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International Environmental Law and American Leadership

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Abstract

The purpose of this paper is to detail and explore both the ethical and pragmatic implications of aggressive climate change mitigation on a coordinated international level. Particularly, this paper attempts to assess the extent to which the leadership of the United States influences the relative success and failure of international agreements, and the agreements, structures and mechanisms themselves. A secondary assessment is the extent to which the United States has incurred additional responsibilities to mitigate beyond those shared by the world, from both a harm-based and special responsibilities standpoint. In this paper, I will ultimately argue that the United States has incurred additional mitigation responsibilities because of its extensive historical emissions, and because of its voluntarily assumed leadership role. First, the ethical imperatives for immediate and aggressive global mitigation are discussed, followed by an assessment of the establishment of the IPCC and UNFCCCC as well as the Kyoto and Montreal Protocols. I argue that the Paris Agreement, signed in 2015, has the requisite flexibility to be successful across the diversity of the international contexts. I finally analyze the role of the United States in forging and implementing these agreements, and present an argument for heightened leadership and mitigation responsibilities for America.

Preface: Purpose and Introduction

Since the mid-1980s and early 1990s, several coordinated attempts have been orchestrated at the international level to combat and mitigate climate change and address other pressing environmental issues. Though there have been sporadic successes, the majority of these treaties and protocols have fallen short of their intended purposes, leaving the global threat of greenhouse gas emissions largely unchecked. However, the most recent treaty, orchestrated at the UN Framework Convention on Climate Change 21st Conference of the Parties held in Paris (typically referred to as the "Paris Agreement") is starkly different from its predecessors in form, and through voluntary contributions, may prove more successful. In the wake of the Paris Convention, environmentalists and politicians alike await early benchmarks of success and failure. Domestically, the United States and its current administration have vowed to dismantle its role the Agreement and renege on the emissions cuts to which predecessors had agreed. The various layers of ethical questions and pragmatic considerations in the field of international environmental law led me to explore the manner in which United States leadership is influencing the environmental law matrix, and the extent to which its leadership has impacted both successful and unsuccessful international environmental laws in the past.

The purpose of this paper is to detail and explore both the ethical and pragmatic implications of aggressive mitigation on a coordinated international level. Particularly, this paper attempts to assess the extent to which the leadership of the United States influences the relative success and failure of international agreements, and the international agreements, structures and mechanisms themselves. A secondary assessment is the extent to which the United States has incurred additional responsibilities to mitigate beyond those

shared by the world, from both a harm-based and special responsibilities standpoint. In this paper, I will ultimately argue that the United States has incurred additional mitigation responsibilities because of its extensive historical emissions, and because of its voluntarily assumed leadership role.

This thesis is divided into four chapters, each with its own objectives and structure. The purpose of Chapter One is to assess the ethical implications of global emissions and establish duties of mitigation. It is here that I establish a duty to mitigate emissions and global warming, based on a simple and relatively uncontroversial base premise: it is prima facie wrong to harm other people. This chapter introduces this ethical principle, applies it to the particular harm of climate change, and assesses both current and predicted global economic and physical harms. I also offer brief responses to objections such as skepticism, overdetermination, and the non-identity problem. Ultimately, I conclude that there exists a pressing global duty to mitigate climate change and reduce emissions in order to prevent future harms and compensate for harms already incurred.

Chapter Two analyzes the primary international institutions used to coordinate mitigation efforts and collect relevant scientific data, and their potential effectiveness in securing the targets of the Paris Agreement. This chapter addresses the nature of collective action problems and the particular difficulties of climate change, and measures the ability of past treaties like the Montreal Protocol and Kyoto Protocol to address the collective action dilemma. The structures of the two relevant bodies – the IPCC for collecting international scientific data and the UNFCCC for conducting international discussion and agreements – will also be detailed here. I then assess the effectiveness and desirability of international institutions in addressing these problems, considering an intergenerational

objection and the pragmatic consideration of previous failures. I ultimately argue that the existing mechanisms are well-poised to coordinate international solutions with consideration of flexibility and differentiation amidst committed parties.

Flexibility and differentiation are important aspects of the 2015 Paris Climate Agreement, the subject of my next chapter. Chapter Three specifically focuses in on the Paris Climate Agreement, examining party positions, negotiation strategies, and early metrics of success a year after the agreement and a few months after the treaty entered into force. This chapter provides relevant context for the convention, especially that which led to the individualized commitment mechanism of the INDC. I will assess the blend of voluntary and binding targets that Paris has created, then discuss preliminary benchmarks that the Paris Agreement has already met. COP 22, held in Marrakech, Morocco, in 2016 will also be briefly discuss. I will end by considering perverse incentives objections and objections to the voluntary structure. Ultimately, I will conclude that the Paris Agreement and component structures are in an excellent position for significant climate change mitigation, though I acknowledge that more ambitious targets must be committed to in the future.

Chapter Four analyzes the United States' role in shaping and adhering to these international treaties. I begin with an analysis of the failed Kyoto Protocol and the United States' inability and unwillingness to ratify the treaty, though it signed and pushed for the emissions cuts included in the text. I will contrast these actions with those of the Montreal Protocol, in which the U.S. corporation DuPont stood to make great profit through market share of CFC substitute. I will also show that because of its historical emissions and voluntarily incurred leadership role, the United States has assumed special responsibilities

to mitigate domestically and shape policy internationally. I will look at U.S. commitments in the Paris Convention and immediately after, looking at key negotiations. Finally, I will consider two objections of heightened U.S. leadership and responsibility, namely the threat of Donald Trump in derailing U.S. Paris commitments, and the increasing emissions of the rapidly developing states of China and India. Ultimately, I aim to show that these pragmatic concerns do not negate the ethical imperatives of the U.S. to aggressively mitigate its own emissions and encourage the rest of the world to do likewise.

Chapter 1: The Ethics of Mitigation

I. Introduction

In 1824, Joseph Fourier, a French physicist, postulated the existence of a natural greenhouse effect of the Earth's atmosphere, stating that heat from sunlight met less resistance in initially penetrating the earth's atmosphere than when exiting as non-luminous heat.[1] John Tyndal, an Irish physicist, furthered Fourier's theory in 1861, showing that water vapor and other gasses contributed to this natural greenhouse effect.[2] Thirty-five years later, Svante Arrhenius, a Swedish chemist, concluded that the coal-burning of industrialization would exacerbate the greenhouse effect, with a few degrees Celsius of warming occurring should atmospheric carbon dioxide levels double.[3] From Arrhenius' viewpoint in 1896, this man-made greenhouse effect would seemingly be beneficial for future generations.[4]

Now, 196 years after the greenhouse effect was first postulated, the scientific consensus regarding anthropogenic climate change is nearly absolute. Ninety-seven percent or more of actively publishing scientists in the field agree that the trends in atmospheric carbon levels and subsequent warming trends are extremely likely attributable to human activities.[5] We now understand that the greenhouse effect is a natural, homeostatic process, allowing energy from the sun to enter our atmosphere while trapping a portion of that energy from exiting into space – without this process, life would

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[1] BBC News," A Brief History of Climate Change," BBC News, September 20, 2013.
[2] *Ibid.*
[3] *Ibid.*
[4] *Ibid.*
[5] NASA, "Scientific Consensus: Earth's Climate Is Warming."

be impossible.[6] However, since the Industrial Revolution, human activity has negatively interfered with the natural homeostasis of our atmospheric composition, releasing more carbon dioxide than our natural carbon sinks can absorb and causing more molecules to trap energy and heat in the atmosphere.[7] Carbon dioxide levels have increased by 42 percent, from 280 parts per million at the onset of the Industrial Revolution, to 400 ppm today. Methane, a gas that is 300 times more potent per molecule than carbon dioxide over a 100-year period, has increased 150 percent since 1750.[8]

Since 1988, the Intergovernmental Panel on Climate Change (IPCC) has evaluated the effects of climate change as a division of the United Nations Environmental Programme (UNEP) and the World Meteorological Organization (WMO).[9] The 195 member states of the UN and WMO are represented by the IPCC, which aims to coordinate international scientists so as to present a snapshot of climate change consensus.[10] In their Fifth Assessment Synthesis Report, published in 2014, the IPCC asserted that 1) Human influence on the climate system was evident, and anthropogenic greenhouse gas emissions were now the highest in history; and 2) Climate change has had a "widespread impact" on both human and natural systems.[11]

The IPCC summarized the ecological harms of global warming in its Fifth Assessment, assessing climate warming trends as well as less-broadcasted impacts, such as

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[6] David Hunter, James Salzman, and Durwood Zaelke, *International Environmental Law and Policy*. 4th ed. (2011): 2.
[7] *Ibid.*
[8] *Ibid.*
[9] Intergovernmental Panel on Climate Change, "IPCC Media Advisory: IPCC Meetings In Bangkok," IPCC Press Office, October 7, 2016, 2.
[10] *Ibid.*
[11] Intergovernmental Panel on Climate Change, "Climate Change 2014 Synthesis Report: Summary for Policymakers," IPCC Press Office, 2014, 2.

ocean acidification. Since the industrial revolution, the global surface temperature has warmed 0.85 degrees Celsius, and the surface temperature of the ocean has warmed 0.11 degrees per decade since 1971.[12] Nitrous oxide, methane, and carbon dioxide molecules have reached levels that are unprecedented in the last 800,000 years.[13] Accordingly, the acidity of the ocean, as measured by the amount of hydrogen ions, has increased by 26 percent since the Industrial Revolution.[14] The Greenland and Antarctic ice sheets have lost mass, and permafrost temperatures in most regions have increased since the 1980s in response in higher surface temperatures.[15] If the West Antarctic ice sheet were to melt – a likely occurrence if the Earth reached two degrees of warming – the U.S. Geological Survey asserts that sea levels would rise by eight meters.[16] A further six-meter rise would occur should the Greenland ice sheet follow suit.[17] With nearly half of the Earth's population living within 60 kilometers of the coast, sea level rise will likely lead to large loss of property, and possibly human life.[18] In the U.S., a 14-meter sea rise would correspond to a flooding of 25 percent of the population.[19]

It is thus apparent that climate change is not only attributable to human activities, but will also have a harmful impact upon both ecological and human systems. These impacts will be spread across time, space, and species, making climate change a

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[12] *Ibid.,* 2-4.
[13] *Ibid.,* 8.
[14] Hunter, Salzman, and Zaelke, *International Environmental Law,* 4.
[15] *Ibid.,* 8.
[16] *Ibid.*
[17] *Ibid.*
[18] UNHCR News, "Climate Change and Disasters," Accessed November 04, 2016.
[19] Hunter, Salzman, and Zaelke, *International Environmental Law,* 4.

particularly difficult type of collective action problem.[20] Just as we in the present day are being harmed by the damaging effects of past emitters, the effects of our own emissions will be felt for hundreds, thousands, and even tens of thousands of years because of the half-life of carbon.[21] Furthermore, those in developing nations, who have contributed the least to atmospheric greenhouse gas levels, are likely to feel the effects most heavily and be least able to enact effective adaptation strategies.[22] As such, the majority of the harms of climate change are imposed by developed nations onto developing nations and their people.

Because of the pervasive impact of harms directly and indirectly attributable to climate change, aggressive mitigation strategies are imperative to combat the existing trends of greenhouse gas emissions and prevent future harms. Furthermore, these mitigation efforts need to begin as soon as possible.

II. The Ethics of Aggressive Mitigation

The need to implement aggressive mitigation strategies rests upon a simple and pervasive moral imperative: it is prima facie wrong to cause harm to other people. My argument will rest upon this common-sense moral principle, showing that it is morally wrong to inflict harm upon others. I will further show that this moral obligation is consistent with our domestic tort litigation principles, as well as international law cases. I will then provide evidence and research that indicates and measures the current and expected harms linked to climate change, concluding that it is prima facie wrong to

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[20] Stephen M. Gardiner, *A Perfect Moral Storm: The Ethical Tragedy of Climate Change*. New York: Oxford University Press, 2011, 8.
[21] *Ibid.*
[22] IPCC, Climate Change 2014 Synthesis Report, 8.

contribute to climate change because doing so harms others, and will continue to harm others for many generations. I will then argue that the duty to refrain from harm necessarily creates a corresponding duty to mitigate the causal chain that has been created by the harmful actions. For these reasons, I will ultimately conclude that aggressive adaptation and mitigation strategies are morally required.

A. It is prima facie wrong to cause harm to other people.

A prima facie obligation is a type of obligation that holds under normal circumstances.[23] If other influences are equal, a prima facie obligation becomes a binding obligation unless another moral consideration intervenes and outweighs the obligation.[24] An act or occurrence can thereby be shown to be prima facie wrong if it is in violation of a prima facie obligation. As people who coexist, we have a prima facie obligation to refrain from harming others. This moral principle requires no particular moral theory to back it; it is common-sense morality that absent other considerations, I am obligated to refrain from punching you in the nose, because to do so would constitute undue harm to your person. It is possible that other moral imperatives might allow me to violate this prima facie obligation, such as you physically threatening my life, but without other moral reasons for action, punching you in the nose would constitute an unjustifiable wrong.

The same basic principle which ethically prevents me from cavalierly punching people in the nose also applies to collectively harmful activities, such as those relevant to climate change. Collectively harmful activities are those that cause real and significant harms when many people engage in them, though these activities are not sufficient to cause

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[23] Nicholas Asher and David Bonevac, "Prima Facie Obligation," *Studia Logica: An International Journal for Symbolic Logic* 57:1 (June 1996): 19.
[24] *Ibid.*

harm on an individual level.[25] In specific regard to climate change, collectively harmful activities include driving a car that runs on gasoline, consuming foods that produce proportionally large emissions (such as beef), unnecessarily using water, relying upon electricity produced by coal-fired power plants, and many others. On an individual level, driving one's car on a Sunday afternoon is neither necessary nor sufficient to cause global climate change.[26] On a collective level however, the drives of millions of automobile drivers result in significant emissions that *are* sufficient to cause some of the harms associated with climate change. Thus, the act of driving is collectively, though not individually, harmful.[27] Individuals, however, are unable to *solve* these problems through personal restraint, but it is fully within their power to abstain from participation in the problem.[28] I am thus not suggesting that morality requires that individuals solve large-scale collective action problems, for it is impossible for them to do so; I am only suggesting the weaker moral principle that it is unethical to contribute to collectively harmful activities through knowing participation.

To understand why morality might require restraint in collectively harmful activities, we can turn to a number of moral theories. Brad Hooker's rule consequentialism asserts that we have a duty to refrain from actions that violate a code of norms that, if followed by the overwhelming majority of people, would create bad consequences.[29]

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[25] Jason Brennan, "Polluting The Polls: When Citizens Should Not Vote," *Australasian Journal of Philosophy* 87: 4 (2009): 539.
[26] Walter Sinnott-Armstrong, "It's Not My Fault: Global Warming And Individual Obligations," *Perspectives on Climate Change: Science, Economics, Politics, Ethics Advances in the Economics of Environmental Research* 5 (2005), 334.
[27] Brennan, "Polls, "539.
[28] *Ibid.,* 540.
[29] *Ibid.*

Collectively harmful activities, such as those complicit in climate change and global warming, would by definition fall under such a category. From a deontological perspective, collectively harmful activities stand in direct contrast to Kant's second categorical imperative, which requires that people engage only in those activities and maxims that one could will to be universalized.[30] Collectively harmful activities logically create a "contradiction in the will" that Kant described, because rational agents cannot will that everyone act in a way that creates large-scale harm.[31]

The moral duty to refrain from harm not only constitutes a common-sense moral principle and is defensible from both consequentialist and deontological perspectives, but is also so pervasive that it forms the basis of our system of tort law. In general, there exist two kinds of proscriptive duties in tort law.[32] Fault-based proscriptive duties are those which obligate people to refrain from faulty harming, and this duty often extends an obligation of preventing such harms.[33] Fault-based proscriptive duties divide into duties to refrain from causing intentional harm, and duties to refrain from causing negligent harm.[34] Duties arising from strict liability are far more demanding: they require that one refrain from or otherwise prevent harms irrespective of whether these harms are intentional or negligent.[35] One need not accept strict liability notions of duties in order to recognize a general, fault-based prima facie duty to refrain from causing intentional or negligent harm. Our tort system in this regard reflects an alignment of legality and morality.

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[30] Robert Johnson, "Kant's Moral Philosophy," Stanford University, 2004.
[31] Brennan, "Polls," 540.
[32] Hanoch Sheinman,"Tort Law and Corrective Justice," *Law and Philosophy* 22:1 (2003): 28.
[33] *Ibid.*
[34] *Ibid.*
[35] *Ibid.,* 29.

In areas that align more closely with conservation and common resources, we do see a similar alignment of law and morality. The legal basis for the prevention and correction of harms is already well-documented in both domestic and international environmental law. Much of our environmental law bases the duty to refrain from pollution and contamination upon the logical basis of the fault-based proscriptive duties of our tort system. To elucidate the ways in which pollution or contamination might constitute a tortious negligence or harm, consider the following thought experiment:

Imagine a considerable, though modestly-sized river that flows from the mountains to the sea. On its path, it transverses hundreds of miles and fuels the lives and endeavors of thousands of people, as well as countless species. In particular, the river supplies water to the irrigation system of a farmer whose crops feed the nearby population. Let's call the farmer person B. Upstream from B, there is an individual, A, who runs a metal-smithing company that produces a large amount of toxic waste. A has options as to the disposal methods of such waste. He can dispose of the waste through the proper authorities, who are trained to dispose of hazardous waste and can minimize the negative effects, incurring a cost and reducing his profit-margin, or A can dump his waste into the river at no cost to himself.

However, many harms will be felt downstream, both to people that he is physically near, such as person B, and to those hundreds of miles down the river's path. In particular, because of B's proximity to A, B will feel the effects strongly and will be acutely harmed; his crops will die because of the heightened toxicity, and his own enjoyment of the river will be significantly diminished. In this microcosm, it seems clear that A has a firm duty to refrain from contaminating the river; his use of the river in such a manner ruins the benefits and

use of the river by person B, inflicting significant harm. Furthermore, there seems to be no reason to limit the scope of this duty to the harms inflicted by A to B; those hundreds of miles downstream will suffer from the effects of A's intentional disposal. Though the harm might be lessened, the distance itself is irrelevant; it would seem that by virtue of the river's status as the common resource of thousands of people, A has a moral duty to not intentionally contaminate its waters, and all along its path have a right to be excluded from the negative effects of A's actions.

The beginnings of international environmental protection were formed from real-life cases of transboundary air pollution, grounded upon the same duties and rights that apply to our toxic waste example. Unlike the river case, where the reliance upon the river was clear and recognized by its dependents, atmosphere and clean air are background conditions that many people take for granted. If asked to think of an example of a limited resource, it is unlikely that most people would immediately respond with air and atmosphere, and as such, our atmosphere has been used as a major waste repository since the Industrial Revolution, but without a long history of legal recourse. These pollutions have not been without harms, however; according to the World Bank, an unthinkable 800,000 people die from air pollution related to emissions each year.[36]

One of the first transboundary air pollution cases was arbitrated between the United States and Canada during the 1940s. Known as the Trails Smelter Arbitration, this case demonstrated the possibility of transboundary harms; a factory located entirely within Canada was polluting portions of the United States downwind from its location.[37]

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[36] Hunter, Salzman, and Zaelke, *International Environmental Law,* 504.
[37] *Ibid.,* 505.

The amount of pollutants steadily increased from the smelter's establishment in 1896, and by 1930, over 10,000 tons of sulfur was emitted each month, approximately 300-350 tons of sulfur daily.[38] In Washington state, the fumes of sulfur dioxide damaged the property of apple growers, though the apple growers could not directly bring a lawsuit in either Washington or British Columbia because of the transboundary nature of the pollution; the government of the United States thus intervened.[39]

The arbitration panel and tribunal investigating the case focused largely on factual issues, including whether harms were actually incurred on the United States residents by the pollution. At the time, the tribunal described their investigation as "the most thorough study ever made of any area subject to atmospheric pollution by industrial smoke."[40] However, the most contentious factor was not simply assigning a value of monetary compensation. Instead, the arbitration tribunal had to question not only the manner of damages, but whether Trail Smelter ought to be legally prevented from causing *future* damages.[41] in other words, it was forced to consider whether a duty to prevent harms existed within an international context. The most important legacy of this case was thus the establishment of a rule now widely recognized in customary international law: states have a moral duty to prohibit activities in its jurisdiction that harm the environment of a neighboring state.[42] The Tribunal found that "no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another

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[38] *Ibid.,* 509.
[39] *Ibid.,* 510.
[40] *Ibid.,* 511. Excerpt: J. Read, *The Trail Smelter Dispute*, Canadian Yearbook of International Law, 1963.
[41] Hunter, Salzman, and Zaelke, *International Environmental Law*, 512.
[42] *Ibid.,* 505.

or the properties of persons therein, when the case is of serious consequence and the inquiry is established by clear and convincing evidence."[43]

The moral duty to refrain from causing harm is thus not only backed up by ethical principles, but by established international law and domestic law precedence. The convergence of law and morality lends strength to the common-sense moral code that prevents me from punching people in the nose without cause, and is similarly defensible from both rule utilitarian and deontological standpoints. In the next section, I will show that the harms predicted by climate change are significant and violate the duty to refrain from causing harm.

B. Climate change will cause significant harms.

The net harms of climate change are real and well-established. While some regions will incur at least temporary benefits from altered climate systems, as a whole, the net global impact will be severely harmful. In addition to impacting the ecological systems globally, these global climate change will affect human systems as well. The IPCC asserts that it is likely that human influence has doubled, and perhaps more than doubled, the probability of heat waves in certain regions.[44] The World Health Organization expects that climate change will cause an additional 5.25 million deaths in the 2030 to 2050 period.[45] Excluding impact costs to agriculture, water, and sanitation sectors, the direct costs to human health will reach $2 billion to $4 billion per year by 2030.[46] Furthermore, the United

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[43] *Ibid.,* 514.
[44] IPCC, "2014 Synthesis Report," 8.
[45] World Health Organization, "Climate Change and Health," June 2016.
[46] *Ibid.*

Nations High Commissioner for Refugees (UNHCR) has given a conservative estimate that 250 million climate refugees will be displaced by extreme weather conditions by 2050.[47]

The impacts across continents is expected to vary greatly by specific region. In the following sections, I will give an overview of some of the expected benefits and harms of climate change, organized by continent for an elucidation of case studies and regional impacts. I will begin by detailing the expected effects of climate change on United States regions and economies, then profile global regions and specific nations to assess projected global harms. The emphasis on the United States and Europe is primarily because of more concrete data sets and projections for future impacts in both near decades and the 2100 benchmark.

i. The United States

One of the greatest expected benefits of climate change to the United States and its people will be an increased growing season and decreased frost. According to the National Aeronautics and Space Administration (NASA), since the 1980s, the length of the frost-free season has been increasing across the nation, with the most extreme changes occurring in the western United States.[48] The lengthened frost-free season has impacted ecosystems, but has had a positive effect on agricultural output in the United States.[49] Given current emissions trends, increases in growing seasons of a month or more are expected across the majority of the United States by the year 2100, though the impact will not be as extreme in

[47] Melita Sunjic, "Top UNHCR Official Warns about Displacement from Climate Change," UNHCR News, December 9, 2008.
[48] NASA, "The Consequences of Climate Change," Accessed November 04, 2016.
[49] *Ibid.*

the northern Great Plains.[50] An increase in the growing season of more than eight weeks is projected in the western United States, with the greatest increases occurring in upper elevations and coastal areas.[51] These agricultural benefits will necessarily be lessened if greenhouse gas emissions are reduce and subsequent climate change is lessened.

