Ratification of Kyoto Aside: How International Law and Market Uncertainty Obviate the Current U.S. Approach to Climate Change Emissions

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RATIFICATION OF KYOTO ASIDE: HOW INTERNATIONAL LAW AND MARKET UNCERTAINTY OBViate THE CURRENT U.S. APPROACH TO CLIMATE CHANGE EMISSIONS

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"[A] relatively small investment today is far wiser than spending vast amounts in the future to restore ecosystems, agriculture and infrastructure.... [T]he time to act on carbon is now."¹

INTRODUCTION

On October 14, 2004, a coalition of thirty U.S. business, non-profit, and energy policy organizations wrote a letter to President Bush expressing concern that the American economy will ultimately suffer as a result of the United States rejecting the Kyoto Protocol.² The organizations lament that they and others "will be cut out of the new carbon trading markets" set up in London and that "incentives to install renewables and other clean technologies in the treaty will give companies in Europe and elsewhere a financial advantage in joint trading agreements with former Eastern Bloc and developing countries."³

Approximately one year earlier President Bush received a different letter regarding global climate change, this time sent by a nationwide coalition of scientists.⁴ The letter confirmed "the consensus opinion of the scientific community" as one fully supporting the findings by the Intergovernmental Panel on Climate Change (IPCC) and the National Research Council (NRC).⁵ Anthropogenic climate change is underway, and "[e]ven under mid-range emissions

³. Id. at 827 (quoting the letter sent to President Bush).
⁵. Id. at 1; see also Naomi Oreskes, Beyond the Ivory Tower: The Scientific Consensus on Climate Change, SCIENCE, Dec. 3, 2004 (noting that the "IPCC is not alone in its conclusions" and that major scientific bodies "have issued statements in recent years concluding that the evidence for human modification of climate is compelling"); U.S. Envtl. Prot. Agency, Global Warming, http://yosemite.epa.gov/oar/globalwarming.nsf/content/aboutthesite.html (last visited Apr. 5, 2006) ("The United States has based its climate change policies on the conclusions of the Intergovernmental Panel on Climate Change (IPCC), which has provided an authoritative international consensus on the science of climate change.").
assumptions, the projected warming could cause substantial impacts in different regions of the United States, including an increased likelihood of heavy and extreme precipitation events, exacerbated drought, and sea level rise. The letter highlighted that late-twentieth-century climate warming fails to appear on computer simulations that include only natural climate forces like volcanic emissions and solar activity, but does appear on computer simulations that include anthropogenic greenhouse gas emissions.

Given the broad scientific consensus regarding human-induced climate change and the belief among some sectors of the U.S. economy that engaging in an international effort to reduce climate change will benefit both the environment and the economy, what is stopping the United States from leading the world in this effort? The answer to this quandary may prove more complicated than it appears. Uncertainty as to what is required by law and conflicting policy preferences over emissions regulations have resulted in a haphazard national approach to anthropogenic climate change. This Note argues that from a legal perspective the United States is, and will remain, out of compliance with its international legal obligations until good-faith efforts toward reducing domestic greenhouse gas emissions are administered. In the interim, stalling such an effort may actually prove harmful to U.S. businesses, which are ill-positioned to compete in a carbon-constrained world.

Part I introduces the reader to mainstream scientific analyses of global climate change, as well as counterarguments regarding the impact of greenhouse gas emissions. Part II studies international efforts to address climate change, examines U.S. reactions to these international efforts, and discusses the present course of U.S. policy in the climate change arena. Part III evaluates the U.S. legal obligations assumed under the United Nations Framework Convention on Climate Change (UNFCCC) and posits that the Bush administration's goal of merely slowing the rate of projected greenhouse gas increases is incongruent with the nation's duty to actually decrease output. Part IV considers several domestic alternatives to ratifying the Kyoto Protocol by which the country

7. Scientists' Letter, supra note 4, at 2.
might meet its international obligations. Finally, Part V assesses market reactions to scientific predictions and international actions, concluding that U.S. industries have a strong mid-term economic interest in reducing emissions and diversifying production.

I. AN INTRODUCTION TO GLOBAL CLIMATE CHANGE

The National Academy of Sciences reported that during the past century the mean surface temperature of the Earth rose by about one degree Fahrenheit.\(^8\) Solar energy is the driving force behind the Earth's climate; atmospheric greenhouse gases such as water vapor, carbon dioxide, methane, nitrous oxide, and ozone trap some of the solar energy that otherwise would be reflected back into space by the Earth's surface.\(^9\) This natural phenomenon is critical to the Earth's function as a life-support system for existing species, including human beings.\(^10\) The twentieth-century temperature increase, however, represents the largest spike in climate warming that has occurred in the past 400-600 years.\(^11\) To add context to the seemingly slight one degree Fahrenheit change in global temperature this past century, note that the last ice age averaged just a three- to five-degree difference from present mean temperatures.\(^12\) Physical changes worldwide lend support to the temperature record data:

- mountain glaciers the world over are receding; the Arctic ice pack has lost about 40% of its thickness over the past four decades; the global sea level is rising about three times faster over the past 100 years compared to the previous 3,000 years;

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\(^9\) Id.
\(^10\) Id.
\(^12\) Paul Kevin Waterman, Note, From Kyoto to ANWR: Critiquing the Bush Administration's Withdrawal from the Kyoto Protocol to the Framework Convention on Climate Change, 13 TRANSNAT'L L. & CONTEMP. PROBS. 749, 751 (2003) (providing data on global mean temperatures as they relate to the last ice age). Thus, from the perspective of human evolution, a numerically slight deviation from present climatic conditions could engender dangerous results. See id.
and there are a growing number of studies that show plants and animals changing their range and behavior in response to shifts in climate.\textsuperscript{13}

Although naturally occurring emissions from plant respiration and decomposing organic matter contain more than ten times the carbon dioxide released by anthropogenic activity, natural emissions have historically struck a delicate balance with the absorption capabilities of terrestrial vegetation and the oceans.\textsuperscript{14} Scientists generally agree that anthropogenic activities since the beginning of the industrial revolution—primarily the combustion of fossil fuels—are responsible for the increased concentration of greenhouse gases in the atmosphere, and that this increased concentration is responsible for the accelerated rate of climate change.\textsuperscript{15}

A study on climatic warming in the Arctic, commissioned by the United States and seven other nations, reported that human-induced climate change will accelerate over the next century, ""contributing to major physical, ecological, social and economic changes, many of which have already begun.""\textsuperscript{16} The report listed many probable harms resulting from melting glaciers, including a shorter oil and gas drilling season, ""devastating consequences for polar bears, ice-living seals and local people for whom these animals are a primary food source,"" and rising sea levels worldwide.\textsuperscript{17} Along

\textsuperscript{13} Union of Concerned Scientists, supra note 11.
\textsuperscript{15} See id. Deforestation and general land-use changes also account for increased greenhouse gas concentration in the atmosphere. Id.
\textsuperscript{16} Andrew C. Revkin, Warming Trend in Arctic Is Linked to Emissions, N.Y. TIMES, Oct. 30, 2004 (quoting the report). Anthropogenic climate change primarily results from carbon dioxide and other greenhouse gas emissions. Id.
\textsuperscript{17} Id. (quoting the report). On December 7, 2005, the Inuit Circumpolar Conference (ICC) filed a petition with the Inter-American Commission on Human Rights to hold the United States—the world's largest greenhouse gas emitter—responsible for violating the Inuit's human rights by failing to take remedial actions to address the impacts of climate change in the Arctic. Press Release, Inuit Circumpolar Conference, Inuit Petition Inter-American Commission on Human Rights To Oppose Climate Change Caused by the United States of America (Dec. 7, 2005), available at http://www.inuitcircumpolar.com/index.php?ID=316&Lang=En (petitioning "the Commission to declare the United States of America in violation of rights affirmed in the 1948 American Declaration of the Rights and Duties of Man and other instruments of international law" and asking that the United States impose mandatory limits on its greenhouse gas emissions); see also Ken Conca, Environmental Governance After Johannesburg: From Stalled Legalization to Environmental Human Rights?, 1 J. INT'L L. & INT'L REL. 121, 135-36 (2005).
the same vein, the 2001 report on climate change science issued by the Intergovernmental Panel on Climate Change (IPCC)\textsuperscript{18} found that some natural systems will be irreversibly damaged by climate change, resulting in species extinctions and biodiversity loss; human systems and human health are also vulnerable to climate change, particularly in coastal and impoverished states.\textsuperscript{19} The report concluded that rising sea levels and "large-scale (continental or global), irreversible changes in Earth systems resulting in widespread and sustained impacts cannot be ruled out," and adaptation "will incur costs and will not prevent all damages."\textsuperscript{20} The IPCC is recognized by the United States as the preeminent objective scientific international body responsible for providing the most current knowledge available on global climate change.\textsuperscript{21} The IPCC found that today's carbon dioxide atmospheric concentration is the greatest in 420,000 years, and probably the greatest in twenty million years.\textsuperscript{22} The United States is the largest producer of greenhouse gases in the world, responsible for about 25% of global carbon dioxide emissions.\textsuperscript{23}

As part of its commitment as a party to the UNFCCC, which was established at the 1992 United Nations Conference on Environment and Development (UNCED) (also known as the Rio Earth Summit), the United States submitted the \textit{U.S. Climate Action Report 2002} to the Secretariat of the UNFCCC.\textsuperscript{24} The portion of this State Department report outlining key regional vulnerabilities and

\textsuperscript{18} The IPCC was formed in 1988 by the United Nations Environment Program and the World Meteorological Organization to be the foremost international scientific authority on global climate change. See John C. Dernbach, \textit{Toward a Climate Change Strategy for Pennsylvania}, 12 \textit{PENN ST. ENVT'L. L. REV.} 181, 182-83 (2004).


