



# Frostpaw Addressing Global Warming: Solving a Big Problem with Old Legal Tools and New Administrative Systems

By William J. Snape, III - 63 Am. U. L. Rev. 1587 (2014)

*Climate change impacts the law on many levels and in many ways. This Article asks a threshold question: what legal structures will most effectively reduce growing levels of anthropogenic greenhouse pollution? The answer is that an existing U.S. statute—the Clean Air Act—not only possesses clear commands to ratchet down greenhouse pollutants domestically, but also provides explicit authority to negotiate concomitant air pollution reduction with countries around the planet in a fair, transparent, and reciprocal fashion. Further, application of the Clean Air Act is consistent with other legal and policy tools to address global warming. This statute-based solution, while facially simple, raises novel administrative law applications that link many local, regional, and national governments while simultaneously raising issues that go to the heart of current individual energy demand and consumption behaviors. Overall, this proposal would demand science-based standards, complete public involvement in decisions, and flexibility on means to achieve pollution reduction goals. Without such an effort, the misery index for humans and the rest of the natural world seems destined to rise precipitously.*

\* Senior Counsel, Center for Biological Diversity. Practitioner in Residence and Fellow, American University, Washington College of Law. J.D., George Washington University, 1989; B.A., Honors College, University of California at Los Angeles, 1986 (magna cum laude). Because of the many outstanding legal questions presented in this paper, all opinions and conclusions presented belong to the individual Author, and do not necessarily reflect the position of any client or entity. The Author thanks Chelsea Tu, Jonna Chung, Melisa Tomais, Anna “Mickey” Moritz, Amanda Leiter, David Bookbinder, Tamara Strobel, and the staff of the American University Law Review for their help and support on earlier drafts.

## TABLE OF CONTENTS

Introduction: “Constitutionalization” of Clean Air Rules .....	1588
I. Lots of Talk, but Little Action Thus Far on GHG Reduction.....	1595
II. Real Greenhouse Pollution Caps Under the Clean Air Act ..	1602
III. The Statute Goes International, Reciprocally and Transparently .....	1614
IV. Time for a Modified Social Contract on Consumption .....	1618
Conclusion: Paradigm Lost .....	1624

## INTRODUCTION: “CONSTITUTIONALIZATION” OF CLEAN AIR RULES

Global warming, and associated climate change, is the most serious environmental danger in history. 1 It has the staggering potential to radically change life on Earth as our species

knows it. Global warming is already degrading potable water quality and quantity, food production and transportation, human respiratory and cardiovascular health, and wild species and ecosystem conservation. Additionally, there has been an increase in rising sea levels and ocean acidification and an almost exponential increase in weather-related disasters. 2 Many analysts link climate change to more wars and less national security. 3 The worst is likely yet to come.

Given these dangers, one would rationally expect policymakers to be acting with great alacrity to solve human-caused climate problems. 4 If global warming were deemed a “terrorist,” for example what would Congress and the President do? 5 But neither speed nor clarity has marked the climate battle, in large part due to the powerful influence of various fossil fuel industries (i.e., coal, oil, and natural gas) at every level of global and national governance. 6 This delay in responding to global warming has been particularly acute in the United States, despite its highly sophisticated environmental law regime, 7 and despite owning the highest per capita greenhouse gas (GHG) emission rates in the world. 8 Indeed, the United States has done precious little to abate the amount of its climate change-inducing GHGs.

The goal of this Article is to present a viable path to immediately and aggressively cut GHG emissions so that global ambient air quality reflects the scientifically accepted limits of greenhouse pollution emitted into our collective atmosphere. Because current fossil-fuel based energy, industrial, and food-production patterns are threatening to swallow the planet whole by exacerbating climate change, pressuring the United States and its multilateral legal system to adjust its approach will likely necessitate novel legal and policy action.

Ironically, practical and effective legal solutions to climate change are before our very eyes in the form of the U.S. Clean Air Act 9 (CAA or “the Act”). Yet sometimes the obvious is the most difficult to see.

Unless the U.S. Supreme Court reverses course, an opportunity it has now denied itself several times, there is zero doubt that the U.S. Environmental Protection Agency (EPA) currently shoulders the obligation to regulate GHGs and also possesses considerable authority under the CAA to utilize even more opportunities for GHG emission reduction. 10 Nothing is stopping the EPA Administrator from setting universal science-based GHG emission limits tied to baseline ambient air GHG levels. 11 Once a macro-target is transparently set, the CAA can facilitate the apportionment of emission limits to each of the fifty states and territories and the use of such limits in negotiating similar arrangements with every other nation in the world. Although the Supreme Court will enter the fray with two more relevant CAA decisions by June 2014, 12 neither will directly impact the domestic-international-administrative proposal presented here. 13

That these existing CAA tools have, to date, been largely ignored speaks to massive political disconnect between global warming’s causes and impacts. The roots of this disconnect possess two related strands: (1) the power of and obfuscation by the fossil fuel and related industrial corporations upon elected governmental officials in the United States and (2) the psychological phenomenon of individuals feeling hopeless or overwhelmed by the magnitude of the problem. 14 Lord Nicholas Stern of the United Kingdom, who oversaw the most detailed economic examinations of climate change to date, concluded that the costs of inaction far outweigh those of action

for humanity and that a common international framework is immediately necessary. 15 This Article's proposal attempts to answer both of Stern's challenges. As for "me," the polar bear, 16 Frostpaw's 17 brethren will likely be exterminated in the wild by the end of twenty first century unless "we" humans find a way to drastically cut GHG pollution. 18

Will Americans act before global warming imperils all of us? This profound question invokes the U.S. Constitution, 19 not because the Constitution possesses an environmental provision, 20 but because how Congress shares its powers with federal, state, and, yes, even international or foreign agencies 21 will be of paramount importance in cutting the climate Gordian knot.

The larger concept of "environmental" constitutionalism has been examined by many legal scholars. 23 Unsurprisingly, the discussion over whether the U.S. Constitution should have an explicit amendment or whether environmental values have risen to Constitution-status implicitly—and the scope of either—remains hotly debated and unresolved. For purposes of this Article, several points leap out: (1) "clean air" is something the vast majority of Americans want and believe they possess a right to, akin to First Amendment rights; (2) the Constitution and the CAA are each difficult to amend and, in fact, the Constitution was more recently amended than the CAA or any other federal environmental statute in any comprehensive way; 24 and (3) a "constitutionalization of environmental statutes" has consequently occurred, whereby new policy lawmaking occurs at a legal level below the statute. 25 In order to build a global system to combat global warming, the system must be based on data transparency, science-based standards, public enforcement, government-to-

government fairness and reciprocity, and local implementation. These principles are precisely what the CAA provides today. 26

## I. LOTS OF TALK, BUT LITTLE ACTION THUS FAR ON GHG REDUCTION

A casual observer of U.S. and multi-lateral climate change policy efforts would likely be surprised that so little has been accomplished. 27 A major reason behind this perception gap is the heavy rhetoric touted by most major political players. Consider President Obama's remarks at Georgetown University in June 2013, for example: "I refuse to condemn your generation and future generations to a planet that's beyond fixing. . . . [W]e will be judged as a people, and as a society, and as a country on where we go from here." 28 In response, the Republican leadership has fervently argued that the Obama Administration's federal regulation of fossil fuel pollution has, and will, cost thousands of jobs, stifle economic growth, and signal a general takeover by the government of life as we know it. 29 Aside from the climate change denials espoused by roughly half of the Republican caucus in both houses of Congress, 30 which have attempted to block any action on global warming for any purpose, Speaker of the House John Boehner has repeatedly mocked any attempt by the Obama Administration to address climate change: "Why would you want to increase the cost of energy and kill more American jobs at a time when the American people are still asking the question, 'where are the jobs?'" 31 All this bluster seems to indicate that current and proposed CAA GHG regulations must actually have teeth.

Massachusetts v. EPA, 32 which effectively began the United States' regulatory response to climate change, inspired several of the EPA's major regulatory actions under the CAA to reduce GHG pollutants, including:

\*Final Endangerment and Cause or Contribute Findings for

Greenhouse Gases Under Section 202(a) of the Clean Air Act; 33

\*Final Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; 34

\*Final 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards; 35

\*Final Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule; 36

\*Final Limitation of Approval of Prevention of Significant Deterioration Provisions Concerning Greenhouse Gas Emitting-Sources in State Implementation Plans; 37

\*Final National Emission Standards for Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units; 38

\*Heavy-Duty Engine and Vehicle and Non-road Technical Amendments; 39 and

\*Proposed Standards of Performance for Greenhouse Gas Emissions From New Stationary Sources: Electric Utility Generating Units. 40

While some of these actions constitute necessary building blocks for a solid climate architecture—for example, peer reviewed scientific conclusions, reporting requirements and data, 41 and plan and permit issuances 42—remarkably few GHG reductions have actually been achieved. 43

The CAA possesses all the necessary machinery to rationalize GHG emission reductions

in a cost-effective manner. 44 But the issue remains in politics, not in the law. 45

This Article predates (and thus does not include) the Supreme Court’s expected June 2014 decision on the full scope of the EPA’s GHG pollutant permitting authority in *Utility Air Regulatory Group v. EPA*, 46 in which the Court will make important decisions 47 about the EPA’s ability to expeditiously reduce emissions through pre-construction and general operating permits. 48 But, ultimately, it may not matter. Under almost any scenario—including whether the Court upholds EPA’s rule or invalidates any part of it—the EPA is still bound, and well-advised, to follow the criteria pollutant process for all types of GHGs as soon as feasible and to implement CAA section 110’s state-planning process. 49 Thus, whatever the Supreme Court decides regarding the timing of stationary sources permitted under the Prevention of Significant Deterioration (“PSD”) program 50—the scope of title V operating permits 51 or the outer boundaries of the EPA’s enforcement discretion under various theories of administrative necessity 52—the EPA’s duty to address ambient air quality for GHG pollutants will remain. Plain-language arguments clearly apply to the necessity of addressing GHG pollutants through all relevant CAA provisions discussed. 53

It is too easily forgotten that Congress has already addressed air pollution’s “effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage to . . . property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being” when it passed the CAA in 1970. 54 It is hard to deny that GHGs are indeed air pollutants: “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.” 55 Unless and until Congress amends the law, the goal remains to check “the growth in the amount and complexity of air pollution brought about by urbanization, industrial development, and the increasing use of motor vehicles” in order to prevent “mounting dangers to the public health and welfare,” including dangers to the “weather” and “climate.” 56 The Founding Fathers did not intend for the American people to wait for Godot 57 while the federal government grapples with industry lobbyists and ideological confusion. 58 It is time for real action against global warming. 59

In addition to ongoing obligations to address greenhouse pollutants under the CAA’s ambient air (i.e., National Ambient Quality Standards (NAAQS)) provisions, nothing in the Supreme Court’s grant of certiorari in *Utility Air Regulatory Group* indicates that the Court will alter the EPA’s duty to comply with other CAA requirements triggered by climate pollutants, 60 including Stationary Source Performance Standards 61 or standards for vehicles such as planes and ships, 62 or with the EPA’s obligations under the Clean Water Act, 63 the National Environmental Policy Act, 64 the Endangered Species Act, 65 the Resource Conservation and Recovery Act, 66 the Coastal Zone Management Act, 67 the Outer Continental Shelf Lands Act, 68 and any other existing environmental authority relevant to climate change, such as the United States’ myriad and majestic public land laws. 69

## II. REAL GREENHOUSE POLLUTION CAPS UNDER THE CLEAN AIR ACT

The CAA has multiple programs that synergistically can and will reduce GHG pollutants. 70 At the “heart” of the Act are the NAAQS—the requirements of which are contained in sections 108 through 110.

71 Under the CAA, the EPA must promptly revise the list of pollutants that may be reasonably anticipated to endanger public health or welfare; to expeditiously issue air quality criteria for such air pollutants; and to make available information to reduce or control pollutants, including air pollution control techniques. 72 Simultaneous with issuance of the air quality criteria, the EPA must also issue ambient air quality standards (or caps) to protect public health and welfare. 73

Then, crucially, the EPA works with the states to implement plans for the harmful, yet controllable, pollutants that meet the science-based standards. 74

Well-established CAA precedent interprets the CAA language that “each air pollutant[,] . . . [the] emissions of which . . . cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare . . . [and] the presence of which in the ambient air results from numerous or diverse mobile or stationary sources” as mandating the issuance of air quality standards.

75 Further, the Supreme Court has emphasized that the NAAQS process is science-based:

The EPA, “based on” the information about health effects contained in the technical “criteria” documents compiled under . . . 42 U.S.C. § 7408 (a)(2), is to identify the maximum airborne concentration of a pollutant that the public health can tolerate, decrease the concentration to provide an “adequate” margin of safety, and set the standard at that level. 76 On remand in this case, the U.S. Court of Appeals for the D.C. Circuit further held that the EPA has discretion in setting the NAAQS at a level sufficient to safeguard the public after examining available evidence and acknowledging “inevitable scientific uncertainties.” 77

For identified GHGs 78 —carbon dioxide, methane, 79 nitrous oxide, hydrofluorocarbons, 80 perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride—utilizing the CAA’s NAAQS provisions would entail calculating the global warming power of each GHG pollutant (which the Agency has essentially already done), 81 setting standards to limit emissions from each pollutant, and enforcing those limits primarily through state implementation plans. 82 One overarching challenge, given fossil fuel combustion’s current centrality in powering modern society, is reducing the current atmospheric carbon level from over 400 parts per million (ppm), the highest level ever achieved in human history, 83 to under 350 ppm, the level the best available science tells us to achieve. 84 Similar scientific standards must be established for other GHGs as well. 85

Methane and nitrous oxide are two pivotal GHGs because the deep and rapid reduction of both of these pollutants—caused primarily by natural gas production (methane), 86 industrial agriculture (methane and nitrous oxide), and landfills (methane) 87 —is an essential part of any meaningful agenda to stem climate change. 88 Because methane has a relatively stable and short atmospheric life of twelve years and is more powerful than carbon dioxide as a GHG, reducing this pollutant significantly could buy society a little time on other GHG pollutants, which will remain in the atmosphere for hundreds of years even if human society completely stopped polluting tomorrow. 89 Reducing methane emissions would also, ironically, prevent existing massive pockets of this gas underneath the Arctic ecosystem from being released to disastrous effect. 90 Nitrous oxide remains in the atmosphere

for an average of 120 years, is a prevalent pollutant significantly stronger than both methane and carbon dioxide (CO<sub>2</sub>)—about 300 CO<sub>2</sub>-equivalent over 100 years—and must be better addressed. 91

Fluorinated gases, including hydrofluorocarbons, 92 perfluorocarbons, 93 and sulfur hexafluoride, 94 are extremely potent synthetic GHGs emitted from industrial processes, including refrigerant, aluminum, and semiconductor manufacturing. 95 In the United States, fluorinated gas emissions have increased by 61% between 1990 and 2011. 96 Fluorinated gases can last in the atmosphere for thousands of years and are of particular concern because they have higher global warming potential than other GHGs—meaning small amounts of these gases greatly impact global temperatures. 97 Emissions of nitrogen trifluoride, a chemical that is released through the manufacture of electronics including liquid crystal display (LCD) panels, has increased forty times between 1992 and 2007 alone. 98 Because of the sheer enormity of the task, many are fearful the CAA will get overloaded. But, given these ominous facts, what system wouldn’t be? 99

The other, more technical, challenge to using the CAA edifice to attack GHG pollutants is calculating fair and accurate GHG emission reductions across state and national boundaries for pollutants that quickly mix and travel in the global atmosphere. In other words, can a pollution law based on traditional political lines combat pollutants that completely defy them? 100

Again, the CAA provides an answer. In the international air pollution context, the CAA mandates that the EPA approve a state implementation plan if two conditions are met:

*1) such plan or revision meets all the requirements applicable to it under the chapter other than a requirement that such plan or revision demonstrate attainment and maintenance of the relevant national ambient air quality standards by the attainment date specified under the applicable provision of this chapter, or in a regulation promulgated under such provision, and (2) the submitting State establishes to the satisfaction of the Administrator that the implementation plan of such State would be adequate to attain and maintain the relevant national ambient air quality standards by the attainment date specified under the applicable provision of this chapter, or in a regulation promulgated under such provision, but for emissions emanating from outside of the United States*

Perhaps most significantly, the EPA must consider the GHG pollution “emissions” 102 from other countries during the state implementation approval process. Further, the “outside of the United States” language is augmented by discretion given to the EPA to approve individual state requirements if “the implementation plan of such State would be adequate to attain and maintain the [NAAQS].” 103 Thus, so long as each state’s implementation plan accomplishes that state’s proportional share of the GHG reductions necessary to achieve the national greenhouse cap, the state need not worry about non-compliance by another state or another country. 104 State-based programs with federal oversight, which already exist under the CAA for “traditional” pollutants, have been shown to work quite well 105 and could quite readily be applied to a large-scale GHG pollution reduction plan. 106 Such a program can easily coexist with other mitigation strategies, including carbon taxes or fees, 107 cap-and-trade schemes, 108 and various incentives for

clean renewable energy. 109

The language of section 110 itself confirms this flexibility at the state level. 110 In the United States, states will be absolutely key in any GHG effort, in large part because of the state implementation plan process under the CAA.