The United States will not, however, be immune to the negative impacts of climate change in its human and financial systems, and extreme adverse effects are expected across the nation. While climate change will improve the growing season in the United States, it is also expected to cause an increased number of natural disasters. In particular, the number of floods, droughts, and hurricanes is expected to continue to increase.[52] In addition to changing weather patterns, the United States will also need to adapt to a sea level rise between one and four feet; since the 1880s, the sea level has risen only eight inches.[53] Corresponding property destruction and inland movement is expected along both the eastern and western coasts of the United States. While these changes will doubtless have an emotional and psychological impact on United States residents, there will also be considerable economic costs. To estimate the effects of climate change on American industries, I will give an account of expected impacts within the insurance industry, which in the United States accounts for 1.4 trillion dollars annually.[54] Insurers have already begun to reduce coverage and policies in certain states and regions because of anticipated climate-change impacts.

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[50] *Ibid.*
[51] *Ibid.*
[52] *Ibid.*
[53] *Ibid.*
[54] Michael Tucker, "Climate Change and the Insurance Industry: The Cost of Increased Risk and the Impetus for Action." *Ecological Economics* 22: 2 (August 1997): 85.

The U.S. Global Change Research Program releases periodic assessments of projected weather pattern shifts across domestic regions. According to its Third Climate Assessment, the northeastern United States is projected to experience increased heat waves, heavy rain, and sea level rise; infrastructure, agriculture, fisheries and ecosystems will be increasingly and exponentially compromised in the coming decades.[55] The Northwest, by contrast, is expected to experience less predictability in stream and river flow, reducing the water supply and placing increased strain upon competing demands.[56] Erosion, inundation, and sea level rise are expected to threaten infrastructure, and ocean acidification is expected to have a potent impact upon the fishing industry. Wildfires, arboreal diseases, and outbreaks of certain insect species is expected to cause widespread destruction to western forests.[57] In the southeastern states, extreme heat is expected to affect overall health and agriculture, with increased heat waves and water scarcity.[58] The Southwest is likely to experience the worst effects of the northwestern and southeastern regions, with heat, drought, insect outbreaks, increased wildfires, and extreme drought expected to cripple agricultural yields and overall human health. Flooding and erosion in coastal states will increasingly threaten property values.[59] Midwestern states will experience alternating extreme heat and flooding, impacting agricultural, forestry, and transportation industries. The Great Lakes are also expected to be negatively impacted by

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[55] NASA, "Consequences of Climate Change."
[56] *Ibid.*
[57] *Ibid.*
[58] *Ibid.*
[59] *Ibid.*

climate change, with decreased water supply and increased resource demands threatening the vitality of the region.[60]

Sea level rise and hurricanes will increasingly affect property owners and cause widespread destruction. Because of the high-demand of property in these coastal regions and the luxury of these neighborhoods, the expected economic impact of property destruction will be especially high. The value of insured properties in the hurricane portion of the East and Gulf Coast region doubled between 1997 and 2007, to more than $7 trillion.[61] The particular vulnerability of these regions will increase significantly with continued changes in climate patterns and extreme weather, posing a particularly salient issue for the insurance industry.

Many insurance companies have begun to develop adaptation strategies for climate change, both in the United States and Europe, with acknowledgment that the impact of climate change on future losses is likely to be grave and significant.[62] The Chairman of Loyd's in London identified climate change as the number one issue for his group, while Allianz, the largest insurer in Europe, believes that climate change-related insured losses are likely to increase by 37 percent by the end of this decade, topping $1 trillion in a severe year.[63] Domestically, Allstate identified climate change as a reason for cancelling and denying the renewal of many policies in Gulf Coast states.[64] This trend is particularly evident in Florida, where Allstate cut policies from 1.2 million to 400,000 in the last

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[60] *Ibid.*
[61] "The Potential Impact of Climate Change on Insurance Regulation," National Association of Insurance Commissioners, 2008, 5.
[62] Mills, Evan. "Responding to Climate Change: The Insurance Industry" ClimateActionProgram.org. Accessed November 4, 2016, 1.
[63] *Ibid.*
[64] *Ibid.*

decade.[65] In the next 10-year period, Allstate intends to insure no more than 100,000 properties in the state of Florida.[66] Climate change thus threatens the vitality of one of the United States' largest industries.

ii. Other regions

Because of its higher latitudes, Europe is projected to experience temperature increases that top global averages by the end of the century, the extremes of which will be recorded in northern and eastern European nations in winter, and southern nations in the summer months.[67] The wet regions in the north are projected to experience increased rain, while the southern regions will suffer droughts.[68] As with the United States, an increased number of extreme weather events is projected, as well as rapidly accelerating sea level rise.[69] Like much of the world, the poorest peoples and areas of Europe are the most vulnerable to climate change, and deepened socio-economic imbalances are therefore projected.[70]

The European Environment Agency has assembled projected effects data for both high and low emissions scenarios according to IPCC projections of temperature increases from the pre-industrial era to 2100. A low-emissions scenario as defined by the European Environment Agency corresponds to a 1.7-degree-Celcius temperature increase by 2100; a high emissions scenario corresponds to a conservative 2.6-degree-Celcius increase.[71]

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[65] *Ibid.*
[66] *Ibid.,* 3.
[67] "Climate Change Impacts and Adaptation," European Environment Agency, February 18, 2015.
[68] *Ibid.*
[69] *Ibid.*
[70] *Ibid.*
[71] *Ibid.*

Without aggressive mitigation, a high-emissions scenario would more than double many climate impacts. Heat-related deaths in Europe are projected to double to 200,000 people per year under such a scenario.[72] Flood damage costs from rivers would double to 10 billion euros per year, and the annual area affected by forest fires would double to 800,000 hectares.[73] The number of people in Europe affected by droughts if global temperatures were to hit the 2.6-degree benchmark would increase seven-fold, to 150 million annually.[74] The expected impact of sea-level rise will triple to 42 billion euros per year.[75]

Unlike the United States and Europe, the impacts of climate change faced by the majority of the world occur without their significant contribution to fossil fuel consumption and emissions. Algeria, for instance, has contributed virtually nothing to the greenhouse in the past century with extremely limited historical emissions, and currently accounts for only 0.41 percent of the world's total emissions.[76] Algeria's land is nearly all arid or semi-arid and receives little rain; the country attributes a 30 percent decrease in rainfall over the past several decades to climate change.[77] Projections for the region include vast increases in desertification and land degradation; 50 million hectares face immediate deterioration.[78] A study compiled in 2000 predicts that as a fraction of GDP in the year 2100, Algeria is

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[72] *Ibid.*
[73] *Ibid.*
[74] *Ibid.*
[75] *Ibid.*
[76] "Country Greenhouse Gas Emissions Data," World Resources Institute.
[77] The People's Democratic Republic of Algeria, "Intended Nationally Determined Contribution, INDC- Algeria," September 3, 2015, 4
[78] *Ibid.*

expected to suffer the third largest average loss to its agricultural sector in the world from land loss.[79]

Algeria is already categorized as a water-scarce nation by the United Nations Development Program; its water availability per capita is 600 cubic meters per year, well under the 1,000 cubic meter benchmark for scarcity.[80] By 2013, the groundwater exploitation had reached 90 percent capacity, while its 71 dams have nearly reached the mobilizeable surface water potential.[81] As droughts and heatwaves increase and lengthen, rainfall will decrease by 10 to 15 percent by 2050.[82] In the steppe of Algeria, cyclical drought increase from one out of three years to seven out of 10 years in only two decades.[83] The exact fiscal and human-life impact of Algeria's increased water-scarcity is expected to vary widely depending on local and global mitigation strategies.[84]

Latin America, as defined by the IPCC, includes all countries in the Americas from Mexico to the southernmost tip of South America.[85] The combined total contribution from these nations is presently 4 percent of global greenhouse gas emissions.[86] The negative impacts of global warming and climate change from other emitters will thus fall disproportionately upon the region. The agricultural sector of Latin America is particularly vulnerable, and significant harms are projected to be felt much sooner than in other

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[79] Robert Mendelsohn, Ariel Dinar, and Arne Dalfelt, "Climate Change Impacts on African Agriculture," July 2000, 6.
[80] F. Sahnoune, M. Belhamel, M. Zelmat, and R. Kerbachi, "Climate Change in Algeria: Vulnerability and Strategy of Mitigation and Adaptation," *Energy Procedia* 36 (2013): 1291.
[81] *Ibid.*
[82] *Ibid*, 1293.
[83] *Ibid,* 1291.
[84] *Ibid,* 1291-1292.
[85] "The Regional Impacts of Climate Change," Intergovernmental Panel on Climate Change.
[86] *Ibid.*

regions. By 2030, the rice crop yield of Central America will decrease by 10 percent.[87] Assuming global trajectories for emissions hold true for the period 2020 to 2050, over 80 percent of Nicaragua's growing area will be unsuitable for growing and harvesting coffee crops in only 34 years.[88]

iii. Global Summary

Global impacts of climate change and greenhouse gas emissions will vary widely by region and specific country, but the overall global impact is projected to be largely and even grotesquely harmful. Furthermore, the countries that have contributed lesser amounts of emissions will suffer the consequences of emissions in disproportionate numbers, and climate change is expected to intensify the global gaps in wealth disparities.[89] The harms inflicted by high-emission countries onto both themselves and other nations are preventable; future harms might be avoided and current harms curtailed through aggressive mitigation.

Economic impacts will be most heavily felt in those industries acutely threatened by climate change; in the United States, the clearest and most acute harms will be seen in the insurance industry, but globally, many areas will experience an acute decrease in agricultural production necessary for their survival. Water-scarce nations like Algeria will experience intense desertification, while regions prone to flooding in Europe and elsewhere will experience an increased number of floods and subsequent damage. The humanitarian crisis, as measured in refugees, air-pollution deaths, and increased wealth

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[87] Climate Change, Agriculture, and Food Security, "2015 Annual Report: A Look at How a Changing Climate Will Hit South and Central America." CCAFS. September 5, 2014.
[88] *Ibid.*
[89] World Health Organization, "Climate Change and Health."

disparity between rich and poor is still more worrisome; the 250 million displaced persons and additional 5.25 million deaths from climate change in the next 34 years are statistics which demand particular attention to the subject of mitigation and incurred harms.

C: It is wrong to contribute to climate change.

As established in section P1, it is prima facie wrong to cause harm to other people. This ethical principle has justifications in common sense morality, as it is wrong absent other considerations for a person to punch another person in the nose. The ethical duty to refrain from causing harm is similarly supported by consequentialist frameworks of rule utilitarianism, as well as being deontologically supported by Kant's second categorical imperative. This moral principle is so strong that it established the basis of the American and English tort law system, and is especially salient in fault-based proscriptive duties of tort law. In an environmental context, the fault-based proscriptive duties to refrain from harm can be seen in a thought-experiment concerning hazardous waste in a river. It is similarly reflected in the beginnings of international environmental law, as shown in the logic of the Trails Smelter Arbitration between the United States and Canada. This case created an international principle that legally required nations from harming one another, barring individual nations from using their resources in such a manner that harmed others.

As section P2 detailed, though the effects of climate change are far from uniform on a global scale, the expected impact will cause real harms throughout the globe. Industries ranging from insurance to agriculture and water will be heavily impacted, and loss to property and life expected. The most pressing harms will come in the form of expected displacement and loss of human life, with 250 million refugees and 5.25 million additional

deaths from climate change expected before 2050.[90] These statistics predict real, pressing, and grave harms in addition to those already being incurred by victims of emissions; 800,000 people currently die of emission-related air pollution alone.[91]

Because it is prima facie wrong to cause harm, and contributions to climate change are causing and will continue to cause grave harms for decades to come, it necessarily follows that it is wrong to cause climate change and a duty exists to refrain from contribution.

D: If it is wrong to cause climate change, then there exists a duty to mitigate its effects.

It seems intuitive that if it is wrong to cause a harm, there exists a corresponding duty to mitigate or stop the effects once the harm has been inflicted or begun. If I punch you in the nose without cause, it seems like I am morally obligated at the very least to provide you with an ice pack. If I run over your fence, I ought to pay to repair it, and if I my household waste is seeping into your well, I ought to bear the full cost of mitigating the problem in the future. This principle of reparation is as entrenched into the United States tort system as the original duty to refrain from harm, and in fact dates back to the centuries-old foundation of trespass, case, and negligence in English common law. The system of trespass, case, and negligence existed to ensure that the legal system provided recourse so that those who were harmed were made at least as well off through the litigation process as they were before the harm was committed; this principle was decidedly "eminently fair" and readily apparent.

E: Aggressive mitigation is morally required of those who cause climate change harm.

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[90] *Ibid.*
[91] *Ibid.*

Contributing to climate change entails a moral wrong, and there exists a duty to repair wrongs by those who commit them. As such, it seems natural that if it is wrong to cause climate change, there exists a subsequent duty to mitigate the associated harms and incur relevant costs on the part of those who cause the harm in the first place. Therefore, aggressive mitigation and the provision of adaptation strategies is morally required of heavy-emitter countries, who must bear the costs to remedy these harms.

III. Objections

I will now assess other moral obligations and considerations involved in climate change ethics. First, I will consider the skeptic viewpoint, which aims to show that climate change will not cause significant harm or that the problem is so overdetermined that mitigation will not matter, and I will ultimately show that these skeptics are falsely assessing the scope of the problem. I will then consider the objection known as the non-identity problem, ultimately concluding that the expected harms to future generations are inexcusable regardless of whether we can specify their identities. Thus, I will show that other moral considerations do not override the imperative to refrain from inflicting harm upon others.

A. Skepticism and Overdetermination

There are two distinct branches of what I view as skepticism in climate change ethics. The first encompasses skepticism towards the problem of climate change itself, in that some believe that the harms and scope of climate change is not significantly bad enough to warrant mitigation. The second branch encompasses skepticism toward the benefit and impact of mitigation itself; these ethicists believe that if some degree of climate change is overdetermined and will occur regardless of our present and future actions, we

might as well enjoy the free-riding and not worry about it. I will show that both of these views present a false outlook on climate change ethics and the moral requirements of mitigation, the first because of its false outlook on the scope of climate change, and the second because it falsely ignores the impact of marginal emissions to favor a "threshold" approach to overdetermination. The second branch will be henceforth referred to as "overdetermination"; the first I will refer to as "skepticism."

One high-profile philosopher who advocates for the skeptic approach to climate change is Bjorn Lomberg. His brand of skepticism is moderate, classifying anthropogenic climate change as a problem, but not one that deserves the level of aggressive mitigation that some like myself advocate.[92] Lomborg's primary reason for this assertion is his belief that the social cost of carbon used by the IPCC and other mitigation advocates is too high. The social cost of carbon is an economic figure that can be best defined as the estimated price of damages expected by each marginal ton of CO2 released into the atmosphere.[93] Lomborg cites a study conducted by Richard Tol in establishing his estimate of the social cost of carbon – in the range of $2 to $14 per ton of CO2.[94] Instead of aggressive mitigation, Lomborg advocates for a modest carbon tax set at this price, which would cut emissions by 5 percent.[95] However, the exceptionally low-range of the social cost of carbon advocated by Tol is probably not our best estimate; the possibility of gross miscalculation by Tol and Lomborg is best seen by examining the figure used by an organization with a vested

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[92] Bjorn Lomborg, "Let's Keep Our Cool About Global Warming," In *The Environment, Consumption, and Climate Change*, 738.
[93] Frank Ackerman and Elizabeth A. Stanton, "The Social Cost of Carbon." *Real-World Economics Review*, 53 (2010): 129.
[94] Lomborg, "Keep Cool," 739.
[95] *Ibid.*

interest in killing mitigation strategies: Exxon-Mobile. As a producer of oil and gas, it is highly intuitive that Exxon-Mobile has a strong vested interest in retaining levels of oil consumption; any significant mitigation, including a carbon tax or cap-and-trade system will curb the company's profits. Yet Exxon-Mobile acknowledges that the social cost of carbon likely tops $80 per ton of CO2.[96] This figure, 40 times higher than the low range of Lomborg's estimate, does not represent the extreme high of social cost estimates (Lomborg cites Al Gore as advocating for a $140 estimate[97]). Exxon-Mobile's figure thus raises a significant challenge to the moderate skeptics who believe a 5 percent decrease in emissions is enough to relieve polluters of their ethical duties to the world and its people. Furthermore, the social cost of carbon metric is likely to mistakenly identify the liability levels of emitter countries because the figure is purely utilitarian by nature, averaging the global benefits of mitigation.

Regardless of his position on mitigation, Lomborg does concede that spending 0.5 percent of every nation's GDP on climate change research is warranted to develop non-carbon emitting energy technologies.[98] Deep cuts in emissions will thus become both possible and desirable from a utilitarian prospective when technology makes mitigation more reasonable priced.[99] This assertion advocates a purely utilitarian assessment of mitigation that uses a dollar metric of utility and cost. While it is always *desirable* that utility will be maximized through mitigation, this purist approach fails to consider deeply-entrenched notions of liability, fault, and the duty to refrain from causing harm. It seems

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[96] "Energy and Carbon: Managing the Risks," Exxon Mobile, 2014, 17-18.
[97] Lomborg, "Keep Cool," 741.
[98] *Ibid.,* 739.
[99] *Ibid.*

that if I punch you in the nose so that you require an ER visit that will cost $1000, I cannot escape the duty to pay by claiming that spending the money elsewhere will better maximize overall utility. It would be a highly weak argument if I asserted that I didn't have to pay for your ER visit because I would get more utility out of investing that money than your repaired nose will yield. I still ought to pay for your ER visit because I am morally and legally liable for the damage; as such, *even if we concede* that Lomborg is right in asserting that the expected damage of climate change does not yet align with the cost of mitigation, it does not follow that there is no obligation to incur these costs so as to prevent harm to others.

Overdetermination accounts of climate change appeal to a different type of skepticism – namely, if the problem of climate change is so certain that we have already committed ourselves to high atmospheric carbon levels for centuries, it is futile to incur heavy costs in order to halt an inevitable process.[100] It is true that even if we were to cease all emissions right now, carbon dioxide will remain in the atmosphere for centuries, continuing the greenhouse effect through a series of feedback loops.[101] The sentiment that climate change is catastrophically inevitable has recently increased; in September of 2016, the world's atmospheric carbon level annual minimum exceeded 400 ppm for the first time in recorded history.[102] This symbolic threshold has often been dubbed the "point of no return" or the "tipping point," a signal that significant global warming is overdetermined because of feedback loops.[103] For this reason, might seem intuitive that when a collective

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[100] John Broome, *Climate Matters: Ethics in a Warming World*. New York, 2012, 28
[101] *Ibid.,* 34.
[102] "The World Passes 400ppm Carbon Dioxide Threshold. Permanently," The Guardian. September 28, 2016.
[103] *Ibid.*

harm like climate change is already occurring –when a problem is so overdetermined that your restraint will not prevent the scope of the problem – that it is morally permissible to simply join in the collectively harmful action and reap the benefits. Yet simply because something bad is happening does not mean one is entitled to participate, even if it is impossible for them to stop the collective harm from occurring and it will progress regardless. Consider Jason Brennan's famous firing squad thought experiment:

In this experiment, Brennan asks us to imagine a ten-person firing squad who is moments away from executing an innocent child, all of whom will shoot the child at the exact same time.[104] Because you happen to be in the vicinity, the firing squad offers you an opportunity to join them in shooting the child. The child is going to die anyway; each of the ten bullets alone is sufficient enough to kill him. You are fully free to walk away without consequence, or you can join with the knowledge that your participation will have absolutely no bearing upon the outcome of what you are about to witness.

Naturally, the typical response to such an experiment is that you should not join the firing squad; in fact, morality forbids you from participating, though the outcome is already overdetermined and the child's fate is sealed – your individual duty to refrain from participation in something harmful remains intact. Accordingly, many collective action problems are overdetermined; the inevitability of the problem does not exclude participants from the related moral responsibilities.

If such a duty exists *even in circumstances* of inevitability, then it certainly applies to collectively harmful activities where the outcome is not so certain, or can conceivable

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[104] Jason Brennan, The Ethics of Voting (Princeton, NJ: Princeton University Press, 2012), 72.

become marginally, increasingly, and significantly worse. It is true that climate change of some degree has already occurred, and that atmospheric carbon levels have committed the Earth and its population to a certain amount of future harm regardless of current or future cuts in emissions. Yet it is also clear that marginal increases in emissions and atmospheric carbon levels will create marginally greater harms, that aggressive mitigation and stabilization at 400 parts per million will create lesser harm than stabilization at 450 parts per million, 500 parts per million, and 700 parts per million. Thus, while some degree of climate change is overdetermined, the scale of the harm is by no means inevitable; collectively, we could prevent marginally greater harms through aggressive mitigation and stabilization efforts. The false sense of inevitable harm thus does not pose a moral hurdle for the ethics of aggressive mitigation.

B. Non-Identity problem

Another common objection to mitigation strategies questions the premise that future generations will actually be harmed by our actions. The non-identity problem does not, however, address the harm by questioning the science or models of future impacts; instead, it questions whether future, un-born humans are philosophically able to be harmed by present actions. The non-identify problem was made prominent by philosopher Derek Parfit.[105] Essentially, it stipulates that the identity of a person is dependent upon her origin – the exact sperm and egg from whence she originates.[106] Consequently, even the slightest environmental variations in the timing of conception create a different human being.[107] These biological claims are seemingly uncontroversial.

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[105] Broome, *Climate Matters,* 61.
[106] *Ibid.*
[107] *Ibid.,* 62.