\textsuperscript{20} Id. (internal quotation marks omitted).


\textsuperscript{22} Dernbach, \textit{supra} note 18, at 183.


probable consequences of climate change for the United States follows:

**Northeast, Southeast, and Midwest** - Rising temperatures are likely to increase the heat index dramatically in summer....

**Appalachians** - Warmer and moister air is likely to lead to more intense rainfall events in mountainous areas, increasing the potential for flash floods.

**Great Lakes** - Lake levels are likely to decline due to increased warm-season evaporation, leading to reduced water supply and degraded water quality. Lower lake levels are also likely to increase shipping costs .... Shoreline damage due to high water levels is likely to decrease, but reduced wintertime ice cover is likely to lead to higher waves and greater shoreline erosion.

**Southeast** - Under warmer, wetter scenarios, the range of southern tree species is likely to expand. Under hotter, drier scenarios, it is likely that grasslands and savannas will eventually displace southeastern forests in many areas, with the transformation likely accelerated by increased occurrence of large fires.

**Southeast Atlantic Coast, Puerto Rico, and the Virgin Islands** - Rising sea level and higher storm surges are likely to cause loss of many coastal ecosystems that now provide an important buffer for coastal development against the impacts of storms. Currently and newly exposed communities are more likely to suffer damage from the increasing intensity of storms.

**Great Plains** - Prairie potholes, which provide important habitat for ducks and other migratory waterfowl, are likely to become much drier in a warmer climate.

**Southwest** - With an increase in precipitation, the desert ecosystems native to this region are likely to be replaced in many areas by grasslands and shrublands, increasing both fire and agricultural potential.

**Mountain West** - Higher winter temperatures are very likely to reduce late winter snow-pack.... As the peak flow shifts to earlier in the spring, summer runoff is likely to be reduced, which is likely to require modifications in water management to provide for flood control, power production, fish runs, cities, and irrigation.
Northwest - Increasing river and stream temperatures are very likely to further stress migrating fish, complicating current restoration efforts.

Alaska - Sharp winter and springtime temperature increases are very likely to cause continued melting of sea ice and thawing of permafrost, further disrupting ecosystems, infrastructure, and communities....

Hawaii and Pacific Trust Territories - More intense El Niño and La Niña events are possible and would be likely to create extreme fluctuations in water resources for island citizens and the tourists who sustain local economies.25

These data indicate that the United States is well informed of the potentially dire implications of climate change. Several international fora suggest the same is true for the rest of the world. At the 2003 World Climate Change Conference in Moscow, scientists from around the globe shared studies and research, confirming that "human activity had led to systemic changes in precipitation patterns, ozone depletion, river runoff, plant growth, ice cover, and sea levels."26 A June 2003 report by the United Nations concluded that "greenhouse emissions in the developed world are likely to rise more than ten percent over the next decade, despite regulations designed to keep such emissions in check."27

A. Critics of Anthropogenic Climate Change

Senator Frank H. Murkowski of Alaska, chairman of the Senate Energy and Natural Resources Committee, arguably leads Congress's collection of climate change critics.28 His analysis, which is similar to that of President Bush, recognizes that human activity has increased the level of carbon dioxide in the atmosphere but questions the link between that fact and changing climatic condi-

25. Id. at 110.
27. Id.
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tions. \(^{29}\) To address the potential negative consequences of climate change, Senator Murkowski suggests focusing on research and technological development rather than costly greenhouse gas regulation. \(^{30}\) The senator feels strongly that "it makes no sense for the United States to constrain its own economic growth in an effort to minimize the uncertain impacts of climate change." \(^{33}\)

In questioning the link between anthropogenic greenhouse gas emissions and climate change, Senator Murkowski cites arguments made by S. Fred Singer, a distinguished research professor at George Mason University and professor emeritus of environmental science at the University of Virginia. \(^{32}\) Professor Singer argues that mainstream scientific analyses of climate change rely on models that fail to comprehend the impact of cloud systems in the atmosphere, and that such a failure renders resulting scientific predictions unreliable. \(^{33}\) He is one of the few authoritative climate scientists in the climate change skeptic camp. \(^{34}\) Unapologetic admissions that he and others in the skeptic camp accept funding from the fossil fuel industry, however, cast doubt on the credibility

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29. See id. at 348-49 (stating that "[w]e must focus research efforts on the role of natural ecosystems and human-induced changes, such as forest management and land-use practices, in order to better understand the carbon cycle and its role in climate change").

30. Id. at 360-61 (recognizing that because greenhouse gases remain in the atmosphere for decades, if not centuries, "[w]e must promote new technology to trap and store greenhouse gases" that are already concentrated in the atmosphere if we are to solve the long-term potential effects of greenhouse gas emissions).

31. Id. at 346.

32. See id. at 350 n.27.

33. See Interview by Jon Palfreman, Frontline/NOVA Producer, with S. Fred Singer, atmospheric physicist at George Mason University and founder of the Science and Environmental Policy Project, "a think tank on climate and environmental issues" [hereinafter Singer Interview], available at http://www.pbs.org/wgbh/warming/debate/singer.html (last visited Mar. 26, 2006) (noting that although some scientists interpret cloud systems as helping to trap heat, others view them as helping to cool the planet). Professor Singer believes that scientific uncertainty regarding climate change results from imprecise computer models and inconsistent research techniques. Id.

34. See, e.g., Meet the Global Warming Sceptics, NEW SCIENTIST, Feb. 12, 2005, at 40, available at http://www.newscientist.com/article.ns?id=mg18524861.500 (noting that other than two or three notable scientists who question climate change, most, if not all, other skeptics can be linked financially to the fossil fuel industry, particularly to ExxonMobil, "the world’s largest oil company and an outspoken corporate opponent of mainstream climate science").
of sweeping policy statements against regulating industry. Additionally, Professor Singer recognizes the existence of anthropogenic climate change; he simply believes that it is occurring on a small scale and that its consequences are not necessarily harmful.

B. Response to the Critics

Professor Singer and Senator Murkowski both use the term "global warming" and, to an extent, rest their theories on scientific uncertainty regarding whether the climate is actually and abnormally warming. The IPCC, however, has made clear that the popular phrase "global warming" is more aptly referred to as "global climate change," with extreme weather events resulting from even slight increases in global mean temperatures, rather than simple, straightforward warming.

Further, policy arguments by climate change skeptics rely heavily on scientific imprecision and uncertainty to support their stance against regulation of carbon emissions. The fundamental presumption, however, is flawed: although modern science cannot precisely forecast the degree of temperature change over the next one hundred years, there is a consensus, even among critics such as Professor Singer, that every computer model indicates an increase in global mean temperatures of between two degrees and nine degrees Fahrenheit by 2100. There is also a consensus, even among critics, that such change is partially attributable to human activity.

35. See ROSS GELBSPAN, THE HEAT IS ON 46-49 (1997) (stating that "[a]mong the skeptics, Dr. S. Fred Singer stands out for being consistently forthcoming about his funding by large oil interests").

36. See Singer Interview, supra note 33 (arguing that global warming will be beneficial to the U.S. economy).

37. See id.; see also Murkowski, supra note 28, at 350-51.

38. See U.S. CLIMATE ACTION REPORT, supra note 24.

39. See, e.g., Murkowski, supra note 28, at 345-48, 357-58, 366-67 (basing his policy suggestions regarding climate change on the idea that the impacts of climate change remain uncertain).

40. See Singer Interview, supra note 33 (noting that there are approximately two dozen climate models in the world that do not conclude identically, but that predict a two- to nine-degree Fahrenheit increase in global temperatures over the next century).

41. See id.
appear convinced that, despite variation among computer model projections, all predictions point in the same direction, and even data reflecting low-range estimates predict environmental impacts that may endanger human health and welfare. This level of consensus has proven adequate to motivate large-scale international intervention to address the issue of climate change.

