Act (CWA)**¹⁰: A variety of regulatory and nonregulatory tools are made available that could be used to virtually eliminate emissions of methane, a powerful GHG in its own right, but also one that creates other “forcers,” such as ozone or smog.
- **Public Resource Laws and Inherent Powers of the President**: Following the examples of Presidents Theodore Roosevelt, Carter, Clinton, and George W. Bush, President Obama could exercise the powers of the Antiquities Act. Protecting the Arctic could also be done using other laws, such as the Outer Continental Shelf Lands Act.

D. Other Authorities

In addition to environmental laws, governments and individuals could invoke others statutes and laws. These will be examined in a later Article. However, they include the following:

- **Common Law**: Using the tobacco lawsuits of the 1990s as a model, money damages or equitable relief can be sought against corporations under nuisance, negligence, and a wide variety of other theories, including personal liability for corporate officers and directors, either criminally or civilly, or both, for actions of the business. Indeed, the patterns of spending, conduct, and public statements are consistent with the theory that just as tobacco firms established a program to sow confusion and discredit science, so, too, did some other corporations intentionally seek those same scientists. So-called skeptics were sought out for the express purpose of misrepresenting and distorting global warming science, using corporate front groups.
- **Knowing or Reckless Endangerment**: Virtually all of the media-specific laws now include provisions for bringing corporations and, under certain circumstances, their officers and directors, to the bar for knowing or reckless endangerment.
- **The Racketeer Influenced and Corrupt Organizations Act (RICO)**¹¹: Starting in the 1980s, lawyers began exploiting the RICO Act, which allows civil claims to be brought by any person injured in business or property because of a RICO violation, which, if established, automatically triggers judgment in the amount of three times actual damages, as well as an award for costs and attorneys fees.

One basis for invoking nonenvironmental laws is the potential existence of a conspiracy, which was a basis for some investigations of the tobacco industry in the 1990s. Investigators asserted that the tobacco industry had created an institution, the Council on Tobacco Research, that promoted allegedly objective scientific research into the health effects of tobacco. In reality, that research was controlled to make sure it either disproved any causation between tobacco and disease, or the research was stopped before it could reach a conclusion.

Some who were the most vocal critics of the science warrenting control of “passive” or “second hand” smoking have also been among the most outspoken deniers of the existence of global warming. (See Figure 1.)

There undoubtedly are many other laws under which global warming can be attacked without need for further statutory enactments. While many of these require an initiative on the part of the U.S. government, many others can be pursued by state attorneys general, district attorneys, or even private individuals. What is lacking, then, are not legal authorities to address global warming, but people willing to invoke them to possibly stave off the gravest threat ever posed to human survival.

7. 42 U.S.C. §§7401-7671q, ELR STAT. CAA §§101-618.

8. 42 U.S.C. §§9601-9675, ELR STAT. CERCLA §§101-405.

9. 42 U.S.C. §§6901-6992k, ELR STAT. RCRA §§1001-11011.

10. 33 U.S.C. §§1251-1387, ELR STAT. FWPCA §§101-607.

11. 18 U.S.C. §§1961-1968 (2007).

Figure I
Genuine Skeptics or Pay-for-Hire Skeptics?

PASSIVE SMOKING

Steve Milloy

“Anti-smoker propaganda may be killing more smokers than smoking does.”

“Secondhand smoke is annoying to many nonsmokers. That is the essence of the controversy and where the debate should lie—the rights of smokers to smoke in public places versus the rights of nonsmokers to be free of tobacco smoke.”

Richard Lindzen

The evidence linking passive smoking to cancer is “weak, inconsistent, and ambiguous.”

S. Fred Singer

“In their anti-smoking zeal, the U.S. Environmental Protection Agency had cooked the data on second-hand tobacco smoke claiming 3,000 lung cancer deaths a year.”

Michael Crichton

Studies showing 3,000 deaths annual from passive smoking “was openly fraudulent science” (so) “we now have a social policy supported by the grossest of superstitions.”

GLOBAL WARMING

Steve Milloy

“Hell—we don’t even know if the planet has actually recorded a genuine increase in mean temperature over the last half century.”

“It will take all our strength in the coming years to combat global warming alarmism and to keep America from falling into the totalitarian green abyss.”

Richard Lindzen

“I think it’s [concern about global warming] mainly just like little kids locking themselves in dark closets to see how much they can scare each other and themselves.”

ExxonMobil is “the only principled oil and gas company I know in the U.S.” and that “they have a CEO who is not going to be bamboozled by nonsense.”

S. Fred Singer

“Are human activities, including the burning of fossil fuel, the primary or even significant cause of the current warming trend? The scientifically appropriate answer—cautious and conforming to the facts—is probably not.”

Michael Crichton

“Nobody believes a weather prediction twelve hours ahead. Now we’re asked to believe a prediction that goes out 100 years into the future? And make financial investments based on that prediction? Has everybody lost their minds?”

Source: A Package for Copenhagen: Existing Authorities in the United States for Responding to Global Warming, Health & Clean Air Newsl., Fall-Winter 2009, available at <http://healthandcleanair.org/newsletters/issue11.htm>.

II. Existing Laws and Other Provisions to Eliminate Short-Lived Causes of Global Warming

A. The CAA

The nation’s flagship environmental law, the CAA, was crafted to deal with a wide range of air pollution threats,

including global warming. It contains a number of provisions under which emissions of short-lived causes of warming could be attacked, including the following:

- Regulating as a threat to human health, triggering the adoption and enforcement of a primary ambient standard;
- Regulating as a threat to welfare, triggering the adoption and enforcement of a secondary ambient standard;

- Issuing new or revised motor vehicle emission limits pursuant to §202(a)(1);
- Declaring a national emergency and issuing “such orders as may be necessary to protect public health or welfare or the environment”;
- Adding global warming agents to the list of substances regulated to protect the stratospheric ozone layer and imposing appropriate controls;
- Issuing new source performance standards (NSPS) for sources, even if there is no ambient standard. (The difficulty with relying on such standards is that the vast majority of pollution comes from existing sources, not new ones.);
- Defining reasonably available control technology (RACT) for existing sources.

The use of existing authorities to attack pollutants that cause global warming is illustrated by recent lawsuits challenging the proposed 24-hour ambient standard for particulate matter with a diameter of 2.5 microns or less (PM_{2.5}).¹²

As drafted, the EPA proposal would exempt areas next to highways from compliance with the standard, even though these are some of the most polluted areas in the nation and the adverse effects of the pollution are well documented. In Los Angeles, California, for example, roughly 1.5 million people live near—that is, within 300 meters,¹³ or roughly the length of three football fields—major highways where they are exposed to high levels of air pollution.

The evidence that living near major roadways causes serious illness, including death, is compelling.¹⁴ Setting a 24-hour standard for PM_{2.5} would force the development and adoption of control technologies that would not only protect the health of those living adjacent to roads, but sharply reduce emissions of black carbon, a major cause of global warming.

Similarly, EPA’s reconsideration of the ozone ambient standard could mandate concentrations of 70 ppm or less, a level that would require major reductions in the emissions of oxides of nitrogen (NO_x). This, in turn, could compel the conversion of many coal-fired electricity generators to cleaner combustion technologies or natural gas, or both, with a resulting reduction in emissions of CO₂ of 50% or more.¹⁵

What little doubt there might have been as to whether global warming was an adequate basis for regulating its causes as air pollutants was settled in the April 2007 decision

by the U.S. Supreme Court in *Massachusetts v. U.S. Environmental Protection Agency*,¹⁶ which held that EPA possesses the authority under the CAA to regulate CO₂ and other GHGs, and that EPA could not refuse to exercise the authority for policy reasons. The Agency’s options in response to the petition for rulemaking that triggered the lawsuit in *Massachusetts* were to determine: (1) whether or not emissions of GHGs from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare; or (2) whether the science is too uncertain to make a reasoned decision.

On April 17, 2009, EPA Administrator Lisa P. Jackson announced a proposed endangerment finding in which the Agency would formally conclude that GHGs should be regulated. Nearly eight months later, on December 7, 2009, just as international negotiations on global warming were beginning in Copenhagen, Denmark, she issued a formal ruling that emissions of the Kyoto gases were a threat to human health, saying: “This administration will not ignore science and the law any longer.”¹⁷

A legally mandated comment period ended June 23, 2009,¹⁸ allowing the Agency to publish the endangerment finding when it wished. On Sept. 1, 2009, Administrator Jackson told reporters that publication of the finding would “happen in the next months.”¹⁹

Thus, the stage is now set for the Obama Administration to craft regulations to deal with global warming. However, according to a memorandum of law written in 1998 by then-EPA General Counsel Jonathan Z. Cannon, these regulations cannot legally establish a market-based, cap-and-trade program. That, he wrote, would require a new law.²⁰

EPA is empowered, Cannon wrote, to require states to regulate specific pollutants but could not “mandate specific emission control measures for states to use in meeting the general provisions for attaining ambient air quality standards.” Thus, he concluded, the potentially applicable provisions of the law would not support the cap-and-trade program sought by then-President Clinton in the 1990s and by others today.²¹

12. See Brief for Appellant at Natural Res. Def. Council v. U.S. Envtl. Prot. Agency (9th Cir. 2008) (No. 08-72288).

13. The distance of 300 meters is critical and supported by studies. See, e.g., Yifang Zhu et al., *Seasonal Trends of Concentration and Size Distribution of Ultrafine Particles Near Major Highways in Los Angeles*, 38 AEROSOL SCI. & TECH. 5 (2004).

14. See, e.g., Michael Riediker et al., *Particulate Matter Exposure in Cars Is Associated With Cardiovascular Effects in Healthy Young Men*, 169 AM. J. RESPIRATORY & CRITICAL CARE MED. 934 (2004). The authors conclude that “[t]he observations in these healthy young men suggest that in-vehicle exposure to PM_{2.5} may cause pathophysiologic changes that involve inflammation, coagulation, and cardiac rhythm.” *Id.* at 934.

15. Personal Communication to author from Robert Yuhnke, Counsel for Petitioners in Natural Res. Def. Council v. U.S. Envtl. Prot. Agency (9th Cir. 2008) (No. 08-72288), Sept. 23, 2009.

16. 549 U.S. 497, 37 ELR 20075 (2007).

17. Steven Mufson & David A. Fahrenthold, *EPA Is Preparing to Regulate Emissions in Congress’s Stead*, WASH. POST, Dec. 7, 2009, at A9. A legally mandated comment period had ended June 23, 2009, allowing the Agency to publish the endangerment finding when it wished. On Sept. 1, 2009, Administrator Lisa Jackson told reporters that publication of the finding would “happen in the next months.”

18. U.S. Environmental Protection Agency (EPA), Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under the Clean Air Act, <http://epa.gov/climatechange/endangerment.html> (last visited Dec. 18, 2009).

19. Jennifer A. Dlouhy, *EPA Likely to Declare CO₂ a Dangerous Pollutant*, S.F. CHRON., Sept. 1, 2009, available at http://articles.sfgate.com/2009-09-01/news/17204810_1_greenhouse-gases-carbon-dioxide-climate-change-bill.

20. Jonathan Cannon’s memorandum outlined the legal basis for EPA regulation of CO₂. Environmental groups filed a petition asking EPA to regulate CO₂, which was denied by appointees of President George W. Bush. The Bush decision was supported by a legal opinion written by then-EPA General Counsel Robert E. Fabricant. It was this denial that became the basis for the *Massachusetts* decision, holding not only that EPA has the authority to regulate CO₂ under the CAA, but also a legal duty to respond to the facts in a petition. Thus, *Massachusetts* was, in effect, a case of two dueling memoranda.

21. See J. Christopher Baird, *Trapped in the Greenhouse: Regulating Carbon Dioxide After FDA v. Brown & Williamson Tobacco Corp.*, 54 DUKE L.J. 147, 156 n.57 (2004).

The Supreme Court did not address in *Massachusetts* whether a cap-and-trade program would be legally defensible under current law. However, the reasoning of the opinion was similar to that of Cannon's memorandum, as well as the arguments contained in a *Duke University Law Review* article that compared and contrasted Cannon's reasoning and conclusions with those of Robert E. Fabricant, the Bush Administration General Counsel.²²

Because of the widespread view that cap and trade represents the only politically viable means of addressing global warming, some organizations have pursued it single-mindedly. Chief among these are the Environmental Defense Fund (EDF) and the Natural Resources Defense Council (NRDC). NRDC, for example, claims: "A new generation of climate legislation is needed to fight global warming by spurring innovation and clean energy,"²³ even though not a single wind turbine, solar installation, or conservation program was created in response to the much vaunted acid rain trading program.²⁴

In my judgment, as a professional who has worked in this field for over 35 years, many of them in Congress, the insistence on cap and trade is both wrong-headed and dangerous. Despite contentions to the contrary, cap and trade has failed in every instance in which it has been adopted, based on one of the most comprehensive critical analyses ever conducted.²⁵

Moreover, there is considerable danger inherent in the pursuit of a new law to mandate cap and trade, for it opens the CAA to a wide variety of weakening amendments that threaten its integrity as a means of protecting human health. At over 1,400 pages, as passed by the House, the Waxman-Markey Bill is a bit difficult to digest. But one powerful public-interest lobby group that initially supported the legislation, MoveOn.org, switched to opposition, saying: "The energy bill passed by the House of Representatives contains an ugly surprise—the repeal of a key part of the Clean Air Act that limits global warming pollution from coal plants and oil refineries."²⁶

Critics argue that §811 of the bill would repeal a key provision of the CAA because it provides: "No standard of performance shall be established under section 111"—the section of the CAA that regulates coal-fired plants—"for capped greenhouse gas emissions from a capped source unless the Administrator determines that such standards are appropriate because of effects that do not include climat-

exchange effects."²⁷ In effect, this would exempt coal-fired power plants, many of them built when Dwight D. Eisenhower was president and airplanes flew with propellers, from plant-specific regulation.