*Even a cursory review of the Clean Air Act shows that the states are important actors in the implementation and enforcement of air pollution policy. Section 110 offers states the opportunity to adopt and enforce state implementation plans (SIPs) that allocate air emissions among stationary sources so long as the aggregate emissions do not violate [the federal standard]. 111*

Indeed, there are “many ways the state planning and implementation framework used to achieve the NAAQS is an excellent fit for addressing global warming.” 112

In a completely transparent manner, states can and should compile and distribute pollution information, leverage and improve the climate-related work they are already doing, recognize variations and challenges unique to the state, set and enforce emission limits, and coordinate with other states about best practices planning. States and localities have tremendous experience and comfort in implementing the CAA already 113 and frequently are more capable of dealing with individual behaviors and needs, including the desire to go beyond federal standards in certain circumstances. 114

One of the more promising avenues of pollution and energy reform, consistent with the CAA state planning process, is the oddly named “feed-in tariff” (“FIT”) approach, which has worked well in some U.S. jurisdictions and has had particular success in Ger-

many. 115 In short, a FIT is a policy mechanism that allows a state utility commission to authorize long-term contracts to clean renewable energy sources, such as wind, solar, and geothermal sources for guaranteed grid access. 116 The utility commission agrees to pay the renewable source a fixed price, which must be consistent with the requirements of both the Federal Power Act (FPA) and the Public Utility Regulatory Policy Act of 1978 117 (PURPA). The most significant of these requirements is that generators of the renewable power must be a “qualifying facility” under the PURPA in order to avoid the general FPA prohibition against any generator of power selling that power directly to consumers. 118 Despite these limitations, FITs and the CAA state plans could immediately complement each other without congressional intervention. 119 Professors Michael Vandenberg and Jim Rossi have noted that “policymakers should recognize the important gatekeeping role that utilities play for the uptake of various efficiency and conservation measures.” 120

Nonetheless, not all are convinced about the efficacy of CAA state planning to greenhouse emission reductions. 121 Despite the fact that “aggregate emissions of the six criteria pollutants is down forty-eight percent,” while “the gross domestic product has increased by 164 percent and energy consumption i[s] up forty-two percent” since 1970, some remain worried that the venerable CAA, and particularly the state implementation plans process, is not the right fit for the problem. 122 But it seems that these critics are throwing away the good in search for the perfect. Yes, the EPA has sometimes been unable to issue state implementation plan regulations and guidance, or review and enforce state submissions, in a timely manner. 123 Yes, states have occasionally played games with data, reporting, and

enforcement. 124 Yes, our economic system frequently worships traditional, natural-resource intensive economic growth, with booming human population numbers, at the expense of all other values, including greenhouse pollutant abatement. 125

However, what massive pollution reduction program would not possess these imperfections? 126 The long history of numerous state implementation plan enforcement and conformity 127 actions bouncing back and forth amongst the EPA, the states, Congress, and the courts could certainly be improved. 128 But the clean air progress under the NAAQS program demonstrates that it is ultimately a success. Cleaning up a lot of pollution can be almost as messy as the pollution’s dirty impact itself. The fact that the EPA has very rarely applied either the highway funding sanction or the two-to-one offset sanction for states not in attainment is evidence that the process is not overly draconian. 129 As even critics of state implementation plans admit, “[i]n the future, federally mandated measures will be the major cause of the additional emissions reductions that are needed if progress is to be made.” 130 The next question is whether the United States can gain vital international partners in this effort.

## II. THE STATUTE GOES INTERNATIONAL, RECIPROCALLY AND TRANSPARENTLY

In the multilateral context, section 115 of the CAA 131 is the perfect third wheel of the climate tricycle, along with CAA sections 110 and 179b, by directly linking the U.S. domestic regulatory progress with concomitant foreign progress:

*Whenever the Administrator, upon receipt of reports, surveys or studies from any duly constituted international agency has reason*



*to believe that any air pollutant or pollutants emitted in the United States cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare in a foreign country or whenever the Secretary of State requests him to do so with respect to such pollution which the Secretary of State alleges is of such a nature, the Administrator shall give formal notification thereof to the Governor of the State in which such emissions originate. . . . The notice of the Administrator shall be deemed to be a finding under section [110] of this title which requires a plan revision with respect to so much of the applicable implementation plan as is inadequate to prevent or eliminate the endangerment. . . . This section shall apply only to a foreign country which the Administrator determines has given the United States essentially the same rights with respect to the prevention or control of air pollution occurring in that country as is given that country by this section.*<sup>132</sup>

In sum, so long as a foreign country affords the United States reciprocity (i.e., “essentially the same rights”) with regard to its clean air law, the Administrator of the EPA or the Secretary of State can make a section 115 GHG endangerment finding that necessitates not only revisions to state implementation plans, but also commitments by foreign authorities to make comparable GHG reductions in a similarly transparent manner. <sup>133</sup> The United States and citizen groups of all political persuasions vastly under-tap this negotiating tool and substantive strategy. <sup>134</sup>

The most immediate implication of section 115 is that it provides another complimentary authority for a GHG pollution cap. What section 115 further provides is international authority for the Secretary of State to negotiate bilateral and multilateral executive agreements

on GHG emission reductions, <sup>135</sup> which can be self-executing without either congressional approval or Senate ratification. <sup>136</sup> This provides an incredible outreach opportunity that could rival the quantity of executive agreements that the U.S. Trade Representative (USTR) reached. The USTR has made agreements with many countries throughout the globe on diverse topics, which are frequently climate-related. <sup>137</sup> This new effort would be consistent with, and build upon, what the Senate has already ratified <sup>138</sup> and the President has already committed, <sup>139</sup> under their constitutional powers, <sup>140</sup> which include the duty to execute laws of the land under the CAA. Section 115 authorities must be rethought because they provide, in a science-based setting, the “procedural mechanisms that make the back-and-forth on policy options as conducive to reaching consensus as possible.” <sup>141</sup> Reciprocity is this approach’s most salient feature. <sup>142</sup> The net result is a new creation in U.S. law: a constitutionally approved, congressional-agency regulatory action system that is simultaneously domestic and extra-territorial. Aside from some of the many international environmental agreements themselves, <sup>143</sup> and the World Trade Organization’s jurisdictional crusade into environmental matters, <sup>144</sup> there are few international legal regimes <sup>145</sup> that use administrative law mechanisms centered upon domestic statutory authority. <sup>146</sup> So, the legal needle can be threaded, but can the political journey be even slightly harmonious?

#### IV. TIME FOR A MODIFIED SOCIAL CONTRACT ON CONSUMPTION

It has been commonly recognized by economists that current market transactions and mechanisms do not adequately capture environmental externalities—namely, costs to clean water, air, lands, and wildlife. <sup>147</sup>

Regulations seek to counteract side-effects of modern industrial growth by making the polluter/developer pay the fair share of societal costs that its economic activity accrues. 148 Under any configuration of the global warming conundrum, every sector of society must join in the effort. 149 At present, externalities abound everywhere with climate pollutants.

Where to start such a gargantuan effort? Traditionally, the focus has been on the individual person or business because

*lower-level engagement is key to real, long-term progress. There must be a local commitment, down to individuals, to accomplish the type of economic and societal transformations that will be necessary to achieve very large reductions in carbon. The more engaged and the more powerful the commitment, the more likely it is that actual change will occur.* 150

Some analysts have broken “the individual” into two related but distinct roles: a “citizen” and a “consumer.” 151 Citizens go to public and private meetings, talk to the press, go to protests, attend government hearings, file written comments, make personal conservation choices, and perhaps even file lawsuits. 152

Consumers on the other hand, decide what types of cars to buy, evaluate whether they will drive or take public transportation, determine whether to purchase solar panels or implement better home insulation, and base literally any commercial transaction upon GHG impacts.

Implicit in this examination of “the individual” is the notion of sacrifice—whether for self-preservation, for the protection of other humans, or for the conservation of the natural world. 153 Certainly, there is no right to “consume” under the Constitution. 154

Equally certain, Congress possesses considerable authority to limit consumption under the Commerce Clause and related powers under Article I, Section 8 of the U.S. Constitution, 155 and states possess similar authority to limit certain types of commerce or consumption within their jurisdiction. 156 Individual or collective sacrifice 157 will be part of the climate solution for sure, 158 but perhaps such sacrifice is overstated for two fundamental reasons.

First, recent groundbreaking research reveals that a mere ninety entities have produced almost two-thirds of all carbon dioxide and methane pollution since the early days of the Industrial Revolution. 159 The rigorous quantitative analysis in Heede’s historic report took fossil fuel and cement production records of the fifty leading investor-owned, thirty-one state-owned, and nine nation-state producers of fossil fuels and cement from the eighteenth century until 2010. 160 These ninety benefited greatly from using the air we all ostensibly share together in the commons. 161 This research will change the legal landscape with regard to causation and liability 162 and has the potential to change the frame of climate regulation from “this is all so overwhelming” to “let’s make the big polluters fix this problem.” The bottom line is that almost 1000 gigatons of CO<sub>2</sub> 63% of cumulative worldwide emissions of industrial CO<sub>2</sub> and methane between 1751 and 2010—have now been forever linked to these ninety “carbon major” entities. Second, the challenge of beating climate change is formidable, but not impossible. The best scientific and technological information tells us that we can create a realistic energy production mix of individual conservation savings, clean energy incentives, and the clean-up and phase out of harmful fossil fuels. For instance, one analysis demonstrated that with significant

per-capita drops in energy use already available with current technologies, fossil fuel energy production in the United States could be under 10% of total domestic energy use, even as we are simultaneously phasing out nuclear power by 2050. 163

What this means is that the true culprits and true saviors of the climate crisis are becoming more visible every day. This nascent combination of corporate culpability, technological feasibility, and individual opinion are changing the politics of climate change. 164 Every empirical examination of political regimes has identified “larger group dynamics” and “inequality issues” as central to understanding societal stability and success in striving for true public welfare. 165 When a threshold is reached—for example, blatant favoritism by governmental entities to powerful and selfish economic interests that are shown to harm the public interest 166 —the opportunity for real action has arrived. 167

At this juncture, the equation of climate victory comes full circle. We already have a law. We already possess the power to direct public and private funding away from injurious actions and toward sustainable ones. Those who fret that the process might be bumpy miss the point. No major transformation of society—from democratic rights to civil rights —occurs without a struggle: “Our ethereal intuitions about what’s right and what’s wrong are weapons designed for daily, hand-to-hand combat among individuals.” 168 In a public-policy setting, this is called “the exercise of public reason.” 169 It is hard to find anyone who thinks the current system to combat climate change is working well. Frostpaw, for one, most definitely clamors for assistance

## CONCLUSION PARADIGM LOST 170

We possess the legal, technical, and economic tools to meet and beat the global warming challenge. What we apparently lack is the collective political will to implement any number of promising proposals. The sad irony is that a distinct majority of Americans want to address climate change. 171 This Article presents a vision that the long-standing and successful Clean Air Act already possesses the mechanisms necessary to institute meaningful, binding, and fair GHG air-pollutant standards for the United States and every other country in the world. In this way, the CAA is already “a generative participant in [an] ongoing ethical argument.” 172 CAA standards would not only create a regulatory floor that polluters and governmental entities could not fall below, but they would also catalyze innovative and incentive-based mechanisms to achieve the overarching ambient air quality and emission target goals. While the world will need to implement certain adaptation measures for the GHG pollutants (some of which will be in the atmosphere for hundreds of years), the trillions of estimated dollars necessary to adapt to “business as usual” are better spent fixing the underlying cause. 173 The CAA might not quite be paradise, but it certainly provides a tried and true paradigm to lead humanity through the arduous journey toward a saner climate future.

1. This Article does not focus massive amounts of time on the scientific “debate” over climate change, but instead relies upon the findings of the U.S. government and relevant international bodies. For a discussion of the science of climate change, see NAT’L ACADEMY OF SCIENCES & THE ROYAL SOCIETY, CLIMATE CHANGE EVIDENCE & CAUSES 5 (2014) (“Scientists know that recent climate change is largely caused by human activities from an understanding of basic physics, comparing observations with models, and fingerprinting the detailed patterns of climate



change caused by different human and natural influences.”). 2. See, e.g., INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS, at viii, 5, 11, 295, 323, 684 (Thomas F. Stocker et al. eds., 2013) [hereinafter IPCC CLIMATE CHANGE 2013], available at [http://www.climatechange2013.org/images/report/WG1AR5\\_ALL\\_FINAL.pdf](http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf) (comprising a report from approximately 800 scientists from around the world concluding that government leaders possess only a few more years to reduce greenhouse pollution that otherwise will produce significant sea-level rise, large-scale shifts in temperature, and dramatic disruptions to humans and natural ecosystems.). 3. See John M. Broder, Climate Change Seen as Threat to U.S. Security, N.Y. TIMES (Aug. 9, 2009), [http://www.nytimes.com/2009/08/09/science/earth/09climate.html?pagewanted=all&\\_r=0](http://www.nytimes.com/2009/08/09/science/earth/09climate.html?pagewanted=all&_r=0) (suggesting that future military intervention may be necessary to deal with “climate-induced crises” such as “violent storms, drought, mass migration and pandemics,” which could potentially “topple governments, feed terrorists movements or destabilize entire regions”). 4. See, e.g., PAUL R. EHRLICH & ANNE H. EHRLICH, BETRAYAL OF SCIENCE AND REASON: HOW ANTI-ENVIRONMENTAL RHETORIC THREATENS OUR FUTURE 125 (1996) (“In few areas has the brownlash produced more inaccuracies and misinterpretations of science than in dealing with atmospheric issues. This is hardly surprising, since our society is based on fossil fuel use (the leading source of anthropogenic, or human-caused, greenhouse gas increase and acid precipitation) . . . . Possible policy changes in response to scientific findings thus obviously could pose a huge threat to business as usual for some of the world’s most powerful industries.”). 5. But cf. Aaron Blake, Gingrich Calls for Kerry to Resign Over Climate Change Speech WASH. POST (Feb. 18, 2014, 10:49 AM), <http://www.washingtonpost.com/blogs/post-politics/wp/2014/02/18/gingrich-calls-for-kerry-to-resign-over-climate-change-speech/> (“Newt Gingrich. . . called on Secretary of State John Kerry to resign over Kerry’s recent comments equating the threat of climate change to terrorism and weapons of mass destruction.”). 6. See, e.g., Emily Atkin, Fossil Fuels Receive \$500 Billion a Year in Government Subsidies Worldwide, CLIMATE PROGRESS (Nov. 7, 2013, 1:35 PM), <http://thinkprogress.org/climate/2013/11/07/2908361/rich-countries-fossil-fuel-subsidies> (arguing that oil, gas, and coal subsidies must end before climate change can be adequately addressed); Jacob Sandry, Clean Energy Is Beating Fossil Fuels with Six Times Fewer Subsidies—New Age of Energy Campaign, MOSAIC (Oct. 21, 2013), <https://joinmosaic.com/blog/clean-energy-beating-fossil-fuels-six-times-fewer-subsidies-new-age-energy-campaign> (reporting that clean energy receives only \$60 billion in subsidies, versus \$409 billion for fossil fuels); see also Michael T. Klare, Fossil Fuel Euphoria, TRUTHDIG (Oct. 17, 2013), [http://www.truthdig.com/report/page2/fossil\\_fuel\\_euphoria\\_20131017](http://www.truthdig.com/report/page2/fossil_fuel_euphoria_20131017) (discussing an International Energy Agency report estimating that fossil fuel investment will outpace renewable energy by at least three-fold, and that portions of the U.S. “elite” are plotting to use the abundance of U.S. fossil fuels as a national security wedge against other countries). 7. See generally DEFENDERS OF WILDLIFE, BIODIVERSITY AND THE LAW 2 (William J. Snape III ed., 1996) (observing that the federal government faces a number of challenges when trying to respond to climate change, including the fact that responding to global warming is a long-term public interest—impacting future generations more than the current one, it encompasses traditionally nonfederal concerns; it covers so many types of human activity, all across the United States; and it “comes at a time of extreme hostility and frustration toward the federal government”). 8. See Tia Ghose, 2013 Global Carbon Emissions To Reach Record Level, LIVE SCIENCE (Nov. 19, 2013, 12:30 PM), <http://www.livescience.com/41326-2013-carbon-emissions-record-levels.html> (noting that “the United States has the largest per capita emissions in the world: Each person in the United States has a carbon footprint of 17.6 tons (16 metric tons), compared to just 2 tons (1.8 metric tons) for people in India”). 9. 42 U.S.C. §§ 7401–7671q (2012). See generally JAMES E. MCCARTHY ET AL., CONG. RESEARCH SERV. CLEAN AIR ACT: A SUMMARY OF THE ACT AND ITS MAJOR REQUIREMENTS 2 (2005) (explaining that the original Clean Air Act (CAA) was passed in 1955, while the “modern” Act was passed in 1970, with major reauthorizations in 1977 and 1990). 10. Coal. for Responsible Regulation, Inc. v. EPA, 684 F.3d 102, 114 (D.C. Cir. 2012) (per curiam), cert. granted sub nom. Util. Air Regulatory Grp. v. EPA, 134 S. Ct. 418 (2013). Nine petitions for writ of certiorari were filed, presenting numerous questions for review on the EPA’s stationary source for rulemaking, but the Supreme Court’s order granting certiorari was quite limited: “Whether [the] EPA permissibly determined that its regulation of greenhouse gas emissions from new motor vehicles triggered permitting requirements under the Clean Air Act for stationary sources that emit greenhouse gases.”