II. INTERNATIONAL EFFORTS TO ADDRESS GLOBAL CLIMATE CHANGE

A. The Stockholm Declaration and the Framework Convention

International environmental law is rooted in the 1972 Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration), which articulates the following principles: there is a "fundamental right to ... an environment of a quality that permits a life of dignity and well-being," and humans bear "a solemn responsibility to protect and improve the environment for present and future generations." Principle 21 of the Stockholm Declaration is now accepted as a substantive rule of customary international law: "States have ... the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction." One hundred fourteen nations, including the United States, participated in the Stockholm conference.

Twenty years later, in response to growing international scientific concern over global climate change, the United Nations established the UNFCCC, aiming "to achieve ... stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the ..."
climate system." The United States signed and ratified this worldwide convention, which entered into force in 1994 and has been legally binding from that time. Article 3 of UNFCCC contains principles to guide participating parties, including that "[p]arties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures ...." Also in Article 3, the developed member nations agreed to take the lead in mitigating anthropogenic effects on the climate, in recognition of their responsibility to "protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities." Under Article 4, parties to the convention committed to reduce their own greenhouse gas emissions and to help developing nations do the same.

B. The Kyoto Protocol

Against this backdrop, more than 180 parties to the UNFCCC met in 1997 for a formal Conference of the Parties (COP) in Kyoto, Japan, in order to commit to specific, numeric reductions in greenhouse gas emissions. The controversial Kyoto Protocol emerged, legally binding participating Annex I parties (developed nations) to reduce their greenhouse gas emissions by specific

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47. UNFCCC, supra note 45, art. 3.
48. Id.
49. Id. art. 4.
52. The greenhouses gases referred to include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur
individualized percentages, with an overall result of reducing greenhouse gas emissions to 5.2% below 1990 levels by 2008-2012.\(^\text{53}\) As a precondition for the Protocol to take effect, ratification by fifty-five industrialized nations, representing at least 55% of total climate change emissions was necessary.\(^\text{54}\) Russia’s ratification in November 2004 was thus critical to the Protocol’s implementation.\(^\text{55}\)

The Kyoto Protocol contains several procedural mechanisms to aid signatory nations in compliance. The Clean Development Mechanism (CDM), established in Article 12, allows Annex I parties to finance sustainable development projects in developing countries that reduce carbon emissions and use emissions reductions attributable to such projects to meet their own targets.\(^\text{56}\) Largely as a result of U.S. pressure,\(^\text{57}\) the Protocol includes Article 6, which allows parties to meet their reduction goals via the creation of carbon sinks,\(^\text{58}\) such as reforestation projects that will collect greenhouse gases and prevent them from concentrating in the atmosphere. Under this Article, Annex I parties are permitted to acquire emission reduction credits from participation in joint projects with other Annex I parties that reduce emissions or enhance carbon sinks.\(^\text{59}\) A party may only utilize these mechanisms, however, in conjunction with domestic programs that contribute to emissions reductions.\(^\text{60}\) Article 3 obligations to reduce emissions may also be carried out through the provisions of Article 16 bis, which permits market-based emissions trading.\(^\text{61}\) This mechanism raises concerns that parties can attain their emissions targets without actually reducing their emissions,\(^\text{62}\) but the Protocol clearly

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hexafluoride (SF\(_6\)). See id.; DiLuigi, supra note 50, at 705. The terms “greenhouse gas emissions” and “climate change emissions” are denotatively identical.

55. Id. Russia accounted for 17% of carbon dioxide emissions in 1990; the United States accounted for 36%. Id.; see also Geoffrey T. Smith, Russia To Proceed with Ratification of Kyoto Protocol, WALL ST. J., Oct. 22, 2004, at A14.
56. See Kyoto Protocol, supra note 51, art. 12.
57. Waterman, supra note 12, at 757.
58. Kyoto Protocol, supra note 51, art. 6.
59. Id.
60. Id.
61. See id. art. 16 bis.
62. See Waterman, supra note 12, at 757-58.
demands that "such trading shall be supplemental to domestic actions for the purpose of meeting quantified emission limitation and reduction commitments."63  

During the first commitment period (2008-2012) developing nations are not required to reduce emissions,64 but because Article 7 of UNFCCC commands a formal and annual COP to assess and develop the agreements it fosters,65 it is logical to assume that future COPs will help the schema evolve and eventually call for more explicit commitments from all parties. Additionally, all parties to the Protocol, including developing nations, are committed to update national inventories of greenhouse gases and to create national programs to reduce the effects of climate change.66 Nonetheless, the lack of mandatory emissions reduction targets for developing nations has been a major source of concern for the United States and factored into the Bush administration's withdrawal from the Protocol.67 The "bubble" option for two or more Annex I parties to act jointly in emissions reduction is also worrisome for the United States.68 It measures compliance as though multiple parties are one, so if combined emissions fall within the parties' aggregate allowable emissions, all joint participators are deemed to be in compliance.69 This is especially relevant and economically beneficial to the European Community.70

1. The Free-Rider Problem

Using 1990 as the baseline year for measuring emissions reductions favors several countries that, for varying reasons, reduced their carbon dioxide emissions between 1990 and 1997.71 France, for example, reduced its emissions during that time period

63. Kyoto Protocol, supra note 51, art. 16 bis.
65. See UNFCCC, supra note 45, art. 7.
66. See Kyoto Protocol, supra note 51, art. 10.
67. See Waterman, supra note 12, at 758.
68. See infra notes 77-80 and accompanying text.
69. See infra notes 77-80 and accompanying text.
70. See infra notes 77-80 and accompanying text.
in part due to an increased use of nuclear power.\textsuperscript{72} England engaged in a similar switch (from coal to natural gas), thereby reducing its emissions.\textsuperscript{73} The fall of the Berlin Wall resulted in the closure of many primitive East German power plants, reducing Germany's emissions in the 1990 to 1995 time period by 25\%.\textsuperscript{74} In Russia, the collapse of the Soviet Union closed many power plants as well, resulting in as much as a 38\% decrease in emissions.\textsuperscript{75} Russia could thus earn billions of dollars by selling unused greenhouse gas quotas to countries that have exceeded their limits.\textsuperscript{76}

In addition, many European countries will benefit from the joint action mechanism of the Kyoto Protocol, which allows two or more Annex I countries to act jointly so that each will be deemed in compliance with its emissions reduction obligations if total emissions do not exceed the combined levels assigned to the parties under the Protocol.\textsuperscript{77} The European Union particularly benefits from this mechanism because of the emissions reductions already noted in countries like Germany, England, and France.\textsuperscript{78} Further, the Joint Action mechanism allows those European countries "that face high costs in cutting back their emissions" to "buy permits or credits from other European countries that face lower control costs."\textsuperscript{79} This creates a trade bubble that clearly favors the EU, allowing it much greater flexibility than other parties to the Protocol, who must abide by individual reduction standards.\textsuperscript{80}

Moreover, developing countries will bear no burden to limit greenhouse gas emissions under Kyoto.\textsuperscript{81} This could inspire a shift of industrial production, investment, and jobs from developed to developing countries.\textsuperscript{82} Developing countries also stand to benefit

\textsuperscript{72} Id. at 218 \& n.256.
\textsuperscript{73} Id. at 218.
\textsuperscript{74} See id.
\textsuperscript{76} Shchedrov, supra note 75.
\textsuperscript{78} See Yandle \& Buck, supra note 71, at 223.
\textsuperscript{79} Id. at 225.
\textsuperscript{80} See id. at 226.
\textsuperscript{81} See id. at 219.
\textsuperscript{82} Id.
from the CDM. Developed countries such as the United States, Canada, and Australia would be most likely to engage in CDM projects, as their burdens under Kyoto would be relatively high due to increased carbon emissions in those countries between 1990 and 1997.