Fortunately, there is no need to invite such weakening changes because there is no need to amend the law to deal with global warming.

Although initially enacted in 1955 and significantly amended in 1970, 1976-1977, and 1990, the law has proven to be an extraordinarily flexible and formidable tool. At a time when the concept of government ordering corporations to take actions was unprecedented—indeed, revolutionary—the far-sightedness of its drafters was remarkable. Although not designed specifically to deal with global warming, the law's flexibility and comprehensiveness make it a more-than-adequate vehicle, compared to proposals currently in Congress.

Some short-lived causes of warming—ozone, CO, black carbon (as a subset of fine particles), hydrochlorofluorocarbon (HCFC)-134a, and many of the chlorofluorocarbons, to name but a few—are already regulated under the CAA. The only question is whether they can be regulated for the purposes of indirectly protecting health by coping with global warming as well as for directly protecting health. Clearly, if Administrator Jackson's finding of endangerment for purposes of regulating the Kyoto gases is legally defensible, so, too, would such a finding be with respect to non-Kyoto pollutants.

Moreover, since the law's definition of welfare expressly includes weather and climate as values to be protected, controls also could be imposed on non-Kyoto causes of warming under those provisions. Although the *Massachusetts* decision dealt with one specific cause of global warming, CO₂, its rationale would apply to all causes of warming. The provisions under which these pollutants can be addressed under the CAA go well beyond the ambient standards, however.

I. Discussion

A significant advantage to using the CAA as the vehicle with which to attack short-lived causes of warming is its existing, muscular infrastructure at the federal, state, and local levels, and throughout business and industry. Every state has air quality experts, as well as every city of significant size. Bureaucrats and citizens alike are familiar with the emission sources and control mechanisms, as are manufacturers and vendors. In addition, the CAA has already been employed to cope with a major threat to the global environment: stratospheric ozone depletion. In fact, those ozone-depletion provisions are one of the mechanisms that could be adopted to deal with global warming, because the two are intimately linked: ozone depletion increases global warming and vice versa.²⁸

22. As sometimes happens, this law review article became the basis for much of the Supreme Court's reasoning in *Massachusetts*. It is an excellent analysis. See Baird, *supra* note 21.

23. Natural Resources Defense Council, A New Generation of Climate Legislation Is Needed to Fight Global Warming by Spurring Innovation and Clean Energy, <http://www.nrdc.org/globalWarming/cap2.0/default.asp> (last visited Jan. 6, 2010).

24. See Curtis Moore, *Marketing Failure: The Experience With Air Pollution Trading in the United States* (Feb. 3, 2004) [hereinafter Moore, *Marketing Failure*]; Curtis Moore, *RECLAIM: Southern California's Failed Experiment With Air Pollution* (Jan. 26, 2004). Both articles can be found at <http://www.healthandcleanair.org/emissions/index.html>.

25. Moore, *Marketing Failure*, *supra* note 24.

26. Change.org, Smokestacks vs. Windmills?: Can We Save the Clean Air Act?, http://globalwarming.change.org/actions/view/smokestacks_vs_windmills_can_we_save_the_clean_air_act (last visited Jan. 6, 2010).

27. Committee on Energy and Commerce, U.S. House of Representatives, Washington, D.C., Report 111-137 American Clean Energy and Security Act of 2009.

28. See, e.g., ANTHONY J. McMICALH ET AL., CLIMATE CHANGE AND HUMAN HEALTH: RISKS AND RESPONSES 11 (2003).

The major obstacle to employing the CAA is not the law itself, but the novelty of the concept. Most of those who deal with this landmark legislation view it as concerned principally with safeguarding human health from the impacts of conventional air pollutants. Indeed, although EPA has suggested using the law to address global warming, it has unnecessarily limited itself to the Kyoto “Bag of Six,” citing impacts such as heat waves, air pollution, and food and water-borne illnesses. The non-Kyoto causes of warming have fundamentally been ignored, as have non-health impacts, ranging from warming and melting of the Arctic and Antarctic to inundations of coastal regions like California, Florida, North Carolina, and other areas bounded by oceans.²⁹

A difficulty with relying on the health effects of Kyoto pollutants is that their effects are, to some degree, speculative and indirect. The impacts of heat waves, for example, depend on the availability of air conditioning. However, if the targeted warming agents include short-lived pollutants, such as black carbon and ozone, the case for acting to protect human health is manifest and indisputable. Unlike the Kyoto Six, there is no question whatsoever that short-lived causes of warming also cause millions of deaths and billions of illnesses. Ozone is clearly a cause of mortality, as is black carbon and, among those with congestive heart failure, CO.³⁰

2. Short-Lived Warming Agents as Air “Pollutants”

Certainly, the short-lived warming agents qualify as an air pollutant as defined by the CAA just as certainly as CO₂ does under *Massachusetts*:

The term “air pollutant” means any air pollution agent or combination of such agents, including any physical, chemical, biological, radioactive (including source material, special nuclear material, and byproduct material) substance or matter which is emitted into or otherwise enters the ambient air. Such term includes any precursors to the formation of any air pollutant, to the extent the Administrator has identified such precursor or precursors for the particular purpose for which the term “air pollutant” is used.³¹

Although this definition is very broad, it is not ambiguous. It is manifestly written with the conscious design of casting as wide a net as might be necessary, and as a means of dealing with unforeseen circumstances. For any person who has read transcripts of the markups by the U.S. Senate Committee on Public Works from 1970, as I have, its members were clearly intent on crafting a law that was sufficiently explicit—as the tailpipe emission standards were in specifying exact concentrations and dates to be met—but also generous in its grant of flexibility. This balance of discretion linked to specificity can be seen throughout the 1970 provisions.

As the Supreme Court wrote in rejecting EPA’s argument that CO₂ was not a pollutant under the law:

Because EPA believes that Congress did not intend it to regulate substances that contribute to climate change, the agency maintains that carbon dioxide is not an “air pollutant” within the meaning of the provision. The statutory text forecloses EPA’s reading. The Clean Air Act’s sweeping definition of “air pollutant” includes “any air pollution agent or combination of such agents, including any physical, chemical . . . substance or matter which is emitted into or otherwise enters the ambient air . . .” 7602(g) (emphasis in opinion added by the Court). On its face, the definition embraces all airborne compounds of whatever stripe, and underscores that intent through the repeated use of the word “any.” Carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons are without a doubt “physical [and] chemical . . . substance[s] which [are] emitted into . . . the ambient air.” The statute is unambiguous.³²

Continuing, the Court wrote:

While the Congresses that drafted §202(a)(1) might not have appreciated the possibility that burning fossil fuels could lead to global warming, they did understand that without regulatory flexibility, changing circumstances and scientific developments would soon render the Clean Air Act obsolete. The broad language of 202(a)(1) reflects an intentional effort to confer the flexibility necessary to forestall such obsolescence . . .

adding:

Because greenhouse gases fit well within the Clean Air Act’s capacious definition of “air pollutant,” we hold that EPA has the statutory authority to regulate the emission of such gases from new motor vehicles.³³

Further, if a petition for rulemaking is filed with EPA:

Under the clear terms of the Clean Air Act, EPA can avoid taking further action only if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do.³⁴

By this reasoning, if a petition for rulemaking with respect to methane and the non-Kyoto causes of warming were filed, the Agency could, in the words of the Supreme Court, “avoid taking further action only if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do.”³⁵

3. Primary and Secondary Standards

If EPA determines that an air pollutant poses a threat, it must set a primary standard, which is to protect health, and it may set a secondary standard to protect welfare. If a level of air pol-

29. Juliet Elperin, *EPA Presses Obama to Regulate Global Warming Under Clean Air Act*, WASH. POST, Mar. 23, 2009.

30. See generally HEALTH & CLEAN AIR NEWSL., Spring 2008, available at <http://healthandcleanair.org/newsletters/issue10.html>.

31. §302(g).

32. *Massachusetts v. U.S. Envtl. Protection Agency*, 549 U.S. 497, 37 ELR 20075 (2007).

33. *Id.*

34. *Id.*

35. *Id.*

lution exceeds the relevant national ambient air quality standard (NAAQS),³⁶ the area is described as nonattainment,³⁷ which triggers specific and fairly rigorous control requirements that are, in turn, backed by mandated cutoffs of federal highway and sewer funding if a state refuses to act. NAAQS have been established for PM,³⁸ ozone,³⁹ CO,⁴⁰ nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and lead.⁴¹

There are a number of provisions of the CAA under which emissions of short-lived causes of warming could be attacked, including the following:

- Regulating as a threat to human health, triggering the adoption and enforcement of a “primary” ambient standard⁴²;
- Regulating as a threat to “welfare,” triggering the adoption and enforcement of a “secondary” ambient standard⁴³;
- Issuing new or revised motor vehicle emission limits pursuant to §202(a)(1) of the CAA;
- Declaring a national emergency and issuing “such orders as may be necessary to protect public health or welfare or the environment”⁴⁴;
- Adding global warming agents to the list of substances regulated to protect the stratospheric ozone layer and imposing appropriate controls⁴⁵;
- Issuing new source performance standards for sources, even if there is no ambient standard; as well as adopting controls for existing sources;
- Defining reasonably available control technology (RACT) for existing sources; and

36. See, e.g., National Ambient Air Quality Standards for Particulate Matter, 62 Fed. Reg. 38652 (July 18, 1997).

37. See §107(d)(1)(A), 42 U.S.C. §7407(d)(1)(A) (requiring states to designate as “nonattainment” those areas within their territory that do not meet the national or secondary ambient air quality standards for a given pollutant).

38. 40 C.F.R. §50.6 (2003).

39. Final Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard—Phase 1, 69 Fed. Reg. 23951, 23956-57 (Apr. 30, 2004), 40 C.F.R. pts. 50, 51, and 80.

40. 40 C.F.R. §50.8.

41. *Id.* §§50.11, 50.4, and 50.12 for NO₂, SO₂, and lead, respectively.

42. National primary ambient air quality standards, under §109(b)(1) must be “ambient air quality standards the attainment and maintenance of which in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health.”

43. Under §109(b)(2), a national secondary ambient air quality standard must “specify a level of air quality the attainment and maintenance of which in the judgment of the Administrator, based on such criteria, is requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air.”

44. §303.

45. The law states that “the Administrator shall add to the list of class I substances any other substance that the Administrator finds causes or contributes significantly to harmful effects on the stratospheric ozone layer. The Administrator shall, pursuant to subsection (c), add to such list all substances that the Administrator determines have an ozone depletion potential of 0.2 or greater.” §602(a).

In addition, it states that “Pursuant to subsection (c), the Administrator shall add to the list of class II substances any other substance that the Administrator finds is known or may reasonably be anticipated to cause or contribute to harmful effects on the stratospheric ozone layer.” §602(b).

- Promulgating emission limits for motor vehicles.

4. Adopting Ambient Standards

Ambient Standards for Causes of Global Warming

Pollutant	Primary Standard		Secondary Standard	
	Level	Averaging Time	Level	Averaging Time
CO	9 ppm 35 ppm	8-hour 1-hour	None	None
PM _{2.5}	15 µg/m ³ 35 µg/m ³	Annual 24-hour	Same as Primary	Same as Primary
Ozone	0.075 ppm (2008) 0.08 (1997) 0.12	8-hour 8-hour 1-hour	Same as Primary	Same as Primary

Source: U.S. EPA, National Ambient Air Quality Standards (NAAQS), <http://www.epa.gov/air/criteria.html>.

Of these options, the most straightforward would be to regulate causes of global warming as either threats to human health or welfare, or both. Indeed, as noted earlier, some of the short-lived causes of warming are already the subject of primary standards to protect health. These include black carbon, as a fraction of fine PM_{2.5}, ozone, and CO.

As the accompanying table shows, secondary standards either have not been adopted or are identical to the primary standards for three of the short-lived warming agents, CO, PM_{2.5}, and ozone. There can be no question that a secondary standard is warranted for global warming, because as previously noted, the welfare values to be protected by the law expressly include “effects on . . . weather . . . and climate.”