Consider the full implications of the non-identity problem. Let's say a person – let's call him Jerry – living in the year 2100 has a difficult life because of unchecked global warming. His poverty, hunger, and quality of life are significantly worse than they would have been if we in the present had implemented aggressive mitigation, and he suffers significantly more as a result. Can it be said that people today harmed Jerry? According to Parfit, such harm is philosophically impossible; because Jerry was conceived under a high-emissions scenario, had we implemented aggressive mitigation, the conditions of his conception would have never existed, and neither would Jerry.[108] Instead, a different person altogether would be living in a low-emissions world. Within several generations of a low-emissions framework, the entire world's population would have consisted of different people – this phenomenon is known as the non-identity effect.[109] The full philosophical implication of Parfit's argument is that it is impossible to harm a person by an action that occurred prior to their existence even if it leads to a harmed condition, provided that this person's life is still worth living.[110]

Underlying Parfit's claim is an implicit premise: my actions can only be counted as wrong if there exists a *particular* person who is worse off than they would otherwise be had I acted differently.[111] Similarly, Parfit also stipulates Kripke's genetic origins point of view, which argues that only those people in alternative scenarios with my exact genetic origins can count as me.[112]

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[108] *Ibid.*
[109] *Ibid.,* 63.
[110] Anthony Wrigley, "Harm to Future Persons: Non-Identity Problems and Counterpart Solutions," *Ethical Theory and Moral Practice* 15: 2 (2011): 175.
[111] *Ibid.,* 178.
[112] *Ibid.*

A different set of premises is applied when considering the harms of genetic disorders. Rather than a genetic origins approach, Divers introduced a theory that allows for a selection of counterparts in philosophy; that counterparts to an individual are those similar to the original in relevant respect and degree.[113] Lewis added specificity to this counterpart approach; a "John-qua-human" is similar to John in significant respects, but possesses a different genetic property (eye-color, deafness, etc.).[114] The match of genetic origins does not survive scrutiny under such an approach; rather, a "tenacity of origin" test is used, which demands only that a counterpart to an individual have an origin that maintains something similar to actual origins that is normally fixed in counterfactual situations.[115] These underlying principles allow for the philosophical possibility of a person with a genetic disorder claiming harm, provided that the cause was foreseen, alternatives were available, and genuine choice was possible.[116] The particular genetic information of a person does not preclude the possibility of their experiencing harm. Similarly, a person experiencing harm in a high-emissions scenario could very much claim that we living in the present harmed him respective to his counterpart, low-emissions-scenario self, provided that the harms of climate change were foreseen, alternatives were available, and genuine choice was possible. As detailed in Section 2, such harms are foreseeable, and mitigation strategies are available; that they would entail a cost does not preclude genuine choice. As such, the non-identity problem can be reassessed through different stipulations about genetic origins and counterparts.

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[113] *Ibid.,* 180.
[114] *Ibid.,* 181.
[115] *Ibid.,* 182.
[116] *Ibid.,* 185.

Even if the genetic origins view of humanity is the correct account, it still does not follow that the non-identity problem clears individuals of all blame. Though on the societal level, the genetic origins of future people will be significantly altered in a few generations by moving from business-as-usual to a low-emissions model, the impacts of each individual person will *not* significantly alter the spectrum of future people's genetic codes. Should I cut down my emissions immediately, it is true that my changed behavior will impact those close to me compared to a business-as-usual model, and these impacts will slightly alter the identities of babies born who are progressively more remote from me.[117] These ripples, however, will not spread across the world for several generations, so for the immediate future, the identities of the vast majority of children born in the world will retain the same identities regardless of my actions.[118] Yet my reduction itself would have begun to cease causing harms across the world almost immediately, and this impact would be compounded over time;[119] thus, I am individually capable of NOT harming those born in future generations whose genetic code would have remained identical regardless of my actions, and therefore it is entirely possible to directly cause harm to these individuals through my personal emissions. Because it is philosophically possible for individuals to harm people in such a manner, the non-identity problem does not allow one to escape the generational implications of the harm principle. The duty to mitigate remains entirely the same. Furthermore, it is certainly the case that presently-living people who will live to 2030, 2050, and beyond are presently being harmed and will continue to be harmed by the

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[117] Broome, *Climate Matters,* 63.
[118] *Ibid.*
[119] *Ibid.*

impacts of global warming and our current emissions. The non-identity problem cannot philosophically excuse their harm, as their genetic identities have already been established.

In addition to these responses to the non-identity problem, there also exists the distinct pragmatic possibility that it is possible to harm someone even if your harmful actions do not ultimately make the person worse off. Consider that possibility that I am in possession of a large brick. It appears that dropping this brick on a passersby's head from an upper window would constitute a distinct harm in that I would hurt the person. But what if the brick were made of solid gold? It seems that the value of the brick is immaterial to whether my action constitutes a harm; even if I have made the person economically better off by dropping a brick on them, I have nevertheless harmed them. Though this thought-experiment is rather far-fetched, the possibility of making someone better off while simultaneously harming them has very real and serious grounds in the case of a pregnancy conceived through rape. It seems fully plausible that a woman who conceives a child through rape might perceive her life as better on the whole because of her relationship with that child; it does not follow, however, that her rapist did not harm her or violate her rights.[120] This possibility shows that benefit and harm are not mutually exclusive, but the benefit produced does not ethically excuse the egregious nature of the harm. As such, it is fully plausible that a future person, whose entire existence and life worth living is dependent upon a business-as-usual emissions trajectory, could not be simultaneously harmed by my emissions actions. Thus, the emissions of greenhouse gasses

[120] Elizabeth Harman, "Can We Harm and Benefit In Creating?," Philosophical Perspectives 18, no. 1 (2004): 99, doi:10.1111/j.1520-8583.2004.00022.x.

constitute a harm to present and future generations; the non-identity problem thus cannot override the duty to implement aggressive mitigation.[121]

C. Objections do not outweigh the duty for aggressive mitigation

In this section, I have shown that appeals to skepticism, overdetermination, and the non-identity problem cannot morally outweigh the duty to implement aggressive mitigation. Though moderate skeptics like Lomborg advocate for lesser mitigation strategies and correspondingly weaker duties, he does so on the false assumption that the social cost of carbon hovers around $2 to $14 per ton; we have reason to question these figures because institutions with vested interest in continued pollution, such as Exxon-Mobile, recognize an $80 per ton price point. Furthermore, the moderate skeptics do not leave room for duties of harm, reparations, or fault when advocating their utilitarian calculus; even if it were true that the expected harms were less than the cost of mitigation, these appeals to utility do not weigh deeply-entrenched notions of fault and tort law. Another branch of skepticism doubts that mitigation will actually do any good; if we are already committed to 400 ppm of CO2 in the atmosphere and significant harm will come of the present atmospheric carbon levels, it seems plausible that climate change is overdetermined. However, simply because something is overdetermined does not give one a moral right to participate in a harm; it is morally reprehensible to join a firing squad simply because the death of the innocent victim is already inevitable. Even if one could participate in overdetermined collectively harmful activities, the marginal harms of climate change are *not* overdetermined; significantly more harm will occur with each additional degree of warming and marginally greater harm will occur with each additional part-per-

millions of atmospheric carbon established. As such, both appeals to skepticism fail to morally outweigh the duty to mitigate climate change and prevent its harms.

The non-identity problem does not challenge the scope of the problem or the potential benefits of mitigation; instead, it attempts to establish that it is physically impossible to harm someone if the harmful action occurred before their conception. However, the genetics origin account of identity is not the only philosophical claim for morality, and counterpart accounts have been used to establish harm in cases of genetic disorders provided the harm was foreseeable, preventable and that an alternate choice was conceivable. The same logic present in the argument for harm in genetic disorders applies to climate change harm in future generations, where harms are foreseen, preventable, and alternate choices are readily apparent. Furthermore, even if it could be proven that the genetics origin account of identity was the correct approach to identity, individual harms are still philosophically possible under such an account, since individual actions cannot be expected to alter the identities of future populations for several generations, but can influence ambient atmospheric carbon levels. As such, the non-identity problem does not pose a significant threat to the duty to mitigate climate change for future generations, and logically cannot excuse the harm inflicted on humans whose identities are already genetically conceived.

IV. Ethical Conclusions

Since the greenhouse effect was first postulated in 1824, scientists attempted to understand how our behaviors influence the atmosphere's retention of heat; 97 percent now agree that human actions are directly responsible for the rapid rise in atmospheric carbon levels, ocean acidification, and extreme weather events. However, this knowledge

itself is useless unless accompanied by an ethical assessment of the normative implications of the expected harms and our present actions. I do believe that human influence is significant enough to normatively require aggressive mitigation strategies based on the simple ethical principle that it is morally obligatory to refrain from causing harm to others.

In the preceding sections, I showed that the status of this prima facie obligation is entrenched in both our ethical and legal frameworks. It is cognitively apparent that it is immoral for me to cause injury to a person absent other considerations through physical force; this duty is similarly entrenched in notions of rule consequentialism and Kantian deontology. Furthermore, the fault-based proscriptive duty to abstain from causing harm forms the cornerstone of modern tort law; in international contexts, courts recognized in 1941 that this duty limits how states can use their resources when their actions harm parties elsewhere. It is also readily apparent that climate change constitutes significant moral harm; loss of human life and loss of property are expected, and these burdens will fall disproportionately on non-emitter and low-emitter states. As such, it necessarily follows that climate change violates the harm principle, and that we should not contribute the climate change to avoid harming others. Similarly, this duty to refrain from harm creates a similar duty to mitigate this harm after the causal chain has been launched. As such, there exists a duty for aggressive mitigation.

I further showed that the skeptic viewpoints and non-identity problem do not present significant moral reasons for overriding the duty to mitigate. While moderate skeptics predict less-severe crisis in the future, their social cost of carbon figures are incredibly low, and their moral theories ignore fault-based proscriptive duties prevalent in our legal and ethical systems for centuries. Other skeptics falsely believe that the climate

change problem is overdetermined, and thus marginal contributions to the problem are excusable. But just as I am not permitted to join in on the execution of an innocent person on the grounds that it would happen anyway, my moral obligations to refrain from causing climate change are similarly unaltered by the possibility of overdetermination. Furthermore, there is little reason to dismiss the marginally worse outcomes associated with marginally increasing levels of atmospheric carbon; significant harm can be prevented by stabilizing carbon levels at 400 ppm instead of continuing to pollute without restraint. Furthermore, the non-identity problem can be overcome by considering alternative theories of genetic identity, and scrutinizing the so-called problem from an individual rather than societal level. As such, the non-identity problem does not excuse inflicting harm onto future generations, and cannot excuse the liability to mitigate harm to present generations. The moral duty for aggressive mitigation holds against objections.

With the ethical roots of aggressive mitigation established, I will turn to international institutions in my next chapter, examining how they function, the international status of their laws, and how they might be used to facilitate cooperative backgrounds for aggressive mitigation strategies.

Chapter 2: International Institutions – The IPCC and UNFCCC

I. Introduction

As we established in Chapter 1, there exists a firm duty to combat climate change through aggressive mitigation strategies, and that these strategies ought to be implemented in the present day. Future predictable harms will be imposed by climate change, as well as present harms inflicted in loss of life and property. Given these impacts, and the general duty to prevent harms, it seems logical that mitigating climate change would be a top priority for the world's people and their governments. However, there are a number of challenges particular to climate change that make mitigation difficult for individual countries – and individual people – to implement successful strategies. Climate change constitutes a collective action problem – a public goods problem and tragedy of the commons more specifically.

The particular challenges of collective action problems and tragedies of the commons make unilateral solutions to climate change unattractive for individual countries, especially small and low-emissions countries. The lack of incentives for small, low-emissions countries is self- evident; if Luxembourg were to cut its emissions to zero, for example, there would be little to no impact on the overall atmospheric carbon levels, and little to no benefit for the country itself. As such, small, low- emissions countries would reap almost no benefits from implementing mitigation strategies alone, while incurring the costs of mitigation. Because the common resource of the Earth's atmosphere constitutes a public good, it is subject to overuse, and individual countries are incentivized from incurring the costs of fixing it alone.[122]

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[122] Paul Krugman and Robin Wells, *CourseSmart E-Book for Economics,* 2012, 479.

However, collaboration amongst countries through international agreements, backed by international institutions, can incentivize countries to contribute to climate change mitigation and decrease the risk for defection. There is strong evolutionary basis for persuasive social influences to facilitate coercion and enforcement, making effectiveness more feasible.[123] As such, collective agreements backed by international institutions can strengthen existing incentives to mitigate climate change, while simultaneously formulating new incentives through cooperation. There have been numerous past instances of success in solving tragedies of the commons and providing public goods through international agreements, both within environmental law and in other international contexts.

In this chapter, I will examine the processes by which international agreements and institutions can best foster the global cooperation needed to effectively solve the collective action problem of climate change and mitigate its effects. I will argue that the specific collective action problems implicit to climate change can best be addressed through concerted international agreements. I will show that international institutions are well-suited to effectively arrange cooperation strategies and make defection less attractive. Furthermore, international agreements backed by international institutions have successfully created and enforced effective collective action strategies in the past, both in an environmental and non-environmental context. I will examine successful instances in order to elucidate which particular aspects and methods can be reproduced in future environmental law transactions. My ultimate argument is that the collective action problem

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[123] Elinor Ostrom, "Collective Action and the Evolution of Social Norms," *Journal of Economic Perspectives* 14, no. 3 (Summer 2000): 148.

of climate change and its mitigation can be facilitated through concerted international agreements backed by international institutions.

In section II, I will discuss the challenges inherent to collective action problems in general, and then focus specifically on the aspects of climate change that disincentivize individuals and singular countries from aggressively mitigating its impacts and effects. I will examine prisoner's dilemma problems and game theory, and then show why public goods are typically subjected to underprovision, overuse and tragedy-of-the-commons scenarios. Furthermore, there are specific aspects inherent to climate change that make the collective action problem more complicated that will be detailed in this section.

In my next section, I will show the potential effectiveness of an international strategy to climate change mitigation, illustrating that despite the challenges of collective action problems, these institutions can foster effective cooperation. I will examine specific achievements of international law, with a heavy focus on the successful environmental treaty of the Montreal Protocol. I will begin by examining a general international law case, the provision of collective security through NATO, which illustrates the potential for effective global cooperation. I will use this case to establish the general legitimacy and effectiveness of international institutions in solving broader collective action problems.

I will also briefly discuss the Vienna Convention and subsequent Montreal Protocol as a singular event within international law, showing how effective cooperation was used to solve a collective action problem. Together, Vienna/Montreal are considered one of the primary achievements – if not the apotheosis of achievements – within environmental law. These agreements focused on fixing and mitigating ozone depletion and the ozone "hole" above Antarctica through a reduction in the consumption and production of

chlorofluorocarbons (CFCs), using international agreements to incentivize effective compliance. I will note the particular arrangements that made this protocol and convention so successful, as well as detailing the universal success the Protocol has achieved. I will conclude by arguing that international institutions have a record of success in solving collective action problems through collective means in both an environmental and non-environmental context.

In section 4, the existing international institutions relevant to climate change will be discussed and examined, specifically focusing on the IPCC (Intergovernmental Panel on Climate Change), whose purpose is to collect and consolidate the scientific evidence of global warming, climate change, and harms without making policy implications or agreements; and the UNFCC (the United Nations Framework Convention on Climate Change). I will explore the formation and objectives of both of these international organizations, but will focus the majority of my analysis on the UNFCCC, as it is this branch that has enacted and continues to enact policy and international agreements regarding climate change. I will close by arguing that these international institutions are well-suited to enact and enforce effective global mitigation for climate change. I will present the overall conclusion that the collective action problem of climate change and its mitigation can best be facilitated through concerted international agreements backed by international institutions.

Before ending this chapter, I will consider objections to the effectiveness and desirability of international institutions. The first objection I will consider is the intergenerational aspect of climate change –the majority of mitigation benefits will accrue to future generations while costing the present. Typical successful international

agreements solve problems that accrue immediate benefits. I will respond by showing that while this might discourage cooperation, there exist powerful pushes for mitigation across the majority of the world; the lack of immediate benefits does not seem to be overwhelmingly dissuading to the relevant actors.

The second objection that some argue is that these institutions, particularly the UNFCCC, have already failed to create meaningful agreements, with the failure of the Kyoto Protocol being particularly embarrassing. I will respond to this objection by analyzing Kyoto's failure, arguing that the problem is not one inherent to international agreements, but was attributable instead to other circumstances. On a related note, I will address the argument that voluntary, unilateral agreements are best suited to address the collective action problem of climate change, as these are less costly and less likely to create mass defection. I will respond to this objection by showing how the voluntary and unilateral arrangements typically praised by this objection can be integrated into concerted international agreements, particularly the 2015 Paris Climate Convention and subsequent Paris Agreement. Thus, I will show that the aspects which make unilateral arrangements attractive can be effectively reflected in concerted international agreements, and how these international arrangements can increase the effectiveness of unilateral treaties by increasing the assurance of mass cooperation.

I will show that the conclusion that international agreements are well-suited to solve climate change holds despite these objections. The Paris Agreement will be more extensively examined and analyzed in Chapter 4; it will be detailed in this section only as it pertains to the strength of international agreements and illustrates the union of voluntary arrangements and international backing.

II. Game Theory – Why is solving climate change so tough?

Where general economic principles are concerned, we tend to assume that groups of people who share common interests or objectives will work together to achieve these common goal.[124] It is common to ascribe those drives which govern individual pursuits to the group or cooperative level; however, a number of factors impede direct analogy between individual and group economic behavior.[125] Instead, we typically see that rational, self-interested people will not act to achieve common interests unless coercion or some other incentivizing device is at play.[126] These aspects of collective action problems bind most large groups *even with* unanimous agreement about the common good and the best method of attaining it.[127]

As such, large groups of self-interested individuals tend to produce sub-optimal results on the group level. An individual self-interested firm, for instance, is economically incentivized to produce until the marginal cost of production is equal to the market price, without consideration of how the extra output affects the prices of the industry as a whole.[128] Stipulate that this additional supply on the market level will cause prices to fall – had the industry restricted production as a whole, the group and each individual firm would be better off. Even in such a scenario, a firm who alone voluntarily restrains its production, foreseeing the damage that producing to the marginal cost would have on the entire industry, is made even worse off, as the price will fall on the market level absent

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[124] Mancur Olson, *The Logic of Collective Action: Public Goods and the Theory of Groups* (Cambridge, MA: Harvard University Press, 1965), 1.
[125] *Ibid.*
[126] *Ibid.*, 2.
[127] *Ibid.*, 2.
[128] *Ibid.*, 10.

similar restraint across the industry.[129] Thus, the non-cooperative economic structure at play in this scenario unfortunately ensures that all firms are individually incentivized to increase production, though the group and each subsidiary is left with a sub-optimal result. Without reassurance that other firms will restrain productivity, the firm must over-supply to remain competitive.

Prisoner's dilemmas constitute one form of collective action problem that can help lay some of the ground work for understanding the mechanisms that make climate change negotiations difficult to resolve and implement. Prisoner's dilemmas describe scenarios in which all actors have selected an individually wise strategy, and no actor can independently change its existing strategy without making herself worse off.[130] The equilibrium which arises is called a "Nash equilibrium," from which no parties can individually escape without incurring a loss.[131] The problem is that Nash equilibriums are often sub-optimal for the group as a whole. The classic prisoner's dilemma example involves two prisoners who have both been arrested for a minor crime, but the police suspect they also committed a major crime, though there is insufficient evidence.[132] If both of them confess to the major crime and turn one another in, they will each be sentenced to eight years in prison.[133] If one confesses but the other does not, the police will grant the confessor immunity and give the other a 20-year sentence.[134] If neither confess, they will

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[129] *Ibid.*
[130] Len Fisher, *Rock, Paper, Scissors: Game Theory in Everyday Life* (New York: Basic Books, 2008), 18.
[131] *Ibid.*
[132] Jonathan Becher, "The Prisoner's Dilemma," Forbes BrandVoice, April 28, 2016.
[133] *Ibid.*
[134] *Ibid.*

both serve one year for the minor crime.[135] The optimal scenario is for neither to confess, but by not confessing, the prisoner risks a 20-year sentence; by confessing, the maximum sentence he can get is eight years, and he might even be given immunity. The Nash equilibrium and most-likely result in such a scenario would be for both to confess, and both to serve an 8-year sentence; the likelihood of this result occurring is heightened by the fact that neither can communicate with one another.

Communication under such scenarios can help reduce sub-optimal results and bring about mutually beneficial strategies. Because people can communicate, they can design cooperative structures to maneuver past the Nash equilibrium, or so it is assumed. The prisoner's dilemma structure is one of the most classic setups for collective action problems; its fascination is so pervasive that several gameshows such as "Golden Balls" in the United Kingdom and "Friend or Foe?" in the United States have run for seasons, following the simple communication techniques and strategies people will employ when faced with a prisoner's dilemma.[136] However, without instruments of coercion, social pressures, or incentives available, the risk of defection is high, and trust rather low in these types of shows and situations.

The risk of a sub-optimal result produced without cooperation is certainly relevant and evident on the private enterprise level, but is far more burdensome on the public goods level. By definition, public goods are non-excludable and non-rival in consumption.[137] Non-excludable goods are those that benefit many people regardless of if they have paid for

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[135] *Ibid.*
[136] Nick Corrigan, Ibrahim Hussein, and Andy Rowe, "The Golden Rule," RadioLab (audio blog), 2014.
[137] Krugman and Wells, *Economics,* 477.

their deliverance – it is impossible to provide the good without its benefits extending to all people.[138] Examples of non-excludable goods include national defense, fresh air, and rule of law. Non-rival in consumption means that the provision of the good to one person does not diminish the usefulness to another person[139] – think of broadcast TV, for example. A sewer system in London in the mid-19th century was both non-excludable and non-rival in consumption, a classic public good. The need for a sewer system was enormous – neighborhoods near the Thames experienced cholera at a rate six times greater than the surrounding neighborhoods.[140] Yet the economic cost of a sewer system was too great to incentivize private parties to embark upon its provision – it was not until the Great Stink of 1858 that Parliament approved a plan for a sewer system, which opened in 1865.[141]

While the sewer system was a public good – both non-rival and non-excludable – the cleanliness of the water itself in the Thames would be classified as a common resource.[142] Common resources are non-excludable, but the use by one party does reduce the amount available to others, and as such it is not non-rival. However, both public goods and common resources tend to be underprovided and over-exploited without government intervention, which typically involves punishments and coercion for defectors.[143] Without such mechanisms for provision and punishment, non-excludable goods are subjected to the free-rider problem, wherein self-interested consumers fail to pay for the good, instead allowing others to pay for its provision and reaping the benefits regardless.[144] Thus, inefficiently low

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[138] *Ibid.*
[139] *Ibid.*
[140] *Ibid.,* 479.
[141] *Ibid.,* 477.
[142] *Ibid.*
[143] *Ibid.*
[144] *Ibid.,* 479.

production occurs in the economic market for non-excludable goods in the absence of government.[145] Common resources, by contrast, are subject to chronic exploitation leading to tragedies of the commons without significant protection and intervention.

For these reasons, the protection of the public good of the world's clean and usable atmosphere, as well as related common resources, are subjected to sub-optimal provision and cooperation by the residents of the Earth. I define a clean atmosphere as public good because it is non-excludable and generally non-rival, though one could argue that some functions, such as its capacity to store carbon, are rival in consumption because the release of carbon by one party means that other parties are less able to release carbon without exceeding the atmosphere's realistic threshold. The atmosphere's ability to absorb carbon is vastly overexploited, and its protection under-provided; this alone poses significant challenges for mitigation, but climate change as a collective action problem is further complicated by a series of other factors.