On the other hand, developing countries argue that Annex I developed countries have been primarily responsible for carbon dioxide and other greenhouse gas emissions historically, and thus have created the very problem from which the developing countries will suffer most. After obtaining extensive wealth through essentially unregulated industrial development that emitted large doses of greenhouse gases into the atmosphere, the United States now refuses to participate in the only multilateral effort to address the problem of climate change unless poor, developing countries meet benchmarks similar to those required of developed countries. Such countries might therefore argue that the free-rider problem about which the United States complains actually occurs in the reverse, to the advantage of the United States and other already industrialized nations. Given the divergent views and national concerns regarding greenhouse gas emissions and global climate change, perhaps the Kyoto Protocol, although far from perfect, is the best solution that reasonably could be expected from the first

83. See supra note 56 and accompanying text.
84. See Yandle & Buck, supra note 71, at 218.
85. See Perry E. Wallace, Global Climate Change and the Challenge to Modern American Corporate Governance, 55 SMU L. Rev. 493, 502 (2002). Developing nations will logically suffer most from the effects of climate change because they lack the financial resources necessary to mitigate damages and adapt to changing climatic conditions. See Jonathan Baert Wiener, Global Environmental Regulation: Instrument Choice in Legal Context, 108 Yale L.J. 677, 698-99 (1999).
86. See Wallace, supra note 85, at 501-02.
87. History is replete with examples of Western colonialism creating export economies in the lesser developed world, resulting in virtually no industrial complex within colonized nations. Lagging industrialization left the economies of such nations relatively primitive and depressed. Meanwhile, the U.S. economy benefitted tremendously from rapid (and unregulated) industrialization and inexpensive raw material imports during the late-nineteenth- and early-twentieth-centuries. Many lesser developed nations thus believe it is unfair to impose costly restrictions on their ability to industrialize because the Western world was able to develop and thrive without such restrictions and, arguably, at the expense of the colonized world. See, e.g., Lan Cao, Toward a New Sensibility for International Economic Development, 32 Tex. Int'l L.J. 209, 241-42 (1997).
worldwide effort to combat climate change—and perhaps that was its intention.  

2. The United States Reacts to Kyoto

Before President Clinton signed the Kyoto Protocol in 1998, the Senate unanimously passed the 1997 Byrd-Hagel Resolution, dashing any hopes of immediate U.S. ratification. Byrd-Hagel emphasized both the environmental impact of developing nations’ emissions, which "are expected to surpass" those of the United States and others as early as 2015, and the economic impact that free passes for developing nations could inflict upon the United States under an international regulatory regime. The Senate thus declared:

[T]he United States should not be a signatory to any protocol to, or other agreement regarding, the United Nations Framework Convention on Climate Change of 1992, at negotiations in Kyoto in December 1997, or thereafter, which would—

(A) mandate new commitments to limit or reduce greenhouse gas emissions for the Annex I Parties, unless the protocol or other agreement also mandates new specific scheduled commitments to limit or reduce greenhouse gas emissions for Developing Country Parties within the same compliance period, or

(B) would result in serious harm to the economy of the United States.  

Concerned that the executive branch would circumvent Congress and implement Kyoto by way of Environmental Protection Agency (EPA) regulation, Congress attached temporary budget riders to various appropriations bills in 1998 and 1999, barring the use of

88. See Antonio Regalado & Jeffrey Ball, As Planet Heats Up, Scientists Plot Innovative Fixes, WALL ST. J., Oct. 22, 2004, at A1 (stating that, in reality, the Kyoto Protocol “never was intended as anything but a first step.... Most scientists believe trimming emissions by 5.2% isn’t anywhere near enough to protect the planet”).
90. Id.
91. Id.
funds to issue regulations for the purpose of implementing or preparing to implement Kyoto.92

Fears associated with the President circumventing Congress and unilaterally implementing Kyoto disappeared with the election of George W. Bush in 2000. On July 11, 2001, from the White House Rose Garden, President Bush referred to the Kyoto Protocol in the past tense: "The Kyoto Protocol was fatally flawed in fundamental ways" due to scientific uncertainty, lack of commitments from developing nations, and arbitrary unscientific targets that would harm the U.S. economy.93 Months before this speech, the administration officially withdrew the United States' signature from the treaty.94 One year later, reneging on a campaign promise to impose mandatory emissions reductions,95 President Bush unveiled his plan for voluntary emissions reductions via the Clear Skies legislation.96 During his remarks President Bush reaffirmed the country's commitment to the UNFCCC and presented his administration's goal of cutting the country's greenhouse gas intensity, defined as the ratio between emissions and economic growth (emissions per unit of GDP).97 This approach, the President said, "will set America on a path to slow the growth of our greenhouse gas emissions and, as science justifies, to stop and then reverse the growth of emissions."98 In effect, President Bush is taking a laissez-
faire approach; during the last decade, as the U.S. economy has become less reliant on the manufacturing sector, greenhouse gas intensity has naturally fallen even though total emissions have steadily increased. In rhetoric, however, President Bush compares his emissions plan favorably to that required of the average nation under the Kyoto Protocol and has promised not to interfere with the decisions of those nations that choose to participate in the international agreement. Just recently, the United States entered into a nonbinding agreement with five Asian and Pacific nations, including China and India, "to address the growth of climate-changing pollution while still meeting their growing energy needs." It is clear, however, that the United States will not become a party to Kyoto under the current administration.

III. ARE EMISSIONS REDUCTIONS BINDING UNDER INTERNATIONAL LAW?

A. Obligations Under the UNFCCC

Certainly the United States is not yet bound by international law to ratify or specifically adhere to the Kyoto Protocol. However, the UNFCCC may present another issue. Treaties are the simplest, most straightforward way to make international law, as they are entered into voluntarily. Under the UNFCCC, the United States is obligated by treaty to take domestic measures to reduce greenhouse gas emissions, despite a degree of scientific uncertainty and slower progress on the part of developing nations. Thus, as a party to an international convention whose commitments—although general—are quite clear, the United States is technically

103. See supra notes 45-49 and accompanying text.
bound by international law to the explicitly agreed upon action of reducing rather than increasing greenhouse gas emissions.\textsuperscript{104}

Further, under domestic law, Article VI of the U.S. Constitution provides that “[t]his Constitution, and the Laws of the United States which shall be made in Pursuance thereof; and all Treaties made, or which shall be made, under the Authority of the United States, shall be the supreme Law of the Land.”\textsuperscript{105} The Supreme Court has interpreted this language to mean that the legal status of treaties in the United States is equivalent to that of federal statutes.\textsuperscript{106} The United States is therefore bound to its obligations under the UNFCCC by domestic law as well, unless it revokes its signature to the treaty or passes superseding legislation. The Byrd-Hagel Resolution of 1997 does not qualify as superseding legislation because it very clearly states that its intention is to prevent future international agreements to limit U.S. emissions\textsuperscript{107} without ever implying any intention to repudiate the UNFCCC. President Bush’s reiteration of the nation’s commitment to its obligations under the UNFCCC underscores this point.\textsuperscript{108}

In 2001, despite its treaty commitment, the United States showed a net increase in emissions of 13\% above 1990 levels, and has since failed to set forth any federally mandated reductions.\textsuperscript{109} In fact, the United States rewards greenhouse gas emitters with federal subsidies.\textsuperscript{110} Further, the U.S. policy goal of reducing the rate of emissions increases, rather than actually reducing emissions—even by the slightest of margins—conflicts with the

\footnotesize{\begin{itemize}
\item \textsuperscript{104} Clearly, the United States is not bound to specific reduction targets under this theory, but it is bound to create a national program aimed at reducing net greenhouse gas emissions, per the plain language of UNFCCC. \textit{See supra} notes 45-49 and accompanying text.
\item \textsuperscript{105} U.S. CONST. art. VI, cl. 2.
\item \textsuperscript{106} Reid v. Covert, 354 U.S. 1, 18 \& n.34 (1957); Whitney v. Robertson, 124 U.S. 190, 194-95 (1888).
\item \textsuperscript{107} The Byrd-Hagel Resolution demands that no specific emissions limitations be agreed to after 1990, unless such limitations will not harm the U.S. economy \textit{and} lesser-developed nations also incur binding emissions limitations. \textit{See supra} notes 89-92 and accompanying text.
\item \textsuperscript{108} \textit{See supra} notes 93-101 and accompanying text.
\item \textsuperscript{109} McKinstry, \textit{supra} note 46, at 25.
\item \textsuperscript{110} \textit{Id.} at 25-26 (noting that fossil fuel tax subsidies are part of U.S. policy despite a UNFCCC obligation for the country to “...identify and periodically review its own policies and practices which encourage activities that lead to greater levels of anthropogenic emissions of greenhouse gases ... than would otherwise occur” (alteration in original) (omission in original) (quoting UNFCCC, \textit{supra} note 45, art. IV, § 2(e)(ii))).
\end{itemize}}
These factors support the argument that the United States is out of compliance with the UNFCCC, and thus in violation of its international obligations.

B. Multilateral Treaties as Customary International Law

An analysis of customary international law, which sets forth principles binding on all nations, further supports the argument that the United States is out of compliance with international law. Generally, a legal principle must be widely accepted before it is recognized as customary international law. For a treaty to create customary international law, and bind all nations, the treaty must have multilateral compliance. The International Court of Justice (ICJ) has held that "there is no doubt that this [treaty] process is a perfectly possible one and does from time to time occur" and that "it constitutes indeed one of the recognized methods by which new rules of customary international law may be formed," but that it is not to be regarded lightly.