All language referring to effects on welfare includes, but is not limited to, *effects on* soils, water, crops, vegetation, man-made materials, animals, wildlife, *weather*, visibility, and *climate*, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being, whether caused by transformation, conversion, or combination with other air pollutants.⁴⁶

The inclusion of the references to climate in 1977 and 1990 were intentional, designed to spur EPA to action, though 32 and 18 years, respectively, have now passed with none having been taken. In its *Report* of the bill, the Senate Committee on Environment and Public Works wrote:

[B]y the time there is scientific proof for every detail of the problem, it will be too late to avoid the most devastating impacts of an intensified greenhouse effect and global climate change. We can ill-afford to wait for 5 or 10 years of research before we take action to (1) limit the rate and extent of future climate change by reducing atmospheric emissions and concentrations of greenhouse gases, and (2) implement

46. §302(h) (emphasis added).

adaptation strategies for coping with the changes to which we are already committed.⁴⁷

The *Report* continued: “Failure to act on the greenhouse effect on the basis of current scientific understanding would replicate the mistake made in the early 1980s with respect to destruction of the ozone layer.”⁴⁸

The short-lived causes of warming differ legally from CO₂, which will ultimately be the largest single cause of warming. At the time of the *Massachusetts* decision, the Administrator had not yet determined that CO₂ met the criteria for regulation under one or more provisions of the Act. That, however, is not the case with the short-lived agents of warming: they are already regulated under the law, so there is no need for a threshold determination of “endangerment.” There are ambient standards for ozone, fine particles, and CO.⁴⁹ NO_x is subject to an ambient standard, not only because of its own toxic properties, but as a precursor to ozone. Methane, while not now subject to an ambient standard, could be, because it is also an ozone precursor.⁵⁰ (Similarly, while CO is currently subject to an ambient standard, it plays an important role in determining the atmospheric concentration and lifetime of methane, and is not regulated for this purpose.⁵¹)

Even though methane, emitted from animal feedlots, sewage treatment plants, oil and gas operations, and landfills, is not subject to an ambient standard, landfills that are larger and new, modified, or reconstructed are subject to an NSPS issued in 1996.⁵² However, of the roughly 7,000 landfills in existence at the time the NSPS was issued, EPA estimated that only about 4% would be subject to the final regulation. And, of the 900 new landfills that were projected to open during the five years following the NSPS adoption, only about 5% were expected to be subject to the final regulation. Other landfills are subject to nonbinding guidelines.⁵³

EPA has proposed mandatory reporting of GHG emissions, including methane, from large sources.⁵⁴ This would require, for example, concentrated animal feeding operations (CAFOs)—factory farms, to most of us, where ani-

mals stand cheek-to-jowl on hard floors—to report their GHG emissions.⁵⁵

5. Issuing Revised Motor Emissions Standards Under §202

Section 202(a)(1) of the CAA provides:

The [EPA] Administrator shall by regulation prescribe (and from time to time revise) in accordance with the provisions of this section, standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare”

The petition that ultimately led to the Court’s decision in *Massachusetts* asked EPA to regulate “greenhouse gas emissions from new motor vehicles under §202 of the Clean Air Act.” The decision is consistently considered to be limited to CO₂ or, at the broadest, the Kyoto Six, even though there is no doubt that pollutants other than those cause global warming.⁵⁶ This is a far too narrow reading of the petition and decision, however. For that matter, it is based on an incorrect reading of the Kyoto Protocol and other relevant international agreements.

The Kyoto Protocol does not define the term GHG. Instead, it lists six chemicals and families of chemicals in Annex A that are subject to the Protocol. The obligations of the Parties to the Protocol run to “emissions of the greenhouse gases listed in Annex A.”⁵⁷ Nowhere does the Protocol suggest that the Annex A list is exhaustive or that it is a list of exclusion.

The Kyoto Protocol is an agreement negotiated under the aegis of another international agreement, the United Nations Framework Convention on Climate Change (UNFCCC). Unlike the Protocol, the UNFCCC does contain a definition of GHGs as follows: “Greenhouse gases” means those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation.⁵⁸

Despite the virtually universal assumption that the term GHG includes only the six chemicals and chemical families listed in the Annex, this view is completely incorrect. The UNFCCC and the Protocol alike apply to all causes of warming, including but not limited to tropospheric ozone and its precursors, CO, and hydrofluorocarbons (HFCs). While black carbon might not be included because it is a solid and the UNFCCC is limited by its terms to gases, there is, again, no indication that the definition is, or was intended to be, one of exclusion.

47. S. REP. NO. 101–228, at 379–80 (1990), reprinted in 1990 U.S.C.C.A.N. 3385, 3762–3763.

48. *Id.* at 380.

49. In some cases, establishing an ambient standard would not require a new initiative. EPA is, for example, now in the process of revising the fine particle standard and could establish a subsidiary standard directly addressing black carbon.

50. Michael J. Prather, *Time Scales in Atmospheric Chemistry: Theory, GWP_s for CH₄ and CO, and Runaway Growth*, 23 GEOPHYS. RES. LETT. 2597–2600 (1996).

51. *Id.*

52. Such standards are required under the law for “major” sources, which are defined as follows: “Except as otherwise expressly provided, the terms ‘major stationary source’ and ‘major emitting facility’ mean any stationary facility or source of air pollutants which directly emits, or has the potential to emit, one hundred tons per year or more of any air pollutant (including any major emitting facility or source of fugitive emissions of any such pollutant, as determined by rule by the Administrator).” §302(j)

53. U.S. EPA, Fact Sheet: Amendments to the New Source Performance Standards and Emission Guidelines for Municipal Solid Waste Landfills (Dec. 12, 1997), <http://earth1.epa.gov/ttn/atw/landfill/landfs.pdf>.

54. U.S. EPA, Proposed Mandatory Greenhouse Gas Reporting Rule (undated), <http://www.epa.gov/climatechange/emissions/ghgrulemaking.html>.

55. Meredith Niles, *Factory Farms Get the Ultimate Handout*, Grist.org (June 19, 2009), <http://www.grist.org/article/factory-farms-get-the-ultimate-handout/>.

56. See Intergovernmental Panel on Climate Change, Aviation and the Global Atmosphere, Table 1-1: Species Contributing to Climate and Ozone Change, <http://www.ipcc.ch/ipccreports/sres/aviation/index.php?idp=16>.

57. See, e.g., art. 3, ¶ 1 (“The Parties included in Annex I shall, individually or jointly, ensure that their aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A”), <http://unfccc.int/resource/docs/convkp/kpeng.html>.

58. UNFCCC, art. 1, ¶ 5, <http://unfccc.int/resource/docs/convkp/conveng.pdf>.

Further, in the Convention's Preamble, it recognized for immediate action a first step toward comprehensive response strategies at the global, national, and, where agreed, regional levels "that take into account *all* greenhouse gases."⁵⁹

Moreover, for domestic U.S. purposes, what is most relevant are the terms contained in the *Massachusetts* decision and related filing. In the brief of the petitioners filed in the case, it described the dispute as "[w]hether the Administrator . . . has authority to regulate air pollutants associated with climate change under section 202(a)(1)."⁶⁰

The proposed endangerment finding, however, is narrower than the other sources of applicable law and guidance, including *Massachusetts*, the Kyoto Protocol, the UNFCCC, and the scientific reports of the Intergovernmental Panel on Climate Change. It proposes:

to define the "air pollution" referred to in section 202(a) of the CAA to be the mix of six key directly emitted and long-lived greenhouse gases: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).⁶¹

How to change this is an open question. The simplest and most direct way to cure this defect would be to amend the endangerment finding to include all causes of global warming. This would be especially important since the policy rationale for limiting action to the Kyoto Six has been that they are so long-lived that they are well mixed in the atmosphere and, therefore, good candidates for a cap-and-trade program. However, without new federal legislation, a cap-and-trade policy cannot be adopted. Thus, to respond adequately to the threats posed by global warming, the Administration should include all causes of warming within the ambit of endangerment.

If EPA makes a finding of endangerment that includes short-lived causes of warming as well as the longer lived pollutants, the CAA requires the Agency to regulate emissions of the deleterious pollutants from new motor vehicles. As the Supreme Court wrote in *Massachusetts*:

EPA no doubt has significant latitude as to the manner, timing, content, and coordination of its regulations with those of other agencies. But once EPA has responded to a petition for rulemaking, its reasons for action or inaction must conform to the authorizing statute. Under the clear terms of the Clean Air Act, EPA can avoid taking further action only if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do. To the extent that this constrains agency discretion to pursue other priorities

of the Administrator or the President, this is the congressional design.

6. Standards for Global Warming Causes Already Regulated Under the CAA

The Administrator already establishes emissions standards for some short-lived causes of global warming. Under §202, there are vehicle standards for CO, as well as the ozone precursors of NO_x and volatile organic compounds (VOCs). Black carbon is regulated as diesel soot.

Despite increasingly stringent vehicle emission limits having been adopted since 1970, they remain the dominant source of CO and diesel soot, as well as a very substantial source of NO_x and VOCs. Thus, more stringent standards for emissions of these pollutants could be adopted by the Administrator without the need to amend the pending endangerment finding.

7. Global Warming as a Cause of Stratospheric Ozone Depletion—and Vice Versa

Ozone is a gas naturally present throughout the atmosphere. In the upper levels of the atmosphere—the stratosphere and beyond—ozone is both formed by and blocks the sun's ultraviolet radiation.⁶² At lower levels, it is formed principally by reactions between naturally occurring hydrocarbons—those wonderful-smelling terpenes from pines and fir trees, for example—and other natural constituents in the air. But as human pollution has increased, so, too, has lower level ozone. As researchers in France concluded after reviewing data from the 19th century,

ozone levels in central Europe 100 years ago averaged 10 p.p.b. and exhibited a seasonal variation, with a maximum during the spring months. Comparisons with modern data show that ozone levels in rural areas have more than doubled over the past century and that the tropospheric ozone budget is now strongly influenced by photochemical production due to increased levels of NO_x.⁶³

Unfortunately, the reverse has occurred in the stratosphere. There, the protective molecule has declined sharply since the 1970s, mostly due to an increase in atmospheric concentrations of human-made substances, most of which are chlorofluorocarbons (CFCs) developed originally by

59. UNFCCC website, <http://unfccc.int/resource/docs/convkp/conveng.pdf> (emphasis added).

60. Brief for the Petitioners [in the Supreme Court] at I, *Massachusetts v. EPA*, No. 05-1120 (U.S. Aug. 31, 2006).

61. Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, EPA, 40 C.F.R. ch. 1 (Apr. 24, 2009), <http://epa.gov/climatechange/endangerment/downloads/EPA-HQ-OAR-2009-0171-0001.pdf>.

62. The ultraviolet radiation shatters the bond between the two oxygen atoms that form the O₂ molecule, releasing them. One of these free O atoms combines with an O₂ molecule to form ozone, O₃. The O₃ then blocks incoming solar radiation. At lower levels, near the ground, the ozone attacks organic matter, whether lung tissue or tree leaves. Within minutes, it will have literally burned a hole through a lung's cell walls, and cellular fluid will begin to leak into the lungs. See Smog: Nature's Most Powerful Purifying Agent, HEALTH & CLEAN AIR NEWSL., Fall 2002, <http://www.healthandcleanair.org/newsletters/issue3.html>.

63. Andreas Volz & Dieter Kley, *Evaluation of the Montsouris Series of Ozone Measurements Made in the Nineteenth Century*, 332 NATURE 240-42 (Mar. 17, 1988).

U.S. chemical giant DuPont, and better known by their trade name, freon.

Scientists began warning of the destruction of the ozone layer by freons in the early and mid-1970s,⁶⁴ but due to industry denials and half-truths,⁶⁵ it was the late 1980s before the global community acted, adopting the Montreal Protocol,⁶⁶ an international treaty to phase out production of freons and other ozone-depleting substances. The 1990 CAA Amendments included provisions to implement the Montreal Protocol in the United States. These provide yet another basis for using the CAA to attack global warming.

The ozone depletion provisions added to the law in 1990 expressly require that—(T)he Administrator shall add to the list of class I substances any other substance that the Administrator finds causes or contributes significantly to harmful effects on the stratospheric ozone layer.⁶⁷

The law does not require that a substance destroy ozone, merely that it have a “harmful effect.” One such effect is stratospheric cooling.

8. Cooling Due to the Greenhouse Effect

According to the Max Planck Institute, one of the world’s leading scientific bodies, when GHGs absorb infrared radiation from the surface of the earth, they trap it in the troposphere, reducing the amount that reaches the lower stratosphere. This causes a net energy loss to the stratosphere and, as a result, cooling.⁶⁸

Cooling of the stratosphere results in the formation of polar stratospheric clouds, the sort that are responsible for the runaway ozone destruction during the Antarctic spring. The clouds require very cold temperatures to form, but they allow even more ozone destruction to occur, because the chemical reactions that destroy ozone move much faster in clouds than in dry air.

Even though bans on ozone-destroying chemicals began more than 20 years ago (30 years ago in the case of freons used in spray cans), 2006 global temperatures in the stratosphere were the third coldest on record, according to the National Climatic Data Center. Only 1997 and 2000 had colder temperatures since recordkeeping began in 1979.⁶⁹

GHGs have also led to the cooling of the atmosphere at levels higher than the stratosphere. Over the past 30 years, the earth’s surface temperature has increased 0.2-0.4 °C, while the temperature in the mesosphere, about 50-80 kilo-

meters (km) above ground, has cooled 5-10 °C.⁷⁰ There is no appreciable cooling due to ozone destruction at these altitudes, so nearly all of this dramatic cooling is due to the addition of GHGs to the atmosphere, which trap radiation reflected from the earth at lower levels. Even greater cooling of 17 °C per decade has been observed high in the ionosphere, at 350 km altitude. This has affected the orbits of satellites, due to decreased drag, since the upper atmosphere has shrunk and moved closer to the surface.⁷¹

Clearly, there is a factual basis for the Administrator to conclude that causes of global warming “may reasonably be anticipated to affect the stratosphere,” in which case the “Administrator shall promptly promulgate regulations respecting the control of such substance, practice, process, or activity, and shall submit notice of the proposal and promulgation of such regulation to the Congress.” Here again, however, the filing of a petition would likely be required.

9. Accelerating Some Bans, Adopting Others

Action to reduce global warming agents for the purpose of protecting the stratosphere is only one-half of the story, however. CFCs and their substitutes, HCFCs and HFCs, are all powerful causes of global warming. Indeed, an argument can be made that the most significant step yet taken globally to slow global warming was forcing freons out of the marketplace. The United Nations Environment Programme has said:

In 2007 a scientific paper calculated the climate mitigation benefits of the ozone treaty as totaling an equivalent of 135 billion tonnes of CO₂ since 1990 or a delay in global warming of seven to 12 years.⁷²

As successful as some believe actions against the ozone-destroying freons and other chemicals have been, there is tremendous potential for slowing global warming even further by eliminating still more of the CFCs and their substitutes. There are at least three areas where actions could yield benefits:

- Accelerating the global ban on HCFC-22;
- Banning HFC-134a; and
- Capturing and destroying all “banked” CFCs and HCFCs.