Because countries as a whole are better off combatting climate change, but individually better off without reducing emissions or incurring the necessary costs, global agreements must entice countries to collectively reduce emissions and keep their commitments.[146] Those that view climate change in terms of the economic problems at hand, with the ultimate economic goal being for the world in total to invest in reducing GHG's to the point where the cost of increased expenditure on mitigation equals the benefit of reduced climate change damage.[147] In short, we should mitigate up until the marginal

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[145] *Ibid.*
[146] Todd L. Cherry, "Enforcing Compliance with Voluntary Agreements under Uncertainty," Center for International Climate and Environmental Research Oslo (CICERO), 2.
[147] Ross Garnaut, "The G-20 and International Cooperation on Climate Change.," in *The G-20 Summit at Five* (Washington: Brookings Institution Press, 2014)., 225.

cost. However, each country's unique position means that the absolute value of its own individual cost-benefit analysis will vary substantially, according to its personal risk from climate change as well as its existing economic position.[148] By leaving the matter of climate change to unilateral actions, we risk, and likely guarantee, that each country's actions will not necessarily align with the perspective of the world as a whole. For this reason, global agreements offer the best chance of effectively negotiating the interests of parties to resolve the collective action problem and produce meaningful treaties and agreements.

An influential work by Stephen Gardiner, titled "A Perfect Moral Storm," postulates that the characteristics of the climate change problem undermine our ability to address it, as the convergence of these peculiar features make us vulnerable to moral corruption. In addition to the features typical of collective action problems, global and intergenerational storms surrounding climate change obscure this essential moral corruption, and the synergy of the two combined is far greater than the sum of the individual storms.[149]

The global storm is characterized by a spatial dispersion of causes and effects, a fragmentation of agency, and institutional inadequacy.[150] These factors both limit the willingness to respond of individual countries, and perhaps more crucially their ability to respond. He identifies reliable and coercive sanctions as the primary, and perhaps only, means of making collectively rational action individually rational.[151]

Gardiner's point that poor countries are badly situated to hold rich nations accountable bears attention; if we can call sanctions a form of altruistic punishment, we

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[148] *Ibid.*, 233.
[149] Stephen M. Gardiner, "A Perfect Moral Storm: Climate Change, Intergenerational Ethics and the Problem of Moral Corruption," *Environmental Values* 15, no. 3 (2006): 399.
[150] *Ibid.*
[151] *Ibid.,* 401.

must further acknowledge that the costs of such punishment can be borne only by the few.[152] A global governance system that holds asymmetric availability of enforcement and altruistic punishment doubtless creates systemic problems. This asymmetry might very well provide further incentive for wealthy nations to delay climate change response and acknowledgement; as Gardiner asserted, acknowledging the moral defects of climate change and carbon distribution will likely encourage attention to other moral defects of our global governance system and economic system, namely poverty.[153] If the logical similarities between climate change and global poverty are such that to accept the logic of one it is necessary to apply it to the other, then there is strong economic incentive for wealthy nations to retain the status quo in both dimensions.

Intergenerationally, back loading and substantial deferral compound difficulties in collaboration. Because temporally fragmented agents cannot unite, there is even stronger incentive to delay action and pass the burden to future generations.[154] Meaningful solutions to make collectively rational solutions individually rational are thus far more difficult when actors are temporally separated rather than spatially distant. However, inaction in such scenarios creates egregious violations of the harm principle, as kicking the can down the road implicates more temporally distant generations that might have otherwise been spared.[155]

These aspects addressed by Gardiner complicate the existing collective action problem, and provide further explanation as to why creating meaningful solutions to

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[152] *Ibid.,* 402.
[153] *Ibid.*
[154] *Ibid.,* 403.
[155] *Ibid.*, 406.

mitigation strategies is so hard. The intergenerational objection he poses warrants particular attention, and will be addressed in section 5 of this chapter. His other points give us reason to anticipate failure on the global scale, and yet these points largely ignore the fact that effective international agreements have been implemented in the past, both within and outside the environmental realm.

III. International Strategy – Are International Institutions and Treaties Viable?

Despite the challenges of collective action problems, international institutions and treaties are often highly successful at providing member states with public goods that they could not achieve, or could not achieve as effectively, when acting individually. A public good that is often the subject of treaties is peace and collective security, and one prominent international organization that was founded primarily for its provision was NATO. The North Atlantic Trade Organization was founded in 1949, between the United States, Canada, and 10 European Nations.[156] Its three essential functions were to deter Soviet expansion across Europe, preventing a revival of nationalist militarism in Europe, and encouraging political integration across the continent.[157] The organization provides collective security, and its North Atlantic Treaty provides that an armed attack against one member state is considered an armed attack against them all.[158] Though this particular clause has only been invoked once, in response to the 9/11 terrorist attacks against the United States, NATO has acted together many times to successfully achieve the three ends

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[156] "A Short History of NATO." North Atlantic Treaty Organization.
[157] *Ibid.*
[158] *Ibid.*

of its initial formation.[159] One prominent success for the organization was its actions in Kosovo.

The Balkans remained outside of NATO's borders in the 1990s, and the collapse of Yugoslavia lead to many wars in the region, threatening European security and causing humanitarian tragedies.[160] The NATO Implementation Force united more than 30 countries, including Russia, to form a coalition of peace, but the situation in Kosovo nevertheless escalated.[161] In the fall of 1998, approximately 300,000 Kosovar citizens fled, about one-sixth of whom went to the surrounding mountains and forests.[162] As many died of cold and starvation that winter, the U.N. identified the hostilities as an "impending humanitarian catastrophe."[163] Facing a "deliberately engineered mass expulsion" just outside its borders, NATO decided to intervene.[164] NATO launched a 77-day airstrike, prevailing without any casualties of its own and avoiding another ethnic cleansing crusade in Europe.[165] Though the airstrikes were heavily criticized, the institution of NATO achieved success in Kosovo by the metrics of the goals set by its establishment. Today, NATO has 28 member states, and has invoked collective security initiatives during the Cold War, in Afghanistan, against maritime piracy, and in Libya.[166] The international organization has been able to successfully provide the public good of security through its

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[159] *Ibid.*
[160] Javier Solana, "NATO's Success in Kosovo," Foreign Affairs, Nov. & Dec. 1999.
[161] *Ibid.*
[162] *Ibid.*
[163] *Ibid.*
[164] *Ibid.*
[165] *Ibid.*
[166] "Encyclopedia of NATO Topics: Background information on the Alliance, its policies, activities and structures." NATO.

nation states in a more stable and effective way than would likely have been achieved by individual state actors.

Within International Environmental Law, the Vienna Convention and Montreal Protocol clearly illustrate the potential for success in the domain of collective environmental protection. These two international agreements were formulated in response to widespread concern of ozone depletion, the ozone hole, and related health risks. As of 2010, both the Vienna Convention (1985) and the Montreal Protocol (1987) were universally ratified by all 196 parties.[167] The crowning achievement of these deals was the elimination by 2010 of the production of 97 percent of ozone-depleting substances, with commitments to phase-out the remaining substances by 2030.[168] These accomplishments were achieved despite scientific uncertainty, unequal regional contribution to the problem, high transition costs, unequal capacity across parties to bear the costs, and the need for near-universal participation to achieve the solution.[169]

Strong public outcry and the availability of a usable substitute engineered by DuPont aided the feasibility of implementation.[170] Short-term competitive benefits were added in the amendment process – the treaty would enter into force only when 11 countries representing 66 percent of emissions ratified the treaty.[171] This clause ensured that the perverse incentive to hold out in order to gain competitive advantage was strategically lessened.[172] Funding mechanisms and technology transfers were also included

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[167] David Hunter, James Salzman, and Durwood Zaelke, *International Environmental Law and Policy*. 4th ed. (2011): 533.
[168] *Ibid.*
[169] *Ibid.*
[170] *Ibid.,* 552.
[171] *Ibid.,* 554.
[172] *Ibid.*

in the adjustments and amendments to ensure developing countries were included in a manner that reflected their differing economic position.[173] Furthermore, non-compliance procedures were added in 1992; the Implementation Committee for review was given the power of enacting potential response measures that included providing assistance in meeting targets, issuing warnings, and suspending Protocol privileges.[174] Potential privileges that can be revoked concerned industrial rationalization, production, consumption, trade, technology transfers, the Multilateral Fund, and other non-specified institutional arrangements.[175]

Global institutions effectively and rather rapidly responded to the threat of ozone depletion with universal ratification in the Vienna Convention and subsequent Montreal Protocol. A 97-percent reduction was achieved in the production of ozone-depleting substances, despite the usual difficulties present in environmental collective action problems. This highly successful case illustrates the potential effectiveness of international institutions to collectively enact meaningful change to promote a cleaner environment and atmosphere. Furthermore, cases outside of the environmental law umbrella, such as NATO's provision of collective security, illustrate that cooperative treaties and arrangements are often used to provide public goods. As such, in spite of the multi-faceted difficulties inherent to collective action problems, international institutions have a history of providing public goods and environmental services that lend credence to their capabilities at addressing effective climate change mitigation.

IV. Existing Environmental Institutions – The IPCC and UNFCCC

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[173] *Ibid.,* 558.
[174] *Ibid.,* 575.
[175] *Ibid.*

Two prominent institutions – the IPCC and the UNFCCC – have been developed by international bodies to address the threat of climate change. The IPCC focuses primarily on collecting and analyzing scientific data so that governments can understand both regional and global patterns and enact informed policy. The UNFCCC by contrast is the policy body of the United Nations designated to create effective response to climate change. One of the major hurdles to enacting global change is often creating the relevant institutions necessary; fortunately, these bodies already exist to combat and mitigate climate change.

In 1972, the United Nations decided at its Stockholm Conference on the Human Environment to create a specific program focused on solving and tracking environmental challenges.[176] The United Nations Environment Program (UNEP) was confirmed by the UN General Assembly to "facilitate international co-operation in the environmental field; to keep the world environmental situation under review so that problems of international significance receive appropriate consideration by Governments; and to promote the acquisition, assessment and exchange of environmental knowledge."[177] To stress the acquisition, assessment and exchange of knowledge clause, the International Panel on Climate Change was created in 1988, a subsidiary of UNEP and the World Meteorological Organization (WMO).[178] The first task for the IPCC was outlined in the UN General Assembly Resolution 43/53; the panel was to prepare a comprehensive review of the science, social and economic impact, and possible response strategies for climate change.[179] This institution was founded to inform governments and relevant institutions of climate

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[176] *Ibid.*, 192
[177] *Ibid.*
[178] "History," Intergovernmental Panel on Climate Change.
[179] *Ibid.*

change impacts; today, its goal is to comprehensively, transparently and objectively assess the scientific and economic impact on anthropogenic climate change, including its potential future impacts and strategies for adaptation and mitigation.[180]

In 1990, the IPCC released its First Assessment Report, in which it identified climate change as a challenge that would require concerted international cooperation to resolve.[181] This aspect of the report, along with the magnitude of its scientific findings, acted as a major incentive for the creation of an international institution specifically aimed at addressing and mitigating climate change on a comprehensive global level.

The United Nations Framework Convention on Climate Change was first established in 1992 by international agreement.[182] By its inception, a certain degree of warming and subsequent impacts were already perceived as inevitable.[183] As of 2016, there were 197 Parties to the Convention, making it the most comprehensive international institution focusing specifically on climate change.[184] Its size, as well as its overwhelming success at incentivizing parties to join its convention, makes it the best-suited institution to enact global climate change treaties that aim for specific mitigation targets.

The UNFCCC document details the essential background agreements and stipulations needed to enact effective mitigation. Its universal ratification – all 196 countries and 1 economic integration organization[185] -- signals a global acceptance that

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[180] *Ibid.*
[181] *Ibid.*
[182] "Background on the UNFCCC: The international response to climate change," United Nations Framework Convention on Climate Change.
[183] *Ibid.*
[184] *Ibid.*
[185] "Status of Ratification of the Convention," United Nations Framework Convention on Climate Change.

climate change and its effects are a "common concern of human kind," a stipulation addressed in the document.[186] It established as an objective the achievement of a stabilization of atmospheric greenhouse gas levels so as to prevent serious anthropogenic interference in the climate.[187] The document establishes a precautionary principle to minimize climate change and its adverse effects even where there exists doubt, and to enact global mitigation in such a manner as is sensitive to the common but differentiated responsibilities of developed and developing countries.[188] It calls upon the world to commit to develop national inventories of emissions, formulate mitigation measures nationally, promote technological developments and sustainable management, and create adaptation strategies.[189] Though there were no specific targets included, the Convention expressed the common goals of the world and laid the necessary background work and positions necessary to facilitate further treaties.[190]

Thus, both the IPCC and the UNFCCC have achieved important baselines that can aid the effectiveness of future and existing climate treaties. The continuous appraisal of scientific metrics of global climate change is essential for monitoring trends and measuring the scope of the problem; as such, the existence of the IPCC helps build factual consensus and continually establishes and reaffirms the scientific basis for climate change mitigation. The UNFCCC as a Convention established the common goals of the world in addressing climate change, laying out the stipulations that unite the globe. As a recurring convention, the UNFCCC provides the body and legal metrics for the establishment of new treaties,

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[186] Hunter, Salzman, and Zaelke, *Environmental Law,* 679.
[187] *Ibid.*
[188] *Ibid.*
[189] *Ibid.,* 680.
[190] *Ibid.,* 682.

revision of existing ones, and potential enforcement mechanisms. These institutions are pre-designed and already in full-force; as such, much of the institutional requirements that can impede the speedy address of global collective action problems have already been cared for. With universal ratification and participation behind us, international institutions are in a far better position to address this collective action problem, though the need for incentivization structures and ambitious yet realistic and successful targets remains.

V. Overall Conclusions

Despite the inherent difficulties of collective action problems, climate change can be effectively addressed with global cooperation. Concerted international efforts solidified by treaties and international institutions have historically been successful in providing public goods and have been effective at solving international environmental law problems, such as ozone depletion. The existence of two international structures dedicated to climate change mitigation, the IPCC and UNFCCC, make creating new treaties more feasible, as the necessary background structures and common goals are already established and universally ratified by the globe. As such, international institutions are well-equipped to facilitate aggressive mitigation of climate change.

VI. Objections to International Structures –Intergenerational Problems and Past Failures

There exist several objections to the effectiveness and desirability of international institutions that ought to be addressed. The first objection I will consider is the concept that the intergenerational aspect of climate change undermines the possibility of effective mitigation. The second is that because of past failure of international climate change treaties, other solutions, such as unilateral and multilateral arrangements, present the only truly viable options to addressing climate change mitigation.

Unlike many collective action problems and arrangements, wherein cooperation involves immediate group costs and immediate group benefits, the majority of mitigation benefits will accrue to future generations while costing the present.[191] It seems feasible that the long arch of climate change might dissuade actors from incurring costs; after all, why incur costs in the present when the majority of benefits won't accrue till many of the payers are dead? However, while this might discourage participation, it seems as though this particular aspect has not dissuaded parties from at recognizing the desirability of doing something in the present. The very wording of the UNFCCC demonstrates that there exist powerful pushes for mitigation across the majority of the world; the lack of immediate benefits does not seem to be overwhelmingly dissuading to the relevant actors. Furthermore, the most successful international environmental law treaty – the Montreal Protocol – was not immune to this very problem.

With the adoption of the UNFCCC, the parties of the world voluntarily incurred enumerated provisions and duties with fervent knowledge that climate change mitigation would be costly, with the benefits of mitigation being accrued primarily in the distant future.[192] All of the Earth's countries recognized at this conference the existence of a problem, established a costly and lofty goal in common, recognized the necessity of leadership from developed countries in aiding developing countries, and recognized that adaptation for the sake of future generations would be necessary in the present.[193] These provisions do not necessarily dismiss entirely the potential reluctance about the delay of

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[191] Gardiner, "A Perfect Moral Storm, 405.
[192] "First steps to a safer future: Introducing The United Nations Framework Convention on Climate Change," United Nations Framework Convention on Climate Change.
[193] *Ibid.*

benefits, but it does show that the intergenerational aspect of climate change mitigation were not so salient that relevant actors were unwilling to sign on to the treaty. Furthermore, the specific actors who negotiate these treaties belong to a relatively small group of negotiators – thus, strong social norms at this level can incentivize cooperation through the introduction of immediate social benefits.[194] Developments in the study of cultural revolution show both genetic and adaptive incentives that increase the propensity to cooperate based on social norms.[195] Despite the long-term nature of the total collective benefit within climate change settings, evolutionary psychology suggests that social norm benefits from both the internal group and world-wide outcry/media influence can be significant enough to promote cooperation.[196] Furthermore, the very existence of climate change treaties through the UNFCCC and the continuous compliance and attendance at the Conferences of the Parties shows that global cooperation exists regardless of the present asymmetry between mitigation costs and benefits.

The awareness of the long-term benefits but present costs was actually articulated during the adoption of the Montreal Protocol. The overwhelming success of this Protocol was discussed in Section 2 of this chapter, and yet the very same asymmetry – of present costs and far-off benefits – was present in the ozone depletion problem as is present in the climate change mitigation problem. The chief American negotiator of the Protocol stated that overcoming this aspect was an incredible feat for international law. He stated that "the most extraordinary aspect of the treaty was its imposition of substantial short-term economic costs to protect human health and the environment against unproved future

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[194] Ostrom, "Collective Action," 154.
[195] *Ibid.*
[196] *Ibid.*

dangers … at the time of the negotiations and signing, no measurable evidence of damage existed."[197] The success of the Montreal Protocol and its universal adoption shows that this objection does not pose an overwhelming threat to the viability of international treaties. While the intergenerational aspect certainly complicates the relevant collective action problems, this feature does not pose an *inherent* threat to a concerted international arrangement for aggressive mitigation.

The second objection that some argue is that these institutions, particularly the UNFCCC, have already failed to create meaningful agreements, with the failure of the Kyoto Protocol being particularly embarrassing. As such, voluntary unilateral arrangements might achieve speedier change, and even be more cost-effective. However, the failure of Kyoto does not reflect an inherent defect of international agreements, but rather elucidates a number of structures that must be improved upon. Furthermore, the voluntary and unilateral arrangements typically praised by this objection can be integrated into concerted international agreements, and aspects were in fact featured in the 2015 Paris Climate Convention and subsequent Paris Agreement. Thus, I will show that the aspects which make unilateral arrangements attractive can be effectively reflected in concerted international agreements, and how these international arrangements can increase the effectiveness of unilateral treaties by increasing the assurance of mass cooperation.

While there does exist a long pattern of failure with international climate change treaties, an examination of their structure and efficacy can give us an understanding of *why* they have failed. In most cases, I believe that the failure of these treaties was not attributable to their global structure, but rather was attributable to a number of individual

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[197] Hunter, Salzman, and Zaelke, *Environmental Law,* 533.

factors. Furthermore, many of the features that supposedly make success more probable in unilateral and bilateral cooperations – such as the social group dynamics of the actors and the voluntary nature of the agreements – are features that can be integrated into a global agreement and treaty.

In the wake of signing the UNFCCC, much emphasis was placed on the need to find and establish specific targets for relevant countries and actors. As such, at the Berlin Conference of the Parties (CoP) in 1995, The Berlin Mandate was drafted and agreed upon.[198] This document established a time table for QUELROs – quantifiable emissions limitation and reduction objectives – to be negotiated at the third session of the CoP. This session was scheduled for December 1997 in Kyoto, Japan.[199]

The first Convention required that developed countries take steps towards meeting 1990 levels of greenhouse gas emissions by the year 2000 in Article 4 of the convention.[200] The UNFCCC required that the first Conference of the Parties (CoP) to review developed countries' commitments to meeting this target, but by the first CoP, two things were decidedly clear. Firstly, the Article 4 commitments, even with perfect compliance, were going to be insufficient to meet the Article 2 objective – stabilizing greenhouse gasses at a safe and sustainable level.[201] Secondly, even if such targets were sufficient, few developed countries were going to be even reasonably near their 1990 levels by the year 2000.[202] The targets set by the UNFCCC establishment were not ambitious enough to successfully achieve the original goals and purpose of its existence; furthermore, compliance was low

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[198] *Ibid.,* 677.
[199] *Ibid.,* 685.
[200] *Ibid.*
[201] *Ibid.*
[202] *Ibid.*

and enforcement so weak that even these unambitious targets were not producing the desired results.[203] Firm targets would need to be set at the Kyoto CoP.

Heavy media attention was placed upon the Kyoto conference, but the key parties – the European Union, United States, and G-77, all had released position statements in prior negotiations that seemed too distant and irreconcilable for a meaningful treaty to be reached within the confines of the Kyoto Conference.[204] Yet there was such lofty public scrutiny of the convention that most parties were highly incentivized to strike a deal.[205] Even with the majority of the Kyoto Protocol preliminary text heavily bracketed, with multiple alternatives for nearly every provision elaborated, no single party wanted to be blamed for killing Kyoto with the stakes so high and with the world watching.[206] Furthermore, the unexpected attendance of U.S. Vice President Al Gore intensified the stakes of failure and increased the collaboration.[207] It also increased the desperation to reach a deal by the conclusion of the conference, with compromises being hastily drafted to extend by a full year deadlines agreement of certain provisions.[208]

Kyoto required through QELROs all industrialized party to reduce their net emissions below 1990 levels.[209] The biggest failure of the Kyoto Protocol was the United States' failure to ratify the treaty through its Congress.[210] The U.S. Senate instead adopted a resolution stating that the country would not sign any international agreement that limited

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[203] *Ibid.*
[204] *Ibid.,* 685-686.
[205] *Ibid.,* 686.
[206] *Ibid.*
[207] *Ibid.*
[208] *Ibid.*
[209] *Ibid.,* 689.
[210] Bård Amundsen and Else Lie, "Why the Kyoto Agreement Failed," The Research Council of Norway, December 15, 2010.

greenhouse gas emissions if doing so would substantially harm the United States economy.[211] Though the United States substantially increased its emissions post-1990 levels instead of adhering to its agreed 7 percent reduction, the majority of developed countries in fact made substantial reductions in the wake of Kyoto.[212] Once it was clear that Kyoto would not be adopted by the United States, the remaining industrialized countries still agreed to reduce their emissions by 5.2 percent below 1990 levels by 2012.[213] This was substantially less than the 8 percent average agreed to before the U.S. defected on its commitments, but nevertheless, the agreement entered into force with 127 parties in 2005.[214]

Though the Kyoto Protocol was deemed a failure of the international community, its failure rests heavily on the United States' inaction, and perhaps says more about the domestic priorities of the United States rather than the viability of international institutions. And while it is true that Kyoto failed to meet the QUELRO objectives it established, international agreements have been successful in reducing greenhouse gas emissions in the past. In addition to addressing ozone depletion, the Montreal Protocol was also highly successful at reducing greenhouse gas emissions. The net reduction of the Protocol before 2010 was 135 billion tons of Co2-equivalent – approximately 11 billion tons of CO2-equivalent each year.[215] Protocol mandates and subsequent voluntary measures in the U.S. and Europe had an effect on global warming, with an approximate

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[211] *Ibid.*
[212] Hunter, Salzman, and Zaelke, *Environmental Law,* 689.
[213] Amundsen and Lie, "Kyoto."
[214] *Ibid.*
[215] Hunter, Salzman, and Zaelke, *Environmental Law,* 534.

delay of 35 to 41 years.[216] Though the express purpose of the Protocol was divorced from the reduction of greenhouse gasses, it effectively produced a vast and substantial global reduction in the use of CO2 equivalent. Thus, this externality of the Montreal Protocol illustrates that reductions of greenhouse gases can and have been facilitated through international agreements.