Util. Air Regulatory Group, 134 S. Ct. at 418; see also Petition for a Writ of Certiorari at i, Util. Air Regulatory Grp., 134 S. Ct. 418 (No. 12-1146), 2013 WL 1191182, at \*i. The Supreme Court declined to review the EPA's Endangerment Finding or the authority of the Agency to promulgate motor vehicle GHG regulations under section 202(a) of the CAA. The Obama Administration urged the Court to reject the review entirely, saying the lower court ruling was a straightforward application of the CAA, consistent with the deference that judges generally afford to federal administrative rulings. Environmental advocates and a New York-led group of seventeen states joined the Administration in opposing Court review of the nine petitions. See generally *Utility Air Regulatory Group v. Environmental Protection Agency*, SCOTUS BLOG, <http://www.scotusblog.com/case-files/cases/utility-air-regulatory-group-v-environmental-protection-agency> (last visited May 6, 2014). The Justices specifically declined to grant three petitions that comprised (1) a broad challenge to the EPA's capacity to reduce GHG emissions from factories and other stationary facilities; (2) a challenge to the EPA's "public endangerment finding" that carbon emissions threaten public health and welfare; and (3) a request to overturn *Massachusetts v. EPA*, 549 U.S. 497 (2007). See generally *id.* The refusal to review these petitions eliminated a more in-depth review of the EPA's overall authority to regulate GHG emissions under the CAA. See generally *id.*

11. Scientists have already started developing firm methodologies that interpret GHG emission amounts to correspond to different levels of GHG in the ambient atmosphere, measured in carbon dioxide (CO<sub>2</sub>)-equivalent parts per million (ppm). See, e.g., David Biello, *How Much Is Too Much?: Estimating Greenhouse Gas Emissions*, SCI. A M. (Apr. 29, 2009), <http://www.scientificamerican.com/article/limits-on-greenhouse-gas-emissions> (finding that because human activity releases more than 30 billion metric tons of CO<sub>2</sub> yearly, atmospheric concentrations of CO<sub>2</sub> have reached historic proportions and have resulted in warming of approximately 0.8 degrees Celsius (1.4 degrees Fahrenheit)).

12. See *Util. Air Regulatory Grp. v. EPA*, No. 12-1146 (U.S. argued Feb. 24, 2014); *EPA v. EME Homer City Generation, L.P.*, No. 12-1182, 12-1183, 2014 WL 1672044 (U.S. Apr. 29, 2014).

13. Although not directly addressing GHG regulation per se, *Homer* (i.e., the cross-state pollution case in which the Court upheld the EPA's ability to regulate under the CAA upwind states for particulate matter, ozone, sulfur dioxide (SO<sub>2</sub>), and nitrogen oxide (NO<sub>x</sub>), all of which contribute to climate change) might have the longest lasting impact on the CAA. See *EME Homer*, 2014 WL 1672044, at \*20 ("Obligated to require the elimination of only those 'amounts' of pollutants that contribute to the nonattainment of NAAQS in downwind States, [the] EPA must decide how to differentiate among the otherwise like contributions of multiple upwind States. [The] EPA found decisive the difficulty of eliminating each 'amount,' i.e., the cost incurred in doing so. Lacking a dispositive statutory instruction to guide it, [the] EPA's decision, we conclude, is a 'reasonable' way of filling the 'gap left open by Congress.'" (quoting *Chevron, U.S.A., Inc. v. Natural Res. Def. Council, Inc.*, 467 U.S. 837, 866 (1984))); see also *Georgia v. Tenn. Copper Co.*, 206 U.S. 230, 238 (1907) (finding that upwind states owe an obligation to downwind states to manage cross-state pollution). See generally Richard L. Revesz, *Federalism and Interstate Environmental Externalities*, 144 U. PA. L.REV. 2341, 2374-2414 (1996) (examining how to control the problem of interstate externalities when an upwind state pollutes but does not face the full consequences of the activity); *infra* note 110 (referencing the text of CAA section 110 and corresponding state implementation plans).

14. See, e.g., PAUL HAWKEN, *THE ECOLOGY OF COMMERCE: A DECLARATION OF SUSTAINABILITY* 218 (1993) ("We have become convinced by the trappings and arcana of government proceedings that we are unequipped as citizens to participate in or mold the debate over-critical issues.").

15. NICHOLAS STERN ET AL., *THE STERN REVIEW: THE ECONOMICS OF CLIMATE CHANGE*, at vi-vii (2006), available at [http://mudancasclimaticas.cptec.inpe.br/~rmclima/pdfs/destaques/stern-review\\_report\\_complete.pdf](http://mudancasclimaticas.cptec.inpe.br/~rmclima/pdfs/destaques/stern-review_report_complete.pdf). The report proffers many conclusions: "There is still time to avoid the worst impacts of climate change, if we take strong action now." *Id.* at vi. "The costs of stabilising the climate are significant but manageable; delay would be dangerous and much more costly." *Id.* at vii. "Action on climate change is required across all countries, and it need not cap the aspirations for growth of rich or poor countries." *Id.* "A range of options exists to cut emissions; strong, deliberate policy action is required to motivate their take up." *Id.* at viii. "The damages from climate change will accelerate as the world gets warmer." *Id.* at vii. "Resource cost estimates suggest that an upper bound for the expected annual cost of emissions reductions consistent with a trajectory leading to stabilisation at 550ppm CO<sub>2</sub> [-equivalent] is likely to be around 1% of GDP by 2050." *Id.* at xiii. "Policy to reduce emissions should be based on three essential elements: carbon pricing, tech-

nology policy, and removal of barriers to behavioural change.” Id. at xviii. “Establishing a carbon price, through tax, trading or regulation, is an essential foundation for climate-change policy.” Id. “The removal of barriers to behavioural change is a third essential element, one that is particularly important in encouraging the take-up of opportunities for energy efficiency.” Id. at xx. “An effective response to climate change will depend on creating the conditions for international collective action.” Id. at xxii. “Creating a broadly similar carbon price signal around the world, and using carbon finance to accelerate action in developing countries, are urgent priorities for international co-operation.” Id. at xxiii. “Co-operation can be encouraged and sustained by greater transparency and comparability of national action.” Id. “Climate change demands an international response, based on a shared understanding of long-term goals and agreement on frameworks for action.” Id. at viii. 16. Relatedly, the current regulatory system’s use of “cost-benefit” analysis, through the Office of Information and Regulatory Affairs (OIRA) within the White House, to make limited and misleading conclusions with regard to natural resource conservation, contributes to the problem of global warming, to the lack of U.S. leadership, and to the general incoherence of environmental policy. See, e.g. Lisa Heinzerling, *Why Care About the Polar Bear? Economic Analysis of Natural Resources Law and Policy*, in *THE EVOLUTION OF NATURAL RESOURCES LAW AND POLICY* 53, 55 (Lawrence J. MacDonnell & Sarah F. Bates eds., 2010) (arguing that using cost-benefit analysis to evaluate natural resources law and policy is not a good idea because it does not properly value endangered species); Sidney A. Shapiro, *Does OIRA Improve the Rulemaking Process? Cass Sunstein’s Incomplete Defense*, 39 *ADMIN & REG. L. NEWS* 6, 6–7 (2013) (criticizing the OIRA’s rulemaking process for its lack of transparency, partial review system, influence by special interests, and politicization); see also DOUGLAS A. KYSAR, *REGULATING FROM NOWHERE: ENVIRONMENTAL LAW AND THE SEARCH FOR OBJECTIVITY* 255–58 (2010) (proposing “The Environmental Possibilities Act,” which would force the agencies to consider, inter alia, welfare criteria, intergenerational effects, extraterritorial effects, and nonquantified benefits when performing cost-benefit analyses) 17. Frostpaw is a fictional polar bear sponsored by the Center for Biological Diversity. See *In a World Where Polar Bears and Dancing Are Endangered . . . There’s Still Frostpaw the Polar Bear*, CENTER FOR BIOLOGICAL DIVERSITY, [http://www.biologicaldiversity.org/species/mammals/polar\\_bear/frostpaw-video.html](http://www.biologicaldiversity.org/species/mammals/polar_bear/frostpaw-video.html) (last visited May 6, 2014) (labeling Frostpaw as the Center’s “mascot”). During the 2013–2014 holidays, the Author of this Article was part of a team that shadowed President Obama, reminding him of his powers to stem global warming and the melting Arctic. See, e.g., Keoki Kerr, *Polar Bear Protestor Trailing President Obama During Hawaii Vacation*, *HAW NEWS NOW* (Dec. 25, 2013, 2:24 AM), <http://www.hawaiinewsnow.com/story/24299840/polar-bear-protester-trailing-president-obama-during-hawaii-vacation>. SNAPE. OFF. TO. WEBSITE (DO NOT DELETE) 6/23/2014 2:19 PM2014] FROSTPAW ADDRESSES GLOBAL WARMING 1593 first century unless “we” humans find a way to drastically cut GHG pollution. 18 Will Americans act before global warming imperils all of us? This profound question invokes the U.S. Constitution, 19 not because the Constitution possesses an environmental provision, 20 but because how Congress shares its powers with federal, state, and, yes, even international or foreign agencies 21 will be of paramount importance in cutting the climate Gordian knot. 22 18. *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Polar Bear (Ursus maritimus) Throughout Its Range*, 73 *Fed. Reg.* 28,212 (May 15, 2008) (to be codified at 50 C.F.R. pt. 17) (determining that the polar bear’s habitat is declining, that the habitat is expected to continue declining, and that the species will likely become an endangered species); see also *New Polar Bear Finding*, U.S. GEOLOGICAL SURV. (Oct. 2, 2009), [http://www.usgs.gov/newsroom/special/polar\\_bears](http://www.usgs.gov/newsroom/special/polar_bears) (containing nine studies presenting the relationship of polar bears to present and future sea ice environments). The U.S. Department of the Interior, under both major political parties, has defended its decision to list the polar bear under the Endangered Species Act (ESA) “based on the best available science, which shows that loss of sea ice threatens and will likely continue to threaten polar bear habitat.” Press Release, U.S. Dep’t of Interior, Secretary Kempthorne Announces Decision To Protect Polar Bears Under Endangered Species Act (May 14, 2008), available at [http://www.doi.gov/news/archive/08\\_News\\_Releaes/080514a.html](http://www.doi.gov/news/archive/08_News_Releaes/080514a.html). This conclusion was based in part on recommendations and studies from the U.S. Fish and Wildlife Service and the U.S. Geological Survey, which relied upon ten peer-reviewed climate models, all of which projected that global warming would lead to a further and steep decline in Arctic sea ice. Id.

see also *In re Polar Bear Endangered Species Act Listing & § 4(d) Rule Litig.*, 794 F. Supp. 2d 65, 69 (D.D.C. 2011) (upholding the U.S. Fish and Wildlife Service's determination that the polar bear is a threatened species).

19. See, e.g., U.S. CONST. pmbl ("We the People of the United States, in Order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common defence, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish this Constitution for the United States of America."). 20. See, e.g., Rodger Schlickeisen, *Protecting Biodiversity for Future Generations: An Argument for a Constitutional Amendment*, 8 TUL. ENVTL. L.J. 181, 182 (1994) (proposing a constitutional amendment that would oblige the U.S. government to "protect the right of all people, including future generations, to the benefits of our living natural resources"). 21. Several countries do possess constitutional provisions specifically relating to climate change. ECUADOR: The Constitution of Ecuador obligates the national government to mitigate climate change impacts by "limiting greenhouse gas emissions, deforestation, and air pollution" while conserving forests and vegetation as well as protecting populations at risk. CONSTITUCIÓN DE LA REPÚBLICA DEL ECUADOR 2008, art. 414, translated in *Ecuador's Constitution of 2008*, CONSTITUTE, [https://www.constituteproject.org/constitution/Ecuador\\_2008.pdf](https://www.constituteproject.org/constitution/Ecuador_2008.pdf) (last visited May 6, 2014). Additionally, article 413 of the Constitution of Ecuador states the country "shall promote energy efficiency, the development and use of environmentally clean and healthy practices and technologies, as well as diversified and low-impact renewable sources of energy that do not jeopardize food sovereignty, the ecological balance of the ecosystems or the right to water." *Id.* art. 413. DOMINICAN REPUBLIC: The Constitution of the Dominican Republic obliges the government to establish a national land use plan that ensures the sustainable use of natural resources and addresses climate change adaptation. CONSTITUCIÓN DE LA REPÚBLICA DOMINICANA DE 2010, art. 194. TUNISIA: Tunisia's new Constitution also contains a climate change amendment, which passed with near-unanimous support in the Tunisian Parliament in January 2014. See *Our MPs Introduce Climate Clause to Tunisian Constitution*, CLIMATE PARLIAMENT (Jan. 26, 2014), <http://www.climateparl.net/cp/386&lang=en>. In particular, the climate change clause, article 44, "obliges the state to guarantee 'a sound climate and the right to a sound and balanced environment,' and [to] 'provide the necessary means to eliminate environmental pollution.'" *Id.*; see also CONSTITUTION OF TUNISIA 2014, arts. 44–45, translated in CONSTITUTION OF THE TUNISIAN REPUBLIC (Jasmine Foundation unofficial trans., 2014), available at [http://www.jasmine-foundation.org/doc/unofficial\\_english\\_translation\\_of\\_tunisian\\_constitution\\_final\\_ed.pdf](http://www.jasmine-foundation.org/doc/unofficial_english_translation_of_tunisian_constitution_final_ed.pdf). The preamble of Tunisia's constitution also recognizes "the necessity of contributing to a secure climate and the protection of the environment." See Kharunya Paramaguru, *Tunisia Recognizes Climate Change in Its Constitution*, TIME (Jan. 29, 2014), <http://science.time.com/2014/01/29/tunisia-recognizes-climate-change-in-its-constitution>; see also CONSTITUTION OF TUNISIA 2014, pmbl. 22. See generally WILLIAM SHAKESPEARE, *HENRYV*, act 1, sc. 1, 45–47 ("Turn him to any cause of policy, The Gordian Knot of it he will unloose, Familiar as his garter."); Gordian Knot, ENCYCLOPAEDIA BRITANNICA, <http://www.britannica.com/EBchecked/topic/239059/Gordian-knot> (last visited May 6, 2014) (describing a Gordian knot as "a proverbial term for a problem solvable only by bold action"). 23. See, e.g., BRUCE ACKERMAN *WE THE PEOPLE 2: TRANSFORMATIONS* 4–5 (1998) (examining how constitutional change has in fact been revolutionary and focusing on transformative movements, which assure enduring legitimacy); KYSAR, *supra* note 16, at 247–48 ("[C]onstitutionalism must be envisioned as living beyond the four corners of the written text and the four walls of the Supreme Court . . . . Although difficult to model as a casual system, this broader array of constitutional determinants can, under certain circumstances, come together to enable the proposal, acceptance, and consolidation of constitutional change just as powerfully as the more conventionally studied mechanism of judicial interpretation and formal amendment . . . . Also like federal civil rights legislation, many of the landmark federal environmental laws seem on their face to aspire to something more dramatic than business-as-usual law-making."); Heather K. Gerken, *The Hydraulics of Constitutional Reform: A Skeptical Response to Our Undemocratic Constitution*, 55 *DRAKE L. REV.* 925, 927–28 (2007) (exploring the existence and value of an informal amendment process to the Constitution). 24. The Twenty-Seventh Amendment to the U.S. Constitution, which states, "No law, varying the compensation for the services of the Senators and Representatives, shall take effect, until an election of Representatives shall have intervened," was ratified in May 1992. U.S. CONST. amend. XXVII. The CAA was most recently reauthorized in 1990, which was the last environmental statute of any subject