To reach customary status a treaty must have a sufficiently large number of states in accession, including those most pertinent to, or affected by, the agreement. A strict approach to analyzing multilateral treaty agreements as customary international law also demands that the treaty not allow for reservations to its provisions. Although this formula tends to prevent most multilateral treaties from reaching customary status, such a result is in accord with the ICJ's hesitation to take the development of binding international law lightly. The UNFCCC, however, meets all three prongs of this stringent test, and thus may well be regarded as

111. Compare supra notes 96-97 and accompanying text, with supra notes 45-49 and accompanying text.
112. The United States surely would argue that voluntary programs and research funding are enough to comply with the vaguely worded treaty directives, but such an argument seems to defy the treaty's plain meaning.
113. See Scott & Carr, supra note 102, at 84.
114. See id. at 85.
115. Id. (internal quotation marks omitted).
116. See id. at 85-87 (noting a qualitative and a quantitative requirement).
117. See id. at 91-92 (noting a "no reservation" requirement).
customary international law, with its principles binding on all nations.  

Even without this customary status, however, as a signatory to the UNFCCC the United States agreed to be bound without reservation to the UNFCCC's tenets. One may therefore conclude that the United States is obligated by both treaty law and customary international law to take good-faith action (or inaction, e.g., not subsidizing fossil fuel emitters) to reduce net greenhouse gas emissions. A comprehensive plan to set and monitor mandatory emission limits is probably necessary to fulfill this obligation.

IV. IF NOT KYOTO, THEN WHAT? DOMESTIC ALTERNATIVES

A. Regulation Under Existing Federal Law: Clean Air Act and New Source Review

Arguably, there are several ways by which domestic measures could be utilized to bring the United States into compliance with the UNFCCC. One option may be the Clean Air Act (CAA) New Source Review (NSR) permit program. Even if carbon dioxide, the main greenhouse gas, is not considered a "criteria pollutant" for purposes of CAA mandatory regulation, it can be classified as an "unregulated pollutant" under NSR. NSR demands that originators of major new sources of air pollution evaluate and mitigate the environmental impact of their actions, including the impact from

118. See Craig L. Carr & Gary L. Scott, Multilateral Treaties and the Environment: A Case Study in the Formation of Customary International Law, 27 DENV. J. INT'L L. & POL'Y 313, 325 (1999) (classifying the UNFCCC as clearly meeting the three-part test, because most of the world's developed states—which are the pertinent ones to this treaty—are parties, 177 states in total are parties, and the treaty does not allow reservations). Additionally, the "precautionary principle" is present in just about every modern international environmental protection treaty, a fact that may make delaying an absolute reduction in anthropogenic greenhouse gas emissions because of scientific uncertainty a violation of international customary law. See Waterman, supra note 12, at 763.

119. The international law concept of jus cogens—peremptory norms that protect common interests—may provide an additional legal vehicle by which to enforce global reductions in greenhouse gas emissions in the future. For a full analysis, see Eva M. Kornicker Uhlmann, State Community Interests, Jus Cogens and Protection of the Global Environment: Developing Criteria for Peremptory Norms, 11 GEO. INT'L ENVTL. L. REV. 101 passim (1998).

120. See Foote, supra note 23, at 10,642.

121. Id. at 10,643.

122. Id.
unregulated pollutants. Permit-issuing authorities may use NSR to require, for example, that new coal-burning power plants—the largest greenhouse gas emitters—the largest greenhouse gas emitters—utilize Integrated Gasification Combined Cycle (IGCC) technology to curb emissions.

Economy-wide emissions regulations are also possible through the CAA’s pollution-control sections if EPA classifies greenhouse gases as air pollutants that arise from diverse sources and may reasonably be anticipated to endanger the general health and welfare. In a 1999 legal opinion letter, an EPA official testified that the agency had preexisting legal authority under the CAA to regulate carbon dioxide as a hazardous air pollutant, just as it had authority to regulate sulfur dioxide, nitrogen oxide, and mercury. Former EPA Administrator Carol Browner maintained that EPA has broad authority to regulate carbon dioxide under several CAA regulatory provisions.

According to the D.C. Circuit, the CAA defines “air pollutant” extremely broadly. Congress defined the term to include “any air pollution agent or combination of such agents ... which is emitted into or otherwise enters the ambient air,” encompassing “any precursors to the formation of any air pollutant.” Congress also listed carbon dioxide in its delineation of “multiple air pollutants” that require research under section 103(g) of the CAA.

To regulate carbon dioxide under the CAA, EPA must determine that it is an air pollutant, that its emissions stem from numerous or diverse sources, and that its emissions “may reasonably be anticipated to endanger public health or welfare.” This seems like a reasonable conclusion under the statute’s plain language. Carbon dioxide emissions stem from both industry plants and motor vehicles (numerous and diverse sources) and, according to the

123. See id.
124. Id. For a technical account of this latest technology, see id.
126. See id. at 498 n.33.
127. Id. at 499 & nn.38-40.
IPCC, may fairly be anticipated to endanger human health and welfare.\textsuperscript{132}

Nevertheless, in August 2003, EPA reversed its position and determined that carbon dioxide is not a CAA pollutant and is thus beyond the CAA’s regulatory reach.\textsuperscript{133} The rationale: carbon dioxide is an agent of climate change, and Congress did not intend for EPA to address climate change under the CAA, so carbon dioxide is not an air pollutant under the Act.\textsuperscript{134} In so concluding, EPA ruled against petitions seeking such classification.\textsuperscript{135} Lawsuits, administrative petitions, and state-based initiatives to curb greenhouse gas emissions followed.\textsuperscript{136}

\textit{B. Massachusetts v. EPA}

Twelve states, the District of Columbia, New York City, the City Council and Mayor of Baltimore, the American Samoa government, the Commonwealth of the Northern Mariana Islands, the International Center for Technology Assessment, and several environmental groups jointly filed suit against EPA, challenging the agency’s denial of its authority to regulate greenhouse gas emissions from new motor vehicles under CAA section 202.\textsuperscript{137} Section 202(a) states, in relevant part: “The Administrator shall by regulation prescribe ... standards applicable to the emission of any air pollutant from any class ... 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

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\textsuperscript{132} See supra Part I.
\textsuperscript{133} See, e.g., Gary C. Bryner, \textit{Carbon Markets: Reducing Greenhouse Gas Emissions Through Emissions Trading}, 17 Tul. Envtl. L.J. 267, 275 (2004). Note, however, that EPA’s determination that carbon dioxide is not an air pollutant and is beyond the regulatory reach of the CAA is hotly contested. Judicial review of EPA’s determination or a change in administration could well lead to the opposite conclusion.
\textsuperscript{136} See Bryner, supra note 133, at 275.
\textsuperscript{137} Final Brief for the Petitioners in Consolidated Cases at i, 12, Massachusetts v. EPA, 415 F.3d 50 (D.C. Cir. 2005) (No. 03-1361), 2005 WL 257460 [hereinafter Petitioners’ Brief].
\end{flushright}
health or welfare." 138 "Air pollutant" is defined by section 302(g) of the CAA as "any air pollution agent or combination of such agents, including any physical, chemical, biological, [or] radioactive ... 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." 139 "Effects on public welfare" is defined in section 302(h) as including, but "not limited to, effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate." 140 The plain language of the Act, with the use of the word "shall" in section 202, seems to support the petitioner's proposition that EPA has a non-discretionary duty to regulate greenhouse gas emissions from new motor vehicles, but EPA's fall-back argument of agency discretion apparently persuaded the court otherwise.

EPA functioned as the lead agency in the U.S. Climate Action Report, 141 which outlined the likely impacts of climate change on the public welfare. Nevertheless, EPA argued that as a threshold matter, carbon dioxide is not an air pollutant for purposes of the Clean Air Act. 142 It further argued that when the CAA was passed, Congress did not intend for EPA to spearhead a massive regulation of carbon dioxide to address the issue of global climate change, and that legislative history of the 1990 amendments reveals that Congress explicitly debated carbon dioxide emissions from vehicles and voted against granting EPA authority to regulate. 143 Petitioners responded that Congress's failure to pass specific, numerical carbon

141. See U.S. CLIMATE ACTION REPORT, supra note 24; see also text accompanying note 24.
142. Control of Emissions from New Highway Vehicles and Engines: Notice of Denial of Petition for Rehearing, 68 Fed. Reg. 52,922, 52,925 (Sept. 8, 2003) (adopting the position that "the CAA does not authorize EPA to regulate for global climate change purposes, and accordingly that CO₂ and other GHGs cannot be considered 'air pollutants' subject to the CAA's regulatory provisions for any contribution they may make to global climate change").
143. Joint Brief of Industry Intervenor-Respondents at 1, 5-8, Massachusetts v. EPA, 415 F.3d 50 (D.C. Cir. 2005) (No. 03-1361), 2005 WL 257457 [hereinafter Respondent's Brief]. EPA specifically relied on FDA v. Brown & Williamson Tobacco Corp., 529 U.S. 120 (2000), concluding that "in light of the enormous economic and political consequences of regulating greenhouse gas emissions, Congress would have been far more specific if it had intended to authorize EPA to regulate the subject" under the Clean Air Act. Massachusetts v. EPA, 415 F.3d 50, 56 n.1 (D.C. Cir. 2005). The court declined to express a view on this analysis. Id.
dioxide standards "provides no basis for concluding that EPA lacked pre-existing authority to regulate greenhouse gases." EPA then contended that its authority to regulate pollutants that settle in ambient air does not include carbon dioxide, which concentrates in higher altitudes of the atmosphere. Finally, the agency argued that regulating carbon dioxide under section 202 of the CAA would directly conflict with the more recent Energy Policy and Conservation Act (EPCA), which itself regulates fuel economy standards. As a fall-back argument, EPA proffered that even assuming statutory authority to regulate carbon dioxide emissions from new motor vehicles, the decision to exercise such authority remained a matter of agency discretion.