However, global agreements take considerable compromise and are often very slow. As development continues to expand rapidly across much of the world, the risk of eclipsing the 2-degree-Celcius-of-warming threshold increases, making the need for significant cuts increasingly urgent.[217] There exists a significant possibility that the world no longer has the luxury of waiting for universal acceptance of a particular climate change treaty, and that instead countries should work individually and in smaller groups to combat the effects of climate change.[218] Some speculate that such arrangements would be more quickly created and more strongly enforced because they are purely voluntary, and exist between smaller groups with well-established relationships.[219] The G20 bloc, for example, which includes the majority of the world's top emitters, might be in an excellent position to negotiate significant cutbacks in carbon emissions without the need for a fully globalized treaty.[220]

I will stipulate that any reduction in emissions by a unilateral or multilateral agreement is better than unfettered emissions when it comes to mitigating global climate change. Should negotiating a climate change treaty prove impossible, with all proposals ending in utter failure and gridlock after multiple methods had been tried, I would likely

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[216] *Ibid.*
[217] Garnaut, "G20," 230.
[218] *Ibid.,* 232.
[219] *Ibid.,* 242.
[220] *Ibid.,* 223.

also concede that such agreements constitute the best option. However, what unilateral and bilateral arguments fail to persuasively address is why they would be more effective than a *successful* global treaty. There exists no reason to prefer unilateral and bilateral solutions to large global treaties unless global treaties are inherently destined to fail. The existence of the substantial greenhouse gas reduction in the Montreal Protocol undermines inherent failure in international agreements in this dimension. The failure of Kyoto and others is not one inherent to international climate change treaties, but rather is a systemic and policy failure.

Furthermore, the social influence and voluntary properties of unilateral and multilateral agreements that supposedly make them so attractive can be replicated on the international level. Though cooperation in collective action problems is increasingly difficult in large groups, small group phenomena are much more nuanced and complex.[221] The Conference of the Parties is sufficiently small that evolutionary and social norms exert meaningful influence and increase the likelihood of international agreements.[222] As to the voluntary component of unilateral treaties, the global Paris Agreement effectively utilized voluntary arrangements and sacrifices on the part of individual countries to create a concerted effort in its use of INDCs.[223] These Intended Nationally Determined Contributions were submitted by individual parties ahead of the Paris COP21, with countries asked to set their own ambitious targets for mitigation based on their varying capabilities.[224] Rather than setting sweeping targets that all developed and developing

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[221] Olson, *Logic of Collective Action,* 3.
[222] Ostrom, "Collective Action," 148.
[223] "The Paris Agreement." United Nations Framework Convention on Climate Change.
[224] *Ibid.*

countries were bound to meet, these INDCs allowed countries to put forward their best efforts while simultaneously being mindful of varying national objectives.[225] In 2018, the efforts of all countries will be assessed, with all parties required to report regularly on emissions and implementation strategies.[226] The threshold for entry into force was met on October 5, 2016, less than a year after the Conference and many months ahead of even the most optimistic predictions.[227] As such, both the social and voluntary aspects that might make unilateral arrangements more effective can and have been integrated into the international treaty level, and the Paris Conference's rapid ratification seems to indicate a higher degree of enthusiasm for mitigation than was anticipated.

Though past failures and the intergenerational aspect of climate change might give us reason to doubt the potential effectiveness of international institutions, these considerations do not reveal inherent flaws in international agreements. The success of Montreal illustrates that delayed benefits do not necessarily undermine the viability of a treaty, and the greenhouse gas reductions of this treaty prove that the world can and has significantly been able to delay mass global warming. Though the failure of Kyoto is certainly a dark stain on the UNFCCC's record, the Paris Accord has integrated the voluntary aspects of unilateral and multilateral treaties in its system of INDCs. While it is too early to measure the success of Paris, the rapid ratification seems to indicate fervent global enthusiasm. Overall, the conclusion that international frameworks have the potential combat climate change and are well-suited to do so holds against these objections. The

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[225] *Ibid.*
[226] *Ibid.*
[227] Vivienne Walt, "How Donald Trump Helped the Paris Climate Deal Become Law Ahead of Schedule," Fortune, November 03, 2016.

particular role of the U.S. – which arguably doomed the Kyoto Protocol – is deserving of further examination; the politics and incentives of the United States are the subject of the next chapter.

Chapter 3: COP 21, The Paris Agreement

1. Introduction

The Paris Agreement was drafted and agreed upon during the 21st annual Conference of the Parties (COP) held in December 2015 in Paris, France. Its primary goal was to achieve a climate change agreement that would be binding and universal, yet the agreement would set goals according to objectives and targets announced by individual parties. This method blended voluntary elements into a binding structure, contrasting previous treaties that featured limits set by the overarching body. In this chapter, I will contend that the structure and aims of the Paris Agreement have set the treaty up well for successful implementation and adherence; the Paris Agreement serves as a promising example of meaningful mitigation achieved through well- established international institutions in international environmental law.

I will begin by providing context for the Paris Convention, including a general overview of the articulated aims of the United Nations Framework Convention on Climate Change, of which the Paris Convention was the 21st installment. I will mention preceding Conferences of the Parties (COPs) that significantly influenced the structure and aims of the Paris Convention, with particular emphasis on COP 20 held in Lima, Peru, in 2014 and COP 19 held in Warsaw, Poland in 2013. Both of these conferences significantly shaped the structure of the Paris Conference as well as the preliminary necessities of party participation.

After discussing the context of the Convention, I will then shift my attention to structure of the Paris Convention and subsequent treaty, placing particular emphasis on the voluntary mitigation apparatus of the Intended Nationally Determinted Contributions

(INDCs), on which the Paris Agreement is fully reliant. I will also explore the text of the Paris Agreement, indicating the metrics of enforcement within the document to incentivize actors to meet their voluntary targets. I will also illustrate the mechanisms by which the text crafts a careful and deliberate compromise between parties.

Next, I will discuss the degree to which the Paris Agreement has made progress toward its mitigation goals. I will evaluate the impact of the conglomeration of voluntary promises, the rapid ratification of the Agreement, and the extent to which the parties have progressed toward meeting their goals in the past year. I will briefly address COP 22, held recently in November of 2016 in Marrakech, Morocco, and the extent to which the parties at this conference are satisfied or dissatisfied with the structure of Paris. I will also examine the efforts made to quicken the agreement's entry into force, championed particularly by United States President Barack Obama in the final months of his eight-year presidential tenure.

Before concluding, I will consider objections to the Paris Agreement, first examining doubts of its potential efficacy, and then turning my attention to objections concerning the potential for perverse incentives inherent to voluntary and self-made mitigation commitments. I will respond to these categories of objections, concluding by showing that the blend of voluntary limitations and binding enforcement places the Paris Agreement in an excellent position for significant, if sub-ideal, climate change mitigation.

II. Context of COP 21 Paris Convention and preceding conventions

The United Nations Framework Convention on Climate Change (UNFCCC) was held in Rio de Janeiro in 1992. Its highly significant contribution to global climate change mitigation was the provision of an international apparatus to negotiate the political means

necessary on the domestic level to stabilize concentrations of greenhouse gasses at the atmospheric level.[228] Its long- term purpose is to avoid anthropogenic interference in the atmosphere that will cause dangerous results to human systems.[229] With 195 parties to the Framework Convention, the UNFCCC is the primary international body aimed at creating significant climate change mitigation.[230] To maintain consistent progress toward attaining this goal, the UNFCCC parties meet annually at Conferences of the Parties (COPs).

These COPs aim to review the implementation of the original UNFCCC convention, which entered into force in 1994. These COPs began in 1995 in Berlin, Germany. Other significant COPs have included COP3 (Kyoto, Japan, which produced the Kyoto Protocol, largely regarded as an international failure), COP 11 (Montreal, Canada, which introduced the Montreal Action Plan, COP 15 (Copenhagen, Denmark, in which a successor to Kyoto failed to be realized), and COP 17 (Durban, South Africa, which created the Green Climate Fund).[231]

Given the history of failure evident present through many of these COPs, the overarching goal of Paris seems even more ambitious than it might otherwise appear. In the prior 20 years of UNFCCC negotiations, the parties had never attempted to secure a mitigation agreement that was both legally binding and universally agreed upon. Paris aimed to solidify not only these binding and universal clauses, but also specifically aimed to design its targets so as to limit warming to 2 degrees Celsius above pre-industrial levels.[232]

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[228] "UNFCCC COP 21 Paris France," United Nations Environment Programme Climate Action, http://www.cop21paris.org/about/cop21/.
[229] *Ibid.*
[230] *Ibid.*
[231] *Ibid.*
[232] *Ibid.*

With such high aims on the line, the 2015 COP 21 Paris Conference attracted over 50,000 participants, including 25,000 official delegates.[233]

However, the general ambitions articulated during the Paris Convention, including the timeline and commitment mechanisms, were determined far in advance of COP 21. Beginning at COP 17 Durban, held in 2011, countries forged agreements regarding the post-2020 emissions period, deciding that the 2015 COP at the latest would be used to formalize a treaty.[234] They further decided that this agreement would be universal and legally binding.[235] The UNFCCC deemed the Durban Conference to be a "turning point" for international climate change negotiations; the parties were able to agree that a comprehensive blueprint was required to meaningfully combat climate change.[236] Included in this agreement was the understanding that parties would contribute to climate change mitigation in accordance with the stipulated principle of common but differentiated responsibilities and leaving room for sustainable development.[237] However, the parties to the Durban Conference also recognized a need for greater and more ambitious action to reduce emissions and adapt to existing climate change, as well as ease the process of enacting a 2015 climate change agreement.[238]

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[233] *Ibid.*
[234] United Nations Framework Convention on Climate Change, "Durban Climate Change Conference - November 2011," UNFCCC, July 26, 2016. http://unfccc.int/meetings/durban_nov_2011/meeting/6245.php
[235] *Ibid.*
[236] United Nations Framework Convention on Climate Change, "Durban: Towards full implementation of the UN Climate Change Convention," Essential Background - Durban outcomes. http://unfccc.int/key_steps/durban_outcomes/items/6825.php.
[237] *Ibid.*
[238] *Ibid.*

The next Conference of the Parties, COP 18 held in Doha, Qatar, further emphasized the goal of working toward a universal 2020 climate change agreement to be adopted by 2015.[239] However, unlike COP 17 Durban, the Doha COP 18 Conference established an additional goal: scaling up efforts and increasing ambitions for the pre-2020 period, beyond existing pledges to which the parties had already agreed.[240] To ensure the success of the 2015 Conference and treaty, the UN Secretary General announced at Doha that he would lead a convention of world leaders in 2014 to mobilize political will ahead of the COP 21 deadline. The Doha convention established a set timetable for progress towards COP 21, and also completed an action plan for streamlining the 2015 agreement through the existing Ad hoc Working Group on the Durban Platform for Enhanced Action (ADP). The Convention crafted an agreement for governments to submit their information, views, and proposals for the 2015 climate convention by March 1, 2013. In addition to climate mitigation and adaptation finance, infrastructure and technology transfers, and an amendment to the Kyoto Protocol, Doha's central contribution to the UNFCCC legacy was furthering the preliminary processes that paved the road to Paris.

As the 2015 Convention became more imminent, the urgency to formalize specific preliminary actions, as well as broader goals of COP21, increased. The 2013 COP 19 conference in Warsaw, Poland, advanced both of these objectives. In regards to the broader goals of the 2015 conference, at the Warsaw Conference, the Parties agreed on two primary objectives: 1) create a binding, universal, and effective global effort to reduce emissions at

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[239] United Nations Framework Convention on Climate Change, "The Doha Climate Gateway," May 15, 2013, http://unfccc.int/key_steps/doha_climate_gateway/items/7389.php#Specific_Outcomes

[240] *Ibid.*

sufficiently rapid pace to remove humanity's long-term emissions bath out of the climate change danger zone, while simultaneously building adaptation capacity, and 2) stimulate broader and faster action in the present and pre-2020 period.[241] More specifically, the Warsaw Conference established a requirement for governments to communicate their contributions to climate change in advance of the Paris Convention. It also established standards for monitoring, reporting, and verifying metrics for domestic action to be finalized before implementation, and reiterated the importance of aiding the poorest countries adapt to climate change impacts, create sustainable development, and address loss and damage caused by climate change impacts.[242]

It was at Warsaw that the Parties of the UNFCCC rhetorically expressed an increasing urgency to combat climate change, stating that the evidence of anthropogenic climate change was beyond denial, and that there existed only a "limited time" to limit warming to 2 degrees Celsius past pre-industrial levels.[243] To achieve this limit to warming, the Warsaw Convention articulated that global emissions needed to peak in the present decade (the 2010s), and that the globe needed to achieve zero net emissions by the second half of the century (2050).[244] The Warsaw Convention also recognized that these ambitious and necessary goals could not be achieved without rapid, concerted and coordinated efforts at the international, domestic, business, and finance levels; the Convention thus included a cross-sector climate action showcase to make clear that the world had the money,

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[241] United Nations Framework Convention on Climate Change, "Warsaw Climate Conference Outcomes," February 12, 2014, http://unfccc.int/key_steps/warsaw_outcomes/items/8006.php.
[242] *Ibid.*
[243] *Ibid.*
[244] *Ibid.*

technology, models, and knowledge to create immediate and shared benefits to all sectors of the global economy and global atmosphere.[245]

The Warsaw Convention also laid out the structural beginnings of the Paris Convention, including a goal that the resulting treaty would enter into force in the year 2020.[246] The Parties also agreed at Warsaw to submit the formal draft text of the treaty by May 2015, with successful negotiations concluding at the Paris Convention in December.[247] Domestic preparations for implementing nationally determined contributions were to begin in the first quarter of 2015 ahead of the convention, and governments further agreed to identify the precise information required of the nationally determined contribution documents at the 2014 Lima Conference.[248] The conclusions reached at Warsaw for the pre-2020 period were less specific; governments resolved to strengthen efforts to close the "ambition gap" between existing pledges and what was reasonably required of countries to avoid exceeding the warming benchmark of 2 degrees Celsius.[249] However, no binding or specific benchmarks were established to close this gap, merely an empty assertion that governments would work to "accelerate the implementation of policies and environmentally sound technologies."[250]

With only a year left before the Paris Convention, the 2014 Conference held in Lima, Peru, was particularly focused on cleaning up remaining precursors to a successful 2015 treaty. The aims of COP 20 Lima were primarily to lay out the explicit groundwork and

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[245] *Ibid.*
[246] *Ibid.*
[247] *Ibid.*
[248] *Ibid.*
[249] *Ibid.*
[250] *Ibid.*

agreements necessary for a successful Paris Convention the following year. In the two weeks of negotiations of Lima, over 190 countries agreed to explicit elaborations of previous proposed tenets of the Paris Convention. The most significant elements of the Lima Call for Climate Action (the resulting text of COP 20) were submission guidelines for national contributions (INDCs), and the establishment of the INDC as the foundation for climate action in post-2020 negotiations. Lima also articulated explicitly that the Parties did not anticipate the new Paris Agreement to come into effect until 2020. Transparency apparatuses were also agreed upon through a Multilateral Assessment process to review emission targets. The UNFCCC's technology mechanism was further strengthened by pledges totaling $10 billion to the Green Climate Fund, initiated at COP 17 Durban.[251]

Between the 2014 Lima Conference and 2015 Paris Conference, over 190 countries met again for seven days of interim negotiations in Geneva, Switzerland.[252] Held in February 2015, a mere two months after COP 20 Lima and 10 months before COP 21 Paris, the Geneva Climate Change Talks prepared the full negotiating text for Paris.[253] The content of the draft detailed strategies for mitigation, adaptation, finance, technology, and capacity building within the necessary timetable to create a legally binding agreement by December of that year.[254] However, preliminary work did not conclude at the Geneva Climate Talks; the draft text would be further edited and negotiated at three additional formal sessions in

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[251] "Lima Call for Climate Action Puts World on Track to Paris 2015," UNFCCC, December 14, 2014, http://newsroom.unfccc.int/lima/lima-call-for-climate-action-puts-world-on-track-to-paris-2015/.
[252] "Governments Agree the Negotiating Text for the Paris Climate Agreement," UNFCCC, February 13, 2015, http://newsroom.unfccc.int/unfccc-newsroom/governments-agree-the-negotiating-text-for-the-paris-climate-agreement/.
[253] *Ibid.*
[254] *Ibid.*

Bonn, Germany, in June, August-September, and October of 2015.[255] At the ministerial-level, interim meetings and negotiations were held at the Major Economies Forum, the Petersburg Climate Dialogue, the African Ministerial Conference of the Environment, and the G7 and G20 meetings.[256]

Because of the long-term preparation for the 21st Conference of the Parties, the Paris Convention should not be considered merely as the annual meeting in a long series of conferences demanded by the original UNFCC Convention. With over four years of preliminary and progressive negotiations, the Paris Convention carried with it the global ambitions of parties disappointed by previous international failures and insufficient pledges. As such, the weight of Paris cannot be fully understood nor appreciated without grasping the vast preparation contributing to its drafting and negotiations. The resulting anticipation increased the stakes of the Convention, and given the failure of Kyoto and prior UNFCCC treaties to create effective mitigation, much of the perceived viability of the UN Framework rested upon the Parties' ability to successfully negotiate a binding and universal treaty.

III. Structure of Paris

Amid these high stakes and intense global scrutiny, the Paris Agreement managed to create a structure that incorporated both voluntary and compulsory elements. The UNFCCC Parties had previously agreed that the 2015 agreement should aim to be both universal and binding; all Parties needed to be invested in the stakes of global climate change, and all needed to be held to some level of accountability. Where previous treaties had excluded

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[255] *Ibid.*
[256] *Ibid.*

mitigation targets for certain nations on the basis of their developing status, Paris aimed to unite developing and developed nations under a common cause, requiring commitments from both but maintaining the principle of common but differentiated responsibilities.[257] However, the Paris Agreement also incorporated voluntary measures by avoiding a top-down, imposed structure. Instead of targets being applied across nations, regions, or Annexes, countries instead determined their own contributions to mitigation strategies. Thus, instead of fulfilling its universal and binding aims through sweeping restrictions that did not individually differentiate between countries' capabilities and statuses, the Paris Agreement encouraged universal participation by binding countries to targets individually proposed from the bottom-up.

The most revolutionary feature of the Paris Agreement is its solution to reaching universality. Serious international efforts to combat climate change must all surpass a salient problem: international bargaining.[258] Getting 195 countries, each with individual preferences, capabilities, and responsibilities to reach consensus poses a daunting hurdle for climate change negotiations. Rather than attempt to classify countries along developed and undeveloped lines, as the UNFCCC did in the Kyoto Protocol, and set mitigation targets unilaterally, the Paris Agreement invited each country to set its own agenda.[259] This flexibility mechanism promotes durability, while stipulating periodic oversight and review.[260]

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[257] *Ibid.*
[258] David G. Victor, "Making the Promise of Paris A Reality," in T*he Paris Agreement and Beyond: International Climate Change Policy Post-2020* (Cambridge, MA: Harvad Project on Climate Agreements, 2016), 13.
[259] *Ibid.*
[260] *Ibid.*

The INDCs themselves are not mandated to include a specific format; however, all countries were required to submit a proposal for their contribution to prevent "dangerous anthropogenic interference with the climate system" with clarity and transparency, and to consider undertakings for implementing the proposal.[261] The documents vary in length, ranging from just a few pages to more than 30, and many include detailed accounts of expected climate change impact within their borders, specific regional challenges, and metrics of accountability.

To illustrate the general format of an INDC, the United States submitted an excellent example of an INDC with baseline transparency, adaptation, and mitigation metrics included. The United States submitted a joint INDC and cover letter which together comprise five pages.[262] Its contribution to climate change mitigation is clearly stated and visually supported by a graph – by 2025, the U.S. will reduce emissions 26-28 percent below 2005 levels.[263] This pledge is contextualized through unchecked emissions predictions, and an statement which declares these emissions to be consistent with an overall goal of reducing emissions by 80 percent or more by 2050 in a straight-line path from 2020.[264] The transparency section lists included gasses, affected sectors, reference points, carbon sinks and land usage, and carbon equivalency metrics.[265] The U.S. also

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[261] United Nations Framework Convention on Climate Change, "INDCs - Intended Nationally Determined Contributions," September 27, 2016, http://unfccc.int/focus/indc_portal/items/8766.php.
[262]United States of America, "Intended Nationally Determined Contribution," March 31, 2015, http://www4.unfccc.int/Submissions/INDC/Published%20Documents/United%20States%20of%20America/1/U.S.%20Cover%20Note%20INDC%20and%20Accompanying%20Information.pdf
[263] *Ibid.,* 1.
[264] *Ibid.,* 2.
[265] *Ibid.,* 3-4.

included in its INDC a list of relevant laws and regulations to secure implementation, specifying heavy reliance on the Clean Air Act, the Energy Policy Act, and the Energy Independence and Security Act.[266]

This INDC does not include any mention of expected climate change impacts on the U.S., nor does it mention any promises of transfers to developing nations, be that monetary or technological. It does, however, fit the required structure agreed upon at COP 20 Lima: clearly defined mitigation commitments, transparency in outlining the context of the commitment, and an overview of domestic implementation metrics.

While social scientists often laud the flexibility approach of INDCs, they also recognize the varying level of quality present within both the documents, and in the pledges themselves.[267] During the next decade of INDC updating periods, what will be necessary is to ensure that the stream of information regarding mitigation costs and real implementations are accurate.[268] Overall, the initial INDCs have proven that countries are voluntarily willing to do quite a lot to combat climate change, but ensuring that these pledges are met may prove challenging.[269] However, the structure of Paris in fact acknowledged and laid the groundwork for an information regime, with the goal of lower transaction costs for further international and multilateral agreements among actors.[270] Though it is still possible for strict UN accountability metrics to emerge, these may discourage ambitious targets to be put forth in further meetings if sanctions are

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[266] *Ibid.,* 4-5.
[267] Victor, "Promise of Paris," 13.
[268] *Ibid.,* 14.
[269] *Ibid.*
[270] *Ibid.*

imposed.[271] Instead, following the voluntary approach, leaders will need to voluntarily improve the quality metrics of their initial pledges consistent with the spirit of the UN approach, but without the need for top-down impositions in the period before strict monitoring and enforcement systems are in place.[272] Taking flexibility as a serious advantage of the Paris Agreement requires that countries commit to cooperation outside of UN surveillance, through a bottom-up emergence through multi-lateral entities known as "clubs" to lower the cost of bargaining.[273]

Differentiation was also a key element of Paris, stemming from the long-standing UNFCCC principle of "common but differentiated responsibilities."[274] Rather than relying on the Annex-1 and non-Annex 1 binary that divided countries into developing and developed categories, Paris allowed differentiation in targets for mitigation, adaptation, finance, capacity, technology and transparency issue areas.[275] However, definitions of developed and developing were not defined at Paris, and countries with "special circumstances" were not identified; many INDCs were submitted pending conditions of support were met, and no definite long-term pathways for low-greenhouse gas development was finalized.[276] However, despite these drawbacks, the Paris Agreement effectively transitioned climate change negotiations away from the Annex-based binary,

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[271] *Ibid.,* 15.
[272] *Ibid.,* 14.
[273] *Ibid.,* 15.
[274] Lavanya Rajamani, "Differentiation and Equity in the Post-Paris Negotiations," in *The Paris Agreement and Beyond: International Climate Change Policy Post-2020* (Cambridge, MA: Harvard Project on Climate Agreements, 2016), 19.
[275] *Ibid.*
[276] *Ibid.*, 20-21.

allowing for substantially more differentiation amongst nations than was previously precedented.