to be substantively and comprehensively amended by Congress. See *supra* note 9. 25. See, e.g., sources cited *infra* notes 33–40 (CAA regulations by EPA); see also Administrative Procedure Act, 5 U.S.C. §§ 500–706 (2012) (including as codified, *inter alia*, the Freedom of Information Act, the Government in Sunshine Act, public notice and comment opportunities, and judicial review of arbitrary or illegal federal agency behavior). 26. But see Victor B. Flatt, *Frozen in Time: The Ossification of Environmental Statutory Change and the Theatre of the (Administrative) Absurd*, 24 *FORDHAM ENVTL. L.REV* 125, 148 (2013) (arguing that congressional intervention is necessary to avoid rulemaking that is too complex and delegitimizing). Ideally, Flatt is correct. In reality, given the urgency of the climate threat and the horrendous environmental record of the past few Congresses, we must play with the cards we have been dealt. See National Environmental Scorecard: Overview of the 2013 Scorecard, LEAGUE OF CONSERVATION VOTERS, <http://scorecard.lcv.org/overview-2013-scorecard> (last visited May 6, 2014) (calling the current U.S. House of Representative the “most anti-environmental [House] . . . in history” for rolling back key environmental laws, approving risky drilling and pipeline projects, cutting funding for renewable energy, and denying the harms of carbon pollution). 27. A 2013 EPA report showed U.S. GHG emissions increased 8.4% from 1990 to 2011, with emissions specifically increasing by 3.6% from 2009 to 2010 alone. U.S. ENVTL. PROT. AGENCY, *INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990–2011*, at ES-4, 2-3 (2013) [hereinafter *INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS* ], available at <http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2013-Main-Text.pdf>. Although U.S. GHG emissions decreased by 6.6% between 2008 and 2009, and 1.6% between 2010 and 2011, emissions are still increasing at an average annual rate of 0.4%. *Id.* Furthermore, recent dips in emissions are mainly attributable to an economic recession and higher energy prices (with the exception of natural gas), in addition to a slight decrease in the energy intensity and carbon intensity of the energy supply. See U.S. ENERGY INFO. ADMIN., *EMISSIONS OF GREENHOUSE GASES IN THE UNITED STATES 2009* at 1 (2011), available at [http://www.eia.gov/environment/emissions/ghg\\_report/ghg\\_carbon.cfm](http://www.eia.gov/environment/emissions/ghg_report/ghg_carbon.cfm); see also Yanna Antypas & Tyson Brown, *U.S. Energy-Related CO2 Emissions in 2013 Expected To Be 2% Higher than in 2012*, U.S. ENERGY INFO. AGENCY (Jan. 13, 2014), <http://www.eia.gov/todayinenergy/detail.cfm?id=14571>. Thus, even under the rosiest scenario, U.S. emissions continue to head in the wrong direction, and the U.S. legal and political system has done almost nothing to help turn the tide, 28. President Barack Obama, *Remarks at the Georgetown University on Climate Change* (June 25, 2013) (transcript available at <http://www.whitehouse.gov/the-press-office/2013/06/25/remarks-president-climate-change>). The President’s proposal to cut U.S. greenhouse emissions 17% by 2020 from 2005 levels, *id.*, is far below what scientists have estimated is needed to stem climate change. See EXEC. OFFICE OF THE PRESIDENT, *THE PRESIDENT’S CLIMATE ACTION PLAN 4* (2013), available at <http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf> (noting that the preventative measures already taken have not prevented worsening climate events). 29. Alexis Levinson, *Boehner Says Obama Climate Change Plan Is ‘Absolutely Crazy’* *DAILY CALLER* (June 20, 2013, 1:14 PM), <http://dailycaller.com/2013/06/20/boehner-says-obama-climate-change-plan-is-absolutely-crazy/#ixzz2ttJBpGbZ>. 30. See generally Richard J. Lazarus, *Congressional Descent: The Demise of Deliberative Democracy in Environmental Law*, 94 *GEO. L.J.* 619 (2006) (describing the congressional gridlock on environmental issues). 31. Levinson, *supra* note 29. 32. 549 U.S. 497 (2007). 33. 74 Fed. Reg. 66,496 (Dec. 15, 2009) (to be codified at 40 C.F.R. ch. I). In sum, the Agency considered effects on public health and welfare caused by climate change. *Id.* at 66,523. The EPA focused on welfare because of strong scientific evidence, *id.* at 66,498, regarding water resources, sea-level rise, coastal flooding, energy, infrastructure, ecosystem and wildlife, indigenous communities settlement, food security, and forest production, *id.* at 66,530–34. But, rising mortality and morbidity associated with extreme weather events, potential increasing and spreading of allergenic illnesses and pathogen, and certain vulnerable groups are also relevant. *Id.* at 66,523–26. This endangerment finding is for both current and future generations because adverse impacts are occurring now and are expected over time to worsen. *Id.* at 66,516. 34. 75 Fed. Reg. 25,324 (May 7, 2010) (to be codified at 40 C.F.R. pts. 85, 86, 600); see also *New Mileage Standards Out of Step with Worsening Climate Crisis*, CENTER FOR BIOLOGICAL DIVERSITY (Aug. 28, 2012), [http://www.biologicaldiversity.org/news/press\\_releases/2012/vehicle-emissions-08-28-2012.html](http://www.biologicaldiversity.org/news/press_releases/2012/vehicle-emissions-08-28-2012.html) (chastising the new vehicle emission standards as “ignor[ing] the urgency of the climate crisis” and as insufficient, for they will still allow overall GHG emissions to increase in



the long run). 35. 77 Fed. Reg. 62, 624 (Oct. 15, 2012) (to be codified at 40 C.F.R. pts. 85, 86, 600). 36. 75 Fed. Reg. 31,514 (June 3, 2010) (to be codified at 40 C.F.R. pts. 51, 52, 70, 71). This is the rule that led to *Coalition for Responsible Regulation, Inc. v. EPA*, 684 F.3d 102, 115–16 (D.C. Cir. 2012) (per curiam), which is now before the Supreme Court on narrower grounds in a consolidated case under the name *Utility Air Regulatory Group v. EPA*. See *supra* note 10. The Supreme Court heard oral arguments for the case on February 24, 2014. See *supra* note 12. 37. 75 Fed. Reg. 82,536 (Dec. 30, 2010) (to be codified at 40 C.F.R. pt. 52). 38. 77 Fed. Reg. 9,304 (Feb. 16, 2012) (to be codified at 40 C.F.R. pts. 60, 63); see 78 Fed. Reg. 24,073 (Apr. 24, 2013) (reconsidering certain new source issues). This rule is an example of the “traditional” regulation of fossil fuel facilities that also possesses some positive GHG reduction as well. 39. 78 Fed. Reg. 49,963 (Aug. 16, 2013) (to be codified at 40 C.F.R. pts. 1037, 1039, 1042, 1068) (partial withdrawal of Withdrawal of Heavy-Duty Vehicle Greenhouse Emission Standard Direct Rule); see also Peter Baker & Coral Davenport, *Obama Orders New Efficiency for Big Trucks*, N.Y. TIMES (Feb. 18, 2014), [http://www.nytimes.com/2014/02/19/us/politics/obama-to-request-new-rules-for-cutting-truck-pollution.html?\\_r=0](http://www.nytimes.com/2014/02/19/us/politics/obama-to-request-new-rules-for-cutting-truck-pollution.html?_r=0) (highlighting that although many experts believe these standards are an important step, they are likely insufficient to meet long-term emission reduction targets). 40. 79 Fed. Reg. 1430 (proposed Jan. 8, 2014) (to be codified at 40 C.F.R. pts. 60, 70, 71, 98) (power plants). 41. The EPA issued the Greenhouse Gas Reporting rule requiring large sources and suppliers in the United States to report GHG data. *Mandatory Reporting of Greenhouse Gases*, 74 Fed. Reg. 56,260 (Oct. 30, 2009) (to be codified in scattered parts of 40 C.F.R.); *Greenhouse Gas Reporting Program*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/ghgreporting> (last visited May 6, 2014) (comprising the EPA’s website for its Greenhouse Gas Reporting Program); see also 42 U.S.C. § 7414 (2012) (entitled “Recordkeeping, inspections, monitoring, and entry”). 42. See, e.g., U.S. ENVTL. PROT. AGENCY, *PREVENTION OF SIGNIFICANT DETERIORATION PERMIT FOR GREENHOUSE GAS EMISSIONS 6* (2013), available at [http://www.epa.gov/region4/air/permits/ghgpermits/porteverglades/PortEverglades\\_FinalPermit\\_112513.pdf](http://www.epa.gov/region4/air/permits/ghgpermits/porteverglades/PortEverglades_FinalPermit_112513.pdf) (focusing on various technical “efficiencies” that do not even attempt to calculate emissions). 43. See *supra* note 27. 44. Summary of the Clean Air Act, U.S. ENVTL. PROTECTION AGENCY, <http://www2.epa.gov/laws-regulations/summary-clean-air-act> (last visited May 6, 2014) (authorizing the EPA to establish air quality standards to protect the public health and welfare and regulate hazardous air pollutants); U.S. ENVTL. PROT. AGENCY, *THE CLEAN AIR ACT IN A NUTSHELL: HOW IT WORKS 1* (2013), available at [http://www.epa.gov/air/caa/pdfs/CAA\\_Nutshell.pdf](http://www.epa.gov/air/caa/pdfs/CAA_Nutshell.pdf) (providing a non-technical document detailing, inter alia, the many ways in which costs must be considered in implementing the CAA). 45. Since 2010, House Republicans have launched a full-out political assault against any action by the EPA that attempts to deal with GHGs. See, e.g., EPA’s Proposed GHG Standards for New Power Plants and H.R. 3826, *Whitfield-Manchin Legislation: Hearing Before the Subcomm. on Energy & Power of the H. Comm. on Energy & Commerce*, 113th Cong. 3 (2013) (statement of Rep. Whitfield), available at <http://democrats.energycommerce.house.gov/sites/default/files/documents/Preliminary-Transcript-EP-EPA-GHG-Standards-Whitfield-Manchin-Legislation-2013-11-14.pdf> (“Because of what many of us view the extreme position in this greenhouse gas regulation that EPA has taken, our legislation would allow EPA to regulate greenhouse gases, but Congress would set the parameters for that regulation.”); *The Obama Administration’s Climate Change Policies and Activities: Hearing Before the Subcomm. on Energy & Power of the H. Comm. on Energy & Commerce*, 113th Cong. 3–4 (2013) (statement of Rep. Whitfield), available at <http://democrats.energycommerce.house.gov/sites/default/files/documents/Preliminary-Transcript-EP-Obama-Administration-Climate-Change-Policies-2013-9-18.pdf> (expressing disappointment with President Obama’s position on climate change); *EPA’s Regulatory Threat to Affordable, Reliable Energy: The Perspective of Coal Communities: Hearing Before the Subcomm. on Oversight & Investigations of the H. Comm. on Energy & Commerce*, 113th Cong. 3–5 (2013) (statement of Rep. Murphy), available at <http://democrats.energycommerce.house.gov/sites/default/files/documents/Preliminary-Transcript-OI-EPA-Regulations-Coal-Community-2013-10-29.pdf> (lambasting the Administration for cutting clean-coal subsidies in favor of “unproven renewable energy projects”); *The American Energy Initiative, Part 25: EPA’s Proposed Greenhouse Gas New Source Performance Standard for Utilities and the Impact this Regulation Will Have on Jobs: Hearing Before the Subcomm. on Energy & Power of the H. Comm. on Energy & Commerce*, 112th Cong. 2 (2012) (statement of Rep. Whitfield) (stating that the CAA was not meant to allow the regulation of GHG emissions); *RIN Fraud: EPA’s Efforts to Ensure*

Market Integrity in the Renewable Fuels Program: Hearing Before the Subcomm. on Oversight & Investigations of the H. Comm. on Energy & Commerce, 112th Cong. 3–6 (2012) (statement of Rep. Stearns), available at <http://democrats.energycommerce.house.gov/sites/default/files/documents/Preliminary-Transcript-OI-RIN-Fraud-EPA-Efforts-Market-Integrity-2012-7-11.pdf> (focusing on fraud in the EPA’s Renewable Fuels Program).

46. No. 12-1146 (U.S. argued Feb. 24, 2014). 47. The Federal Government defined the issues as: (1) Did the EPA permissibly conclude that, when a particular source is subject to the PSD program based on its emissions of non-greenhouse-gas pollutants, the program’s substantive requirements (e.g., the BACT requirement) apply to the source’s greenhouse-gas emissions? (2) Did the EPA permissibly conclude that a particular source’s greenhouse-gas emissions standing alone can subject that source to the PSD program? (3) Did the EPA permissibly conclude that the Title V program applies to some sources solely because of their greenhouse-gas emissions? Brief for the Federal Respondents at 24, *Util. Air Regulatory Grp. v. EPA*, 134 S. Ct. 418 (2013) (Nos. 12-1146, 12-1248, 12-1254, 12-1268, 12-1269, 12-1272), 2014 WL 251995, at \*24 (“The answer to each question is yes.”). 48. See generally 42 U.S.C. § 7475 (2012) (preconstruction requirements); *id.* §§ 7661–7661f (permits). 49. See *infra* Part III; see also 42 U.S.C. § 7411(c) (regarding state implementation and enforcement of standards of performance). 50. 42 U.S.C. §§ 7470–7492. 51. *Id.* §§ 7661–7661f. 52. The application of a statute as complex and technical as the CAA is within the unique and special expertise of the administering agency. See *Chevron, U.S.A., Inc. v. Natural Res. Def. Council, Inc.*, 467 U.S. 837, 865 (1984). “It is altogether fitting that Congress designated an expert agency, here, EPA, as best suited to serve as primary regulator of greenhouse gas emissions.” *Am. Elec. Power Co. v. Connecticut*, 131 S. Ct. 2527, 2539 (2011). 53. See *infra* Parts II–III. Climate means climate, and weather means weather. The analysis begins “where all such inquiries must begin: with the language of the statute itself.” *Caraco Pharm. Labs., Ltd. v. Novo Nordisk A/S*, 132 S. Ct. 1670, 1680 (2012) (quoting *United States v. Ron Pair Enters., Inc.*, 489 U.S. 235, 241 (1989)). 54. 42 U.S.C. § 7602(h) (emphasis added) (offering the definition of “public welfare”). 55. *Id.* § 7602(g). 56. *Id.* § 7401(a)(2); see, e.g., CHRISTINA DECONCINI & FORBES THOMPSON, WORLD RESOURCES INST., IMPACTS OF HURRICANE SANDY AND THE CLIMATE CHANGE CONNECTION 1 (2012), available at [http://www.wri.org/sites/default/files/pdf/Sandy\\_Fact\\_Sheet.pdf](http://www.wri.org/sites/default/files/pdf/Sandy_Fact_Sheet.pdf) (detailing the deleterious effects from Hurricane Sandy and suggesting that it was only a “harbinger of future [weather-related] climate change impacts”). 57. SAMUEL BECKETT, *WAITING FOR GODOT* (1953). 58. See generally THE FEDERALIST NO. 85, at 477 (Alexander Hamilton) (E.H. Scotted., Albert, Scott & Co. 1898) (“And the unwarrantable concealments and misrepresentations, which have been in various ways practised to keep the truth from the public eye, are of a nature to demand the reprobation of all honest men.”); David Rothkopf, *The Opposite of Thinking*, FOREIGN POL’Y (Nov. 26, 2012), [http://www.foreignpolicy.com/articles/2012/11/26/the\\_opposite\\_of\\_thinking](http://www.foreignpolicy.com/articles/2012/11/26/the_opposite_of_thinking) (“The United States, for example, is still committed to spending more money on defense than the next 17 countries combined—even though the country is broke and the vast majority of those countries are either America’s allies or not a threat at all. . . . Then, of course, there’s global warming, where notwithstanding tidal waves of scientific evidence suggesting we are overcooking the plant and could displace hundreds of millions of people and destroy vital swaths of the environment, it is apparently a priority of exactly no one in an influential position in either U.S. political party.”). 59. In addition to GHG reduction efforts, organic statutes for the United States’ national parks, national forests, national wildlife refuges, and Bureau of Land Management holdings could be better implemented to maintain the carbon absorption properties of forests and other natural vegetation, as well as restrict oil, coal, and natural gas exaction on these lands. See, e.g., Michael Brune, *Choose Wisely . . .*, HUFFINGTON POST (Apr. 15, 2014, 3:45 PM), [http://www.huffingtonpost.com/michael-brune/choose\\_wisely\\_b\\_5154954.html](http://www.huffingtonpost.com/michael-brune/choose_wisely_b_5154954.html) (discussing fossil fuel extraction on public lands); Ellen Moyer, *Trees Are Our Climate Saviors—So Stop Logging on Public Land*, HUFFINGTON POST (Apr. 14, 2014, 5:59 AM), [http://www.huffingtonpost.com/ellen-moyer-phd/trees-are-our-climate-logging\\_b\\_4775894.html](http://www.huffingtonpost.com/ellen-moyer-phd/trees-are-our-climate-logging_b_4775894.html) (stressing the importance of trees in our ecosystem and urging all levels of government to do more to preserve forests). 60. See *Util. Air Regulatory Grp. v. EPA*, 134 S. Ct. 418 (2013) (granting certiorari to decide “[w]hether [the] EPA permissibly determined that its regulation of greenhouse gas emissions from new motor vehicles triggered permitting requirements under the Clean Air Act for stationary sources that emit greenhouse gases”). 61. See 42 U.S.C. § 7411. For new and modified stationary sources, the EPA has discretion to set new source performance standards