In a plurality opinion supplemented by a lengthy and vigorous dissent, the D.C. Circuit agreed with EPA's fall-back argument. The court, assuming arguendo that EPA retained statutory authority to regulate greenhouse gases from new motor vehicles, addressed the issue of whether EPA properly declined to exercise such authority. The court resolved that question in the affirmative, reasoning that when an agency is faced with issues on the frontiers of scientific knowledge, a reviewing court should "uphold agency conclusions based on policy judgments." With a splintered holding and a well-reasoned dissent highlighting the fact that EPA's policy judgment failed to relate to the statutory standard, this case appears ripe for Supreme Court review.

144. Petitioners' Brief, supra note 137, at 32.
145. Respondents' Brief, supra note 143, at 11-12.
146. See id. at 15; see also Massachusetts, 415 F.3d at 72 (stating that CO2 regulation by EPA would "overlap" with the Department of Transportation's authority under the EPCA). The EPCA is codified at 42 U.S.C. §§ 6201-6422 (2000).
147. Massachusetts, 415 F.3d at 53.
148. Id. at 58.
149. Id. at 56.
150. Id. at 58 (quoting Envtl. Def. Fund v. EPA, 598 F.2d 62, 62 (D.C. Cir. 1978)).
151. See id. at 67-69, 80-81 (Tatel, J., dissenting) (stating that "an agency may not avoid the Congressional intent clearly expressed in the [statutory] text simply by asserting that its preferred approach would be better policy" (alteration in original) (internal quotation marks omitted)). Judge Tatel asserts that the broad, precautionary, and mandatory language of the Act easily covers greenhouse gases emitted from motor vehicles and that to disregard the Act's plain text, EPA must offer "extraordinarily convincing justification," a feat at which it utterly failed. Id. at 67-69.
152. In a four-to-three decision, the D.C. Circuit denied petitioners' petition for rehearing en banc. Massachusetts v. EPA, 433 F.3d 66 (D.C. Cir. 2005). In another compelling dissent,
Motor vehicle emissions constitute 20% of U.S. greenhouse gas emissions. Thus, if the court had held for petitioners, the resulting EPA standards for motor vehicle emissions could have single-handedly brought the United States into compliance with its UNFCCC obligation to reduce greenhouse emissions. More broadly, a victory in this case for petitioners would have required a finding that EPA acted wrongly in failing to define carbon dioxide as a CAA air pollutant. Such a finding would theoretically have opened the door to direct, economy-wide regulation of the substance under sections 108 and 109, which set air quality standards for pervasive, “criteria” air pollutants, defined as those which “cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare.” By holding for the respondent, however, Congress has arguably been given both the opportunity and the obligation to develop a national program for UNFCCC compliance, possibly by amending the CAA and laying out a clear framework for greenhouse gas regulations.

Judge Tatel, joined by Judge Rogers, admonished that “[a]lthough Ethyl recognizes EPA’s discretion to interpret data from health risk assessments, nothing in Ethyl authorizes the Agency to do what it did here, i.e., to ignore record evidence of impending public harm and to refuse altogether to assess related risks.” Id. (Tatel, J., dissenting) (referring to Ethyl Corp. v. EPA, 541 F.2d 1 (D.C. Cir. 1976) (en banc)). In fact, “EPA acknowledges not only that automobile emissions produce greenhouse gases, ... but also that greenhouse gases in turn contribute to climate change.... In short, EPA all but concedes that automobile greenhouse gas emissions ‘cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.’” Id. 153. Anne Klosterman, The United Nations’ Agreement To Adopt Uniform Technical Regulations for Wheeled Vehicles: An Important Step Toward International Harmonization for Vehicle Emissions Regulations, 12 COLO. J. INT’L ENVTL. L. & POL’Y (2000 Y.B.) 239, 247 (2001).

154. See Bugnion & Reiner, supra note 125, at 502-09 (laying out the statutory analysis). Regulating carbon dioxide as a National Ambient Air Quality Standards (NAAQS) pollutant may pose practical obstacles to states’ ability to comply with state implementation plans (SIPs) due to the relatively even dispersion of carbon dioxide in the lower atmosphere. See Massachusetts, 415 F.3d at 69-70 (Tatel, J., dissenting) (referencing EPA’s unworkability argument). However, § 7609(a) of the CAA provides a safe harbor for states that fail to meet their NAAQS due to emissions originating from outside the country; from a practical perspective, therefore, EPA could regulate carbon dioxide under section 202 of the Act while functionally circumventing regulation as a criteria pollutant under sections 108 and 109 because of unworkability and the safe harbor provision. See id.
C. State-Based Initiatives

Frustrated by the absence of serious national action to address climate change, some states are proceeding independently. As Justice Brandeis eloquently remarked in 1932, "[i]t is one of the happy incidents of the federal system that a single courageous State may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country." In that famous dissent, Justice Brandeis reiterated the settled principle of constitutional law "that the police power commonly invoked [by states] in aid of health, safety and morals, extends equally to the promotion of the public welfare."

More than half of the states have utilized this power in the climate change arena. Massachusetts issued a rule in 2001 capping carbon emissions from six high-emitting older power plants in the state. Similarly, in 2002, New Hampshire passed legislation imposing a carbon cap on power plants fired by fossil fuels, which, by 2007, will cut carbon dioxide emissions to 7% below 1990 levels. California enacted one of the most far-reaching climate change bills in 2002, requiring its Air Resources Board (CARB) to regulate greenhouse gas emissions from motor vehicles to the maximum extent feasible, with mandatory reductions from 2009 models and beyond. Oregon now requires carbon dioxide offsets for new power plants; Vermont is under an executive order to cut greenhouse gas emissions; and Maine is requiring state officials to develop a climate change program that will reduce carbon dioxide emissions to 1990 levels by 2010, by an additional 10% as of 2020.
and eventually by a full 80%. In November 2004, Colorado voters approved a ballot measure requiring major utilities statewide to derive 10% of their power from renewable sources by 2015.

Regional agreements also abound. Governors of New England states and the eastern Canadian premiers have agreed to a climate action plan to cap carbon dioxide emissions at 1990 levels by 2010. In July 2003, ten northeastern states announced the formation of a cap-and-trade program for power plant carbon dioxide emissions. Seven of those states, led by New York, have since moved closer to actual implementation, with Maryland and Pennsylvania agreeing to participate as observers. On the West Coast, California, Oregon, and Washington have pledged to purchase more hybrid vehicles for government fleets, to encourage renewable electricity resource development, and to coordinate greenhouse gas inventories and standards.

States reducing greenhouse gas emissions report ancillary benefits such as the creation of new jobs and businesses, technological development, and lower energy costs for homes and businesses. As the urgency of climate change continues to grow, the

162. Bryner, supra note 133, at 277; Hagen et al., supra note 159, at 52.
165. Bryner, supra note 133, at 276-77.
167. Hagen et al., supra note 159, at 52.
168. See Dernbach, supra note 18, at 194-95 (“[I]ronically, then, one of the most important reasons for states to reduce greenhouse gas emissions is to achieve ancillary or other benefits. These benefits have been a primary motivation for states that have already done
market will expand, and economic rewards should compound for states that invest in programs and technology related to renewable energy and energy efficiency. The mushrooming of state-based regulatory action over the past five years indicates the speed at which change is occurring; industry would probably be wise to view it as a precursor to federal regulation. After all, although praiseworthy, state-based regulations do not represent the concerted national effort promised in the UNFCCC and thus do not bring the nation into compliance with its international obligations.

**D. Pending Federal Legislation**

Since the Byrd-Hagel Resolution of 1997, Congress has taken meaningful strides toward what appears to be an inevitable regulatory regime to address climate change. Senators Jeffords of Vermont and Lieberman of Connecticut, for example, sponsored the Clean Power Act, legislation that has been percolating in Congress since 2001 and that would drastically reduce nitrogen oxides, mercury, sulfur dioxide, and carbon dioxide emissions by 2008 if implemented. This reduction would be accomplished by demanding that old power plants, which currently escape modern pollution control standards through a grandfathering mechanism in the Clean Air Act, be held to the same standards as all other power plants. It would also establish a cap-and-trade program designed to limit emissions and encourage innovation.