10. Accelerating the Global Ban on HCFC-22

Although the chemical behind the name HCFC-22 has existed since the 1920s when it was developed by the DuPont Corporation, the current name did not come into

64. See, e.g., Steven C. Wofsy et al., *Freon Consumption: Implications for Atmospheric Ozone*, 187 SCIENCE 535-36 (Feb. 14, 1975).

65. See generally SETH CAGIN & PHILIP DRAY, *BETWEEN EARTH AND SKY: HOW CFCs CHANGED OUR WORLD AND ENDANGERED THE OZONE LAYER* (1993).

66. United Nations Environment Programme, *Montreal Protocol on Substances That Deplete the Ozone Layer* (United Nations Environment Programme, Nairobi, 1987).

67. 42 U.S.C. §§7671 et. seq.

68. Max Planck Institute website, *Upper Atmosphere—Stratospheric Cooling*, <http://www.atmosphere.mpg.de/enid/20c.html>.

69. NOAA, National Climatic Data Center, *State of the Climate—Global Analysis, Annual 2006*, <http://www.ncdc.noaa.gov/sotc/index.php?report=global&year=2006&month=ann>.

70. Jeffrey Masters, *Global Warming Causes Stratospheric Cooling*, Weather Underground, http://www.wunderground.com/education/strato_cooling.asp.

71. *Id.*

72. United Nations Environment Programme, *OzoNews, Action on HFC Gases “Low Hanging Fruit” Opportunity to Combat Climate Change Says U.N. Environment Chief*, http://www.uneptie.org/ozonAction/news/ozonews_archives/2009.htm.

being until 1989. Up to that time, HCFC-22 was referred to as a CFC (or another of the generic names for the chemicals), like all of the other ozone-destroying freons. But in the 1980s, a nationwide backlash against CFCs, especially when used in egg cartons, foam cups, “clam shells,” and other foamed food and beverage containers mounted.

Producers (such as Ft. Howard Paper Company) and users (such as McDonalds) were desperate to find a way to escape burgeoning boycotts. They hit on a novel idea: lock themselves behind closed doors with compliant officials from EPA and some environmental groups—some of the same environmental organizations that today are the principal backers of carbon cap-and-trade—and simply rename one of the CFCs.

So, when the groups went into the room, the chemical was named CFC-22. When they came out, it was named HCFC-22.⁷³ Voila! McDonalds began to claim that it did not use products made from CFCs, and the companies that made the “clam shells” and other products said they did not use CFCs either. Within a few years, instead of being eliminated like the other CFCs, HCFC-22 production and use was soaring, as it became the leading CFC replacement of choice.

Today, HCFC-22 is used in residential window air-conditioning units, dehumidifiers, central air conditioners, air-to-air heat pumps, ground-source heat pumps, ductless air conditioners, chest and upright freezers, commercial packaged air conditioners and heat pumps, chillers, retail food refrigeration, cold storage warehouses, and industrial process refrigeration.⁷⁴

A phase out of HCFC-22 is scheduled to start soon, with a ban on production and import of HCFC-22 starting on January 1, 2010, except for ongoing servicing needs in equipment made before January 1, 2010.⁷⁵ But the phaseout will move at a glacial pace. Moreover, there is a loophole, and it is a big one: HCFC-22 that is recovered, then recycled or reclaimed, can be used forever—which means that it will continue to be used, if not forever, for a long, long time.⁷⁶

Thus, HCFC-22 will join the other CFCs that are contained, or “banked,” in discarded appliances and other goods. With no requirement that they be recovered and destroyed, these ozone destroyers—and causes of global warming—will continue for decades.

However, this need not happen. There are two measures that are readily available to the international community to limit unnecessary CFC and HCFC emissions:

Mandate or otherwise facilitate the recapture of banked CFCs and HCFCs in old commercial and domestic refrigeration equipment and, wherever possible, from insulation foam installations; and

Facilitate, through the Multilateral Fund of the Montreal Protocol, the establishment of a global network for the recapture and safe destruction of CFCs and HCFCs in domestic and commercial refrigeration equipment.

Accelerating the phaseout of HCFC-22 is a double-edged sword, however. As it and other HCFCs are phased out, however slowly, the demand for refrigerants and other products is being filled by HFCs, especially HFC-134a. While not an ozone destroyer, HFC-134a is a powerful cause of global warming, and demand is rising, even though there are a multitude of much safer alternatives.

II. Banning HFC-134a and Other HFCs

Thus, yet another, even more important, step needs to be taken. As production and use of HCFC-22 falls, users are turning increasingly to a replacement selected in 1990, HFC-134a. While safe for the ozone layer, HFC-134a is a powerful GHG, with a lifetime of about 14.7 years. One back-of-the-envelope calculation concluded that a single 10-ounce can had the same global warming impact over the following 20 years as burning at least 100 gallons of gasoline.⁷⁷ Because of its potency, Europe has adopted a ban of HFC-134a in mobile air conditioners, starting with model year 2011.⁷⁸

Without a ban of HFC-134a and other HFCs, releases are projected to increase substantially in the future. According to one analysis:

Global HFC emissions in 2050 are equivalent to 9-19% (CO₂-eq. basis) of projected global CO₂ emissions in business-as-usual scenarios and contribute a radiative forcing equivalent to that from 6-13 years of CO₂ emissions near 2050.⁷⁹

Some of the uses of HFC-134a are frivolous and utterly unnecessary. Compressed, it is widely used as a “duster” for computer keyboards and electronics. Yet, sitting on a shelf alongside a duster filled with HFC-134a is usually a competing product using another HFC, HFC-152a. It also causes global warming, but less of it. Switching from the HFC-134a duster to the HFC-152a version reduces the global warming impact by 93%.⁸⁰ (Switching to the canister

73. Curtis Moore, *McTruth: Fast Food for Thought; How Environmentalists and Plastic-Foam Makers Came to Terms*, WASH. POST (Dec. 10, 1989).

74. U.S. EPA, Phaseout of HCFC-22 and HCFC-142b in the United States, <http://www.epa.gov/Ozone/title6/phaseout/hcfcfaqs.html>.

75. On January 1, 2015, a ban on introduction into interstate commerce or use of HCFC-22, except where used as a refrigerant in appliances manufactured prior to January 1, 2020, will take effect; and, on January 1, 2020, a ban on production or import of HCFCs, except where used as a refrigerant in appliances made before January 1, 2020. For developing nations, where HCFC-22 consumption has risen exponentially, the phaseout will be even slower, not reaching its maximum until 2030.

76. Peter Powell, *The Facts on the R-22 Phaseout*, AIR CONDITIONING, HEATING, REFRIGERATION NEWS (Aug. 6, 2007), http://www.achrnews.com/Articles/Cover_Story/BNP_GUID_9-5-2006_A_10000000000000145620.

77. Eric de Place, *Why We Should Ban Compressed Chemical Dusters*, Grist.com, <http://www.grist.org/article/sorry-climate-i-had-to-dust-my-keyboard>.

78. World Business Council for Sustainable Development, *Car Industry “Not Preparing for HFC-134a Ban,”* <http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=MzU1MTI>.

79. Guus J.M. Velders et al., *The Large Contribution of Projected HFC Emissions to Future Climate Forcing*, 106:27 PNAS 10949-54 (July 7, 2009). The projected increases result primarily from sustained growth in demand for refrigeration, air conditioning, and insulating foam products in developing countries assuming no new regulation of HFC consumption or emissions.

80. STEPHEN O. ANDERSEN ET AL., R-152A MOBILE A/C SYSTEM, *available at* <http://74.125.95.132/search?q=cache:yAV5fMDYniIJ:www.sae.org/events/aars/2002/baker.pdf>.

filled with CO₂, also on the shelf, would be even better, reducing the impact by 99.9%).

According to one analysis—whose authors included employees of car maker General Motors, a manufacturer of auto parts manufacturer Delphi, and the head of ozone-depletion activities at EPA—this is how the rival chemicals compare:

Both chemicals are classified as HFCs because they contain only carbon, hydrogen and fluorine. They do have similar chemical compatibilities with commonly used [air conditioning] system materials—and that's a good thing—but act very differently in the atmosphere. While the atmospheric lifetime of HFC-134a is 14.7 years, the lifetime of HFC-152a is only 1.5 years. This is reflected in the much lower GWP assigned to HFC-152a. Due to the lower molecular weight of HFC-152a, only 2/3 as much charge would be required to fill the system compared to HFC-134a. Since GWP is based on mass, the relative system GWP would be $140 \times \frac{2}{3} = 91$ versus 1,300 for the HFC-134a system. Hence, the overall climate impact would be reduced to only 7% that of HFC-134a ($91 (100\%)/(1300) = 7\%$). Alternatively stated, the change to HFC-152a from HFC-134a would result in a 93% reduction attributable to the refrigerant alone, i.e., not including any energy savings.⁸¹

Others also agree that same HFC-152a can be used in car and truck air conditioners, will leak less, and reduce global warming.⁸²

Given the superiority of HFC-152a, why is HFC-134a being used at all? After all, the nations of the world knew that global warming was occurring and that, if adopted, HFC-134a would make it worse and complicate efforts to slow warming. Why jump from the frying pan into the fire?

Part of the answer lies in the question of patents, which lead, in turn, to profits. DuPont, the company that had developed freons in the 1920s (in the same labs where it also developed leaded gasoline), owned the patents on the HFC-134a line of replacements, which it was intending to market under the trade name of Suva. There were no patents on HFC-152a, however, so companies anywhere could have made it. If HFC-152a or some other nonpatented refrigerant were selected as the replacement for freons, DuPont's lucrative profits would have suffered a body blow.

So, DuPont acted in its own economic self-interest and fought back. As explained at the time:

The DuPont chemical company has been showing a video of a home refrigerator going “whoomph” in a cloud of flame and smoke—just as you see in an episode of MacGyver. It is a refrigerator whose compressor and coils are filled with an experimental refrigerant fluid difluoroethane, commonly called R-152a. The Environmental Protection Agency (EPA) and many environmental activists want it in new refrigerators.

What DuPont did not share with viewers of the video, however, was uncovered by an investigative reporter at DuPont's hometown newspaper, in Wilmington, Delaware. According to reporter Merrit Wallick of the *News Journal*, the video demonstrated the flammability of R-152a by using a 15,000-volt spark plug to ignite it.⁸³

Today, some parts of the world are beginning to move away from HFC-134a, just as they abandoned the CFCs in the 1990s. DuPont, having wrecked the stratospheric ozone layer with freons, then raised the planet's temperature with Suva, now plans to replace HFC-134a with yet another substitute, HFO-1234yf,⁸⁴ described by one group as follows:

Many questions remain unsolved concerning HFO 1234-yf, chemical refrigerant for vehicle air conditioning jointly proposed by DuPont and Honeywell. This new substance is potentially toxic, with unknown decomposition effects in the atmosphere and poorer efficiency than current R-134a-based systems. Moreover, the new chemical refrigerant is flammable. As shown by independent tests, in case of a vehicle front-end collision, the refrigerant could lead to an additional fire inside the passenger cabin.⁸⁵

B. “Conformity” Provisions of the Federal Clean Air and Road Construction Programs

I. Background

Of the few mechanisms compelling an integration of transportation, land use, and air quality, perhaps the most powerful are the “conformity” provisions of the CAA⁸⁶ and the counterpart provisions of the 1991 Intermodal Surface Transportation Efficiency Act. Taken together, these two laws provide a combination of “push” and “pull,” or carrot-and-stick approaches that could rapidly and substantially protect health and protect climate. This could be accomplished by:

- On the one hand, requiring reductions in emissions from motor vehicles, e.g., diesel trucks and buses, by, perhaps, mandating the installation of pollution controls, such as filters that trap and burn diesel soot;
- Making the costs of buying and installing these technologies an “eligible project cost,” or a reimbursable expense under the federal highway program; and
- Providing state, regional and local governments with conformity credit for retrofits and other measures to reduce emissions of global warming forcers.

83. Cato Institute, *Currents*, 15:1 REGULATION (Winter 1992), <http://www.cato.org/pubs/regulation/regv15n1/reg15n1-currents.html>.

84. Jessica Leber, *The Struggle to Find a Climate-Friendly Auto Refrigerant*, ClimateWire (July 31, 2009), <http://www.eenews.net/public/climatewire/2009/07/31/1>.

85. The Alliance for CO₂ Solutions, Time Is Up for Choice of Sustainable Refrigerant in Cars, http://www.alliance-co2-solutions.org/docs/press_release_2008_06_04_en.pdf.

86. §176.

81. *Id.*

82. Mahmoud Ghodbane et al., *R-152a Mobile A/C With Directed Relief Safety System*, Society of Automotive Engineers Presentation (2003), <http://www.sae.org/altrrefrigerant/presentations/presw-hill.pdf>.

The conformity provisions are aimed at controlling emissions and ambient levels of air pollutants that cause death and illness. But because some of these very same pollutants are also “forcers,” conformity could be used with great effectiveness to combat global warming. The forcers that could be addressed with the conformity provisions include:

- Black carbon, which is regulated as a fine particle.
- Ozone, which is regulated itself, as are its precursors. These include NO_x and VOCs, but methane has been largely ignored, even though it is a major cause of rural ozone, which is transported into cities and other urban areas.
- CO, which is still addressed in “maintenance” areas that comply with the health-based ambient standard, but must remain vigilant to avoid returning a dirty air status.

The federal highway program already contains a cost-sharing effort, the Congestion Mitigation and Air Quality Program (CMAQ), for the express purpose of supporting improvements in air quality. Amending this to include measures that address global warming, including the retrofit of equipment with pollution-control devices, could be a relatively straightforward and administratively simple act.