(NSPS) in conjunction with overarching NAAQS goals. Id. § 7411(f). For existing sources, the EPA will possess motivation under the statute to finalize NSPS quickly because, under the statute, the NAAQS process replaces NSPS for existing sources. Id. § 7411(d). 62. Id. §§ 7547, 7571. 63. 33 U.S.C. §§ 1251–1387. 64. 42 U.S.C. §§ 4321–4370f. 65. 16 U.S.C. §§ 1531–1599. 66. 42 U.S.C. §§ 6901–6992k. 67. 16 U.S.C. §§ 1451–1466. 68. 43 U.S.C. §§ 1301–1356b. 69. In addition to the Outer Continental Shelf Lands Act and site-specific pieces of land legislation, relevant organic statutes include the National Forest Management Act, 16 U.S.C. §§ 1600–1614; the Federal Land Policy and Management Act of 1976, 43 U.S.C. §§ 1701–1782; the National Wildlife Refuge System Administration Act of 1966, 16 U.S.C. §§ 668dd–668ee; and the National Park Service Organic Act, id. §§ 1–4. See, e.g., Matt Vespa, *The Clean Air Act Works: How the Landmark Pollution Law Can Benefit our Climate, Health and Economy* 7–8 (Climate Law Inst., Working Paper No. 3, 2011), available at [http://www.biologicaldiversity.org/programs/climate\\_law\\_institute/global\\_warming\\_litigation/clean\\_air\\_act/pdfs/CleanAirActReportFeb2011.pdf](http://www.biologicaldiversity.org/programs/climate_law_institute/global_warming_litigation/clean_air_act/pdfs/CleanAirActReportFeb2011.pdf) (justifying the CAA as having saved more than 160,000 lives and increased national productivity due to mass health benefits). 71. See, e.g., Holly Doremus & W. Michael Hanemann, *Of Babies and Bathwater: Why the Clean Air Act's Cooperative Federalism Framework Is Useful for Addressing Global Warming*, 50 A RIZ. L.REV. 799, 817 (2008) (outlining how the EPA first sets NAAQS and then states must draft State Implementation Plans to achieve the EPA's goals). 72. 42 U.S.C. § 7408. 73. Id. § 7409. 74. Id. § 7410. For a detailed description of sections 108 to 110, see ARNOLD W. REITZE, JR., *AIR POLLUTION CONTROL LAW: COMPLIANCE AND ENFORCEMENT* 31–75 (2001) [hereinafter REITZ, *AIR POLLUTION CONTROL LAW*]. I disagree with Reitze, who was my environmental law professor, that the state implementation process for GHGs would necessarily strait-jacket the EPA into either massive attainment or massive non-attainment. Arnold W. Reitze, Jr., *The Intersection of Climate Change and Clean Air Act Stationary Source Programs*, 43 A RIZ. ST. L.J. 901, 913–14 (2011) [hereinafter Reitze, *Intersection of Climate Change*]. 75. 42 U.S.C. § 7408(a)(1); see, e.g., *Natural Res. Def. Council, Inc. v. Train*, 545 F.2d 320, 327–28 (2d Cir. 1976) (“The structure of the Clean Air Act as amended in 1970, its legislative history, and the judicial gloss placed upon the Act leave no room for an interpretation which makes the issuance of air quality standards for lead under § 108 discretionary.”). 76. *Whitman v. Am. Trucking Ass'ns*, 531 U.S. 457, 465 (2001). 77. *Am. Trucking Ass'ns v. EPA*, 283 F.3d 355, 378 (D.C. Cir. 2002). 78. Although not a gas, black carbon (also known as soot) is also a powerful climate pollutant that has been directly linked, inter alia, to the accelerating melt of the Arctic ecosystem as well as to significant public health problems. U.S. ENVTL. PROT. AGENCY, *REPORT TO CONGRESS ON BLACK CARBON* 67 (2012), available at <http://www.epa.gov/blackcarbon/2012report/fullreport.pdf>. Black carbon is not controlled directly under the CAA, although it is regulated to the extent that it is one constituent of particulate matter (PM 2.5) and also a component of diesel exhaust. Id. at xxiii, 147. PM 2.5 NAAQS can certainly reduce black carbon, although much of the PM 2.5 reduction comes from reducing other components of PM 2.5, such as sulfates and NO<sub>x</sub>. Id. at 162. Various sections of the CAA address particulate emissions from mobile and stationary sources. Regulation of emissions from cars, trucks, locomotives and ships would all be likely to reduce black carbon. For instance, mobile source emissions of black carbon were reduced by about 32% between 1990 and 2005, with an anticipated 90% reduction by 2030. Id. at 175; see also Jessica Seddon Wallack & Veerabhadran Ramanathan, *The Other Climate Changers: Why Black Carbon and Ozone Also Matter*, FOREIGN AFF. (Sept./Oct. 2009), available at <http://www.foreignaffairs.com/articles/65238/jessica-seddon-wallack-and-veerabhadran-ramanathan/the-other-climate-changers>. 79. Methane, with a much shorter atmospheric lifetime than carbon dioxide, is still (pound for pound) more than twenty times more powerful than CO<sub>2</sub> over a 100-year period and more than seventy times more powerful than CO<sub>2</sub> over a ten-year period. Sarah Zielinski, *Emissions of Methane, a Potent Greenhouse Gas, May Be Underestimated*, SMITHSONIAN (Nov. 25, 2013), <http://www.smithsonianmag.com/science-nature/emissions-of-methane-a-potent-greenhouse-gas-may-be-underestimated-180947838/?no-ist>. Because of the massive expansion of international fracking, emissions of methane are skyrocketing. Id. Methane is the second most emitted GHG pollutant after CO<sub>2</sub>. Overview of Greenhouse Gases, U.S. ENVTL. PROTECTION AGENCY, <http://epa.gov/climate-change/ghgemissions/gases/ch4.html> (last visited May 6, 2014). 80. International efforts to reduce or eliminate short-lived climate pollutants (“SLCPs”) focus on reducing hydrofluorocarbons (“HFCs”), among other pollutants. HFCs could contribute to up to 19% of global CO<sub>2</sub> emissions by 2050. Short-Lived Climate Pollutants



, CLIMATE & CLEAN AIR COALITION, <http://www.unep.org/ccac/Short-LivedClimatePollutants/Definitions/tabid/130285/language/en-US/Default.aspx> (last visited May 6, 2014). The Federal States of Micronesia and North American countries (Mexico, Canada, and the United States) have submitted proposals to phase down HFCs through the Montreal Protocol. Proposed Amendment To Control HFCs Under the Montreal Protocol to Substances that Deplete the Ozone Layer (submitted by the Federated States of Micronesia), U.N. Doc. UNEP/OzL.Pro.WG.1/32/5 (May 11, 2012), available at <http://conf.montreal-protocol.org/meeting/oweg/oweg-32/pre-session/PreSession%20Documents/OEWG-32-5E.pdf>; see also Proposed Amendment to the Montreal Protocol (submitted by the United States, Canada, and Mexico), U.N. Doc. UNEP/OzL.Pro.WG.1/33/3 (May 9, 2012), available at <http://conf.montreal-protocol.org/meeting/oweg/oweg-33/pre-session/PreSession%20Documents/OEWG-33-3E.pdf>. More than 110 countries have since demonstrated support for the amendments as of September 2013. Kitty Stapp, Broad Coalition Pledges To Cut ‘Super Greenhouse Gases’ INTER PRESS SERV. (Sept. 4, 2013), <http://www.globalissues.org/news/2013/09/04/17406>. G-20 leaders, as well as the Arctic Council, have also expressly endorsed reducing HFCs using the Montreal Protocol. The G20 Saint Petersburg Summit Leaders’ Declaration, Art. 101 (Sept. 56, 2013), available at <http://www.igsd.org/news/documents/SaintPetersburgDeclaration.pdf>; Arctic Council Secretariat, Kiruna Declaration, at 3, MM08-15 May-2013-Kiruna, Sweden (May 15, 2013), available at <http://www.arctic-council.org/index.php/en/document-archive/category/425-main-documents-from-kiruna-ministerial-meeting>. Furthermore, during the twenty-fifth meeting of the parties to the Montreal Protocol in October 2013, countries reconvened the discussion group on HFC management to include the recent international agreement calling for the treaty to phase down HFCs. Danielle Grabel, Steady March Towards Action on Reducing HFCs Under Montreal Protocol, INST. FOR GOVERNANCE & SUSTAINABLE EV. (Oct. 25, 2013), <http://www.igsd.org/news/documents/MoPPR25Oct2013.pdf>. 81. Overview of Greenhouse Gases, *supra* note 79 (discussing the concept of CO<sub>2</sub>-equivalents for the various greenhouse pollutants); see also KEVIN A. BAUMERT ET AL., NAVIGATING THE NUMBERS: GREENHOUSE GAS DATA AND INTERNATIONAL CLIMATE POLICY 3–5 (2005) (condensing available GHG emissions data into numerous graphics and providing background for future projections). 82. “[T]he NAAQS system could work for CO<sub>2</sub>: a CO<sub>2</sub> NAAQS would inspire substantial reductions in emissions without contorting the CAA’s requirements beyond recognition or in ways categorically different than those already required by the statute’s symbolic provisions.” Christopher T. Giovino, Defending Overstatement: The Symbolic Clean Air Act and Carbon Dioxide, 30 HARV. ENVTL. L. REV. 99, 153–57 (2006) (detailing statutory flexibility, administrative deference, and practical benefits of regulating GHGs under the NAAQS). 83. NASA Scientists React to 400 ppm Carbon Milestone, NAT’L AERONAUTICS & SPACE ADMIN., <http://climate.nasa.gov/400ppmquotes> (last visited May 6, 2014). 84. See, e.g., James Hansen et al., Target Atmospheric CO<sub>2</sub>: Where Should Humanity Aim?, 2 OPEN ATMOSPHERICS CI. J. 217, 217–18 (2008) (warning that if humanity would like to maintain climates similar to that on Earth, decreasing CO<sub>2</sub> levels to 350 ppm may not be sufficient and further decreases may be necessary). 85. See, e.g., CTR. FOR BIOLOGICAL DIVERSITY & 350. ORG, PETITION TO ESTABLISH NATIONAL POLLUTION LIMITS FOR GREENHOUSE GASES PURSUANT TO THE CLEAN AIR ACT BEFORE THE ADMINISTRATOR OF THE ENVIRONMENTAL PROTECTION AGENCY 16–19 (2009), available at [http://www.biologicaldiversity.org/programs/climate\\_law\\_institute/global\\_warming\\_litigation/clean\\_air\\_act/pdfs/Petition\\_GHG\\_pollution\\_cap\\_12-2-2009.pdf](http://www.biologicaldiversity.org/programs/climate_law_institute/global_warming_litigation/clean_air_act/pdfs/Petition_GHG_pollution_cap_12-2-2009.pdf). 86. Due to the U.S. fracking boom for natural gas (and oil), the EPA has estimated natural gas systems emitted 6,893,000 tons of GHGs in 2011, which amounted to approximately 25% of total anthropogenic methane emissions in the United States that year. INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS, *supra* note 27, at 3-61–62. The EPA estimated the natural gas production sector alone emitted 2,545,000 tons of methane in 2011. *Id.*; see also Thorsten Warneke, Lower Methane Emissions than Expected at Selected Shale Gas Production Sites in the U.S., CLIMATE IMPACT (Oct. 15, 2013), <http://www.shale-gas-information-platform.org/areas/news/detail/article/selected-methane-emissions-than-expected-at-shale-gas-production-sites-in-the-us-copy-1.html>. Although a 2013 study of 489 wells found that natural gas production in the United States emitted 2,300,000 tons of methane in 2011, emissions from equipment leaks were much higher than the EPA’s estimated 291 gigagrams, or 13% of total methane emissions from the production process. DAVID T. ALLEN ET AL., Measurements of Methane Emissions at Natural Gas Production Sites in the United States, PROC. NAT’L



ACAD. SCI. 4 (2013), available at <http://www.pnas.org/content/early/2013/09/10/1304880110.full.pdf>. 87. Methane emissions from enteric fermentation and manure management represented 23.4% and 8.9%, respectively, of total methane emissions from anthropogenic activities in 2011, while landfills are the third highest cause (after natural gas burning and big agriculture) of U.S. methane pollution at 17%. INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS, *supra* note 27, at ES-18, 1-15–16. Further, 69% of nitrous oxide emissions in the United States come from fertilizer use by industrial agriculture, while livestock emissions also contribute. Overview of Greenhouse Gases, *supra* note 79. 88. See Overview of Greenhouse Gases, *supra* note 79 (suggesting methods of reducing nitrous oxide emissions in the areas of fertilizer use and upgraded combustion technology); see also Warneke, *supra* note 86 (stressing that methane emissions could offset any environmental benefits of burning natural gas for power generation). 89. See generally Durwood J. Zaelke & Veerabhadran Ramathan, Going Beyond Carbon Dioxide, N.Y. TIMES (Dec. 6, 2012), [http://www.nytimes.com/2012/12/07/opinion/going-beyond-carbon-dioxide.html?\\_r=0](http://www.nytimes.com/2012/12/07/opinion/going-beyond-carbon-dioxide.html?_r=0) (chronicling the advent of the Climate and Clean Air Coalition in response to awareness of Short-Lived Climate Pollutants, and advocating for increased cooperation with emerging economies such as Brazil and China). 90. See Natalia Shakhova et al., Ebullition and Storm-Induced Methane Release from the East Siberian Arctic Shelf, 7 NATURE GEOSCIENCE 64, 64 (2013) (demonstrating that significant quantities of methane are escaping the East Siberian Shelf as a result of the degradation of submarine permafrost over thousands of years, and that climate change may cause bigger Arctic storms that will contribute to faster methane releases); see also K.M. Walter et al., Methane Bubbling from Siberian Thaw Lakes as a Positive Feedback to Climate Warming, 443 NATURE 71, 71–75 (2006) (demonstrating that land-based permafrost also contributes approximately 4 million tons of methane, which is higher than previously estimated). 91. Overview of Greenhouse Gases: Nitrous Oxide Emissions, U.S. ENVTL. PROTECTION AGENCY, <http://epa.gov/climatechange/ghgemissions/gases/n2o.html> (last visited May 6, 2014). 92. HFCs are used as refrigerants, aerosol propellants, solvents, and fire retardants, and were originally developed to replace other ozone-depleting substances under the Montreal Protocol. Overview of Greenhouse Gases: Emissions of Fluorinated Gases, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/climatechange/ghgemissions/gases/fgases.html> (last visited May 6, 2014). The 100-year global warming potential of HFCs is 140–11,700 times that of CO<sub>2</sub>, and they have an average atmospheric lifetime of 140–11,700 years. *Id.* 93. Perfluorocarbons (“PFCs”) are by-products of aluminum and semiconductor manufacturing, and have an atmospheric lifetime of 800–50,000 years. *Id.* PFCs have a global warming potential of 6,500 to 9,200. *Id.* 94. Sulfur hexafluoride is a chemical used in magnesium and semiconductor manufacturing, and it has an atmospheric lifetime of 3,200 years. *Id.* It has a global warming potential of 23,900 CO<sub>2</sub>-equivalent. *Id.* 95. *Id.* 96. *Id.* 97. *Id.* 98. Stephen Russell, Nitrogen Trifluoride Now Required in GHG Protocol Greenhouse Gas Emissions Inventories, WORLD RESOURCES INST. (May 22, 2013), <http://www.wri.org/blog/nitrogen-trifluoride-now-required-ghg-protocol-greenhouse-gas-emissions-inventories>. SNAPE. OFF. TO. WEBSITE (DONOT DELETE) 6/23/2014 2:19 PM 2014] FROSTPAW ADDRESSES GLOBAL WARMING 1607 are fearful the CAA will get overloaded. But, given these ominous facts, what system wouldn’t be? 99 The other, more technical, challenge to using the CAA edifice to attack GHG pollutants is calculating fair and accurate GHG emission reductions across state and national boundaries for pollutants that quickly mix and travel in the global atmosphere. In other words, can a pollution law based on traditional political lines combat pollutants that completely defy them? 100 Again, the CAA provides an answer. In the international air pollution context, the CAA mandates that the EPA approve a state implementation plan if two conditions are met: (1) such plan or revision meets all the requirements applicable to it under the chapter other than a requirement that such plan or revision demonstrate attainment and maintenance of the relevant national ambient air quality standards by the attainment date specified under the applicable provision of this chapter, or in a regulation promulgated under such provision, and (2) the submitting State establishes to the satisfaction of the Administrator that 99. For example, the American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009), a one-thousand page document otherwise known as the Waxman-Markey bill, proposed to establish a federal cap-and-trade program as well as incentives and standards for increasing energy efficiency and low-carbon energy consumption, while waiving key provisions of the CAA. See U.S. ENVTL. PROT. AGENCY, EPA ANALYSIS OF THE AMERICAN CLEAN ENERGY AND SECURITY