The ability to make conditional offers posed an excellent bargaining advantage in finalizing negotiations. Many countries – especially those who are developing – committed to baseline mitigation efforts, but many expressed a willingness to increase their personal commitments pending support or additional mitigation efforts by specific nations.[277] This allows for countries to better navigate sub-prime results of prisoner's dilemma arrangements inherent to international agreements, increasing the stakes of issuing a sub-prime mitigation target. Furthermore, the pledge and review method requires review of INDC pledges every five years, with countries are pledged to review and strengthen commitments.[278] Longer-term commitments are scientifically undesirable and highly difficult to negotiate on the international level.[279] Thus, the pledge-and-review system enables updates to be initiated more swiftly, and can be amended as scientific consensus shifts.

Despite the voluntary bottom-up approach of the Paris Agreement, the official text also includes an implementation and compliance committee.[280] This expert-based committee was designed to be non-punitive, paying attention to respective national capabilities in issuing its rulings.[281] In the Adoption text of the Paris Agreement, the

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[277] Bård Harstad, "Making Paris Sustainable," in *The Paris Agreement and Beyond: International Climate Change Policy Post-2020* (Cambridge , MA: Harvard Project on Climate Agreements, 2016), 33.
[278] *Ibid.*
[279] *Ibid.*
[280] United Nations, "The Paris Agreement," 2015, https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf, art 15.
[281] *Ibid.*

composition of the committee was determined, with all 12 members holding scientific, socio-economic, or legal competence, and each of the five regional UN groups sending one member, plus one member from the small island states and another from among the least-developed countries.[282] However, the very non-punitive nation of the group necessarily means that implementation and compliance is left to a body without substantial teeth.

IV. Preliminary effectiveness metrics of the Paris Agreement

The Paris agreement ingeniously blends voluntary, bottom-up methods and a binding, universal agreement enforced through a central body. It also unites the world governments under a set of common goals and philosophical objectives to effectively combat climate change. The Paris Agreement was met with global enthusiasm and quickly entered into force at an unprecedented speed; these preliminary signs are all markers of a potentially effective treaty. Over a year after the COP 21 Paris Convention, it is important to track the early signs of success as well as any potential failures within the implementation of the document and the broader UNFCCC framework. In this section, I will assess the early metrics of Paris's effectiveness, beginning with its speedy ratification, United States leadership in ensuring the document went into force before its next election, the expected cumulative impact of individual INDCs, and progress at COP 22 Marrakech.

The Paris Agreement entered into force on November 4, 2016, the first time all governments had agreed to legally-binding limits to rising temperatures.[283] After more

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[282] "ADOPTION OF THE PARIS AGREEMENT, Proposal by the President, Draft decision -/CP.21," UNFCCC, December 12, 2015, https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf, 14.

[283] Fiona Harvey, "Paris climate change agreement enters into force," The Guardian, November 03, 2016, https://www.theguardian.com/environment/2016/nov/04/paris-climate-change-agreement-enters-into-force#img-1.

than 20 years of buildup, and four years of focused negotiations, all governments agreed to limit warming to 2 degrees Celsius above pre-industrial levels while pursuing a more ambitious target of a 1.5-degrees warming limit.[284] Two UN climate representatives, Patricia Espinosa and Salaheddine Mezouar, marked the occasion with a joint statement that declared the monumental nature of the Paris Agreement:

> "Humanity will look back on 4 November 2016 as the day that countries of the world shut the door on inevitable climate disaster and set off with determination towards a sustainable future. The Paris agreement is undoubtedly a turning point in the history of common human endeavour, capturing the combined political, economic and social will of governments, cities, regions and businesses and investors to overcome the existential threat of unchecked climate change."

The pace at which Paris entered into force was unexpected; original intentions for the 2015 agreement placed entry into force in 2020.[285] Fifty- five countries representing 55 percent of global emissions – the required benchmark for entry into force – formally ratified the Paris Agreement years ahead of schedule, reflecting unanticipated momentum and optimism on the part of world leaders and governments.[286]

Much of the swift speed with which the Paris Agreement entered into force can be attributed to negotiations, agreements, and announcements formed by the United States and other high-emitting countries, namely China and India. As Annex II developing

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[284] *Ibid.*
[285] UNFCCC, "The Doha Climate Gateway," 2013.
[286] Helen Clark, "Helen Clark: Statement on Entry Into Force of Paris Agreement," United Nations Development Programme, October 7, 2016, http://www.undp.org/content/undp/en/home/presscenter/speeches/2016/10/07/helen-clark-statement-on-entry-into-force-of-paris-agreement.html.

countries, both China and India had previously been exempt from making mandatory emissions cuts in landmark UNFCCC negotiations, including the Kyoto Protocol. Yet because these countries represented a growing percentage of overall emissions, both developed and developing countries grew to see this omission as unfair. The Paris Agreement aimed to maintain and respect the existing distinction between emission targets for developed and developing countries while ensuring that all high-emitters made progress toward peaking emissions and cutting back on greenhouse gas use. Both countries agreed to binding targets through the submission of their respective INDCs before COP 21 Paris; President Obama met with these nations to incentive their ratification of the Paris Agreement in the latter half of 2016.

On September 3, 2016, President Obama's White House released a statement entitled "U.S.- China Climate Change Cooperation Outcomes," detailing the nature of the two countries' bilateral relationship as the world's two highest emitters and their efforts to negotiate sustainable development in the present and future.[287] On September 3, both the United States and China submitted their individual agreements to join the Paris Agreement, a significant advancement toward entering the Paris Agreement into force.[288] The White House anticipated that these submissions would encourage other nations to submit their instruments to the United Nations Secretary-General Ban Ki-moon, expecting the Paris Agreement to enter into force that year with the help of other nations.[289] The joint

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[287] "U.S.-China Climate Change Cooperation Outcomes," Obama White House Archives, September 3, 2016, , accessed February 25, 2017, https://obamawhitehouse.archives.gov/the-press-office/2016/09/03/fact-sheet-us-china-cooperation-climate-change.
[288] *Ibid.*
[289] *Ibid.*

announcement of the United States and China and their speedy joining of the Agreement spurred other countries to speed up their domestic processes in joining the agreement.[290]

Three months earlier, in June of 2016, President Obama met with Prime Minister Narendra Modi. Many perceive Obama's actions in the latter half of 2016 in regards to climate change negotiations to be safeguarding the success of Paris against a potential Trump presidency and conservative legislature.[291] As a high-emissions nation, securing India's ratification of the Paris Agreement was a crucial step toward meeting the 55-percent-of-emissions requirement for the treaty to enter into force. To incentivize Prime Minister Modi and his nation to submit their documents early, the Obama promised U.S. government assistance in helping India meet its target of expanding solar capacity by five-fold over the next six years.[292] Opportunity for U.S. business opportunity was also ample between the two countries; with the market for LED lightbulbs in India booming and government plans to replace all street lights with LEDs, the United States stood to gain from a supply relationship.[293]

For Prime Minister Modi, an agreement with the United States meant securing the financing necessary for India to launch solar and clean energy initiatives;[294] for President

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[290] Alden Eyer, Peter Frumhoff, and Ken Kimmell, "Paris Agreement Expected to Enter Into Force in Advance of UN November Climate Change Summit," Union of Concerned Scientists, October 04, 2016, http://www.ucsusa.org/news/press_release/paris-agreement-to-enter-into-force-in-advance-of-un-climate-summit#.WKPNRxIrJ-U.
[291] Anne Usher, "How Obama Is 'Trump-Proofing' His Climate Pact," POLITICO Magazine, June 6, 2016, http://www.politico.com/magazine/story/2016/06/obama-trump-climate-change-213942.
[292] *Ibid.*
[293] *Ibid.*
[294] Allie Malloy and Nicole Gauoette, "India moves toward U.S. on climate change," CNN, June 7, 2016, http://www.cnn.com/2016/06/07/politics/indias-narendra-modi-us-visit-climate-change/.

Obama, ensuring that Paris entered into force before the November elections gave him greater reason to hope that his legacy in combatting climate change – namely the Clean Power Plan in domestic policy and the Paris Agreement in international policy – would be cemented no matter the result of the United States elections. As the EPA and Department of Energy enacted bureaucratic policy in accordance with the Clean Power Plan and other Paris commitments, businesses modified their practices to conform to the rulings.[295] With market mechanisms favoring natural gas over coal in the electricity sector, it is possible that the Obama's domestic policy despite a Trump presidency.[296] Obama's leadership incentivized other nations to ratify Paris in an international context, greatly expediting world expectations of ratification.

A year after the COP 21 Paris Convention, the UNFCCC met again at its annual conference of the parties, this time in Marrakech, Morocco. COP 22 Marrakech began three days after the Paris Agreement entered into force.[297] According to the Center for Climate and Energy Solutions, the Marrakesh conference began amongst looming uncertainty is following Donald Trump's election as the United States' new president. Despite changing dynamics within US domestic climate change policy, World leaders set and ambitious new deadline for completion of implementation procedures to be decided before COP 24, to be held in 2018. In the American action proclamation, UNF CCC parties declared that's the momentum which had led to Paris's entry into force what is now so pervasive as to be irreversible. This rhetorical statement was backed by tangible agreements and procedures

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[295] *Ibid.*
[296] *Ibid.*
[297] "Outcomes of the U.N. Climate Change Conference in Marrakech," Center for Climate and Energy Solutions, November 18, 2016, https://www.c2es.org/international/negotiations/cop22-marrakech/summary.

set in place at CO 22 Marrakech, which marked a significant transition from negotiation to implementation procedures.

Though Paris was designed to apply only from the 2020 period onwards, by the Marrakech Conference, it was clear that significant political momentum was already evident in the pre-2020 period to enact steps for significant mitigation. By November 7, when the Marrakech Conference began, 111 parties had already ratified the Paris Agreement, representing over 75 percent of global greenhouse gas emissions.[298] Yet further decisions regarding mitigation, adaptation, finance, transparency, implementation and compliance needed to be addressed, namely through the Ad-Hoc Working Group on the Paris Agreement (APA). Paris established no specific timeline or deadline for creating these decisions, only that they needed to be adopted at CMA 1 – the first COP after the Agreement entered into force. That CMA 1 should be held only a year after Paris was unexpected by all parties; they thus agreed to extend CMA 1 until COP 24 in 2018, though the CMA will meet at COP 23 in 2017 for preliminary agreements.

Marrakech began essential policy elaborations for important features of the Paris Agreement, such as mid-century strategies, finance, and loss and damage. At Marrakech, the nations of Canada, Germany, Mexico, and the U.S. submitted what have come to be known as "mid-century strategies," a development strategy plan which launched the 2050 Pathway Platform to extend the range of climate change mitigation strategies into the latter half of the century. In terms of finance, developed nations released a roadmap to plan mobilization for a collective $100 billion per year to finance developing country emission cuts beginning in 2020. Parties also reviewed the Warsaw International Mechanism for

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[298] *Ibid.*

Loss and Damage (WIM) to aid vulnerable and developing countries cope with existing climate change impacts, including slow-onset sea level rise and extreme weather patterns. Marrakech closed by setting the dates for COP 23 to be held in Fiji and COP 24 Poland, as well as setting the annual subsidiary bodies meeting to be held in May 2017 in Bonn, Germany.

COP 22 Marrakech held that the Paris Agreement was exceeding expectations in every metric by this point in the supposed implementation timeline; however, given that the Paris Agreement was not expected to enter into force by 2016, Marrakech was incapable of assessing expectations of compliance and effectiveness, as there simply were no expectations at such an early date. What is clear is that so far the Paris Agreement has in no way failed existing expectations; its ability to ensure compliance and effectively hold down emissions can only be adequately assessed as data and implementation mechanisms become available in the pre-2020 period and beyond.

V. Objections

Despite initial optimism for the global enthusiasm expressed in the Paris Agreement, there are also numerous reasons to criticize the scope and effectiveness of Paris. Productive criticism can be beneficial as the globe reevaluates the efficacy of the Paris Agreement annually and individual countries review pledges in 2020. The main categories of objections are as follows: a) the individual commitments of Parties do not collectively limit warming below 2 degrees Celsius, b) the Agreement relies heavily upon norms rather than incentivizing enforcement, and c) the Agreement fails to consider important alternate strategies and provisions that could prove more effective. I will address each of these categories briefly in the following segment.

A. The Paris Agreement does not limit warming to under 2 degrees Celsius

The first major objection is a pragmatic fact; expert opinion agrees that the individual targets submitted by the Parties of the Agreement do not as a total sufficiently cut greenhouse gas emissions to avoid dangerous anthropogenic interference in the climate system. Days before the Paris Agreement entered into force, the United Nations Environment Programme issued a statement that pledges to cut emissions would result in a predicted temperature rise of 3 degrees Celsius above pre-industrial levels.[299] The ultimate goal of Paris was to push for a target of 1.5 degrees of warming amid uncertainty that 2 degrees of warming would prevent dangerous climate interference; by this metric, the INDCs failed to meet their primary purpose.[300]

However, it is important to note that these pledges are a vast improvement upon the 5 degrees Celsius of warming predicted by the Environmental Protection Agency without substantial mitigation.[301] Business-as-usual models vary in regards to severity of the global temperature in the year 2100 with no mitigation efforts, but 5 degrees Celsius is fairly conservative. Six degrees of warming by 2100 would be "so extreme it's almost unimaginable," with most of the Earth's surface uninhabitable, oxygen-deficient oceans, and traditional agriculture impossible except for the polar regions.[302] Though the Paris

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[299] Fiona Harvey, "World on track for 3C of warming under current global climate pledges, warns UN," The Guardian, November 03, 2016, https://www.theguardian.com/environment/2016/nov/03/world-on-track-for-3c-of-warming-under-current-global-climate-pledges-warns-un.
[300] *Ibid.*
[301] Environmental Protection Agency, "CIRA Framework," , https://www.epa.gov/sites/production/files/2015-06/documents/ciraframework.pdf, 12.
[302] John D. Sutter, "On 6 degrees of climate change," CNN, May 22, 2015, http://www.cnn.com/2015/05/21/opinions/sutter-6-degrees-climate/.

Agreement alone is insufficient to stop dangerous climate change altogether, it is still a significant accomplishment to avert certain disaster.[303]

Acknowledging that pledges must become progressively more ambitious is important, and the Paris Agreement certainly must encourage greater emission cuts at its 2020 INDC submission deadline in order to reach the desired cap of 2 degrees Celsius. Fortunately, significant warming compared to business-as-usual has already been agreed upon and the institutional apparatuses established; Parties realize that more ambitious steps must be taken to avoid dangerous effects. The reality of warming should give critics reason to push their governments toward more ambitious emission cuts in 2020; it does not pose a direct objection to the structure of the Paris Agreement itself.

B. The Paris Agreement relies on norms rather than incentives.

Some critics of the Agreement deem that Paris relies disproportionately on norms rather than restructuring incentives to deter free-riding.[304] Instead of aligning social norms and incentives, the two instead pull in opposite directions, leaving the success of the Agreement hanging in the balance.[305] While it is possible that social norms will outweigh the temptation posed by lack of free-riding exceptions, too much is at stake to leave the Agreement hanging in the balance.

It is true that cooperation in the realm of climate change suggests that incentives almost always outweigh the pull of norms; while no one wants to be sanctioned by the

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[303] *Ibid.*

[304] Bang, Guri, Jon Hovi, and Tora Skodvin. "The Paris Agreement: Short-Term and Long-Term Effectiveness." Politics and Governance 4, no. 3 (September 8, 2016): 209-18. doi:10.17645/pag.v4i3.640, 216.

[305] *Ibid.*

committee, the non-punitive nature of the committee means incentives are weak.[306] In this respect, the Paris Agreement relies on optimism that may prove false; however, the failure of binding incentives in the past gives reason to test the pull of social norms in the international committee. Furthermore, it is possible that enforcement mechanisms could be strengthened in subsequent conferences of the parties if implementation is on track to undermine the force of the agreement. It is far easier to add incentives and enforcement to an existing Agreement than it is to forge an entirely new structure that more evenly disperses weight between norms and incentives.

C. The Paris Agreement lacks other provisions and strategies that could successfully limit warming.

The sustainability and effectiveness of the Paris Agreement might be improved by the inclusion of at least three alternate provisions and strategies that could prove effective. The first is the use of trade sanctions to incentivize countries in keeping commitments; the second, the inclusion of carbon sinks in assessing a country's mitigation efforts; the third, a comprehensive effort to keep fossil fuels in the ground so that they simply cannot be burned.

The conditional offers submitted by many countries suggests a willingness to increase individual contributions if it is credible that others will do likewise.[307] Trade sanctions would certainly lend a certain degree of credibility to pledges and would incentivize countries to keep their commitments.[308] However, creating punishment structures would increase compliance at the expense of ambitious content; countries

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[306] *Ibid.*
[307] Harstad, "Making Paris Sustainable," 34.
[308] *Ibid.*

would be incentivized to create low-ambition pledges if they knew they were face trade punishments for failing to meet commitments. As such, this addition would come with potentially high-cost; however, as the author notes, sanctions are not the only trade mechanism that could be used. Countries that met ambitious targets, for example, could be granted a "most-favored nations" status and benefit from no or low border measures through the World Trade Organization.[309] This type of incentive structure might boost both compliance and ambition, and should be evaluated at the 2020 COP; however, it poses only an addition to Paris, not an outright objection.

The exclusion of deforestation and carbon sinks from the Paris emission metrics, however, poses a deeper problem for the overall Agreement. Deforestation both contributes to greenhouse gas concentrations through the elimination of carbon sinks, and also leads to irreversible biodiversity loss.[310] Forest conservation is thus an international priority, and conservation today can be incentivized through the promise of compensation.[311] However, compensation is expensive, and would require wealth transfer from monetarily-rich developed countries to tree-rich developing countries, typically located in the Southern hemisphere. It would also require that the globe reframe the way it thinks about goods and services; while we are willing to pay for others to do something for us, we are less inclined to pay for people to cease an action or retain the status quo. While this is proposition I ultimately support for reasons of biodiversity maintenance and intragenerational equity, it also requires that the globe enact policies that are contentious. With most of the wealth and power concentrated in forest-deficient Northern, developed

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[309] *Ibid.*
[310] *Ibid, 35.*
[311] *Ibid.*

countries, it is difficult to know whether such a proposal would ultimately be pragmatic. Despite the flaws and omissions of the Paris Agreement, one of its clear strengths is its pragmatism; it passed international negotiations and entered into force in less than a year. More difficult provisions are certainly aims for which we all should strive to add to future submissions under Paris, and forest conservation should be incentivized, but the lack of contentious elements in the Paris Agreement is a key strength that led to its swift implementation, not a weakness.

Along these same lines is the concept that we should aim to keep fossil fuels in the ground; if Paris is successful in cutting emissions, demand for fossil fuels will necessarily decline, as will the supply extracted.[312] However, reducing extraction levels of producers may be necessary because a drop in demand will decrease price dramatically, making it difficult to secure participation of exporters.[313] The Organization of the Petroleum Exporting Countries (OPEC) see themselves as facing a double vulnerability to both the climate changes in their region and the economic impact of mitigation of their leading industry.[314] Thus, reducing supply will keep prices up while simultaneously encouraging investment in green technologies.[315] If Paris should fail entirely, limiting extraction limits would act as an "insurance" on emissions if voluntary metrics fail.[316] Though limiting fossil fuel extraction is also something that I admit could produce substantial benefit, such limitations should likely be pursued separately from Paris so as to maintain the existing

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[312] *Ibid.*
[313] *Ibid.*
[314] HE Abdalla Salem El-Badri, "OPEC Statement to the United Nations Climate Change Conference (COP18)," December 7, 2012.
[315] Harstad, "Making Paris Sustainable," 35.
[316] *Ibid.*

solidarity amongst articulated goals. As an insurance mechanism, it might be worth pursuing through OPEC incentivization, but it might also prove to be a goal that is politically impossible to achieve.

VI. Conclusion

While it is true that the Paris Agreement in its current form needs to be more ambitious to meet its articulated goals, it is also true that the 2015 Agreement was intended to be a baseline to improve upon in later agreements. Though it alone cannot prevent disastrous warming, current pledges signal a vast improvement when compared to business-as-usual models. Paris' reliance upon norms and optimism through a bottom-up approach does have certain weaknesses, but also marks a shift from traditional top-down UNFCCC agreements that ultimately ended in failure and disappointment. It is also true that more could have been included in the Paris Agreement, including trade measures, conservation incentives, and petroleum supply reductions, but these metrics would have likely posed political problems that might have ended in global stalemate. A clear sign of success of Paris is that it passed international negotiations, and entered into force years ahead of schedule through global optimism and careful negotiations of key leaders.

The voluntary nature of the Paris Agreement is revolutionary in terms of UNFCCC agreements, and it structurally allows for a more nuanced and varied degree of differentiation among nations than was previously possible. After four years of deliberate preparations, the Paris Agreement structurally reflected the principle of common but differentiated responsibilities while mirroring heightened global momentum to combat climate change. INDCs allow countries to reveal what they want to happen and what they are personally willing to implement; across the board, they reveal that countries are willing

to make substantial voluntary cuts to combat climate change.[317] Though it is too soon to evaluate the Paris Agreement, preliminary benchmarks show no signs of failing to meet compliance.

However, the Paris Agreement and climate change mitigation likely met a hurdle in the 2016 United States Presidential Election of Donald Trump; an EPA transition aid declared it a certainty that Donald Trump would pull the U.S. out of the Paris Agreement altogether.[318] Though we cannot yet know the exact climatological impact of the Trump presidency, the extent to which U.S. compliance can sink an international agreement merits consideration. The next chapter will examine U.S. leadership in international climate change agreements more broadly, from Kyoto to Montreal, and ultimately back to Paris. I aim to assess whether economic incentivization of U.S. corporations affects involvement and leadership in these negotiations, and whether the U.S. occupies a special role in these negotiations that might incur special responsibilities.

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[317] Victor, “Making the Promise of Paris a Reality,” 14.
[318] Tom Batchelor, "Trump 'will definitely pull out of Paris climate change deal'" The Independent, January 30, 2017, http://www.independent.co.uk/news/world/americas/donald-trump-paris-climate-change-deal-myron-ebell-us-president-america-pull-out-agreement-a7553676.html.