One quality that makes the conformity provisions almost ideally suited to addressing global warming is that the process already involves virtually all major interests, including all levels of government (federal, state, regional, and local); private-sector interests, such as road builders and heavy equipment vendors; and public-sector organizations, such as health, environmental, and community groups. Moreover, all of these sectors are accustomed to collaborating in achieving the goals of sustainable transportation and lowered pollution.

Thus, the confluence of these two sets of amendments—the conformity requirements of the 1990 CAA Amendments and the institutional restructuring of the 1991 Intermodal Surface Transportation Efficiency Act—provide a vehicle that could be extraordinarily and quickly effective at addressing emissions that cause global warming.

2. The Conformity Requirements

The conformity requirements were added to the CAA in 1990⁸⁷ and require that no

department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve, any activity which does not conform to an implementation plan after it has been approved or promulgated. . . .⁸⁸

As a practical matter, this provision and its counterparts in highway laws have forced cities and states to “assess the

impacts of growth and decide how to manage it.”⁸⁹ Areas that have poor air quality now—or have had it in the past—must not only examine the long-term air quality impacts of their transportation system, but assure that it is compatible with clean air goals.⁹⁰

As the conformity program has evolved, it has become a mechanism for affirmatively reducing air pollution, instead of being limited to merely preventing increases. The principal mechanism for doing this has been the CMAQ.

Historically, transit and traffic-flow improvement projects accounted for approximately two-thirds to three-quarters of CMAQ funds. Other eligible project categories include new transit buses, shared ride, e.g., vanpool and carpool, demand management, e.g., employer trip reduction programs, and bicycle and pedestrian projects. Recently, however, CMAQ has been used for retrofitting diesels with pollution controls.

Since distribution of CMAQ funds vary from state to state, and the federal database tracking previous use of CMAQ funds is not up to date, it is impossible to know how many diesel retrofit projects have been funded. Historically, the number of diesel retrofit projects has been quite limited, but the program could rapidly be ramped up by a president intent on using it as a tool to address global warming.

3. The Intermodal Surface Transportation Efficiency Act

In the Senate, the committee with jurisdiction over environmental matters, the Committee on Environment and Public Works, is also responsible for highway and transportation laws as well. It is perhaps, therefore, no coincidence that hard on the heels of the 1990 conformity amendments to the CAA, came a set of complementary requirements contained, not in environmental law, but the 1991 amendments to the federal highway funding program. These are known formally as the 1991 Intermodal Surface Transportation Efficiency Act, but are almost invariably referred to as the acronym ISTEA.

The 1990 CAA Amendments imposed a wide range of new deadlines and other demands for air pollution control officials, and ISTEA created a parallel set of pressures for the state and regional agencies in the conformity process. Congress enacted ISTEA in late 1991, and the U.S. Department of Transportation (DOT) elaborated its requirements in the

89. Testimony, Robert Perciasepe, Assistant Administrator, Office of Air and Radiation, U.S. EPA, Committee on Environment and Public Works, U.S. Senate (Washington, D.C., July 14, 1999), *available at* http://www.epa.gov/ocir/hearings/testimony/106_1999_2000/071499rp.htm.

90. Under the CAA, state and local governments must determine the levels of air pollution in a given metropolitan area, and if it is too high, develop a plan for reducing it. This state implementation plan (SIP) is a roadmap for not only achieving levels of air quality that are not harmful to health, but maintaining them. Before a new transportation plan can be approved or a new project can receive federal funding, a regional analysis must demonstrate that the emissions projected from the plan or project are consistent with, or “conform,” to the air quality targets of the SIP. The Federal Highway Administration, Federal Transit Administration, and metropolitan planning organizations make conformity determinations based on the most recent estimates of emissions, population, employment, travel, and traffic congestion approved by the metropolitan planning organization.

87. Complementary requirements were added to the federal highway funding program in 1991.

88. §7506(c).

metropolitan planning regulations issued in late October 1993, just before the conformity regulations were issued.⁹¹

Among other things, ISTEA:

- Strengthened the authority of metropolitan planning organizations (MPOs) to conduct the planning process and allocate federal funds;
- Created a new category of projects eligible for federal funding called Congestion Mitigation and Air Quality program (CMAQ) for the express purpose of supporting improvements in air quality;
- Required a more frequent, systematic, and analytical planning process to explicitly take account of new planning factors, including but not limited to air quality;
- Required the development of a long-range transportation plan to be coordinated with the process for developing transportation control measures for the state implementation plan (SIP);
- Encouraged multi-modal planning and explicit project alternatives analysis;
- Required the development of a set of six “management systems” for intermodal facilities, bridges, pavement, public transportation, safety, and congestion;
- Reinforced the requirement that transportation investments be consistent with pollution reduction commitments that a state had made in its SIP;
- Mandated fiscally constrained transportation plans;
- Opened the planning process more widely to institutions that in many locales had previously been secondary participants, including local governments, ports and airports, transit operators, and air quality and economic development agencies; and
- Mandated more active efforts to involve the general public and non-governmental stakeholders such as shippers, freight companies, and environmental advocates in transportation planning.⁹²

The provisions of the 1991 ISTEA were amended in 2005 by the enactment of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, often referred to as SAFETEA-LU. It provided guaranteed funding for federal-aid highways, public transportation, and highway safety programs totaling \$286.4 billion from 2004 to 2009, an increase of 31%.

The 2005 reauthorization also extended the CMAQ program, providing funding of \$8.6 billion. It specifically made the retrofit of diesel-powered off-road equipment eligible for CMAQ funding. It also stipulated that if contract specifications required the use of retrofitted equipment,

CMAQ funds should be provided to contractors to offset the expense of retrofitting their equipment. As large as \$8.6 billion may seem, however, it is dwarfed by the aggregate funding of nearly \$285 billion.

Highway and transit spending is allowed on a case-by-case, or “project” basis. Specifically enumerated expenditures, such as engineering plans, site work, paving, and even roadside and median plantings, are paid for on a 90-10 federal match. That is, the U.S. government provides 90% of the costs.

A given expenditure qualifies for 90% federal funding if it is an “eligible project cost,” a decision that is made by U.S. highway authorities. Designating the retrofit of diesels used in or connected to federal transit or highway programs with devices that achieve the same emission reduction as, say, trap oxidizers or conversion to natural gas, would provide an immense decrease in emissions. These would be multiplied as state and local highway projects emulated federal requirements.

Thus, the president or a designee could, by the simple expedient of requiring diesel retrofits, launch a new and powerful program to control one of the most powerful causes of global warming: black carbon.

C. CERCLA⁹⁸

I. Introduction

At first blush, the suggestion that CERCLA could be used as a tool to attack global warming may strike some as outlandish. Yet, the law was intentionally crafted to serve as a flexible instrument to deal with environmental and health insults of every sort. Unlike most other federal statutes, CERCLA is not medium-specific, but attempts to cope with all sorts of releases, defined as:

[A]ny spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or pollutant or contaminant) . . .⁹³

The same breadth of purpose is reflected in the law’s definition of the “environment” to be protected:

(A) the navigable waters, the waters of the contiguous zone, and the ocean waters of which the natural resources are under the exclusive management authority of the United States under the Fishery Conservation and Management Act of 1976, and (B) any other surface water, ground water, drinking water supply, land surface or subsurface strata, or ambient air within the United States or under the jurisdiction of the United States.⁹⁴

There are two sorts of contaminants dealt with under Superfund, hazardous substances and pollutants or contam-

91. ARNOLD M. HOWITT & ELIZABETH M. MOORE, LINKING TRANSPORTATION AND AIR QUALITY PLANNING: IMPLEMENTATION OF THE TRANSPORTATION CONFORMITY REGULATIONS IN 15 NONATTAINMENT AREAS (1999).

92. *Id.*

93. §101(22).

94. §101(8).

inants. Hazardous substances are defined by: (1) reference to and incorporation of lists compiled under other laws; and (2) substances added under §102 (a) of CERCLA that are:

(E)lements, compounds, mixtures, solutions and substances which, when released into the environment may present substantial danger to the public health or welfare or environment. . . .

Thus, a threshold question is whether a given substance is on one of the lists incorporated by reference. Not surprisingly, of the six chemicals or families listed under the Kyoto Protocol, methane is the only one on a §101(14) list. However, a number of the short-lived causes of warming, sometimes called “forcers,” appear on one or more of the lists. In addition to methane, these include the HCFCs, NO₂ (an ozone precursor), and virtually all of the VOCs (also ozone precursors).⁹⁵

CERCLA, enacted in 1980, establishes a mechanism to respond to “releases” of “hazardous substances” into the “environment.” These terms are very broadly defined to assure the widest possible coverage of harmful or potentially harmful materials. To facilitate its enactment, sponsors had to make a number of political concessions, such as largely exempting petroleum,⁹⁶ natural gas,⁹⁷ and the normal application of fertilizer.⁹⁸ That said, the law on its face nevertheless represents one of the most ambitious and comprehensive efforts to address the threats posed to human health and the environment by harmful substances. Because of this breadth, the law’s authorities can be exercised to address global warming.

Specifically, under CERCLA, the following actions could be taken:

- The Administrator could designate elements and compounds that cause global warming as hazardous substances,⁹⁹ triggering requirements for the reporting of¹⁰⁰ and responses to releases,¹⁰¹ as well liability for damages.¹⁰²
- If the president determines that “there may be an imminent and substantial endangerment to the public health or welfare to the environment,” the Attorney General may “secure such relief as may be necessary to

abate such danger or threat” in a U.S. District Court, which would be required to “grant such relief as the public interest and the equities of the case require.”¹⁰³

- In addition, the president could issue “such orders as may be necessary to protect health and welfare and the environment.”¹⁰⁴ Failing or refusing to obey such orders without sufficient cause would be punishable by a fine of \$25,000 per day.

2. EPCRA

Other authorities that could be used to respond to global warming were added to CERCLA in 1986 by EPCRA.¹⁰⁵ It was enacted after, in the predawn hours of December 3, 1984, methyl isocyanate began leaking from an underground storage tank at a Union Carbide insecticide plant in Bhopal, a city of 900,000 in central India. A toxic cloud spread through the slums and poor neighborhoods, killing people in their sleep and sending them running into the streets in panic. More than 3,500 people were killed and 200,000 injured in the disaster, which became the focus of worldwide concerns about the hazards posed by toxic chemicals.¹⁰⁶ The following year, a cloud of toxic gas escaped from the company’s plant in Institute, West Virginia, sending over 100 people to the hospital,¹⁰⁷ further fueling public demand for a system to safeguard the public from catastrophic releases of chemicals.

Unlike CERCLA, which is designed to discourage releases by requiring government cleanups, then passing the costs on to those responsible for the contamination through a system of strict, and joint and several liability, EPCRA seeks to achieve the same goal through public disclosure and preparedness.

It requires manufacturers, processors, and users of certain substances to file annual reports of their environmental releases of those chemicals with EPA and state environmental agencies. EPA and the state agencies, in turn, make the information available to federal, state, and local governments and the public, including the citizens of communities surrounding covered facilities.¹⁰⁸ The requirements for the report are rather detailed.¹⁰⁹ EPCRA also establishes state commissions and local committees to develop and implement procedures for coping with releases.

Reporting is required for substances listed in a document titled “Toxic Chemicals Subject to Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986,” now known as the toxic release inventory (TRI).¹¹⁰ The original list, compiled by the Senate Committee on

95. U.S. EPA, Office of Solid Waste and Emergency Response, LIST OF LISTS: Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(f) of the Clean Air Act (Oct. 2001), <http://www.epa.gov/ceppo/pubs/title3.pdf>.

96. §101(14).

97. §101(14). Most releases of methane would be covered despite this exemption because those from, for example, landfills, abandoned coal mines, sewage treatment plants, feedlots, and other uses because they are not “natural gas.” Indeed, much of the gas extracted from these operations is heavily contaminated with toxins.

98. §101(22).

99. Under CERCLA §102(a) a “hazardous substance” includes any “elements, compounds, mixtures, solutions, and substances which, when released into the environment may present a substantial danger to the public health or welfare or the environment.” Included in this definition are substances listed under the authority of any of the major environmental statutes.

100. §103(a).

101. §104(a).

102. §107.

103. §106(a).

104. §106(a).

105. Pub. L. No. 99-499, codified at 42 U.S.C. 11001-11050.

106. Sanjoy Hazarika, *Bhopal Payments by Union Carbide Set at \$470 Million*, N.Y. TIMES (Feb. 15, 1989).

107. Philip Shabecoff, *Union Carbide Agrees to Pay \$408,500 Fine for Safety Violations*, N.Y. TIMES (July 25, 1987).

108. 42 U.S.C. §11023(h).

109. See 2 U.S.C. §11023(g)(1)(C)(i)-(iv) for requirements.

110. 42 U.S.C. §11023(c).

Environment and Public Works and incorporated by reference in the statute, included 309 individual substances and 20 categories.

Congress did not, however, limit the coverage of the Act to the original list. It authorized the addition of a substance either at the Administrator's own initiative, or in response to citizen petitions when "there is sufficient evidence to establish . . . a significant adverse effect on the environment of sufficient seriousness, in the judgment of the Administrator, to warrant reporting."¹¹¹ EPA has removed more than 15 and added roughly 350 substances or categories to the original list.

Some substances are placed on the TRI by operation of law. These include any release for which a Material Safety and Data Sheet (MSDS) is required under the Occupational Safety and Health Act (OSHA). As EPA has explained in guidance:

This consolidated list does not include all chemicals subject to the reporting requirements in EPCRA sections 311 and 312. These hazardous chemicals, for which material safety data sheets (MSDS) must be developed under the Hazard Communication Standard (29 C.F.R. 1910.1200), are identified by broad criteria, rather than by enumeration. There are over 500,000 products that satisfy the criteria. See 40 C.F.R. Part 370 for more information.¹¹²

Thus, even though natural gas, or methane, is excluded from the definition of a hazardous substance under CERCLA, it is included in the EPCRA TRI, because an MSDS is required.¹¹³ Other causes of global warming for which an MSDS is required include CO₂, CO, HFC-134a, black carbon (as carbon black), black carbon (as diesel exhaust), and NO₂, to name but a few.