ACT OF 2009: H.R. 2454 IN THE 111TH CONGRESS 2 (2009), available at [http://www.epa.gov/climatechange/Downloads/EPAactivities/HR2454\\_Analysis](http://www.epa.gov/climatechange/Downloads/EPAactivities/HR2454_Analysis). Although it passed the House of Representatives, it stalled in the Senate and never became law. See *id.* at 1–2. The cap would apply to 85% of total U.S. GHG emissions, and would seek to reduce two billion tons of GHG emissions annually. CONG. BUDGET OFFICE, THE ECONOMIC EFFECTS OF LEGISLATION TO REDUCE GREENHOUSE-GAS EMISSIONS 10 (2009), available at <http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/105xx/doc10573/09-17-greenhouse-gas.pdf>. However, the EPA estimated that implementing the cap-and-trade program would have increased electricity bills by 13% per household by 2030 and slightly reduce overall GDP. PEW CTR.ON GLOBAL CLIMATE CHANGE, COST OF AMERICAN CLEAN ENERGY AND SECURITY ACT OF 2009 FOUND TO BE SMALL ACCORDING TO GOVERNMENT ANALYSES 2 (2009), available at <http://www.c2es.org/publications/cost-aces-act-found-be-small-according-government-analyses>; see ENERGY INFO. ADMIN., U.S. DEP’T OF ENERGY, ENERGY MARKET AND ECONOMIC IMPACTS OF H.R. 2454, THE AMERICAN CLEAN ENERGY AND SECURITY ACT OF 2009, at xiii (2009), available at [http://www.eia.gov/oiaf/servicerpt/hr2454/pdf/sroiaf\(2009\)05.pdf](http://www.eia.gov/oiaf/servicerpt/hr2454/pdf/sroiaf(2009)05.pdf). The most important point for purposes of this Article is that the bill would have necessitated thousands of new federal government employees to implement, and the standards in the bill did not reflect the best available science. 100. This is not a completely new challenge. The CAA has two titles devoted to types of other challenging international air pollutants: title IV with regard to acid deposition control, including two pollutants (sulfur dioxide (SO<sub>2</sub>) and NO<sub>x</sub>) that are criteria pollutants and thus part of state implementation plans, see 42 U.S.C. §§ 7651–7651o (2012), and title VI with regard to stratospheric ozone control in tandem with international action, see *id.* §§ 7671–7671q. The CAA has been a part of the solution to cleaning up all of these pollutants. Carbon dioxide is more ubiquitous, however, than these other “international” pollutants 101. 42 U.S.C. § 7509a (footnote omitted) (emphasis added). 102. Doremus & Hanemann, *supra* note 71, at 822 (“We also believe that an emission target makes more sense in this case than an atmospheric level target. As EPA has noted, the level of CO<sub>2</sub> in the atmosphere is essentially independent of the decisions of any individual state, and indeed it is at least somewhat independent of the decisions of all the U.S. states together.” (citations omitted)). 103. 42 U.S.C. § 7509a. 104. This avoids the United States’ “Kyoto problem” of not including countries such as China, India, Brazil, and South Africa in a binding climate regime. See Kyoto Protocol to the United Nations Framework Convention on Climate Change art. 10, Dec. 11, 1997, U.N. Doc FCCC/CP/1997/7/Add.1, 37 I.L.M. 22 (1998). The U.S. Senate failed to ratify Kyoto, in part, because growing developing economies were not included in emission cut requirements under the UNFCCC’s article 10 “common but differentiated responsibilities” and respective responsibilities principle. *Id.* 105. Under the 1990 CAA amendments, the last comprehensive reauthorization of any major environmental statute by Congress, the EPA was required to issue a comprehensive assessment of the CAA’s impact on the “public health, economy, and environment of the United States.” 42 U.S.C. § 7612(a). The EPA issued the first report in 1997, following extensive research and modeling efforts, and made some startlingly positive conclusions about criteria pollutant progress under the CAA. See generally U.S. ENVTL. PROT. AGENCY, THE BENEFITS AND COSTS OF THE CLEAN AIR ACT, 1970 TO 1990 (1997), available at [http://www.epa.gov/cleanairactbenefits/1970-1990/chptr1\\_7.pdf](http://www.epa.gov/cleanairactbenefits/1970-1990/chptr1_7.pdf). The report found that emissions of sulfur dioxide were 60% lower from industrial processes and 40% lower from electricity generation, emissions of volatile organic compounds (i.e., precursors to ozone) were 66% lower, emission of nitrogen oxides (NO<sub>x</sub>, not to be confused with nitrous oxide or N<sub>2</sub>O) were 47% lower, emissions of carbon monoxide were 56% lower, emissions of particulate matter from electric utilities 93% lower, and emissions of particulate matter from industrial sources 76% lower in 1990 than they would have been without the CAA. *Id.* at 15, 17. Emissions of airborne lead had been virtually eliminated. *Id.* at 17. The EPA modeled the impact of the resulting improvements in air quality on human health, including impacts such as respiratory systems, hospital admissions, asthma attacks, and chronic sinusitis from exposure to ozone; mortality, bronchitis hospital stays, and lost work days from exposure to particulate matter; hospital admissions for congestive heart failure from exposure to carbon monoxide; respiratory illness from exposure to nitrogen oxides; changes in pulmonary function and respiratory symptoms from exposure to sulfur dioxide; mortality, hypertension, coronary heart disease, strokes, and IQ loss from exposure to lead. *Id.* at 31. The EPA also modeled welfare effects including change in crop yields, household soiling, and visibility impairments from these same criteria pollutants. *Id.* at 32. The most recent

cost-benefit analysis came to the same basic conclusions regarding the success of the CAA. The EPA's 2011 report found that CAA programs to reduce air pollution prevented more than 160,000 deaths, 130,000 heart attacks, and 1.7 million asthma attacks in 2010 alone; and the economic benefits of those programs will reach approximately \$2 trillion by 2020. U.S. ENVTL. PROT. AGENCY, THE BENEFITS AND COSTS OF THE CLEAN AIR ACT FROM 1990 TO 2020, at 5-25, 7-3. (2011), available at [http://www.epa.gov/cleanairactbenefits/feb11/fullreport\\_rev\\_a.pdf](http://www.epa.gov/cleanairactbenefits/feb11/fullreport_rev_a.pdf). The monetized benefits of clean air far surpass the costs by a ratio of 32:1. *Id.* at 7-9. 106. Indeed, most states have already revised their state implementation plans to include GHG permitting requirements. See, e.g., 2012 Revisions to the Arkansas State Implementation Plan: Greenhouse Gas Tailoring Rule, ARK. DEP' T ENVTL. QUALITY, [http://www.adeq.state.ar.us/air/ghg\\_sip\\_pn.htm](http://www.adeq.state.ar.us/air/ghg_sip_pn.htm) (last visited May 6, 2014) (announcing Arkansas' adoption of changes to Regulation 19 in response to the EPA's GHG tailoring rule). Only a few states, such as Texas, have been recalcitrant. See Texas Air Permitting, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/region6/region-6/tx/tx001.html> (last visited May 6, 2014) (disapproving of the Texas Commission on Environmental Quality's allowance of companies to avoid EPA regulations by lumping emissions from several sources under a single cap rather than setting limits for single pollutants). 107. Many economists favor a carbon or GHG tax as a way of efficiently disincentivizing GHGs and raising government revenue. Carbon taxes have been successfully implemented in various forms over the past two decades. JENNY SUMNER, LORI BIRD & HILLARY SMITH, NAT'L RENEWABLE ENERGY LAB., CARBON TAXES: A REVIEW OF EXPERIENCE AND POLICY DESIGN CONSIDERATIONS 1 (2009), available at <http://www.nrel.gov/docs/fy10osti/47312.pdf>. Although the design of a carbon tax and its implementation vary greatly from scheme to scheme, carbon taxes are typically placed on gasoline, coal, and natural gas. *Id.* at iv. Revenue from carbon taxes could be distributed to fund carbon mitigation programs, governments in general, or back to customers. *Id.* Several countries and regions have enacted carbon taxes, including Finland, British Columbia, and Sweden. Where Carbon Is Taxed, CARBON TAX CENTER (Sept. 6, 2013), <http://www.carbon-tax.org/progress/where-carbon-is-taxed>. "As of 2013, . . . China, Mexico, South Africa, and South Korea . . . are [also] considering implementing a carbon tax" scheme. CTR. FOR CLIMATE & ENERGY SOLUTIONS, OPTIONS AND CONSIDERATIONS FOR A FEDERAL CARBON TAX 7 (2013), available at <http://www.c2es.org/publications/options-considerations-federal-carbon-tax>. 108. California, for example, has legislatively and administratively established a cap-and-trade program as one of its strategies to reduce state GHG emissions to 1990 levels by 2020. See Cap-and-Trade Program, CAL. ENVTL. PROTECTION AGENCY AIR RESOURCES BOARD (Mar. 28, 2014), <http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm>. This program became operative in January 2013, beginning with electric utilities and large industrial facilities. CAL. ENVTL. PROT. AGENCY AIR RES. BD., OVERVIEW OF ARB EMISSIONS TRADING PROGRAM 1 (2011), available at [http://www.arb.ca.gov/newsrel/2011/cap\\_trade\\_overview.pdf](http://www.arb.ca.gov/newsrel/2011/cap_trade_overview.pdf). 109. What is "clean," however, is often debatable. Energy derived from burning plant material is touted as "carbon neutral" but frequently emits more CO<sub>2</sub> per unit of energy produced than conventional fossil fuels when burned. Debunking the Biomass Myth, CENTER FOR BIOLOGICAL DIVERSITY, [http://www.biologicaldiversity.org/campaigns/debunking\\_the\\_biomass\\_myth](http://www.biologicaldiversity.org/campaigns/debunking_the_biomass_myth) (last visited May 6, 2014); see also *Ctr. for Biological Diversity v. EPA*, 722 F.3d 401, 415 (D.C. Cir. 2013) (rejecting the Agency's decision not to regulate biomass under the CAA). 110. For example, 42 U.S.C. § 7410 provides: Each implementation plan submitted by a State . . . shall be adopted by the State after reasonable notice and public hearing. Each such plan shall—(A) include enforceable emission limitations and other control measures, means, or techniques (including economic incentives such as fees, marketable permits, and auctions of emissions rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to meet the applicable requirements . . . ; (B) provide for establishment and operation of appropriate devices, methods, systems, and procedures necessary to—(i) monitor, compile, and analyze data on ambient air quality, and (ii) upon request, make such data available to the Administrator; . . . and regulation of the modification and construction of any stationary source within the areas covered by the plan as necessary to assure that national ambient air quality standards are achieved . . . (D) contain adequate provisions—(i) prohibiting . . . any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will—(I) contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard, or (II) interfere



with measures required to be included in the applicable implementation plan for any other State . . . to prevent significant deterioration of air quality or to protect visibility, (ii) insuring compliance with the applicable requirements . . . (relating to interstate and international pollution abatement); (E) provide (i) necessary assurances that the State (or, except where the Administrator deems inappropriate, the general purpose local government or governments, or a regional agency designated by the State or general purpose local governments for such purpose) will have adequate personnel, funding, and authority under State (and, as appropriate, local) law to carry out such implementation plan . . . , and (iii) necessary assurances that, where the State has relied on a local or regional government, agency, or instrumentality for the implementation of any plan provision, the State has responsibility for ensuring adequate implementation of such plan provision; (F) require, as may be prescribed by the Administrator—(i) the installation, maintenance, and replacement of equipment, and the implementation of other necessary steps, by owners or operators of stationary sources to monitor emissions from such sources, (ii) periodic reports on the nature and amounts of emissions and emissions-related data from such sources, and (iii) correlation of such reports by the State agency with any emission limitations or standards established pursuant to this chapter, which reports shall be available at reasonable times for public inspection; (G) provide for authority . . . ; (H) provide for revision of such plan—(i) from time to time as may be necessary to take account of revisions of such national primary or secondary ambient air quality standard or the availability of improved or more expeditious methods of attaining such standard . . . (K) provide for—(i) the performance of such air quality modeling as the Administrator may prescribe for the purpose of predicting the effect on ambient air quality of any emissions of any air pollutant for which the Administrator has established a national ambient air quality standard[;] . . . and (M) provide for consultation and participation by local political subdivisions affected by the plan 111. John P. Dwyer, *The Practice of Federalism Under the Clean Air Act*, 54 MD. L.REV. 1183, 1193 (1995). 112. Doremus & Hanemann, *supra* note 71, at 823. 113. See, e.g., 76 Cities Call for National Action on Climate Change, CENTER FOR BIOLOGICAL DIVERSITY (Nov. 26, 2013), [http://www.biologicaldiversity.org/news/press\\_releases/2013/clean-air-cities-11-26-2013.html](http://www.biologicaldiversity.org/news/press_releases/2013/clean-air-cities-11-26-2013.html) (announcing that two towns in Massachusetts had become the seventy-fifth and seventy-sixth municipalities to call on the Obama Administration to make greater use of the CAA to mitigate the threats to local tourism and skiing industries posed by climate change). 114. See, e.g., Alice Kaswan, *A Cooperative Federalism Proposal for Climate Change Legislation: The Value of State Autonomy in a Federal System*, 85 DENV. U.L. REV. 791, 824 (2008) (supporting renewable portfolio standards that establish minimum national goals, but allow states to set higher standards based on local renewable energy availability). 115. Steven Ferrey et al., *Fire and Ice: World Renewable Energy and Carbon Control Mechanisms Confront Constitutional Barriers*, 20 DUKE ENVTL. L. & POL'Y F. 125, 169–71 (2010). 116. *Id.* at 170–71 (exemplifying Germany's FIT system that led to the creation of one of the world's largest solar energy markets); see also Steven Ferrey et al., *FIT in the USA: Constitutional Questions About State-Mandated Renewable Tariffs*, PUB. UTIL. FORT. (May 2010), <http://www.fortnightly.com/fortnightly/2010/05/fit-usa?page=0%2C0> (decrying the fact that the Supremacy Clause will create a constitutional barrier to state attempts to implement FIT programs). See generally STEVEN FERREY, *THE NEW RULES: A GUIDE TO ELECTRIC MARKET REGULATION*, at xv (2000). The constitutional issues refer to potential Supremacy Clause problems if the state programs violated the Federal Power Act (FPA), the Public Utility Regulatory Policy Act (PURPA), or any other federal law. 117. The Federal Energy Regulatory Commission (FERC) has confirmed that states have flexibility in setting FIT costs, so long as the costs are real (including environmental costs). See Cal. Pub. Util. Comm'n, 133 FERC ¶ 61,059 (2010); see also David Shaffer, *Massive Solar Plan for Minnesota Wins Bid over Gas*, STAR TRIB. (Jan. 2, 2014, 11:51 AM), <http://www.startribune.com/business/238322571.html> (noting that the administrative law judge held that Xcel Energy should invest in solar rather than gas to power the state because it is a better deal for ratepayers; the issue now goes to the state public utility commission). 118. Federal Power Act, 16 U.S.C. §§ 824d–824e (2012) (giving the FERC power to regulate rates for wholesale sale and transmission of electricity). Under the PURPA, a qualifying facility refers to a qualifying cogeneration facility or a qualifying small power production facility. *Id.* § 796(17)–(18). The qualification can be self-certified once meeting with the requirements of size, fuel use criteria, and filed a notice of self-certification. 18 C.F.R. §§ 292.203(a)–(b), 292.207(a)–(c) (2013). Aside from self-certification, the facility can opt to go through an optional procedure to file a notice of application for Commission