Chapter 4: United States Leadership and Special Responsibilities

1. Introduction

In this chapter, I will give substantial background as to a single nation's actions in shaping and enacting global mitigation strategies and treaties. The role of the United States in shaping both successful and failed environmental treaties, as well as its emissions history and response to these measures, will be detailed here. Ultimately, these details will form the basis for an understanding of how the United States has influenced global environmental politics, and what its responsibility ought to be as the globe continually navigates these negotiations. I will ultimately argue that the United States of America has a particular role and responsibility in combating climate change and negotiating the treaties necessary to create concerted international efforts.

In Section II, I will present accounts of U.S. leadership in past international environmental law treaties, including the Kyoto Protocol, largely deemed a failure by the international community, as well as the relatively successful Vienna/Montreal Protocol. In my account of Kyoto, I aim to show that the United States has been accused of severely undermining international climate change negotiations in the past. Despite heavy support and leadership from the United States in drafting and calling for the Kyoto Protocol, the United States never ratified the treaty, and the George W. Bush administration did little to meet the country's articulated commitments. The ultimate failure of the Kyoto Protocol will be detailed first, and I will use the history of this treaty to elucidate the United States' impact on Kyoto, analyzing the extent to which the overall blame on America for the Protocol's lack of success is valid. I will examine both the international and domestic political apparatuses which best explain the failure of Kyoto, as well as accounts of the

negotiations and aims of the convention parties. The agreed upon cuts and emissions standards of the United States will be contrasted against its actual emissions during the relevant periods, showing an increase in response to a promised decline in admissions. I will present explanatory accounts of this discrepancy, acknowledging the gaps between the Clinton and Bush platforms and presenting explanatory accounts of Kyoto's failure in light of America's domestic political context.

I will also detail the extent to which the most successful international environmental negotiations – the Montreal Protocol and Vienna Convention – featured strong United States leadership and strong opportunity for United States profit. The Montreal Protocol and Vienna Convention, which will be discussed primarily as a single occurrence within international environmental law, successfully achieved its goal of reversing the dismantling of the ozone layer by restricting the use and production of CFCs. The reduction of these chemicals in the atmosphere also had unprecedented effects on the mitigation of global warming and climate change. The United States played a major leadership role in drafting the treaties and implementing required changes; however, one of its leading chemical companies, DuPont, had a substitute ready for production, but required global cooperation to reduce competition and launch its CFC substitute. The company's statement, as well as analysis of substitute availability and profit margins, will be used to contextualize the success of these treaties and the United States' participation and leadership in driving the Protocol to achieve its mission.

In Section III, I will argue that the United States has incurred enhanced special responsibilities to lead and implement international climate change agreements, beyond the general duties shared by all member states to reduce emissions as discussed in Chapter

1. The basis of this elevated role and responsibility is three-fold, based on both emissions, capacity, and global leadership. First, the United States has contributed the most to the problem of climate change as the largest emitter historically; furthermore, it currently boasts the highest per capita emissions of any nation on earth. As Chapter One established, curbing emissions is morally required because of the moral importance of the harm principle. The United States has contributed more to these harms than any other nation, and continues to contribute emissions and harms that are disproportionate to its population. Secondly, the United States is a self-proclaimed world leader, "the most powerful nation on Earth" as its politicians continue to boast. I will detail the role of the United States in establishing the relevant organizations, especially the United Nations Framework Convention on Climate Change and Intergovernmental Panel on Climate Change, as well as its leaders' rhetorical articulations for its role in this dimension. I will argue that with this prominence comes a proportionate responsibility to guide negotiations and put forth good-faith efforts to combat climate change, based on concepts of intentionally formed expectations, voluntarily incurred obligations and promise breaking, and general hypocrisy. As such, the United States has a heightened responsibility in aggressive mitigation efforts.

In Section IV, I will return to Chapter 3's discussion of the most prominent environmental law treaty focused on global climate change that is currently in effect – the 2015 Paris Climate Treaty. In this section, I will examine the United States' submitted INDC, its international negotiations preceding and following the Convention, and its role in securing both the treaty itself and its rapid ratification. I will further examine the extent to which conditional INDCs submitted by other countries frame expectations of U.S.

involvement. To give further depth to my analysis, I will also look at a wide array of individual country INDCs and joint position statements, noting how other actors explicitly and implicitly identify U.S. leadership and frame U.S. responsibility. The sampling will include member states of the G-77, EU, and OPEC, in order to encompass both emitter and non-emitter expectations of the United States.

In Section 5, I will also consider objections related to the United States special obligations. First, I will consider objections which state that the emissions of transition countries such as China and India are far more troubling to overall greenhouse gas stability. Such arguments assert that the emissions of such nations, coupled with their strengthening and rapidly expanding economies, incur greater or equal burdens and responsibility to those incurred by the United States. I will respond by detailing why these objections fail to consider the full weight of historical context, ignore the realities of global leadership and expectations. Furthermore, simply because other countries might also have heightened special obligations in this dimension does not nullify the existence of such responsibilities in the U.S.; rather, it instead gives the United States incentives and reasons to include high-emitter transition economies in international negotiations and push compliance.

I will next consider the objection to the potential success of the Paris Agreement and the one of the largest threats to U.S. leadership in international environmental politics – Donald J. Trump. There is broad speculation as to Trump's ability to derail the Paris Climate Agreement, nullify domestic policy, and ultimately ignore any responsibility in this dimension. I will examine the weight of these claims, but ultimately respond by showing that while Trump might choose to ignore or defect on special responsibilities, it does not

follow that such responsibilities do not exist. Finally, I will respond to the claim that U.S. discourse on climate change – including the relatively high number of "climate deniers" – might give countries reason to lower expectations and U.S. responsibilities incurred through leadership.

I will ultimately argue that the United States plays a vital role in the ultimate success and failure of international environmental law treaties. Its prominence in this dimension is best explained by its historical culpability for current emission levels and its limited response to mitigation, as evidenced by its high per capita emissions, its capacity to implement effective change, and its overarching leadership role that permeates essential aspects of global climate change efforts and its relevant institutional apparatuses.

Section II: U.S. Leadership

A. Introduction

In this section, I will present a brief account of U.S. leadership in past international environmental law treaties, specifically appealing to its actions and negotiations during the Kyoto Protocol and Vienna/Montreal Protocol. The Kyoto Protocol was largely deemed a failure by the international community, while Vienna/Montreal was heralded as one of the most successful international environmental law treaties; I contend that U.S. leadership largely determined the outcomes of these protocols, playing a deterministic factor in their relative success and failure.

Through my account of Kyoto, I aim to show that the United States has been accused of severely undermining international climate change negotiations in the past. Despite heavy support and leadership from the United States in drafting and mandating the Kyoto Protocol, the United States never ratified the treaty, and the George W. Bush administration did little to meet the country's articulated commitments. The ultimate failure of the Kyoto

Protocol will be detailed first, and I will use the history of this treaty to elucidate the United States' impact on Kyoto, analyzing the extent to which the overall blame on America for the Protocol's lack of success is valid. I will examine both the international and domestic political apparatuses which best explain the failure of Kyoto, as well as accounts of the negotiations and aims of the convention parties. The agreed upon cuts and emissions standards of the United States will be contrasted against its actual emissions during the relevant periods, showing an increase in response to a promised decline in admissions. I will present explanatory accounts of this discrepancy, acknowledging the gaps between the Clinton and Bush platforms and presenting explanatory accounts of Kyoto's failure in light of America's domestic political context.

I will next detail the extent to which the most successful international environmental negotiations – the Montreal Protocol and Vienna Convention – featured strong United States leadership and strong opportunity for United States profit. The Montreal Protocol and Vienna Convention, which will be discussed primarily as a single occurrence within international environmental law, successfully achieved their goals of reversing the dismantling of the ozone layer by restricting the use and production of CFCs. The reduction of these chemicals in the atmosphere also had unprecedented effects on the mitigation of global warming and climate change. The United States played a major leadership role in drafting the treaties and implementing required changes; however, one of its leading chemical companies, DuPont, had a CFC substitute ready for production, but required global cooperation to reduce competition before agreeing to launch the product for release. The company's statement, as well as analysis of substitute availability and

profit margins, will be used to contextualize the success of these treaties and the United States' participation and leadership in driving the Protocol to achieve its mission.

B. Kyoto Protocol

The United Framework Convention on Climate Change established the goal that all Annex 1 (developed) countries would freeze their emissions at 1990 levels by the year 2000.[319] However, it soon became clear that this goal alone would be insufficient to meet the broader goal of greenhouse gas stabilization at a safe level to avoid dangerous warming, and even if that goal was in itself sufficient, it was similarly clear that most Annex 1 countries would be unable to meet this goal in the established time frame.[320] As such, beginning at the first conference of the parties, held in Berlin in 1995, fitful negotiations began to attempt to gain heavier commitments from Annex 1 countries. After two years, in December 1997, the parties met in Kyoto, Japan, in December of 1997 to pursue further negotiations and hopefully draft a more substantial protocol.[321] Press coverage was heavy, with attention focused on the distant and seemingly irreconcilable positions of the key parties, namely the European Union, United States, and G- 77 bloc.[322]

In order to further the pace of negotiations and avoid an embarrassing failure, the United States took several highly- public and heavily- publicized steps. The first was the addition to the delegation that came after several days of negotiations – Vice President Al Gore. The second was his public statement addressing the delegation, imploring them to be

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[319] David Hunter, James Salzman, and Durwood Zaelke, *International Environmental Law and Policy*. 4th ed. (2011): 685.
[320] *Ibid.*
[321] *Ibid.*
[322] *Ibid.*

"flexible" so as to ensure an agreement would be reached.[323] A few days after Vice President Gore's arrival, the United States delegation announced its willingness to consider flexible targets and timetables, allowing for differentiation among Annex 1 parties in both emission standards and baseline years.[324] Two days before the close of the conference, the United States eventually conceded to a 3 percent reduction of greenhouse gas emissions from a 1990 baseline year, leading to a 48-hour non-stop negotiation session that closed the conference. Contentious elements of the protocol were delayed for a one-year negotiation period, but the Protocol text was successfully released.

From a United States leadership standpoint, the Kyoto Protocol negotiations began with substantial domestic resistance. The Byrd-Hagel Resolution, which passed unanimously in the Senate, vastly limited the extent to which the U.S. delegation was able to agree to Protocol demands. The Resolution first stated that the U.S. would not ratify any agreement that imposed new limits on greenhouse gas emissions, unless those same restrictions applied to developing nations under identical timelines.[325] Secondly, the U.S. would ratify no treaties that could reasonably be expected to inflict "serious harm" on the U.S. economy.[326] Thirdly, all treaties would be agreed to under advice from the Senate.[327]

The Byrd-Hagel Resolution introduced fierce domestic pressure into the Clinton-Gore administration as they entered international negotiations, greatly encumbering the U.S. starting position and requiring additional compromises to be me. The U.S. entered the

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[323] *Ibid.,* 686.
[324] *Ibid.*
[325] Gerald Kutney, *Carbon Politics and the Failure of the Kyoto Protocol* (London: Routledge, Taylor & Francis Group, 2014): 144.
[326] *Ibid.,* 145.
[327] *Ibid.*

conference pushing for broad flexibility mechanisms to meet targets, and have developing countries participate and accept voluntary targets.[328] Meanwhile, other key players such as the EU wanted a 15 percent reduction in 1990-baseline emissions by 2000, and the G-77 demanded that developed countries take the first steps toward mitigation under the principle of common but differentiated responsibilities.[329] In part thanks to the pull of Byrd-Hagel, the U.S. began negotiations from a far different starting point than its other powerful actors.

In regards to U.S. commitments targets, the U.S. eventually agreed to a 7 percent reduction from 1990-baseline levels after the arrival of Al Gore, though President Clinton had previously agreed to simply return to 1990 baseline levels in a previous statement to National Geographic.[330] The E.U. committed to an 8-percent reduction, setting the 15-percent benchmark as a negotiation ploy.[331] Though the U.S. ceded to a 7-percent decrease, they were given the options of flexibility mechanisms as included in Articles 6 and 17.[332] These came at the price of voluntary emissions reductions from developing countries under the G-77, which ultimately made the Kyoto Protocol ineligible for ratification under Byrd-Hagel.[333]

In November of 1998, Stuart Eizenstat spoke on behalf of the U.S., stating that the negotiations of the past year had been meaningful for flexibility mechanisms and recognizing the growth of developing countries, and that while the U.S. would sign the

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[328] *Ibid.*
[329] *Ibid.*
[330] *Ibid.,* 148-149.
[331] *Ibid.,* 149.
[332] *Ibid.*
[333] *Ibid.*

Protocol, President Clinton would not submit it for advice to the senate, and it thus could not be ratified.[334] On November 12, Al Gore signed the Kyoto Protocol on behalf of the U.S. delegation, with the explicit understanding that no ratification would occur without meaningful participation on behalf of developing countries.[335]

If these blows alone were insufficient to cause the failure of Kyoto ratification from the U.S., the election of George W. Bush, sworn in on January 20, 2001, was certainly the death knell of the Protocol.[336] In an open letter, President Bush emphasized his opposition to Kyoto, reiterating the 95-0 senate vote of Byrd Hagel and stating that any Protocol that exempted the major population centers of India and China from compliance was unacceptable.[337] On March 28, 2000, President Bush officially announced that the U.S. would not ratify the Protocol.[338] Though given the history of the U.S.'s involvement in Kyoto meant that this announcement was hardly a surprise, it was nevertheless met with world outcry.[339] To make matters worse, despite failing to ratify the treaty, the U.S. went on to demand after Kyoto that China accept emissions targets when it had not made those commitments itself.[340]

Not only did the U.S. fail to curb emissions to a 7-percent decrease below its 1990 baseline, but its emissions levels steadily increased during the first two decades of the Kyoto era.[341]

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[334] *Ibid.,* 151.
[335] *Ibid.*
[336] *Ibid.*
[337] *Ibid.,* 152.
[338] *Ibid.*
[339] *Ibid.*
[340] *Ibid.,* 158.
[341] Hunter, Salzman, and Zaelke, *Environmental Law.*

C. Vienna and Montreal

In contrast to the ultimate failure of the Kyoto Protocol, the Vienna Convention and Montreal Protocol were highly successful in achieving their goal of halting and reversing ozone depletion. Together, Vienna/Montreal are considered one of the primary achievements – if not the apotheosis of achievements – within environmental law. These agreements focused on fixing and mitigating ozone depletion and the ozone "hole" above Antarctica through a reduction in the consumption and production of chlorofluorocarbons (CFCs), and the United States played a defining role in rallying public awareness, leading negotiations, and providing CFC substitutes through their industrial economy. Ultimately, as of 2010, both the Vienna Convention (1985) and the Montreal Protocol (1987) were universally ratified by all 196 parties.[342] The crowning achievement of these deals was the elimination by 2010 of the production of 97 percent of ozone-depleting substances, with commitments to phase-out the remaining substances by 2030.[343]

Chlorofluorocarbons were in fact a U.S. invention, created in the 1920s by General Motors's chief chemist, Thomas Midgely, in an attempt to find a safe substitute for toxic and flammable refrigerants.[344] The ozone-depleting substances were also disproportionately consumed by North America and Europe; over 75 percent of CFCs and halons were consumed in these developed countries, but developing countries such as India and Thailand increased consumption by 300 percent between 1985 and 1991.[345]

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[342] *Ibid.,* 533.
[343] *Ibid.*
[344] *Ibid.,* 541.
[345] *Ibid.,* 542.

There was little to no concern over the production and consumption of CFCs until a 1974 study raised concern for their connection to ozone depletion, a hypothesis that was closely examined by NASA and other U.S. organizations over the next three years.[346] As companies such as S.C. Johnson and Sherwin-Williams voluntarily issued public announcements, the public became increasingly attuned to the risk of CFCs, and aerosol demand fell by 66 percent within only two years.[347] An EPA ban on non-essential use of CFC aerosol propellants was issued in 1978.[348]

This ban had an immediate impact on worldwide CFC sales and competition, as U.S. share of global CFC sales dropped from 46 percent to 28 percent, while European countries gained in their shares, angering the U.S. chemical industry.[349] Their became increasing domestic pressure for the United States to lobby for international CFC controls to regain lost ground in the marketplace.[350] Yet with no affordable alternatives, CFCs remained globally attractive; they were "colorless, odorless, non-toxic, nonflammable, and affordable," according to the CFC mantra. As one NGO responded, CFCs were safe in every way, "except they will destroy the universe and all creatures that dare to live there." As such, the Vienna Convention was signed by 20 parties of the 43 in attendance, who committed only to take "appropriate measures" domestically to protect the ozone layer.[351]

Two months after the Vienna Convention's conclusion, scientists discovered what they coined an "ozone hole" above the Antarctic, renewing public interest in ozone

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[346] *Ibid.,* 545.
[347] *Ibid.*
[348] *Ibid.*
[349] *Ibid.,* 546.
[350] *Ibid.*
[351] *Ibid.,* 546-547.

depletion and its reversal.[352] The U.S. began to advocate for a near-term freeze on global consumption; meanwhile, U.S. chemical giant DuPont announced its ability to produce a CFC substitute within five years provided global regulatory requirements could economically justify their research and development investment.[353] U.S. industry began to declare a preference for strong international controls over U.S. unilateral action, in-line with their ability to make profits and reclaim lost global market share.

Over 60 countries participated in the Montreal Protocol in 1987, just two years after Vienna, and adopted the Protocol by consensus.[354] It froze production and consumption of major CFCs and halons within three years, and established a reduction schedule for all ozone-depleting substances.[355] The measure also included an import ban for non-member states, implemented a basket strategy to allow for flexibility, and allowed developing countries more time and resources to meet commitments.[356] Moreover, the Protocol was designed to facilitate ongoing amendment and ambition over time, requiring readjustment by Parties every four years. The first Protocol meeting, held in London in 1990, drew representatives from 123 countries and included 200 media correspondents, and accelerated reduction schedules for all CFCs.[357] With landmark phase-outs already achieved, U.S. chemical companies, led by DuPont, announced full-phase out of aerosol CFCs.[358]

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[352] *Ibid.,* 550.
[353] *Ibid.,* 551.
[354] *Ibid.,* 552.
[355] *Ibid.*
[356] *Ibid.,* 553-554.
[357] *Ibid.,* 555.
[358] *Ibid.*

By 2010, global consumption of ozone-depleting substances decreased by 97 percent, with full phase-out agreed to by 2030.[359] The Montreal Protocol, signed just 13 years after the initial hypothesis connecting CFCs to ozone depletion was released, achieved universal ratification and a 97-percent reduction in only 23 years, an impressive speed by environmental policy standards.

D. Conclusion

These two international environmental law agreements show the extent to which U.S. leadership committees and delegations are able to influence the ultimate path and success of these treaties. The Montreal Protocol illustrates that when backed by economic motives and business support, the U.S. is able to drive and adhere to meaningful changes in the international environmental law spectrum. When domestic agendas and economic motives are contrary to environmental protection, as in the Kyoto negotiations, the U.S. often finds itself at odds with world parties, especially the positions of developing nations, and is unable to successfully advocate for its initial position statements. The status of the U.S. in these negotiations is crucial to understanding the nature of its additional duties to actively mitigate domestically and continue to push for aggressive mitigation in international negotiations. The basis of these duties is the subject of Section III.

Section III: Special Responsibilities of the United States

There are at least two reasons the U.S. might incur additional duties for active mitigation. The first is grounded in the ethical arguments of Chapter 1: as the largest historical contributor to climate change, the U.S. thus has the strongest ethical duties to mitigate. Secondly, the U.S. consistently identifies itself using rhetoric such as the "leader of

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[359] *Ibid.*

the free world," the "most powerful nation on Earth," and similar derivatives. It also led the international community in building the climate-change mitigation institutions, in the IPCC and UNFCCC. As such, there are significant reasons to assume that the U.S. has incurred obligations to implement the mitigation for which it has strongly advocated based on the expectations generated and the promises formed.

A. Harm-Based Responsibility

No single nation can rival the historical emissions of the United States. Since the Industrial Revolution, the United States has consistently poured carbon dioxide into the atmosphere. Looking at the past 150 years, from 1850 to 2011, the United States was responsible for 27 percent of global emissions.[360] In contrast, China was only responsible for 11 percent of total emissions during the same period.[361] Its historical record is irrefutable; the United States has been the single largest contributor to climate change, and its economy has reaped the greatest benefits from the harm it passively inflicted on others by actively emitting CO2 and other toxic gases.

Today, in terms of per capita emissions, the United States emits around 19.5 tons of carbon dioxide equivalent per person; the world average is around 6.5 tons CO2e; China hovers around 7.5 tons CO2e, the EU at 8.5 tons CO2e, and India under 2 tons CO2e.[362] In terms of total emissions, the United States is second only to the emissions of China, emitting approximately 6.5 gigatons of CO2 equivalent in 2011. Collectively, the people of the United States inflict the second-greatest amount of carbon-based harm of any nation;

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[360] Mengpin Ge, Johannes Friedrich, and Thomas Damassa, "6 Graphs Explain the World's Top 10 Emitters," World Resources Institute, November 25, 2014, https://wri.org/blog/2014/11/6-graphs-explain-world's-top-10-emitters.
[361] *Ibid.*
[362] *Ibid.*

individually, each American inflicts approximately triple the carbon-based harm of the world average.

The harms caused by the people of the United States are harms caused by actions; people in America actively emit CO2 and other greenhouse gases, and have done so for a century and a half. These emission-based harms are serious, causing the deaths of real people in both the present and future.[363] This non-accidental harm logically imposes some duty of restitution or compensation; we should likely pay our victims under tort-based duties for the harms conferred upon them.[364] But at the very least, as the largest emissions harmer in the world, the United States and its people have duties to stop harming.

There is some debate as to whether countries can act as collective moral agents because imposing duties and compensatory damages on a country necessarily imposes them upon its citizens, whose contributions to the problem may vary substantially. Eric Posner and Cass Sunstein present this objection in their 2007 paper, "Climate Change Justice," stating that it would be unfair to impose upon the people of developed countries compensatory duties for climate change mitigation, since much of the harms created by emissions were done before citizens today were born or could exercise any control over collective affairs and individual choices.[365] Furthermore, emissions by person vary substantially; even with a firm causal link between country emissions and harm elsewhere, it would not be fair to impose upon the entire nation duties of mitigation.[366] However, as

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[363] Broome, John, *Climate Matters: Ethics in a Warming World*, (New York: W.W. Norton, 2012): 55.
[364] *Ibid.,* 58.
[365] Eric A. Posner and Cass R. Sunstein, "Climate Change Justice," The University of Chicago Working Papers, August 2007, 1. doi:10.2139/ssrn.1008958.
[366] *Ibid.*

John Broome notes in his book "Climate Matters" to a similar objection, the harm individuals create by virtue of their emissions has firm effects on people elsewhere, and emitting persons are an injustice done on a fragment of the world's population.[367] There are exceptional problems creating causal links in climate change justice; international solutions, while they may be imperfect in allocating compensation and mitigation strategies across parties, are pragmatically feasible and ethically justified as a means of allocating such responsibilities. To allow heavily emitting countries, who have benefited the most from industrialization and past emissions and who continue to be high emitters today, to hide behind the history and individual non-emitters within their states would constitute a gross injustice in and of itself.