3. Discussion

In general, generators, transporters, or others who release hazardous substances into the environment are liable for response costs and for damage to natural resources. There are limits to liability, but they are quite high.¹¹⁴ The Act

111. 42 U.S.C. §11023(d).

112. U.S. EPA, Office of Solid Waste and Emergency Response, LIST OF LISTS: Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(r) of the Clean Air Act (Oct. 2001), <http://www.epa.gov/ceppo/pubs/title3.pdf>.

113. See a sample at <http://energyfacilities.puc.state.mn.us/documents/16573/Appendix-4.pdf>.

114. 42 U.S.C. §9607(c) provides that—

(1) Except as provided in paragraph (2) of this subsection, the liability under this section of an owner or operator or other responsible person for each release of a hazardous substance or incident involving release of a hazardous substance shall not exceed—

(A) for any vessel, other than an incineration vessel, which carries any hazardous substance as cargo or residue, \$300 per gross ton, or \$5,000,000, whichever is greater;

(B) for any other vessel, other than an incineration vessel, \$300 per gross ton, or \$500,000, whichever is greater;

(C) for any motor vehicle, aircraft, hazardous liquid pipeline facility (as defined in section 60101 (a) of title 49), or rolling stock, \$50,000,000 or such lesser amount as the President shall establish by regulation, but in no event less than \$5,000,000 (or, for releases of hazardous substances as defined in section 9601 (14)(A) of this

does not impose liability for victims of exposure to hazardous substances. Generally speaking, such victims must seek restitution for damages in state courts.

There would very likely be at least initial resistance to the use of CERCLA as a tool for responding to global warming, on the grounds that the law was enacted to deal with hazardous wastes and releases of chemicals. Yet, it clearly applies to releases to the air, and is not a substance such as CO₂ both a chemical and, when discarded up a stack, a waste? The law is clearly written to protect and restore natural resources. Is not the climate such a resource, in addition to the many life forms whose existence it protects?

Moreover, even if the government is reluctant to use the Superfund law against global warming, private parties arguably could under *United States v. Atlantic Research Corp.*,¹¹⁵ a 2007 unanimous decision of the Supreme Court.

Atlantic Research had leased property at the Shumaker Naval Ammunition Depot, a facility operated by the U.S. Department of Defense. At the site, Atlantic Research retrofitted rocket motors for the United States. Using a high-pressure water spray, Atlantic Research removed pieces of propellant from the motors. It then burned the propellant pieces. Some of the resultant wastewater and burned fuel contaminated soil and groundwater at the site.

Atlantic Research cleaned the site at its own expense and then sought to recover some of its costs by suing the United States under §107(a). The court held that §107(a) permits cost recovery by a private party that has itself incurred cleanup costs, holding that it "provides a cause of action to anyone except the United States, a State, or an Indian tribe."¹¹⁶

Thus, a private party that voluntarily is cleaning up a site has a right-of-action despite the fact that no one is pursuing that party to force the cleanup. If it is correct, therefore, that CERCLA covers releases that cause global warming, a private party could, for example, recover methane at an abandoned coal mine and recover its costs from the owner.

However, even if neither the government nor a private party cared to recover costs, reporting of releases could in and of itself be a valuable tool against global warming. The experience with the TRI leaves no doubt that public disclosure brings immense pressure to bear on polluters, persuading them to act even when they are not legally obliged to do so.

title into the navigable waters, \$8,000,000). Such regulations shall take into account the size, type, location, storage, and handling capacity and other matters relating to the likelihood of release in each such class and to the economic impact of such limits on each such class; or

(D) for any incineration vessel or any facility other than those specified in subparagraph (C) of this paragraph, the total of all costs of response plus \$50,000,000 for any damages under this subchapter.

115. 459 F.3d 827 (8th Cir. 2006).

116. These entities can recover under §113(f).

D. RCRA and Waste Minimization Requirements

Wrapped in the complexities and cross-references of RCRA¹¹⁷ are a series of provisions that, if invoked, could be used to substantially reduce emissions of methane, black carbon, and other short-lived causes of global warming, at least from some sources.

Because RCRA expressly focuses on wastes, it is an obvious candidate for use in dealing with landfills and other “waste” sources of global warming pollutants. Little noticed in the law, however, are expansive definitions that enable the law to extend into activities that generate wastes of all sorts—air and water pollution, for example. In addition, RCRA contains a little-known requirement that generation of wastes—again, of all sorts, not just that destined for dumps or incinerators—be “minimized.” This requirement has been implemented narrowly, but if enforced as written, it has the potential to enhance industrial productivity and sharply reduce releases to the environment.

Landfills are a source of special concern. About 60% of the waste in a typical city or county landfill is organic.¹¹⁸ As these wastes decompose, gaseous pollutants are formed. Landfill gases include methane, smog-causing VOCs, and air toxics, many of which are known or suspected of causing cancer and other serious health effects. Landfills are the largest anthropogenic source of methane emissions in the United States. Methane also is a potent GHG that contributes to global warming.

Methane is important to both tropospheric and stratospheric chemistry, significantly affecting levels of ozone, water vapor, the hydroxyl radical, and numerous other compounds. In addition, methane is currently the second most important GHG emitted from human activities. On a per-molecule basis, it is a much more effective GHG than additional CO₂.¹¹⁹

Methane causes global warming directly by absorbing long-wave radiation that is emitted by the earth’s surface. In addition, methane contributes to warming in other ways:

1. It is a major source of water vapor, which is the most powerful of the GHGs¹²⁰; and
2. It reacts in the lower atmosphere to form tropospheric ozone, or smog, which is also a powerful GHG.¹²¹

I. Direct Regulation of Landfill Methane Emissions

Various regulations require landfill operators to control landfill gas for:

- Off-Site Underground Migration (RCRA Subtitle D);
- Groundwater Contamination (RCRA Subtitle D);
- Odors (local and state regulations); and
- Fugitive emissions of non-methane organic emissions (NSPS).¹²²

Under RCRA, EPA is authorized to directly regulate methane emissions from landfills.¹²³ In 1996, the Agency issued performance standards for new landfills, but they apply only to the largest of them.¹²⁴

The number of landfills in the United States is estimated to be roughly 7,000. Of these, only about 4% of the existing landfills are subject to the RCRA NSPS. Of the 900 new landfills that were expected to open during the five years following the 1996 NSPS, about 5% were expected to be subject to the final regulation.¹²⁵ Even those subject to the NSPS are regulated principally for control of pollutants other than methane.¹²⁶

Landfills that are closed or smaller than the NSPS cutoff are not regulated under federal law. Therefore, expanding methane recovery efforts to closed landfills and to active ones of moderate or even small size, through either voluntary compliance or further regulations, offers the opportunity to substantially reduce atmospheric methane.

2. Broad Definitions

The requirements of RCRA could clearly be used to control emissions of methane from landfills. However, the law’s reach goes far beyond landfills, and far beyond waste, as that term is usually understood. Indeed, there are very few industrial or commercial activities that cannot be reached through RCRA.

So much attention has focused on the dangers and evils associated with toxic waste—think of Love Canal, Smith Farm, Libby, Montana, and Eagle-Picher, Oklahoma—that few commentators even notice the name of the law under which these poisons are regulated. The name—the Resource

117. 42 U.S.C. §§6901-6992k, ELR STAT. RCRA §§1001-11011.

118. U.S. Agency for Toxic Substances and Disease Registry, Landfill Gas Primer—An Overview for Environmental Health Professionals, <http://www.atsdr.cdc.gov/HAC/landfill/html/ch2a.html>.

119. Donald J. Wuebbles & Katharine Hayhoe, *Atmospheric Methane and Global Change*, 57 EARTH-SCI. REV. 177-210 (May 2002).

120. Marlin Wahlen, *The Global Methane Cycle*, 21 ANN. REV. EARTH & PLANETARY SCI. 407-26 (May 1993), available at <http://arjournals.annualreviews.org/doi/abs/10.1146/annurev.ea.21.050193.002203>.

121. *Id.*

122. Mark C. Messics, *Landfill Gas to Energy*, U.S. Department of Energy, National Energy Technology Laboratory, Natural Gas/Renewable Energy Hybrids Workshop (Aug. 7, 2001).

123. Landfills are also subject to a NSPS under the CAA. 40 C.F.R. §60.33(c).

124. Final Rule for the Municipal Solid Waste Landfills, EPA, 60 Fed. Reg. 9918 (Mar. 12, 1996).

125. U.S. EPA, Region III, Air Regulations for Municipal Solid Waste Landfills, <http://www.epa.gov/reg3airtd/airregulations/ap22/landfil2.htm>.

126. EPA’s technical design and operating criteria (regulations) for landfills include specific requirements for location, operation, design (liner, leachate collection, runoff controls, etc.), groundwater monitoring, corrective action in the event of an environmental release, closing the landfill, post-closure care, and bonds, insurance, or other mechanisms to assure financial responsibility. The primary regulations are found in 40 C.F.R. Parts 257 and 258. EPA has also issued regulations under the CAA that apply to emissions from very large landfills, and certain EPA criteria issued under the CWA may apply.

Conservation and Recovery Act—makes it clear that its aim is to prevent environmental insults, and conserve resources instead of squandering them, just as much as it is to remedy injury and recover materials.

Few appreciate the breadth and depth of this law's coverage, because most readers, even careful ones, imagine that the words contained in the law's definitions reflect their titles. Not so, for the words are much, much broader, creating the framework of a law that was crafted to deal with, and prevent, Love Canals.

"Solid Waste," for example, is defined as

. . . any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 1342 of title 33, or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923) [42 U.S.C. §§2011 et seq.]¹²⁷

Similarly, "disposal" is broadly defined as

the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters.¹²⁸

Finally, a "hazardous waste" is

a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may—

(A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or

(B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.¹²⁹

As with the intentionally broad definitions in the CAA, those under RCRA are designed to cast as wide a net as possible. Thus, toxins entering the environment can be subject, not only to medium-specific laws, but also statutes that cover substances based on the threats they pose to human health and the environment, such as RCRA.

3. "Minimization" of Waste

Although RCRA was already crafted with prevention of injury in mind, Congress amended it in 1984 to make the focus explicit, leaving no doubt that the focus of federal law was on preventing pollution, not just dealing with it after the fact. A new requirement was added obliging each firm that was shipping hazardous waste offsite—which is virtually every commercial or industrial enterprise of any significant size in the United States—certify that it was minimizing its waste:

(b) Waste minimization

Effective September 1, 1985, the manifest required by subsection (a)(5) of this section shall contain a certification by the generator that—

- (1) the generator of the hazardous waste has a program in place to reduce the volume or quantity and toxicity of such waste to the degree determined by the generator to be economically practicable; and
- (2) the proposed method of treatment, storage, or disposal is that practicable method currently available to the generator which minimizes the present and future threat to human health and the environment.

To "minimize" is to "reduce to the smallest possible number, degree or extent."¹³⁰

Recall that the definitions of hazardous waste and solid waste are so broad that they include pollution of virtually every kind, whether in the air, water, or soils. Thus, every holder of a RCRA permit is legally required to reduce the volume or quantity and toxicity of its waste and to minimize the present and future threat to human health and the environment that it poses.

Although there are no explicit sanctions connected to these provisions, violations would be actionable under common law and statutory private and public-nuisance laws, and no doubt many other state and federal laws as well.

4. Other Waste Minimization and Pollution Prevention Requirements

Although arguably the most aggressive of the requirements, the waste minimization mandate of RCRA is but one of many in federal law. In the aggregate, these laws reflect a clear intent on the part of a succession of Congresses to prefer prudence over risk.

Other requirements include the following, according to an inventory prepared by EPA¹³¹:

127. §1004(27).

128. §1004(3).

129. §1004(5).

130. WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY (1966).

131. U.S. EPA, Pollution Prevention (P2)—Mandates in Federal Statutes, <http://www.epa.gov/p2/pubs/p2policy/provisions.htm>.

a. Pollution Prevention Act (PPA)

§13103—EPA mandated to develop and implement a strategy to promote source reduction.

§13104—EPA as administrator is given the authority to provide grants to the States to promote source reduction by businesses.

§13105—EPA mandated to establish a database that contains information on source reduction.

§13106—Owners and operators of businesses that are required to file a toxic chemical release form must include a toxic reduction and recycling report.

b. CAA

§7402—Encourages cooperation amongst the federal departments, states, and local governments for prevention and control of air pollution.

§7403—EPA mandated to establish a national research and development program for prevention and air pollution control.

Also, EPA must facilitate coordination amongst air pollution prevention and control agencies.

§7405—EPA can make grants to air pollution prevention and control agencies.

§7412—Facilities that reduce their emission of toxics into the air by 90–95% can qualify for permit waivers.

§7414-7418—EPA may establish record keeping, inspections, and monitoring for all facilities that emit pollutants.

Subchapter I, Part C §§7470-7479—Prevention of significant deterioration of air quality—establishment of a plan that includes emissions limitations to protect public welfare and the environment.

§Subchapter II 12. General emissions standards.

c. EPCRA

§11001-1005—Emergency planning requirements for pollution and fire control. Provides substances and facilities covered under this act.

§11021-11022—Facilities covered under EPCRA must have ready Material Safety Data Sheets (MSDS) for all chemicals and must complete hazardous chemical inventory forms.

§11023—Owners and operators of facilities covered under EPCRA must complete a toxic chemical release form.

d. RCRA

§6907—EPA must establish waste management guidelines.