certification. Id. § 292.207(b); see also What Is a Qualifying Facility?, FED. ENERGY REG. COMMISSION, <https://www.ferc.gov/industries/electric/gen-info/qual-fac/what-is.asp> (last visited May 6, 2014). The law firm of Mayer Brown has recently issued detailed recommendations on how to further expand FERC's authorization of renewable FITs to capture these opportunities. DAVID I. BLOOM ET AL., STATE FEED-IN-TARIFFS: RECENT FERC GUIDANCE FOR HOW TO MAKE THEM FIT UNDER FEDERAL LAW 1, 5 (2011), available at <http://www.mayerbrown.com/Files/Publication/35b914a5-7582-4405-acd9-f377e6009839/Presentation/PublicationAttachment/7444bd26-1fd5-4508-9ba2-fd2439a7bd6a/State-feed-in-tariffs.pdf>. 119. See, e.g., *Union Elec. Co. v. EPA*, 427 U.S. 246, 265 (1976) (prohibiting the EPA from rejecting state implementation choices when national standards are met). 120. Michael P. Vandenberg & Jim Rossi, Good for You, Bad for Us: The Financial Disincentive for Net Demand Reduction, 65 V AND. L. REV. 1527, 1563 (2012). 121. See, e.g., Arnold W. Reitze, Jr., Air Quality Protection Using State Implementation Plans—Thirty-Seven Years of Increasing Complexity, 15 VILL. ENVTL. L.J. 209, 358 (20 [hereinafter Reitze, Air Quality Production]) (asserting that persistent violations and extensions of CAA deadlines by numerous areas across the United States have rendered SIPs a failure). 122. Id. at 365; see also Reitze, Intersection of Climate Change, *supra* note 74, at 942 (concluding that the EPA continues to use the CAA as a means to push a specific national energy policy forward “by increasing the stringency of stationary source emission control and mandated improvements in mobile source fuel economy”). 123. Reitze, Air Quality Protection, *supra* note 121, at 364–65. 124. Id. at 362–63. 125. Id. at 359–60. 126. Even under a GHG tax scheme, which could easily coexist with and reinforce the existing CAA, the EPA and the states would still need to, among other things, track and monitor predicted emission reductions, coordinate across political boundaries, enforce existing pollution health standards, and permit new sources. 127. See 42 U.S.C. § 7506 (2012) (entitled “Limitations on Certain Federal Assistance”). 128. When the EPA ignores a clear command from Congress, its action or inaction will be struck down by the courts. See, e.g., *Sierra Club v. EPA*, 311 F.3d 853, 855 (7th Cir. 2002) (holding that the EPA does not possess discretion to extend statutory deadlines in classifying an area as NAAQS non-attainment). When the states challenge the EPA's clear authority to apply sanctions, which the Agency does relatively infrequently, the courts side with EPA. See, e.g., *Virginia v. United States*, 926 F. Supp. 537, 538–40 (E.D. Va. 1995) (finding that the Agency acted within its constitutional limits in applying discretionary penalties). When Congress thinks the EPA is going too far or too fast, it intervenes. See, e.g., Mitchell-Conte Amendment to the 1987 Continuing Resolution, Pub. L. No. 100-202, 101 Stat. 1329 (1987) (prohibiting the EPA from applying sanctions on non-attainment areas for a short period of time). 129. 42 U.S.C. § 7509 (explaining that the EPA Administrator may prohibit the Secretary of Transportation's approval of state projects, other than projects related to safety, because of the state's failure to achieve the required standards, and stating that the ratio of emission reductions to increased emissions for new emission sources must be at least two-to-one). These sanctions are discretionary and thus immune from citizen suit pressure to apply them under the enforcement doctrine enunciated in *Heckler v. Chaney*, 470 U.S. 821, 823, 827 (1985). See generally 42 U.S.C. § 7413 (providing for federal enforcement of SIPs). 130. Reitze, Air Quality Protection, *supra* note 121, at 366; see also State Implementation Plans; General Preamble for Implementation of Title I of the Clean Air Act Amendments of 1990, 57 Fed. Reg. 13,498 (Apr. 16, 1992) (to be codified at 40 C.F.R. pt. 52) (exemplifying a rule that could delineate enforcement, sanctions, and related actions under the CAA in a predictable way for all parties). 131. See, e.g., Thomas W. Merrill, Golden Rules for Transboundary Pollution, 46 DUKE L.J. 931, 959–60 (1997) (noting that the change in U.S. presidential administrations, from President Carter to President Reagan, added to the failure of an attempt to use section 115 of the CAA to solve the United States-Canada acid rain problem). In the GHG emission arena, every country will need to share proportionally in the ratcheting down, thus making section 115 a much more useful too 132. 42 U.S.C. § 7415(a)–(c) (emphasis added). One such report from the Intergovernmental Panel on Climate Change made several conclusions: Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea levels have risen as concentrations of GHGs have increased. . . . The globally averaged combined land and ocean surface temperature data as calculated by a linear trend, show a warming of 0.85 [0.65 to 1.06] °C, over the period 1880 to 2012, when multiple independently produced datasets exist. The total increase between the average of the 1850–1900 period and the

2003–2012 period is 0.78 [0.72 to 0.85] °C, based on the single longest dataset available. . . . Ocean warming dominates the increase in energy stored in the climate system, accounting for more than 90% of the energy accumulated between 1971 and 2010 (high confidence). It is virtually certain that the upper ocean (0–700 m) warmed from 1971 to 2010 . . . , and it likely warmed between the 1870s and 1971. . . . Over the last two decades, the Greenland and Antarctic ice sheets have been losing mass, glaciers have continued to shrink almost worldwide, and Arctic sea ice and Northern Hemisphere spring snow cover have continued to decrease in extent (high confidence) . . . . Over the period 1901 to 2010, global mean sea level rose by 0.19 [0.17 to 0.21] m . . . . It is likely that the rate of global mean sea level rise has continued to increase since the early 20th century. . . . The atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. Carbon dioxide concentrations have increased by 40% since pre-industrial times, primarily from fossil fuel emissions and secondarily from net land use change emissions. The ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide, causing ocean acidification . . . . From 1750 to 2011, CO<sub>2</sub> emissions from fossil fuel combustion and cement production have released 375 [345 to 405] GtC to the atmosphere, while deforestation and other land use change are estimated to have released 180 [100 to 260] GtC. This results in cumulative anthropogenic emissions of 555 [470 to 640] GtC. Of these cumulative anthropogenic CO<sub>2</sub> emissions, 240 [230 to 250] GtC have accumulated in the atmosphere, 155 [125 to 185] GtC have been taken up by the ocean and 160 [70 to 250] GtC have accumulated in natural terrestrial ecosystems . . . . IPCC CLIMATE CHANGE 2013, *supra* note 2, at 4–5, 8–9, 11–12 (alterations in original) (footnotes omitted). 133. See generally Hannah Chang, *Cap and Trade Under The Clean Air Act?: Rethinking § 115*, 40 ENVTL L. REP. NEWS & ANALYSIS 10,894 (2010) (reviewing legislative history and revealing that Congress was aware of the linkages between domestic statutory requirements and international commitments, simultaneously leaving the Agency with flexibility to adopt any number of different strategies). 134. On February 19, 2013, the Institute for Policy Integrity at New York University Law School filed a petition under the Administrative Procedure Act and Clean Air Act to force the EPA, *inter alia*, to 1) [m]ake a formal finding that all the prerequisites for action to control international air pollution under Section 115 have been satisfied for greenhouse gases; 2) [r]equire states to revise their Clean Air Act implementation plans to control their dangerous greenhouse gas pollution by making reasonable progress toward abatement; and 3) [a]dvise states on their options for implementation under Section 115, including flexible regulatory tools like market incentives. N.Y. UNIV. INST. FOR POL’Y INTEGRITY, PETITION FOR RULEMAKING AND CALL FOR INFORMATION UNDER SECTION 115, TITLE VI, SECTION 111, AND TITLE II OF THE CLEAN AIR ACT TO REGULATE GREENHOUSE GAS EMISSIONS 1 (2013), available at [http://www2.epa.gov/sites/production/files/documents/policy\\_integrity\\_omnibus\\_ghg\\_petition\\_under\\_caa.pdf](http://www2.epa.gov/sites/production/files/documents/policy_integrity_omnibus_ghg_petition_under_caa.pdf). 135. This domestic authority is also completely consistent with international law. See, e.g., *Trail Smelter Case* (U.S. v. Can.), 3 R.I.A.A. 1905, 1907 (1941) (deciding that Canada would pay the United States for damage caused to the State of Washington from the activities of a Canadian mining and smelting company in British Columbia); United Nations Conference on Environment and Development, Rio de Janeiro, Braz., June 3–14, 1992, Rio Declaration on the Environment and Development, Principle 2, U.N. Doc. No. A/CONF. 151/5/Rev. 1 (Vol. 1), 31 I.L.M. 874, 876 (June 13, 1992) (proclaiming that each nation has a responsibility not to harm the environment of another). 136. See, e.g., NIGEL PURVIS, *PAVING THE WAY FOR U.S CLIMATE LEADERSHIP: THE CASE FOR EXECUTIVE AGREEMENTS AND CLIMATE PROTECTION AUTHORITY* 19–21 (2008) (noting that self-executing treaties have force both domestically and internationally, whereas non-self-executing treaties do not have force domestically unless Congress passes implementing legislation). None of the concerns identified apply here because the executive branch already possesses the requisite authority under the CAA. 137. See, e.g., *Free Trade Agreements*, OFF. U.S TRADE REPRESENTATIVE, <http://www.ustr.gov/trade-agreements/free-trade-agreements> (last visited May 6, 2014) (listing twenty countries that have bilateral trade agreements with the United States); *Regional Trade Agreements*, WORLD TRADE ORG., [http://www.wto.org/english/tratop\\_e/region\\_e/region\\_e.htm](http://www.wto.org/english/tratop_e/region_e/region_e.htm) (last visited May 6, 2014) (noting that regional trade agreements are gaining popularity and that, as of January 31, 2014, the World Trade Organization had received 583 notifications of regional trade agreements); see also Robert O. Keohane & David G. Victor, *The Regime Complex for Climate Change* 24 (The Harvard Project on Int’l Climate Agreements, Discussion Paper 10–33, 2010), available at

[http://belfercenter.ksg.harvard.edu/files/Keohane\\_Victor\\_Final\\_2.pdf](http://belfercenter.ksg.harvard.edu/files/Keohane_Victor_Final_2.pdf) (“Over time, the UNFCCC might evolve into a deeper institution and perhaps the core of an integrated regulatory system. With experience, for example, it is possible that a wide of array of ‘club’ efforts under way presently could be governed by common rules—akin, perhaps, to most favored nation status and reciprocity in the GATT/WTO system, which help ensure that particular club deals crafted on trade are generalized to a larger number of countries.”). 138. See United Nations Framework Convention on Climate Change art. 2, May 9, 1992, S. Treaty Doc No. 102-38, 1771 U.N.T.S. 107, 169 (entered into force Mar. 21, 1994). The U.S. Senate ratified the United Nations Framework Convention on Climate Change. *Id.* at 165 (noting that the United States deposited the instrument of ratification on October 15, 1992). 139. United Nations Framework Convention on Climate Change, Copenhagen, Den., Dec. 7–19, 2009, Copenhagen Accord, ¶ 1, U.N. Doc. FCCC/CP/2009/L.7 (Dec. 18, 2009). 140. See, e.g., U.S. CONST. art. I, §§ 1, 8; *id.* art. II, §§ 2–3; *United States v. Guy W. Capps, Inc.*, 204 F.2d 655, 657–58 (4th Cir. 1953) (holding that a United States-Canada potato agreement cannot override congressional provisions on the same topic), *aff’d* on other grounds, 348 U.S. 296, 296–305 (1955); *Swearingen v. United States*, 565 F. Supp. 1019, 1021 (D. Colo. 1983) (finding that an executive agreement was void because it conflicted with an Internal Revenue Code provision). 141. PURVIS, *supra* note 136, at 7 (emphasis omitted). 142. *New York v. Thomas*, 613 F. Supp. 1472, 1486–88 (D.D.C. 1985) (finding that the Canadian Clean Air Act satisfied the reciprocity requirement); see also A MARTYASEN, *THE IDEA OF JUSTICE* 402 (2009) (noting that one rationale behind the notion that “public reasoning about justice should go beyond the boundaries of a state or region . . . [is] the relevance of other people’s interests for the sake of avoiding bias and being fair to others”); A VITUSCHMAN, *OUR POLITICAL NATURE: THE EVOLUTIONARY ORIGINS OF WHAT DIVIDES US* 329–99 (2013) (describing theories of altruism, including kin-based altruism, reciprocal altruism, altruism across a lifespan, self-deceptive altruism, and heroic altruism). 143. See, e.g., INT’ L ENVTL. AGREEMENTS (IEA) DATABASE PROJECT, <http://iea.uoregon.edu/page.php?file=home.htm&query=static> (last visited May 6, 2014) (categorizing international environmental agreements and making them more easily available for research). 144. See, e.g., Robert Howse, *The Appellate Body Rulings in the Shrimp/Turtle Case: A New Legal Baseline for the Trade and Environment Debate*, 27 COLUM. J. ENVTL. L. 491, 495 (2002) (arguing that if critics understand the role of the appellate body in the new WTO system, then the controversial decision in the Shrimp/Turtle case can be better understood as judicial caution). 145. See generally Maximillian Feldman, *The Domestic Implementation of International Regulations*, 88 N.Y.U.L. REV. 401, 403 (2013) (arguing that international agreements may unduly influence domestic rulemaking and that courts should be more careful in assessing these types of domestic rules; the proposal presented in this paper comes at it from the other end: international implementation of transparent and fair domestic regulations); Benedict Kingsbury, Nico Krisch & Richard B. Stewart, *The Emergence of Global Administrative Law*, 68 LAW & CONTEMP. PROBS. 15, 15 (2005) (highlighting the growing body of global administrative law while noting that it is still not unified as a field of scholarship). 146. See, e.g., 22 U.S.C. § 1978 (2012) (restricting the importation of fish or wildlife products from countries that have violated international endangered species regulations). The Pelly Amendment to the U.S. Fishermen’s Protective Act requires the Secretary of Commerce to certify nations when foreign actions are found to diminish the effectiveness of international fishery and endangered species conservation programs and allows the President to pursue enforcement actions against foreign nations to comply with these programs. See *id.* § 1978(a). The Pelly Amendment has been used to effectively conserve various fish, whales, and other marine species worldwide. See John A. Duff, *Recent Applications of United States Laws To Conserve Marine Species Worldwide: Should Trade Sanctions Be Mandatory?*, 2 OCEAN & COASTAL L.J. 1, 5–10 (1996) (highlighting one example of the use of the Pelly Amendment when the United States threatened to use a trade sanction on Japan because of its whaling activities). 147. See, e.g., HERMAN E. DALY & JOHN B. COBB, JR., *FOR THE COMMON GOOD: REDIRECTING THE ECONOMY TOWARD COMMUNITY, THE ENVIRONMENT, AND A SUSTAINABLE FUTURE* 37, 55–58, 141–46, 152, 157 (2d ed. 1994). “It does appear, therefore, that something of a paradigm shift is required in order to admit the Trojan Horse of ‘carrying capacity’ into the citadel of economic theory.” *Id.* at 146. 148. See, e.g., Thomas Helbling, *Externalities: Prices Do Not Capture All Costs*, INT’L MONETARY FUND (Mar. 28, 2012), <http://www.imf.org/external/pubs/ft/fandd/basics/external.htm> (noting that environmental issues often face the problem of collective action). 149. This is why, for instance, the Key-