The McCain-Lieberman Climate Stewardship Act of 2003 represents another mandatory, but market-based, cap-and-trade

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169. See id.

170. See Bryner, supra note 133, at 274-75 (noting that Congress is expected to pass a climate change bill in the near future).


173. See id.
bill modeled on the successful acid rain control program.\textsuperscript{174} Beginning in 2010, emissions of all six greenhouse gases, including carbon dioxide, would be capped economy-wide at year 2000 levels.\textsuperscript{175} On October 30, 2003, the Senate rejected the bill by a vote of 55 to 43, but the vote exhibited increasing bipartisan support for federal regulation of greenhouse gases.\textsuperscript{176} Indeed, a provision passed by the Senate Foreign Relations Committee in May 2003 calls for "U.S. engagement in the development of a binding international climate change treaty."\textsuperscript{177} After rejecting the most recent iteration of the Climate Stewardship Act by a vote of 60 to 38, lawmakers "passed by voice vote a nonbinding resolution calling for Congress to approve mandatory limits on greenhouse gas emissions in a way that does not" cause significant harm to the U.S. economy.\textsuperscript{178}

Overall, the 107th Congress saw the introduction of more than fifty bills and provisions from both sides of the aisle regarding climate change.\textsuperscript{179} This indicates that eventually one is likely to stick, and mandatory emission reductions will ensue. MIT economists performed an independent analysis on the Climate Stewardship Act and concluded that it could cost Americans less than twenty dollars annually per household.\textsuperscript{180} Such studies should help alleviate concerns regarding the economic impact of regulations.

\textsuperscript{174} See Vicki Arroyo, Climate Change: A Primer (ALI-ABA Course of Study, Nov. 20-21, 2003), WL SJ011 ALI-ABA 1, 23-24 (noting that regulating acid rain precursors through a cap-and-trade program was Congress's first attempt at market-based, rather than command-and-control, environmental regulation).

\textsuperscript{175} See id.

\textsuperscript{176} Comm. on Sustainable Dev., Ecosystems & Climate Change, The Year in Review, 2003 ABA SEC. ENV'T, ENERGY, & RESOURCES 117, 123 (stating that "[o]f the forty-three votes in favor of the bill, six came from Republicans, suggesting rising bipartisan support for climate change policy").

\textsuperscript{177} Hagen et al., supra note 159, at 51.

\textsuperscript{178} Justin Blum, Senate Rejects Greenhouse Gas Limits, WASH. POST, June 23, 2005, at A8.

\textsuperscript{179} Healy & Tapick, supra note 158, at 97-98.

V. The Market's Double-Edged Sword: Concerns for the Economy in the Absence of Regulation

If international legal obligations and the physical threat of global climate change together fail to prompt significant formal action by the U.S. government, perhaps the private sector will emerge as a strange bedfellow to environmentalists and scientists. After all, as scientific reports regarding climate change continue to grow more specific and certain, even the rhetoric of those who sharply questioned the reality of climate change has softened. Remaining at issue among various populations is how severe the consequences of climate change will be and how far into the future they will manifest. Most scientists, however, conclude that atmospheric carbon dioxide concentrations are higher than 370 parts per million today; that the Earth can tolerate, at maximum, concentrations of 550 parts per million before dangerous climate reactions occur; and that we will likely reach that point around the year 2050 "[g]iven current projections of economic growth and emissions increases." The United Nations June 2003 report concurred, estimating "that greenhouse emissions in the developed world are likely to rise more than ten percent over the next decade, despite regulations designed to keep such emissions in check." Further, assuming the absence of effective UNFCCC compliance mechanisms, it is still unclear how members of the international community who committed to both the UNFCCC and the Kyoto Protocol will react to nonparticipating industrialized nations who may be seen as global free-riders. Beyond the availability of carbon emissions trading markets, Kyoto participants will likely create additional incentives to join the agreement. After all, parties to the Protocol are essentially taxing their own carbon emissions, so it would make sense, in turn, to impose on goods imported from the nonparticipating parties a tax proportionate to the quantity of

181. See Wallace, supra note 85, at 510.
182. Regalado & Ball, supra note 88 (recognizing that "[s]tabilizing atmospheric concentrations of greenhouse gases at 550 parts per million would require the world to cut emissions between 55% and 85% below where they'd otherwise be by 2100").
183. Hamilton, supra note 26, at 37.
carbon emitted in producing such goods.\textsuperscript{184} Logically, a parallel tax on carbon exports to nonparticipating parties would complete the scheme.\textsuperscript{185}

Accordingly, many companies are preparing for the looming need to regulate their greenhouse gas emissions, and carbon dioxide output in particular.\textsuperscript{186} Beyond international pressure, if scientific concerns about climate change come to fruition, American corporations may find themselves gravely imperiled.\textsuperscript{187} As the IPCC Working Group II Third Assessment Report illustrates, "Economic sectors that support the [human] settlement [or societal setting] are affected [by climate change] because of changes in productive capacity (e.g., in agriculture or fisheries) or changes in market demand for goods and services produced there (including demand from people living nearby and from tourism)."

This fundamental economic threat posed by climate change underscores the Securities and Exchange Commission (SEC) requirement that public companies report material environmental "trends and uncertainties that are likely to have a reasonable impact on a company's operations" under Item 303 of Regulation S-K.\textsuperscript{189} Failure to analyze and disclose these material "trends and

\textsuperscript{184} See David Zachary Kaufman, Comment, \textit{The Greenhouse Effect: Available and Needed Laws and Treaties}, 9 UCLA J. ENVTL. L. & POL\textY 219, 243 (1991). Potential conflicts with free trade agreements are beyond the scope of this Note. Should parties to Kyoto agree to this type of tax imposition, however, they might represent enough of the global economy to force the United States to engage in negotiations, despite a potential future World Trade Organization decision permitting sanctions.

\textsuperscript{185} See \textit{id.} (discussing possible international compliance and enforcement mechanisms to prevent the free-rider problem by encouraging "reluctant participants to join in any agreement to limit carbon emissions").

\textsuperscript{186} In addition to market pressures and probable regulation, companies and their directors/officers that fail to address climate change may find themselves subject to tort and other liability. For an interesting analysis of this issue, see Healy & Tapick, \textit{supra} note 158, at 101-13.

\textsuperscript{187} See Wallace, \textit{supra} note 85, at 511.


\textsuperscript{189} MICHELLE CHAN-FISHEL, FRIENDS OF THE EARTH, SURVEY OF CLIMATE CHANGE DISCLOSURE IN SEC FILINGS OF AUTOMOBILE, INSURANCE, OIL & GAS, PETROCHEMICAL, AND UTILITIES COMPANIES 1 (Sept. 2002), available at http://www.foe.org/camps/intl/corpacct/wallstreet/secsurvey.pdf. Line Item 303 of Regulation S-K provides: "Describe any known trends or uncertainties that have had or that the registrant reasonably expects will have a material favorable or unfavorable impact on net sales or revenues or income from continuing
uncertainties" violates federal securities laws and could ultimately support charges of securities fraud, resulting in significant liability. The Sarbanes-Oxley Act of 2002 raises the stakes for corporate officers and directors—who are personally liable, both civilly and criminally—for certifying the accuracy of their companies' financial reporting. Yet, public companies in the same sectors (e.g., competing automobile companies, competing petrochemical firms) are inconsistent as to whether and to what extent they analyze and disclose climate change vulnerabilities in SEC filings. Perhaps federal legislation regulating climate change emissions would provide public companies with the certainty of appropriate disclosure through reports of compliance with the national laws.

On the ground, companies handle the potential impact of climate change on their operations in various ways. Some are investing in new technologies and energy efficiency programs, not only to be ahead of the curve when regulations become effective, but also due to anxiety expressed by clients of major investment firms. Substantial state pension funds (which are responsible for hundreds of billions of dollars in investments) are exerting considerable pressure on management to screen investments for the risks associated with climate change. In September 2004, a coalition of seven large pension funds sent a letter to the nation's fifty largest investment firms asking for a report on how their investments are being defended against the risks associated with climate change:

"The potential for long term climate risk raises the possibility that certain economic sectors may become more or less profitable as the environment changes, or as certain economic activities are increasingly regulated to mitigate their climatic impact. Please tell us whether investment managers at your operations." 17 C.F.R. § 229.303(a)(3)(ii) (2005).


191. See CHAN-FISHEL, supra note 189, at 6, 10, 14.

192. See, e.g., Matthew Dalton, Pension Funds Push Climate Concerns, WALL ST. J., Oct. 27, 2004, at B2C (describing how investment banks' clients are demanding change and disclosure from energy companies).