§6908a—EPA may assist Indian tribes in waste management.

§6921-6925—EPA must identify and list wastes as hazardous; establish standards for waste generators; establish standards for waste transporters; establish standards for owners and operators of hazardous waste treatment, storage and disposal facilities; and, establish a permitting program for owners and operators of hazardous waste treatment, storage and disposal facilities. Where emerging contaminants are not RCRA “listed” hazardous wastes, they may still be a RCRA-regulated characteristic waste (characteristics include toxicity, corrosiveness, reactivity, or ignitability).

§6921—Hazardous Waste requirements established for owners and operators of facilities that produce hazardous wastes.

§6922—Generators must certify in shipping manifests that they have a plan to reduce waste. They must also submit a biennial report indicating their efforts to reduce volume and toxicity of wastes.

§6925—Permit required for treatment and storage of hazardous wastes.

§6927—EPA can make facilities describe their waste reduction program and inspect them to determine whether a program is actually in place.

§6931—Grants appropriated to the States for assistance in development of Hazardous Waste Programs.

§6981—EPA shall render financial assistance to federal, state, and local agencies that are researching, investigating, or providing in areas of waste management and minimization.

e. CWA

§1251—National goal is to eliminate the discharge of pollutants into navigable waters.

§1252—EPA mandated in cooperation with federal, state, and local agencies and industries to develop programs for preventing, reducing, or eliminating the pollution of the navigable waters and ground waters and improving the sanitary condition of surface and underground waters.

§1256—Appropriation of funds to state and local agencies for pollution control.

§1342—EPA can put additional restrictions on permits (not included in the act).

§1381—EPA given authority to make grants to states for pollution control revolving fund for implementation of management and conservation plans.

f. Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

§136—All pesticides and pesticide establishments must be registered. Non-registered pesticides may not be sold or distributed in the United States.

g. National Environmental Policy Act (NEPA)

§4331—Congress recognizes “the profound impact of man’s activity on the interrelations of all components of the natural environment.”

§4363—EPA shall establish a program for long-term research for all activities listed under NEPA.

§4363a—EPA mandated to conduct demonstrations of energy-related pollution control technologies.

§4368a—Utilization of talents of older Americans in projects of pollution prevention, abatement, and control through technical assistance to environmental agencies.

§4368b—Provide technical assistance to Indian Tribes for environmental assistance on Indian lands.

5. Conclusion

Although RCRA can unquestionably be used to eliminate methane and other emissions from landfills and other facilities where waste is, has been, or will be deposited, it can also be used to target production processes themselves through waste minimization requirements. In the latter objective, RCRA is complemented by comparable requirements in many other laws, leaving no doubt that a succession of Congresses have intended to reduce and, where possible, eliminate altogether threats before they come into existence.

E. The CWA and the American Recovery and Reinvestment Act

The CWA,¹³² the cornerstone of surface water quality protection in the United States, employs a variety of regulatory and nonregulatory tools.¹³³ Chief among these, at least at the law’s inception, was financing by the U.S. government of 90% of the cost of building sewage collection and treatment system. At the time of its enactment, many—some might say most—of the nation’s rivers and streams were unsafe for fishing, swimming, or boating. Raw sewage was routinely discharged into waterways that a few decades earlier had been pristine.

132. 33 U.S.C. §§1251-1387, ELR STAT. FWPCA §§101-607.

133. The origins of the CWA date to 1948, when the FWPCA became law. The law was substantially amended and expanded in 1972, when many of the approaches pioneered two years earlier in the CAA were adapted to deal with water pollution. At the same time, the Clean Water Act became its common name.

1. Using the Law to Control Methane

Human sewage is no longer discharged, but instead collected, sent to central plants, and treated before being discharged. In the process, immense amounts of methane are released into the environment. The authorities of the CWA could be used to halt this.

Similarly, abandoned coal mines emit immense quantities of methane. These, too, can be regulated under the CWA or the CAA. In some areas, methane is extracted from coal beds, in the process polluting surface waters. This also can be regulated under the CWA.

Despite the immense potential, little of it is being exploited. There are more than 16,000 wastewater treatment plants (WWTPs) in the United States ranging in size from multibillion dollar complexes to small, single-community plants. About 3,500 of these facilities, mainly the larger ones, employ anaerobic digestion. Since methane is a byproduct of digestion, many treatment plants use the gas to supply heat needed to complete the digestion process, but only 2% of these plants use the digester gas to produce electricity. Most of these plants could produce power from the gas and still heat their digesters with the waste heat from the generation process.

2. The National Pollutant Discharge Elimination System

The linchpin of the CWA is the prohibition against discharging any pollutant from a point source into navigable waters¹³⁴ without a permit under the national pollutant discharge elimination system (NPDES).¹³⁵ A “navigable” waterway was defined in 1874 by the Supreme Court in *The Montello*¹³⁶ to include more than just navigation by larger vessels:

The capability of use by the public for purposes of transportation and commerce affords the true criterion of the navigability of a river, rather than the extent and manner of that use. If it be capable in its natural state of being used for purposes of commerce, no matter in what mode the commerce may be conducted, it is navigable in fact, and becomes in law a public river or highway.¹³⁷

The Court held that early fur trading using canoes sufficiently showed that the Fox River was a navigable water of the United States. The Court was careful to note that the bare fact of a water’s capacity for navigation alone is not sufficient; that capacity must be indicative of the water’s being “generally and commonly useful to some purpose of trade or agriculture.”¹³⁸

134. The 1973 regulatory definition of “navigable waters” was published in the *Federal Register* on Dec. 11, 1973. 38 Fed. Reg. 34165.

135. Point sources are discrete conveyances, such as pipes or ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit. However, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters.

136. 87 U.S. 430 (1874).

137. *Id.* at 441-42.

138. *Id.* at 442.

Thus, the CWA assigns to the U.S. government the power to regulate discharges into virtually every waterway in the nation of any significant size. Initially, the law's focus was on regulating discharges from traditional "point source" facilities, such as municipal sewage plants and industrial facilities, with little attention paid to runoff from streets, construction sites, farms, and other "wet-weather" sources.

Starting in the late 1980s, efforts to address polluted runoff increased significantly. For nonpoint runoff, voluntary programs, including cost-sharing with landowners, are the key tool. For wet weather point sources like urban storm sewer systems and construction sites, a regulatory approach is being employed.¹³⁹

In effect, the CWA provides two major tools that can be used to address global warming:

- The grant program for constructing sewers and sewage treatment plants; and
- The water quality standards: wastewater standards for industry and water quality standards for all contaminants in surface waters.

3. Construction Grants for Wastewater Treatment Works

Under §202 of the CWA, grants can be awarded as follows:

- Up to 55% for grants awarded after September 30, 1984, or for 75% of eligible project costs for grant assistance awarded before October 1, 1984.¹⁴⁰
- Up to 20% more, but not more than 85%, for innovative or alternative treatment processes and techniques.¹⁴¹
- Up to 100% in American Samoa, Guam, the Northern Marianas Islands, and the Virgin Islands.¹⁴²

4. The American Recovery and Reinvestment Act

The funding available for construction of these plants was increased by roughly \$270 million in early 2009, with adoption of the American Recovery and Reinvestment Act (ARRA). It provides a combination of tax and spending measures designed to create jobs, stimulate economic recovery, and invest in technology and infrastructure for long-term economic benefit.

The ARRA gives priority to projects that are ready to proceed to construction within 12 months of enactment, and sets a goal of using at least 50% of funds for projects that start construction within 120 days of enactment.

In addition, not less than 20% of the funds are for the Green Project Reserve, dedicated to projects to address "green infrastructure, water or energy efficiency improvements or other environmentally innovative activities."

By using either the regulatory authorities of the CWA or the grant awards, the number of plants—municipal and industrial alike—could be increased rapidly and substantially.

Point Loma Wastewater Treatment Plant

The Point Loma Plant serves a 450-square-mile area in and near San Diego, California, and has a capacity of 240 million gallons per day. The plant is energy-self-sufficient and sells excess energy in the form of electricity to the grid. The plant has eight digesters that break down the organic solids removed from the wastewater, producing methane gas that is collected, cleaned, and piped to the onsite as more than 60% methane, and some plants with state-of-the-art facilities have the potential to produce a biogas with concentrations of methane that reach up to 95%. This biogas is produced on a continuous basis, and contaminants, such as hydrogen sulfide, are removed prior to use. Other processing may include dehydration, filtering, or CO₂ removal.

Source: Federal Energy Management Program, "Wastewater Treatment Gas to Energy for Federal Facilities".

Wastewater digester gas can serve as a fuel substitute for natural gas in applications such as boilers, hot water heaters, reciprocating engines, turbines, and fuel cells. The gas produced by anaerobic digestion is usually more than 60% methane, and some plants with state-of-the-art facilities have the potential to produce a biogas with concentrations of methane that reach up to 95%. This biogas is produced on a continuous basis, and contaminants, such as hydrogen sulfide, are removed prior to use. Other processing may include dehydration, filtering, or CO₂ removal.¹⁴³

5. Coal-Bed Methane

One of the greatest potential new causes of global warming is a technology developed over the last decade or so to extract methane, or natural gas, from underground shale using coal-bed methane (CBM) wells. This is one of the few areas where anticipatory action now might prevent major new contributions to global warming.

CBM is natural gas—that is, 99% methane—that is generated and stored in coal seams. Water keeps the CBM in place in these underground formations. To extract it, gas companies use hydraulic fracturing, in which fluids—mostly water but with sand, chemicals, and gels to lubricate the process and help keep the rocks open—are pumped

139. U.S. EPA, National Pollutant Discharge Elimination System (NPDES), Clean Water Act, <http://www.epa.gov/cgi-bin/epaprintonly.cgi>.

140. Catalogue of Federal Domestic Assistance, Construction Grants for Wastewater Treatment Works, <https://www.cfda.gov/index?s=program&mode=form&tab=step1&cid=ef51f6eb4135b40a62d5aad069100b11&cck=1&tau=&cck=>.

141. *Id.*

142. *Id.*

143. Federal Energy Management Program, Wastewater Treatment Gas to Energy for Federal Facilities—Biomass and Alternative Methane Fuels, http://74.125.113.132/search?q=cache:RxMrMEM3pYsJ:www1.eere.energy.gov/femp/pdfs/bamf_wastewater.pdf+Wastewater+Treatment+Gas+to+Energy+for+Federal+Facilities&cd=1&hl=en&ct=clnk&gl=us.

underground at massive pressure to shatter the rock formations.¹⁴⁴ When the groundwater that had held the methane in place is pumped out, the hydrostatic pressure on the coal seam is reduced, which, in turn, allows methane gas to migrate to the well bore where it moves to the surface and is collected.

Most concerns expressed to date about the environmental impacts of hydraulic fracturing have focused principally on its local impacts. As the *New York Times* reported:

A string of incidents in places like Wyoming and Pennsylvania in recent years has pointed to a possible link between hydraulic fracturing and pollution of groundwater supplies. In the worst case, such pollution could damage crucial supplies of water used for drinking and agriculture.¹⁴⁵

Most of the contamination incidents, however, have involved an unintended release of methane. Although these reports are anecdotal, they provide persuasive evidence of the potential for the release to the atmosphere of methane. According to one analysis:

(M)ore than 1,000 other cases of contamination have been documented by courts and state and local governments in Colorado, New Mexico, Alabama, Ohio and Pennsylvania. In one case a house exploded after hydraulic fracturing created underground passageways and methane seeped into the residential water supply. In other cases the contamination occurred not from actual drilling below ground, but on the surface, where accidental spills and leaky tanks, trucks and waste pits allowed benzene and other chemicals to leach into streams, springs and water wells.¹⁴⁶

There is a potential for methane release at a variety of points in the process of hydraulic fracturing. CBM operators prefer to pump the coal seam's groundwater, known as produced water, into streams, but when that is not possible, it will be reinjected (though not where it used to be). After the methane has been extracted, what is left behind are massive, shattered rock formations deep underground; polluted water that is either treated and discharged into surface waters or reinjected underground; and potential sources of massive methane releases.

When CBM producers reinject water, it does not return to its place of origin, but instead into different, deeper formations. Thus, the water is no longer available to other water users, nor does it help recharge nearby streams as it did before methane production.

Production of CBM is encouraged by the National Energy Policy Act of 1992,¹⁴⁷ which is principally concerned with facilitating and exploiting the gas. It contains little, if any, provisions to safeguard the environment, except indirectly, by requiring that production be maximized (which thus reduces emissions).¹⁴⁸

Disposal of produced water into rivers or streams is subject to regulation under the CWA. Injecting them underground was once subject to regulation under the Safe Drinking Water Act (SDWA),¹⁴⁹ but Congress has exempted them.¹⁵⁰ Pumping onto soils is subject to regulation under RCRA. Emissions from pumps and other equipment are subject to the CAA.¹⁵¹ Thus, these laws could be employed separately or in tandem to reduce emissions of methane from CBM operations.

6. Active and Abandoned Coal Mines

While coal mines are operating, mine owners have a powerful incentive to control methane releases. Otherwise it can explode, killing or trapping miners and damaging the mine itself. Once a mine is closed, however, the incentive to control emissions is gone, and the mines become in the aggregate immense emitters of methane.

Taken together, emissions from active and abandoned coal mines account for roughly 15% of the U.S. total. Active mines' methane emissions are estimated to account for about 10% of the national total, while closed mines are placed at about 5%.¹⁵²

As with methane from sewage treatment plants and animal feedlots, this methane is a wasted resource. It can be piped to nearby homes and businesses to be used.

147. 42 U.S.C.S. §§13201 et seq. (Law. Co-op. Supp. 1994) (CBM provisions at 42 U.S.C.S. §13368 (Law. Co-op Supp. 1994)).