stone XL tarsands project (including the extraction, transportation, and consumption of oil) with its estimated 147 to 168 million metric tons of CO<sub>2</sub>-equivalent that would be released into the global atmosphere must be stopped, under the CAA and other laws. DANIEL J. W COMMENTS ON FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT, ORFSEIS, FOR THE KEYSTONE XL, OR KXL, PIPELINE PERMIT 3 (2014), available at <http://www.americanprogress.org/wp-content/uploads/2014/04/Weiss-XL-testimony-PDF.pdf>. This is a project that will decimate large swaths of Canada's boreal forest, will transport oil via a pipeline that will surely spill, will greatly exacerbate climate change, and will destroy water resources and wildlife habitat—all so that the fossil fuel industry in Houston, Texas can export lots of this dirty oil around the globe. See generally Boreal Forests Called 'Northern Lungs of the World,' CBC NEWS (Sept. 23, 2002, 8:39 AM), <http://www.cbc.ca/news/technology/boreal-forests-called-northern-lungs-of-the-world-1.323586>; Sean Cockerham, Oil From Proposed Keystone Pipeline Could End Up Exported, MCCLATCHY DC (Apr. 25, 2013), <http://www.mcclatchydc.com/2013/04/25/189680/oil-from-proposed-keystone-pipeline.html>; Keystone XL: Game Over?, REAL CLIMATE (Nov. 2, 2011), <http://www.realclimate.org/index.php/archives/2011/11/keystone-xl-game-over/%29>; The Keystone XL Pipeline, NEB. WILDLIFE FED'N, [http://www.nebraskawildlife.org/policy\\_Keystone.html](http://www.nebraskawildlife.org/policy_Keystone.html) (last visited May 6, 2014); Richard Stover, America's Dangerous Pipelines, CENTER FOR BIOLOGICAL DIVERSITY, [http://www.biologicaldiversity.org/campaigns/americas\\_dangerous\\_pipelines](http://www.biologicaldiversity.org/campaigns/americas_dangerous_pipelines) (last visited May 6, 2014). The State Department has said that the Keystone XL project will only create fifty jobs. Joshua Green, State Department Says Keystone Pipeline Will Create Just 50 Jobs, JOSHUA GREEN ON POL. (Jan. 31, 2014), <http://www.businessweek.com/articles/2014-01-31/state-department-says-keystone-pipeline-will-create-just-50-jobs>. At a fraction of the cost, renewable energy projects provide far more job opportunities than Keystone XL. Over 3 Times More Green Jobs per \$1 Invested than Fossil Fuel or Nuclear Jobs, CLEAN TECHNICA, <http://cleantechnica.com/2013/03/20/over-3-times-more-green-jobs-per-million-than-fossil-fuel-or-nuclear-jobs> (last visited May 6, 2014). And do not be fooled by the bogus "energy independence" line; the United States is awash in more oil and natural gas than ever before. U.S. Oil and Natural Gas To Reach Levels Not Seen in Decades . . . Again, INST. FOR ENERGY RES. (Oct. 4, 2013), <http://www.instituteeforenergyresearch.org/2013/10/04/u-s-oil-and-natural-gas-expected-to-produce-at-levels-not-seen-in-decades-again>. 150. Nicholas Lutsey & Daniel Sperling, America's Bottom-Up Climate Change Mitigation Policy, 36 ENERGY POL'Y 673, 674 (2008). 151. See John C. Dernbach, Harnessing Individual Behavior To Address Climate Change: Options for Congress, 26 VA. ENVTL. L.J. 107, 114–30 (2008) (describing the importance of involving individuals as both citizens and consumers in efforts to change behaviors and lower emissions). 152. The CAA provides an explicit mechanism for individuals to act as a private attorney general to sue for identified violations of the law. 42 U.S.C. § 7604 (2012) (citizen suits). The Administrative Procedure Act also possesses a waiver of sovereign immunity for interested citizens to sue federal agencies. 5 U.S.C. §§ 702–703. This on the other hand, decide what types of cars to buy, evaluate whether they will drive or take public transportation, determine whether to purchase solar panels or implement better home insulation, and base literally any commercial transaction upon GHG impacts. Implicit in this examination of "the individual" is the notion of sacrifice—whether for self-preservation, for the protection of other humans, or for the conservation of the natural world. 153 Certainly, there is no right to "consume" under the Constitution. 154 Equally certain, Congress possesses considerable authority to limit consumption under the Commerce Clause and related powers under Article I, Section 8 of the U.S. Constitution, 155 and states possess similar authority to limit certain types of commerce or consumption within their jurisdiction. 156 Individual or collective sacrifice 157 will be waiver can be used to enforce statutes without a citizen suit provision such as the National Environmental Policy Act, 42 U.S.C. § 4321, as well as provisions under the CAA that may not be subject to CAA section 304, see *Bennett v. Spear*, 520 U.S. 154, 161–79 (1997). 153. Dernbach, *supra* note 151, at 123 (citing Deborah L. Rhode & Lee D. Ross, Environmental Values and Behaviors: Strategies To Encourage Public Support for Initiatives To Combat Global Warming, 26 VA. ENVTL. L.J. 161, 170 (2008)). 154. Cf. Daniel A. Farber, Sustainable Consumption, Energy Policy, and Individual Well-Being, 65 V AND. L. REV. 1479, 1524 (2012) ("Moving away from consumerism means giving people more time and opportunity for family, friends, personal activities, and civic involvement."). See generally THE ROYALS OC'Y, PEOPLE AND THE PLANET (2012), available at [https://royalsociety.org/~media/Royal\\_Society\\_Content/policy/projects/people-planet/2012-04-25-People](https://royalsociety.org/~media/Royal_Society_Content/policy/projects/people-planet/2012-04-25-People)

Planet.pdf (regarding the need for humans to drastically rethink and reduce our consumption patterns for our own well-being). 155. For instance, the executive branch, acting pursuant to authority granted by the Economic Stabilization Act Amendments of 1973, issued a rationing scheme of crude oil, refined petroleum products, and liquefied petroleum gas, as a result of a national fuel shortage in 1973. See Economic Stabilization Act Amendments of 1971, Pub. L. No. 92-210, § 209, 85 Stat. 743, 748 (1971); Mandatory Allocation Program for Middle Distillate Fuels, 38 Fed. Reg. 28,660 (Oct. 16, 1973). Similarly, during World War II, the Supreme Court upheld the federal government's power to enact and implement price and rent controls as well as ration scarce goods and commodities. See *L.P. Steuart & Bro. v. Bowles*, 322 U.S. 398, 403 (1944); *Yakus v. United States*, 321 U.S. 414, 423 (1944). 156. For instance, the California Department of Water recently established a policy to stop water deliveries except to maintain public health and safety in light of a record drought and state of water emergency in California, in part exacerbated by climate change. Bettina Boxall, California Drought Prompts First-Ever “Zero Water Allocation,” *L.A. TIMES* (Jan. 31, 2014), <http://www.latimes.com/local/lanow/la-me-ln-california-drought-zero-water-allocation-20140131,0,4678128.story#axzz2tyhLCAQe>; see also Dep’t of Water Res., Calif. Dept. of Water Resources Halts Allocation Amid Worst- Ever Outlook, *NEWS 10. NET* (Jan. 31, 2014, 3:09 PM), <http://www.news10.net/story/news/2014/01/31/dwr-drops-water-allocation-to-zero/5084783> (noting that it would have to rain heavily every other day from January 31 until May to get the state back to its average annual rainfall levels). 157. However, clean-energy investments generate roughly three times more jobs than an equivalent amount of money spent on carbon-based fuels. ROBERT POLLIN ETAL., *THE ECONOMIC BENEFITS OF INVESTING IN CLEAN ENERGY 3* (2009), available at [http://www.peri.um-ass.edu/fileadmin/pdf/other\\_publication\\_types/green\\_economics/economic\\_benefits/economic\\_benefits.PDF](http://www.peri.um-ass.edu/fileadmin/pdf/other_publication_types/green_economics/economic_benefits/economic_benefits.PDF). Investing in oil and natural gas will create fewer jobs (5.2 jobs per \$1 million invested) than investing in other sectors, like energy efficiency: building retrofits (16.7 jobs per \$1 million invested), wind (13.3 jobs per \$1 million invested), solar (13.7 jobs per \$1 million invested), and habitat restoration (17 jobs per \$1 million invested). *Id.* at 29. Further, when towns “boom” as a result of energy extraction, as is presently occurring in North Dakota, there are increased job opportunities and a growing population. Susan Christopherson & Ned Rightor, *How Should We Think About the Economic Consequences of Shale Gas Drilling?* 12 (Cornell Univ., Working Paper Series, 2011), available at [http://cce.cornell.edu/EnergyClimateChange/NaturalGasDev/Documents/Green%20Choices%20Papers/Marcellus\\_SC\\_NR.pdf](http://cce.cornell.edu/EnergyClimateChange/NaturalGasDev/Documents/Green%20Choices%20Papers/Marcellus_SC_NR.pdf). Along with this short-term growth comes increased public costs: planning and zoning and other administrative services; intensified road traffic and reconstruction; and increased demands on schools, social services, and public safety. See *id.* at 14, 19. These costs are predominantly paid for by state, county, and municipal governments. *Id.* at 16. When natural resource extraction ends, communities face different challenges from the “bust”—namely, a decreased population and tax base. *Id.* at 8. 158. See, e.g., *Students Rally Against Fossil Fuel Giants*, MOYERS & COMPANY (Apr. 28, 2014), <http://billmoyers.com/2014/04/28/students-rally-against-fossil-fuel-giants> (noting the importance of the divestment movement). 159. Richard Heede, *Tracing Anthropogenic Carbon Dioxide and Methane Emissions to Fossil Fuel and Cement Producers, 1854–2010*, 122 *CLIMATIC CHANGE* 229, 229–30 (2013). 160. *Id.* 161. Garrett Hardin, *The Tragedy of the Commons*, 162 *SCIENCE* 1243, 1244 (1968). 162. See generally *Am. Elec. Power Co. v. Connecticut*, 131 S. Ct. 2527, 2532 (2011) (holding that because of the CAA, there is no federal common law for global warming tort injuries, leaving the issue to application of state common law); David Hunter & James Salzman, *Negligence in the Air: The Duty of Care in Climate Change Litigation*, 155 *U. PA. L. REV.* 1741, 1745 (2007) (exploring potential scenarios for “climate-based tort actions”). 163. DANIEL B. BOTKIN, *POWERING THE FUTURE: A SCIENTIST’S GUIDE TO ENERGY INDEPENDENCE* 255–77 (2010); see also Stephanie Paige Ogburn, *World Can Run on Wind, Water and Sunlight, Scientist Says*, *CLIMATE WIRE* (Feb. 18, 2014), <http://www.eenews.net/cw/2014/02/18> (reporting on a scientist’s finding that renewable energy sources could meet all of the world’s energy needs). “The world could meet all of its energy needs with a combination of wind, water and solar power, Stanford University scientist Mark Jacobson reported . . . at the American Association for the Advancement of Science annual meeting.” Ogburn, *supra*. 164. But cf. *Climate and the Ballot Box*, 4 *NATURE CLIMATE CHANGE* 75, 75 (2014) (“[I]t remains an open question whether national and international governance, as currently formulated, will respond effectively to the challenges of climate change.”). 165. See generally TUSCHMAN, *supra* note 142, at 23–61. “Tribalism,” “Tolerance of In-

equality,” and “Perceptions of Human Nature” are characterized as the three “roots” of political orientation. Id. at 58. These themes have direct applicability to political interactions at many levels, including framing viable solutions to global warming and greenhouse pollution reduction. 166. The multi-billionaire Koch brothers are a perfect example of income and influence disparity that is prevalent in current U.S. politics. Koch Industries, heavily invested in numerous fossil fuel ventures, has lobbied to change more than 100 pieces of federal legislation, including trying to loosen regulations on potentially poisonous substances like dioxins, benzene, and asbestos. Paul Harris, *The Koch Brothers: All the Influence Money Can Buy*, GUARDIAN (Apr. 08, 2011), <http://www.theguardian.com/commentisfree/cifamerica/2011/apr/08/koch-brothers-lobbying>. The Koch brothers have pushed back against restrictions on carbon emissions and funded think tanks and groups that promote efforts to discredit climate change science. See Fredreka Schouten, *Who Are the Kochs and How Far Does Their Influence Reach?*, USA TODAY (Aug. 23, 2012), <http://usatoday30.usatoday.com/news/politics/story/2012-08-23/koch-brothers-profile/57255068/1> (noting that a liberal nonprofit has described the Koch brothers as having a “greed agenda”); see also Harris, *supra* (describing an investigative report by the Center for Public Integrity that detailed the Koch brothers’ expansive political and lobbying activities). 167. But cf. *Citizens United v. Fed. Election Comm’n*, 558 U.S. 310, 319 (2010) (holding that the First Amendment prohibits the government from restricting political independent expenditures by corporations, associations, or labor unions). The *Citizens United* case has had the continued perverse impact of allowing a small number of major donors to privately funnel unlimited cash through corporations who can quickly and effectively spread misinformation. The fossil fuel industry spent more than \$347 million on contributions to congressional campaigns and lobbying during the 111th Congress in 2009 and 2010 alone. See *Fossil Fuel Funding to Congress: Industry Influence in the U.S.*, OIL CHANGE INT’L., <http://priceofoil.org/fossil-fuel-industry-influence-in-the-u-s> (last visited May 6, 2014) (arguing that the largest barrier in the transition to clean energy is the influence of the fossil fuel industry). 168. ROBERT WRIGHT, *THE MORAL ANIMAL: EVOLUTIONARY PSYCHOLOGY AND EVERYDAY LIFE* 328 (1994). 169. SEN, *supra* note 142, at 324, 394 (“If the importance of public reasoning has been one of the major concerns . . . so has been the need to accept the plurality of reasons that may be sensibly accommodated in an exercise of evaluation. The reasons may sometimes compete with each other in persuading us in one direction or another in a particular assessment, and when they yield conflicting judgments, there is an important challenge in determining what credible conclusions can be derived, after considering all the arguments.”) 170. “Paradigm Lost” is a play on John Milton’s *Paradise Lost*: Into this wild abyss The womb of nature, and perhaps her grave, Of neither sea, nor shore, nor air, nor fire, But all these in their pregnant causes mixed Confusedly, and which thus must ever fight Unless the almighty maker them ordain His dark materials to create more worlds. Into this wild Abyss the wary fiend Stood on the brink of Hell and looked awhile, Pondering his voyage; for no narrow frith He had to cross. JOHN MILTON, *PARADISE LOST* lbk. II, ll. 910–20 (Hackett Publishing Co. 2005) (1667). 171. A survey conducted by the Natural Resources Defense Council in July 2013 indicated 65% of Americans support setting limits on carbon pollution from the nation’s power plants. See *Survey: Two in Three Americans Endorse Setting Limits on Carbon Pollution from Power Plants that Drives Climate Change*, NAT. RESOURCES DEF. COUNCIL (July 18, 2013), <http://www.nrdc.org/media/2013/130718.asp> (noting that 61% of Americans back President Obama’s climate action plan, which he unveiled on June 25, 2013). A more recent national survey conducted by the Sierra Club in February 2014 indicates that a strong majority of voters believe that climate disruption is a serious problem and that the federal government should be doing more about climate disruption. See GREENBERG QUINLAN ROSNER RESEARCH, *SIERRA CLUB NATIONAL SURVEY ON COAL, CLIMATE AND CARBON POLLUTION: KEY FINDINGS 4* (2014), available at <http://www.sierraclub.org/pressroom/climatepoll/Sierra%20Club%20GQRR%20Survey%20Presentation%20013114%20-%20BRIEFING%20FINAL.pdf> (finding that few of those surveyed understood that there are currently no regulations on carbon pollution). 172. Jedediah Purdy, *Our Place in the World: A New Relationship for Environmental Ethics and Law*, 62 DUKE L.J. 857, 927 (2013). 173. See, e.g., *Economics of Adaptation to Climate Change*, WORLD BANK (June 6, 2011), <http://www.worldbank.org/en/news/feature/2011/06/06/economics-adaptation-climate-change> (estimating a global cost for climate change adaptations). The estimate of this study was at roughly \$100 billion per year; other studies have put the numbers even higher. Id.