193. See id.
firm are monitoring the impact of this risk on companies in the portfolios they manage."

This degree of economic pressure, despite the presence of an antiregulation administration in Washington, D.C., suggests that investors view greenhouse gas emissions regulations as inevitable, with certain industries more vulnerable to profit impacts than others. With state-based legislation passed, citizen suits filed, and an international treaty in force, this seems like a safe assumption.

On the global market, the implementation of the Kyoto Protocol will spur new markets in technology, which may eventually harm U.S. businesses who have little incentive to compete in the short term. Some economists estimate that the "carbon market" could reach $10 billion by 2008, when the Kyoto Protocol's legally binding emissions reductions take force. Multinational corporations that operate in Annex I countries will be the first U.S. businesses to experience the regulations. When regulations do ensue, those companies that have addressed the issue and taken steps to mitigate the impact will enjoy a significant advantage.

A study by the World Resources Institute concluded that proactive steps are far cheaper than reactionary ones. This theory is illustrated by a London-based company that gave $50,000 to two Indian tribes in Montana for a reforestation project. In return, the company obtained credits for the 47,972 tons of carbon dioxide that the trees are estimated to absorb over the next eighty years.

194. *Id.* (quoting the letter). In the same vein, in 2002, a group of thirty-one large investors, including Merrill Lynch Investment Managers, wrote to the largest 500 publicly traded companies in the world seeking information and analysis related to "possible material impacts on investment value driven by climate change related taxation and regulation, technology innovations, and shifts in consumer sentiment." *CHAN-FISHEL, supra* note 189, at 3.

195. See *CHAN-FISHEL, supra* note 189, at 3 (noting that energy companies, among others, could be viewed as risky investments because of the potential for regulation).

196. See *Waterman, supra* note 12, at 765 (critiquing the Bush administration's economic analysis of the Kyoto Protocol's effect on the U.S. economy).


199. *Temple, supra* note 100, at 249.

200. *Id.*
With a ton of greenhouse gas emissions estimated to be worth $70 or more one day, this exchange could result in a $3 million profit for the corporation.\footnote{201}{Id.} Thus, the Kyoto Protocol's CDM compliance program promises to play a key role in wise carbon investing.\footnote{202}{See supra Part II.B.} Financial models predict "a very large demand for CDM credits" and that "the cheapest CDM projects will likely be taken first by Kyoto signatories and their companies, leaving U.S. companies at a competitive disadvantage if they later become interested in using CDMs as an emissions hedge."\footnote{203}{See id.} If and when the United States moves toward a greenhouse gas cap-and-trade program, cost-effective CDM projects in developing countries will be critical for comfortable compliance by industry.\footnote{204}{See id.}

Some major corporations that operate in the U.S. have thus determined that emissions reductions should begin now, and have announced targets that exceed those required by the Kyoto Protocol.\footnote{205}{Latham & Watkins Envt, Land & Res. Dep't, Overview of the Process for Obtaining Carbon Credits Under the Clean Development Mechanism, CLIENT ALERT BULL. (Latham & Watkins, Wash., D.C.), Mar. 11, 2005, available at http://www.lw.com/resource/Publications/_pdf/pub1221_1.pdf.} DuPont, for example, intends to reduce its emissions to 65% below 1990 levels by 2010, partly by increasing its use of renewable energy by 10%.\footnote{206}{See id.} L’Oréal managed to increase production by 60% between 1990 and 2000 while simultaneously reducing greenhouse gas emissions by 44% and maintaining its status as the world’s largest cosmetics manufacturer.\footnote{207}{This list is not exhaustive.} Kodak reduced carbon dioxide emissions by 17% between 1999 and 2003, and is committed to reducing emissions by another 10% between 2004 and 2008.\footnote{208}{Id.; Donna Timmons, Worldwide Director of Health, Safety, and Environmental Affairs, Kodak Commitment To Reduce Greenhouse Gas Emissions, http://www.kodak.com/US/en/motion/hse/greenhouse.jhtml.} General Electric is spending hundreds of millions of dollars on clean energy technology, and Consolidated Edison, Inc. has already saved

201. Id.
202. See supra Part II.B.
204. See id.
205. Waterman, supra note 12, at 765 (listing Boeing, IBM, Shell, Amoco, BP, and Toyota as members of the Business Environmental Leadership Counsel of the Pew Center on Global Climate Change, which foresees Kyoto targets as only the first step in emissions reductions).
206. Id.
207. Bryner, supra note 133, at 281 (noting that L'Oreal accomplished this feat through energy conservation programs).
millions by investing in the elimination of natural gas leaks.\textsuperscript{209} Other companies, such as Johnson & Johnson, Pfizer Inc., and Citigroup, are preparing for expected regulations by investing in high-end technology that maximizes energy efficiency so as to reduce their usage and insulate themselves against future price spikes.\textsuperscript{210} Companies are also pouring money into research. Over the next decade, ExxonMobil will spend $100 million on climate change research at Stanford.\textsuperscript{211} General Motors is spending $500,000 on a Duke program designed to create fuel cells that run on hydrogen.\textsuperscript{212} A Columbia University scientist funded by private donors is working with engineers to develop technology that aims to capture carbon dioxide from the air and store it in underground boulders, preventing the atmospheric accumulation that results in global warming.\textsuperscript{213} Whether a relatively easy technological solution to the global climate change problem will emerge, however, remains speculative.

Industry lobby predictions that significant economy-wide emissions reductions are cost prohibitive must be viewed in context. Lee Iacocca claimed that the proposed Clean Air Act of 1970 would shut down the U.S. automobile production industry.\textsuperscript{214} During congressional debates over acid rain control legislation in the late 1980s, the National Association of Manufacturers predicted "serious and lasting damage to the economy" that would make the United States a second-class industrial power by the year 2000.\textsuperscript{215} The automobile industry also claimed that raising fuel efficiency standards to forty miles per gallon "would devastate the industry, putting 300,000 auto workers out of their jobs."\textsuperscript{216} This job loss statistic was computed by adding the number of employees manufacturing cars with fuel capacities below forty miles per gallon.\textsuperscript{217} It therefore assumed that the industry would essentially shut down rather than build cars in compliance with new stan-
Hence, when would-be regulated companies report devastating costs associated with compliance, it is wise to examine the methodology used to assess those costs with a critical eye.

**CONCLUSION**

When the United States joins the international community and moves toward genuine compliance with the UNFCCC, the rest of the developed world will be at a far more advanced stage in tackling climate change and adapting to its challenges. Although the atmosphere cannot differentiate between major and minor carbon emitters, nations of the world and their markets are more discerning. By failing to meet its obligation as a developed nation and UNFCCC signatory to be a leader in the mitigation of anthropogenic climate change, the United States may face both legal and economic repercussions from the global community. But all hope is not lost. For better or worse, the United States has genuine concerns about the intentions and ramifications of the Kyoto Protocol. Developing a workable domestic alternative that could later be synthesized with an existing international agreement or used to create a new multilateral regime may be a realistic solution to the impasse.\(^\text{219}\)

At the least, it is critical that the United States comply with the soft, general commitments it undertook in the UNFCCC to adopt policies and measures aimed at reducing emissions to 1990 levels.\(^\text{220}\) This means at least negligibly lowering total net greenhouse gas emissions. Hoping to reduce emissions intensity—the percentage increase of emissions in relation to the percentage increase of GDP—by voluntary actions is insufficient as a matter of law. The effort must result in an overall emissions decrease, not a continued increase, in order to comply with the UNFCCC. Funding additional research into climate science while continuing to increase emissions is a policy fundamentally out of compliance with the nation’s legal obligations under the UNFCCC. It is a question of direction, and good-faith movement toward net emissions reductions may be

\(^{218}\) See id.

\(^{219}\) See, e.g., DANIEL BODANSKY, U.S. CLIMATE POLICY AFTER KYOTO: ELEMENTS FOR SUCCESS 6 (2002).

\(^{220}\) See UNFCCC, supra note 45, art. 4, para. 2.
necessary to guarantee a place in future multilateral negotiations, some of which may contain "members only"-type markets attractive to U.S. businesses.

The consequences expected from global climate change only become clearer and more imminent with the passage of time. A technological cure that will end America's obligation to regulate carbon dioxide and wash away fears of climate change has yet to arrive. There is, however, no incentive to spur technology like necessity. Charging fees for the right to pollute may provide that inspiration. For now, market-based cap-and-trade programs are the dominant environmental regulatory regime. Without a doubt, the value of carbon credits acquired today will skyrocket in coming decades. Industry would be wise to begin carbon credit acquisition, diversification, and efficiency programs now so as to be at a competitive advantage when the inevitable occurs. It remains too early to conclude whether regulations will first be implemented according to standards set by domestic law, international law, or the law of the market, but it is clear that the atmosphere's ills will not, ceteris paribus, self-cure.

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