148. 42 U.S.C.S. §13368(d), (c) (Law. Co-op. Supp. 1994).

149. 42 U.S.C. §§300f to 300j-26, ELR STAT. SDWA §§1401-1465.

150. The U.S. Court of Appeals for the Eleventh Circuit ruled that hydraulic fracturing is in fact underground injection required to be regulated under the SDWA. *Legal Environmental Assistance Foundation v. U.S. EPA*, 118 F.3d 1467, 27 ELR 21385 (11th Cir. 1997). However, in the Energy Policy Act of 2005, Congress amended the SDWA, changing the definition of "underground injection" to "exclude . . . the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations." Pub. L. No. 109-58.

151. The process of CBM extraction requires the construction and operation of wells to access the gas and compressor stations to extract and convey the gas. The compressor stations consist of various pieces of equipment with the potential to emit pollutants at varying levels depending on equipment capacities. In addition, the facility may incorporate a CBM-powered generator (well-head generator) located on top of the well to generate electricity. In these cases, the generator could also be a source of pollutant emissions. According to one analysis, a typical compressor station gathering CBM will incorporate from 1 to 3 compressor engines varying in power from 100 to 500 horsepower. Operation of these natural gas-fired engines results in the emission of regulated air pollutants, including CO, NO_x, VOC, SO_x, and PM₁₀. U.S. Department of Energy, National Petroleum Technology Office, Handbook on Best Management Practices and Mitigation Strategies for Coal Bed Methane in the Montana Portion of the Powder River Basin, <http://74.125.113.132/search?q=cache:h3kKz6NtlxUJ:fossil.energy.gov/programs/oilgas/environment/publications/BMPHandbookFinal.pdf+ federal+regulatory+program+for+coal+bed+methane&cd=20&hl=en&ct=clnk&gl=us>.

152. U.S. EPA, Coalbed Methane Outreach Program, Methane Emissions From Abandoned Coal Mines in the United States: Emission Inventory Methodology and 1990-2002 Emissions Estimates (Apr. 2004).

144. This is referred to as "stimulating" the coal seam. The *New York Times* has reported that, according to the New York State Department of Environmental Conservation, gas companies use at least 260 types of chemicals, many of them toxic, like benzene. These chemicals tend to remain in the ground once the fracturing has been completed, raising fears about long-term contamination.

145. Jad Mouawad & Clifford Krauss, *Dark Side of a Natural Gas Boom*, N.Y. TIMES (Dec. 8, 2009).

146. Abraham Lustgarten & ProPublica, *Drill for Natural Gas, Pollute Water*, Scientific American.com (Nov. 17, 2008) <http://www.scientificamerican.com/article.cfm?id=drill-for-natural-gas-pollute-water>.

F. Public Resource Laws and Inherent Powers of the President

Among the most unlikely U.S. laws that might help combat global warming are those that protect public resources. These statutes seek to protect the environment by preserving public resources for future generations. Such laws range from the African Elephant Conservation Act¹⁵³ to the National Environmental Protection Act (NEPA).¹⁵⁴

Others sources of authority are not statutory laws at all, but powers inherent to the office of the president. Indeed, on March 14, 1903, when the federal government for the first time set aside land for the protection of wildlife, it was through an Executive Order issued by President Theodore Roosevelt creating the Pelican Island federal bird reservation. President Roosevelt would eventually establish a network of 55 bird and national game reservations, the forerunners to today's national wildlife refuge system.¹⁵⁵

I. The Antiquities Act of 1906

Three years later, Congress passed the Antiquities Act of 1906,¹⁵⁶ giving the president of the United States authority to restrict the use of particular public land owned by the federal government by executive order, bypassing congressional oversight. Since it was signed into law by President Roosevelt on June 8, 1906, it has been used over 100 times, sometimes creating considerable controversy,¹⁵⁷ but often not.

On the eve of his departure from office in 2009, President George W. Bush protected an immense pristine ocean area, naming three remote Pacific Island areas as national monuments to protect them from energy extraction and commercial fishing.¹⁵⁸ The three areas total some 195,280

square miles and include the Mariana Trench, the deepest spot on earth at 36,000 feet below the sea.¹⁵⁹

President Bill Clinton did the same on the eve of his departure from office in 2000, designating a vast marine-protected area around the coral-laden Northwestern Hawaiian Islands (NWHI) as a Marine Protected Area (MPA). It ranks as the largest protected area (either terrestrial or marine) in the United States, and the second largest in the world, trailing only Australia's Great Barrier Reef.¹⁶⁰

2. Plight of the Arctic

A like-minded President Obama could, following the examples of Presidents Roosevelt, Clinton, and Bush, designate the U.S. territory that lies within the Arctic as a protected area, thus setting the stage for domestic and international actions to curb global warming. Without some action, it is likely that the Arctic will be free of ice, perhaps within a decade.¹⁶¹

The Arctic is not only melting but, as noted earlier, melting fast. As of August, 2009, the U.S. National Snow and Ice Data Center reported that the polar ice cap extended over 2.61 million square miles after having shrunk an average 41,000 square miles per day in July—equivalent to one Indiana or three Belgiums daily.¹⁶²

Sadly, what the melting has triggered is not a rush to protect the Arctic, but instead, in the words of one commentator

a new scramble for territory and resources among the five Arctic powers. Russia was the first to stake its claim in this great Arctic gold rush, in 2001. Moscow submitted a claim to the United Nations for 460,000 square miles of resource-rich Arctic waters, an area roughly the size of the states of California, Indiana, and Texas combined. The UN rejected this ambitious annexation, but last August the Kremlin nevertheless dispatched a nuclear-powered icebreaker and two submarines to plant its flag on the North Pole's sea floor. Days later, the Russians provocatively ordered strategic bomber flights over the Arctic Ocean for the first time since the Cold War. Not to be outdone, Canadian Prime Minister Stephen Harper announced funding for new Arctic naval patrol vessels, a new deep-water port, and a cold-weather training center along the Northwest Passage. Denmark and Norway, which control Greenland and the Svalbard Islands, respectively, are also anxious to establish their claims.¹⁶³

153. 16 U.S.C. §§4201-4245, 102 STAT. 2318-2323.

154. 42 U.S.C. §§4321-4370f, ELR STAT. §§2-209 (Jan. 1, 1970), as amended by Pub. L. No. 94-52 (July 3, 1975) and Pub. L. No. 94-83 (Aug. 9, 1975).

155. U.S. Fish and Wildlife Service, Pelican Island National Wildlife Refuge, <http://www.fws.gov/pelicanisland/history.html>.

156. 16 U.S.C. §§431-433.

157. Residential powers under the Act have been reduced twice. The first time followed the unpopular proclamation of Jackson Hole National Monument in 1943. The 1950 law that incorporated Jackson Hole into an enlarged Grand Teton National Park also amended the Antiquities Act, requiring congressional consent for any future creation or enlargement of National Monuments in Wyoming. Robert W. Righter, *National Monuments to National Parks: The Use of the Antiquities Act of 1906*, 20 W. HIST. Q. 281-301 (Aug. 1989). The second time followed President Carter's use of the Act to create 56 million acres (230,000 km²) of national monuments in Alaska. The Alaska National Interest Lands Conservation Act requires congressional ratification of the use of the Antiquities Act in Alaska for withdrawals of greater than 5,000 acres (20.2 km²). U.S. Fish and Wildlife Service, *Digest of Federal Resource Laws of Interest to the U.S. Fish and Wildlife Service: Alaska National Interest Lands Conservation Act of 1980*, <http://www.fws.gov/laws/lawsdigest/ALASKCN.html>.

158. President Bush said at a White House ceremony of the areas he protected: "For sea birds and marine life, they will be sanctuaries to grow and thrive. For scientists, they will be places to extend the frontiers of discovery. And for the American people, they will be places that honor our duty to be good stewards of the Almighty's creation." MSNBC.com, *Bush Creates Three Pacific Marine Sanctuaries*, <http://www.msnbc.msn.com/id/28506975/>.

159. *Id.*

160. U.S. Creates World's Second Largest Marine Protected Area, 2:6 MPA NEWS (Dec. 2000–Jan. 2001), <http://www.flmnh.ufl.edu/fish/innews/MPA002.htm>.

161. John Roach, *Arctic Largely Ice Free in Summer Within Ten Years?*, NAT'L GEOGRAPHIC NEWS (Oct. 15, 2009), <http://news.nationalgeographic.com/news/2009/10/091015-arctic-ice-free-gone-global-warming.html>.

162. Charles J. Hanley, *Vast Expanses of Arctic Ice Melt in Summer Heat*, ASSOCIATED PRESS (Aug. 10, 2009).

163. Scott G. Borgerson, *Arctic Meltdown: The Economic and Security Implications of Global Warming*, FOREIGN AFFAIRS (Mar./Apr. 2008).

3. Statutory Options for Protecting the Arctic

Whether the authority for the president to protect the Arctic exists or not is not an open question: clearly it does. There are a wide variety of mechanisms to protect areas of the United States, ranging from marine sanctuaries and national parks to wildlife refuges and national monuments. In deciding whether and how to protect some of these areas, the president has immense discretion.

The speed with which such a process can move forward is demonstrated by President Clinton's action: he designated the MPA in early December and followed a 90-day public consultation process ordered in May 2000 to develop recommendations for increasing protection of the NWHI's coral ecosystems, which contain nearly 70% of U.S. coral reefs.

The statutes under which the president could act include the following:

Endangered Species Act (ESA).¹⁶⁴ The ESA establishes a program for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend.¹⁶⁵ Although the law contains many provisions, among the most important is the requirement that federal agencies assure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat.

Ironically, the George W. Bush Administration invoked the powers of the ESA on behalf of the polar bear, not as an action to curb global warming, but precisely the opposite: to prevent action. Secretary of the Interior Dirk Kempthorne said: "While the legal standards under the ESA compel me to list the polar bear as threatened, I want to make clear that this listing will not stop global climate change or prevent any sea ice from melting. Any real solution requires action by all major economies for it to be effective. That is why I am taking administrative and regulatory action to make certain the ESA isn't abused to make global warming policies."¹⁶⁶

NEPA.¹⁶⁷ NEPA requires that all federal agencies prepare detailed environmental impact statements for "every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the qual-

ity of the human environment."¹⁶⁸ This requirement, however, is wholly procedural, and does not require that the most environmentally protective option be selected. Nevertheless, NEPA does declare a national policy

which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation . . .¹⁶⁹

The Outer Continental Shelf Lands Act.¹⁷⁰ The 1953 statute defines the outer continental shelf as all submerged lands lying seaward of state coastal waters (3 miles offshore) that are under U.S. jurisdiction. It authorizes the Secretary of the Interior to promulgate regulations for the leasing of shelf lands, but in a way that prevents waste and conserves natural resources.

The Marine Protection, Research, and Sanctuaries Act. Title III of the Act authorizes the Secretary of Commerce to designate national marine sanctuaries based on statutory criteria and stipulated factors to be considered by the Secretary as a basis for designation. Consultation with various federal agencies, congressional committees, state agencies, and regional fishery councils is required. Once a sanctuary is established, the law makes it "unlawful for any person to—(1) destroy, cause the loss of, or injure any sanctuary resource managed under law or regulations for that sanctuary."¹⁷¹

Were the Arctic waters established as a marine sanctuary, this provision would clearly allow imposing controls on emissions of a wide variety of causes of global warming, especially black carbon and ozone, because they are the principal cause of warming and melting.

4. Conclusion

Presidents have not hesitated in the past to protect what has often been called the cathedrals of America, the pristine and wild areas. These include national parks, historical sites, monuments, buildings, and battlefields. They also include recreation areas, seashores, rivers, trails, and parkways, almost 34 million hectares of land in all.

Despite their diversity, what each and all of them share is protection by the U.S. government. Sometimes the shield of federal protection has been imposed when it was nearly too late, as in the case of President Roosevelt's designation of the Pelican Island bird reservation, established only after millions of waterfowl had been slaughtered for their plumage. On other occasions, a president has acted in the face of congressional opposition, as President Carter

164. 16 U.S.C. §§1531-1544, ELR STAT. ESA §§2-18.

165. The Act authorizes the determination and listing of species as endangered and threatened; prohibits unauthorized taking, possession, sale, and transport of endangered species; provides authority to acquire land for the conservation of listed species, using land and water conservation funds; authorizes establishment of cooperative agreements and grants-in-aid to States that establish and maintain active and adequate programs for endangered and threatened wildlife and plants; authorizes the assessment of civil and criminal penalties for violating the Act or regulations; and, authorizes the payment of rewards to anyone furnishing information leading to arrest and conviction for any violation of the Act or any regulation issued thereunder. 16 U.S.C. §§1531-1544.

166. Press Release, Office of the Secretary of the Interior, *Secretary Kempthorne Announces Decision to Protect Polar Bears Under Endangered Species Act* (May 14, 2008).

167. 42 U.S.C. §§4321-4370f, ELR STAT. §§2-209 (Jan. 1, 1970).

168. §102(2)(c).

169. §2.

170. 43 U.S.C. §§1331-1356.

171. 16 U.S.C. §1436.

did in December 1978, when he designated 56 million acres as national monuments under the authority of the Antiquities Act. With a stroke of his pen, President Carter not only protected an immense wilderness, but forced the Congress to act.¹⁷²

What is at stake in the Arctic, however, is not merely polar bears and ice, but a region whose collapse could precipitate a calamitous chain of events potentially culminating in the end of life on earth as we now know it. Surely, that is worth preserving.

172. National Parks Conservation Association, Alaska National Interest Lands Conservation Act, http://www.npca.org/media_center/fact_sheets/anilca.html.