In environmental law, harm-based approaches to just allocation of mitigation are typically packaged under what is known as the "polluter pays principle." The Organisation for Economic Co-Operation and Development (OECD) first recommended this principle in May of 1972.[368] It essential demands that states ensure that the users of harmful emissions – the polluters located within their borders – pay the full cost of the environmental and social costs of their activities and the natural resources they consume.[369] At its essence, this principle states that those who cause environmentally based harm ought to be fiscally responsible for compensation.

Applied to the international level, the polluter pays principle heavily burdens the United States and imposes clear reason for heightened mitigation responsibility. The same

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[367] Broome, *Climate Matters,* 78-80.
[368] Hunter, Salzman, and Zaelke, *International Environmental Law,* 484.
[369] *Ibid.*

logic which drives the domestic relationship between state and private business under the polluter pays principle similarly implicates the U.S. – the country with triple the per capita emissions of the world average, and the country with the overwhelmingly largest historical emissions ought to accept responsibility for the harm it has induced. The grossest polluter ought to pay for the pollution it has actively emitted for decades.

B. Expectation-based special responsibilities

Dividing common burdens is a complex task, but the United States might similarly hold a heightened responsibility to mitigate based on what is known as "remedial responsibility." To be remedially responsible for inflicting a particular harm is to have a special or heightened obligation to right the wrong inflicted on the suffering parties that isn't shared by all contributing agents.[370] Issues of moral responsibility in particular are often matters of degrees.[371] One manner of assigning responsibility is thus through assessing the degree to which the relevant party played a special and significant role in the community which might incur upon it special responsibilities through its promises and leadership, and through the expectations it has knowingly generated.[372]

In regards to the United States in the community of international environmental law, it is evident that there exist special duties upon the United States based upon its voluntary role in these contexts. Rhetorically, the United States continually refers to its leadership position within these negotiations and even boasts of its responsibility and guidance in the relevant areas. Institutionally, the United States has been instrumental

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[370] David Miller, "Distributing Responsibilities," *Journal of Political Philosophy* 9, no. 4 (2001): 454, doi:10.1111/1467-9760.00136.
[371] *Ibid.,* 467.
[372] *Ibid.,* 462.

from the beginning in creating these environmental institutions, taking an active leadership role in their formation. Such actions occurred voluntarily; with the formation of these institutions and continued self-aggrandizement of its own power, the United States has actively sought its leadership role in these international environmental law contexts, and are thus bound by the responsibilities this role carries.

Over time, the U.S. has cultivated expectations as to its status as a leader and its role in international climate change negotiations, voluntarily assuming the related responsibilities since the inception of the IPCC and UNFCCC. The United States has a history of assuming the role of a global power and leader in addressing climate change policy on an international scale in prior administrations, especially evidenced in its claims following the founding of the UNFCCC. It was under the administration of George H.W. Bush that the United States signed onto the UNFCCC at Rio de Janeiro in 1992. In his subsequent press conference, Bush claimed success at the convention, stating that proposals for oceanic protection and public participation in free markets had been the invention of the U.S. and were included in Agenda 21 and Rio Declaration because of U.S. intervention.[373] He further declared, "The United States fully intends to be the world's preeminent leader in protecting the global environment. We have been that for many years. We will remain so."[374] During questions from the press, Bush similarly stated that the U.S. was not a follower, but a leader, in environmental politics, and that it had the best environmental record in the

[373] George H.W. Bush, "The President's News Conference in Rio de Janeiro," The American Presidency Project, University of California Santa Barbara, June 13, 1992, ,http://www.presidency.ucsb.edu/ws/?pid=21079.
[374] *Ibid.*

world.[375] He was so confident in this assertion that he supported by stating that the parties at the Rio convention would concede the U.S.'s world leadership role, that it had been the major driver in phasing out CFCs, and that his administration had increased its funding for the EPA.[376] Thus, even if the United States had caused merely an equal share of climate change related harm with the rest of the world's actors, we might have reason to believe that it should bear heightened burdens over other complicit parties and stakeholders because of its leadership role and advocacy in founding the relevant institutions.

In nearly all disciplines, society attributes special and heightened responsibilities to individuals based on their voluntarily assumed roles. Consider Jason Brennan's thought experiment: let us assume that no individual person has a heightened responsibility to become a surgeon, or to know anything about how to perform surgery. However, if one decides to become a surgeon, it seems as though any surgery performed must be done with sufficient knowledge not acquired through bias, and the surgeon must not perform this surgery immorally.[377] In short, by voluntarily assuming the position, surgeons incur special obligations not shared by the rest of the population. We extend such special responsibilities across disciplines. No one has an obligation to learn about U.S. military policy in Syria, nor does someone have an obligation to become president of the United States, but the president of the United States certainly has an obligation to be reasonably versed in U.S. military policy in Syria. No one has an obligation to become a lifeguard, but an off-duty lifeguard has a heightened responsibility to save a drowning person that exceeds that of the

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[375] *Ibid.*
[376] *Ibid.*
[377] Jason Brennan, "Polluting The Polls: When Citizens Should Not Vote," *Australasian Journal of Philosophy* 87: 4 (2009): 536.

typical bystander. Similarly, perhaps no one has an obligation to leave her seat on an airplane to assist someone having a heart attack, but as a society we expect that a trained doctor on board would do so, and morally ought to. In short, we regularly attribute special duties to voluntarily occurred roles across society.

By analogy, even if the harms caused by U.S. emissions gave no rise to obligations to become a leader of mitigation, and even if mitigation burdens were dispersed across all nations, we would still have reason to believe that the United States ought to have particular remedial responsibilities to mitigate climate change, fulfill the international promises it makes, and continue to build both domestic and international apparatuses to lower greenhouse gas emissions. Its status as a professed leader in this discipline, its continual promises to mitigate, and the expectations it has generated in international contexts give the U.S. special responsibilities to perform these voluntarily incurred obligations. The harms it has historically caused in this discipline provide yet an additional, though separate layer, on which to ground its exceptional responsibility.

C. Conclusion

In terms of both historical and present levels of harm, as well as role-based responsibility within the international community, it is clear that the United States has a special mitigation duty that exceeds that held by other nations and states. As the largest emitter historically, the United States has caused the most carbon-based harm in the world; today, its citizens individually cause three-times the harm of the world average on a per-capita basis. The United States also occupies a special role in the realm of international climate change negotiations. As a self-professed leader in this dimension, as well as a causal force in founding the leading international climate change institutions of the IPCC and the

UNFCCC, the United States has tacitly consented to accept heightened responsibilities based on the role it voluntarily occupies in the relevant rhetorical and institutional realms. These heightened responsibilities are especially important for the United States to actively adhere to and accept given the importance of the United States' emissions to the success of the 2015 Paris Climate Treaty.

Section IV: The United States and the Paris Convention

A. Introduction

The involvement of the United States and its adherence to its pledges are crucial to the eventual success of the Paris Climate Convention. In numerous country Intended Nationally Determined Contributions (INDCs), the adherence of the United States is often explicitly or implicitly demanded or delineated by countries throughout the world. Furthermore, many countries submitted both full-fledged pledges, and what are known as "conditional pledges." Conditional pledges are emissions targets that many developing and a few developed countries put forwarded, intending to meet such targets only if certain outside parties meet the specified conditions. Many of these conditional pledges, particularly by developing countries, are tied to the actions and assistance of developed countries, namely the United States. As such, if the Paris Climate Treaty is to reach its fullest mitigation potential for the globe and successfully involve developing countries in a meaningful way for the first time in UNFCCC history, the United States must meet its own INDC mitigation pledges and assist other developing countries in global mitigation strategies.

B. U.S. INDC text and highlights

The U.S. Intended Nationally Determined contribution offered a firm commitment in regards to diminishing its greenhouse gas emissions. The country agreed to make a deep 25 to 28 percent cut in emissions from its 2005 levels by the year 2025, with aims of falling closer to the 28 percent mark.[378] It also emphasized in its INDC that the country had already undertaken the necessary steps to meet the target of a 17 percent reduction below 2005 levels by 2020.[379] To meet the 2025 deadline, the U.S. acknowledged that it would need to accelerate its reduction pace to 2.3 to 2.8 percent per year, a doubling of the 2005-2020 annual pace.[380] The U.S. professed that these targets were fully in-line with its overall emission-reduction pathway, which aims for straight-line emissions from 2020 to deep, economy-wide reductions exceeding 80 percent by 2050.[381]

In addition to these firm goals, the United States also included in its INDC substantial rhetoric as to its intent and commitment to emissions reductions domestically as part of a larger global framework. The country identified itself as being "strongly committed" to climate change mitigation, with the aim of achieving greenhouse gas stabilization to prevent dangerous anthropogenic effects.[382] It stated that its professed targets were "fair and ambitious" in respect to global movements and responsibilities.[383]

In its transparency section, the United States delineated existing domestic regulations relevant to meeting their committed targets, including the Clean Air Act, the

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[378] United States of America, "United States INDC," United Nations Framework Convention on Climate Change, 2015, 1.
[379] *Ibid.*
[380] *Ibid.*
[381] *Ibid.,* 2.
[382] *Ibid.,* 1.
[383] *Ibid.,* 2.

Energy Policy Act, and the Energy Independence and Security Act.[384] The Clean Air Act enabled the EPA to strengthen regulations on new and existing power plants, improve post-2018 fuel economies for heavy duty vehicles, address methane emissions in landfills and the oil and gas sector, and reduce high emission HFCs through the Significant New Alternatives Policy Program.[385] The Energy Policy Act and Energy Independence and Security Act was likewise used to enable the U.S. Department of Energy to reduce buildings-sector emissions through conservation standards for appliances and equipment and building codes.[386] Through Executive Order 13693, issued in March of 2015, emissions from federal government operations were to be reduced by 17 percent, with the target of reducing these emissions by 40 percent from 2005 levels by 2025.[387]

These specific laws and targets, coupled with soft rhetoric, enables us to understand a snapshot of the United States' environmental commitments and considerations under the Obama Administration, including how the United States maintained rhetoric and goals consistent with broader international frameworks.

C. INDCs and bloc position statements

The impact of U.S. domestic policy in fulfilling its INDC obligations exceeds the reduced carbon emissions of the single state; mitigation by the United States is also a central component of the professed intents of other countries. Conditional INDCs – released primarily by developing countries – are those which pledge to meet targets provided additional provisions are met, typically financial assistance or ambitious concurrent

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[384] *Ibid.,* 4.
[385] *Ibid.,* 5.
[386] *Ibid.*
[387] *Ibid.*

mitigation by another party. Bloc position statements issued by groups of countries also often reflect similar patterns; below are a sampling of implications released by non-U.S. parties regarding the actions of the United States and other developed nations in shaping the commitments of developing ones.

The OPEC bloc, composed of almost exclusively developing nations, strongly advocated for the principle of common but differentiate responsibilities in its joint statements preceding the Paris Convention. The common but differentiated responsibilities principle stresses that all states are responsible for the protection of the environment and must promote sustainable development, but differing economic and ecological considerations necessitate that countries must accept differing levels of responsibility.[388] In accordance with these varying levels of responsibilities, developed countries ought to be primarily responsible for implementing technological strategies in developing countries.[389] It requested ahead of Paris that developed country targets be made "with regard to mitigation, adaptation, financial resources, technology transfer and capacity-building."[390]

This stress upon technological transfers and other aid was reflected in suggested modifications to the draft treaty text ahead of the Paris convention by the OPEC member of Kuwait. On October 5, 2015, on behalf of what is known as the "Arab bloc," Kuwait suggested modifications that focused on the inclusion of language that would provide aid to developing nations, transferred from the United States and other developed countries. Specifically, any enhanced pre-2020 ambitions ought to reflect an increased emphasis on mitigation, adaptation, and the provision of means of implementation, "*including*

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[388] Hunter, Salzman, and Zaelke, *International Environmental Law*, 464.
[389] Salem El-Badri, "OPEC Statement at COP-19."
[390] *Ibid.*

technology transfer, finance and capacity building… that *will have significant implications* in a post-2020 context" (emphasis indicates Kuwait's additions).[391]

The G-77 recently reiterated similar expectations in March of 2017, affirming its reliance upon the principle of common but differentiated responsibilities and stating that developed countries must continue to assume a leading role.[392] Differentiated responsibilities exist even amongst developed nations; responsibilities ought to be allocated "in accordance with historical responsibilities and their respective capabilities," which clearly shows a heightened demand for U.S. mitigation in particular.[393] Developing countries in the G-77 not only demand progress for pledged post-2020 commitments, but also for more ambitious targets in the next three years; for them, 2 degrees of warming is an insufficient compromise. Developed nations hold that 1.5 degrees of warming is the maximum the Earth can sustain without causing undo harm to their countries, which are more likely to suffer adverse effects than Northern developed ones.[394]

Developed countries similarly called for enhanced mitigation targets in the U.S. ahead of the Paris Convention. In a comprehensive report released by the EU Parliament in 2015, the EU expressly acknowledged differing formal apparatuses present within U.S. domestic law that pose challenges to mitigation.[395] While both the U.S. and E.U. agreed on metrics of transparency, accountability, and improved ambitions over time, the E.U. noted

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[391]Kuwait on behalf of the Arab Group, "Draft decision on workstream 2 of the Ad Hoc Working Group on the Durban Platform for Enhanced Action," October 5, 2015, 1.
[392] Helena Yanez Loza, "Statement on Behalf of the Group of 77 and China," Climate Change and the Sustainable Development Agenda, March 23, 2017.
[393] *Ibid.*
[394] *Ibid.*
[395]"Climate Policies in the EU and USA: Different Approaches, Convergent Outcomes?," European Parliament, November 2015, 2.

that the U.S. was overtly hesitant of accepting binding mitigation targets, preferring instead to nationally determine non-binding targets.[396] Because together the U.S. and E.U. rival China's current emissions, the concurrence of both parties is essential to active worldwide mitigation; the E.U. thus supported the U.S. in attaining its bi-lateral agreements with China, India, and Brazil, and likewise created a joint summit with China.[397] Unlike the U.S., however, the E.U. made a financial contribution to developing countries through the Global Climate Change Alliance with 300 million euros and programs in 51 countries.[398] This financial contribution aspect was not met by any such pledge by the United States. While the E.U. expressed support of the Obama administrations climate change priorities, it noted that Congress had not passed any federal laws regarding mitigation in 10 years, leaving domestic policy as a patchwork of individual policies and state-led initiatives; while the EU noted the consequences of the federal framework, it accepted this roadblock rather than criticizing it.[399]

Perhaps the most explicit acknowledgement of heightened responsibility of the United States surrounding the Paris Agreement came from within the country itself. The Press Release given by the White House acknowledged a similar heightened U.S. responsibility to mitigate effectively, and lead the world in innovative solutions to climate change.[400] In addition to its INDC, this press release stated that the United States would commit to mobilizing public and private financing for mitigation and adaptation strategies

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[396] *Ibid.,* 1.
[397] *Ibid,* 6.
[398] *Ibid.*
[399] *Ibid.,* 3.
[400] "U.S. Leadership and the Historic Paris Agreement to Combat Climate Change," Office of the Press Secretary, The White House of President Barack Obama, December 12, 2015,.

in developing countries, rather than limiting its responsibility to internal and domestic mitigation commitments.[401] Among these strategies was the launch of Mission Innovation along with nineteen other nations representing 80 percent of green technology research and development, who together pledged to double funding for these programs over five years.[402] Before the election of Donald Trump, notable billionaire Bill Gates pledged to support Mission Innovation; in wake of the election, he and nearly two dozen investors launched a $1 billion clean energy venture fund to support Mission Innovation and the Breakthrough Energy Coalition.[403] In the public sector, Secretary of State John Kerry announced that the federal government would double its grant-based finance for climate change adaptation by 2020 for vulnerable countries; given the change in administration, it is not clear that such a pledge will be met[404] Regardless, the pledges contained in this statement showed an internal acknowledgment of the heightened role for the U.S. in mitigation, above and beyond domestic commitments to meet INDC targets.

D. Conclusion

Given its special responsibilities and the global reliance upon United States leadership in the Paris Climate Treaty, it is essential that the United States fulfill the targets it set forth in the Paris Agreement and continue to fulfill its role in leading other countries to do the same. Because of the nature of the conditional INDCs and the additional global mitigation that could be realized from their implementation, the United States is in a particular position to influence not only its own mitigation, but gigatons of carbon

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401 *Ibid.*
402 *Ibid.*
403 Kristen Korosec, "Bill Gates Heads $1 Billion Clean Energy Venture Fund," Fortune, December 13, 2016, http://fortune.com/2016/12/11/bill-gates-john-doerr-venture-fund/.
404 "U.S. Leadership," The White House of President Barack Obama.

elsewhere in the developing world. Furthermore, both developed and developing countries alike have made it expressly clear that their domestic actions would be negatively influenced by United States defection. As traditional game theory would suggest, the defection of a major party like the United States would significantly compromise overall global compliance; the rhetoric of these INDCs expressly suggests that the world's enthusiasm for mitigation as reflected in the Paris convention would not withstand the deliberate defection of a player such as the United States, who carries the largest global responsibility in this matter.

Section V: Objections

Two pragmatic objections to the United States holding primary responsibility for global climate change mitigation in the present day are deserving of address. The first relates to the rising emissions and improved statuses of major Asian nations, namely China and India. Given the rate at which their emissions have increased, as well as their emergence from the status of "developing" countries to "transitional economies," the burdens of mitigation might seemingly be more appropriately placed on the shoulders of these nations. While this objection has been foreseeable and present for quite some time as these economies and emissions have boomed, the second objection is of a far more novel nature: It is dangerous and impractical to place responsibility for implementing the Paris Agreement and leading mitigation on the United States because of the rhetoric, promises, and potential policies of Donald Trump. If President Trump actively seeks to demolish the United States' obligations in terms of Paris, it seems pragmatically important that the globe place responsibility elsewhere in order to avoid inevitable collapse.

A. China and India

The transitional economies of India and China were excluded from previous UNFCCC mitigation targets because of their classification as "developing" states. China has a current population of 1.357 billion people, with India at 1.252 billion.[405] With a collective population of 2.609 billion, these two nations contain over one-third of the world's population, and thus present the greatest total emissions, as well as the greatest emissions potential. As such, many parties believe that these nations should bear the primary responsibility for mitigation, diminishing any special obligation held by the United States.

Though the United States is the largest historical emitter, today, China emits the greatest total of greenhouse gases, at approximately 10.5 gigatons of CO2 equivalent.[406] This represents approximately 22 percent of world emissions, and 15 percent of cumulative emissions from the period 1990 to 2011.[407] By contrast, India emits approximately 2.25 gigatons of CO2 equivalent, 5 percent of current world emissions, and only 4 percent of the cumulative emissions released from 1990 and 2011.[408] These rapidly emerging economies are developing at an unprecedented pace; the emissions trajectory of that development on so large a scale has significant potential to vastly impact world emissions.

Does this rapid development impose additional mitigation duties on China and India to be environmentally conscious as they develop? Almost certainly. But the existence of a growing obligation in one part of the world in no way diminishes existing special responsibilities elsewhere. For the sake of elucidation, imagine that through your own

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[405] "Population, total," World Bank, Accessed April 07, 2017. http://data.worldbank.org/indicator/SP.POP.TOTL.
[406] Ge, Freidrich, and Damassa, "6 Graphs."
[407] *Ibid.*
[408] *Ibid.*

direct action, you fell a tree on your property and it smashes your neighbor's fence. On the other side of the property, your neighbor's *other* neighbors follow suit, and topple an even larger tree on the same neighbor's opposite fence. Meanwhile, the neighborhood children have been known to throw pebbles at the fence, causing negligible damage. You have been known to give long speeches declaring yourself the leader of the neighborhood, and were instrumental in creating a homeowner's association policy about the dangers of tree toppling. Who ought to pay for fixing the fence? Though all parties in the neighborhood are responsible in varying degrees, it seems that you have a heightened special responsibility to pay for the fence repair well exceeding that of the pebble-throwers; this special responsibility is by no means removed by saying, "But look at your other neighbors! They damaged that fence even more!" While they, too, should pay for the fence they damaged, and learn to fell trees in a different manner, so too should you own up to your special responsibility to mitigate harm to your neighbor.[409]

Likewise, the United States has a heightened obligation to right the harms of the climate change it has caused despite the fact that developing nations have made negligible contributions to the overarching damages. The actions of China and India, though causing similar and even greater damage than the United States in the present day, cannot possibly eliminate the United States' special obligations to compensate for its own damages and live up to the expectations it has created as the leader of the neighborhood and a prominent creator of related policy.

There is a separate aspect to the emissions of China and India that ought to be addressed, namely, why the U.S. ought to mitigate while these developing economies

continue to grow with high emissions. Essentially, this is the free-rider problem in its most basic form, and it is important to assess the extent to which ethical duties and obligations hold even when faced with perceived defection from another party. The duties which ground the argument for special responsibilities of the United States – compensating for cumulative harms and fulfilling its self-proclaimed leadership role – are not conditional on compliance by other parties. Though China is now the world's largest emitter, it does not follow that by virtue of its larger contributions, the U.S. is somehow off the hook for the ramifications of its own actions, even if China were making zero efforts to curb emissions. Consider a drowning child in a pool. There is a lifeguard on duty – the best swimmer in the area by the pool – but said lifeguard has fallen asleep on the job. You may not be a lifeguard, but you're the second-best swimmer in the pool; it seems that the lifeguard's inaction would not excuse inaction on your part and you should take steps to save the child immediately. Similarly, even if China had made it explicitly clear that it had no intentions to curb emissions, the U.S. would still be culpable for its individual duties, regardless of defection elsewhere. Fortunately, China and India have both taken steps through INDCs and bilateral agreements with the U.S. to reduce emissions and mitigate climate change. Though their populations represent vast emissions potential, mitigation on the part of the U.S. can have positive results regardless through marginal good created by marginal reductions. The influence of U.S. action, as seen through these bilateral agreements, can also affect actions throughout the globe, including in China and India.

Furthermore, it is likewise important to note that while the development of China and India is certainly causing emissions, the rate of emissions growth has significantly slowed in recent years because of mitigation on their parts. China's CO2 emissions

decreased by 0.7 percent from 2014 to 2015, primarily attributable to a 1.5 percent decline in coal usage and an increase in natural gas of 4.7 percent.[410] While in previous years, China had increased its emissions from between 2.0 and 4.4 percent on pace with economic growth, 2015 marked the first year of greenhouse gas decrease coupled with 7 percent economic growth.[411] For the tenth consecutive year, China also added more new hydropower capacity than the rest of the world combined, increasing its capacity by 5 percent and reaching 19.5 percent of domestic electricity generation through hydropower.[412] Wind, solar, and renewable energies increased 20 percent in 2015, reaching a total of 5 percent overall electricity generation.[413]

India continued its trend of increased emissions, at a rate of approximately 5.1 percent from 2014 to 2015. However, this growth rate is below the average 2006-2015 period rate of 6.8 percent.[414] Furthermore, India's per capita emissions of just 1.9 tons CO2e/person is three times lower than the per capita emissions of the EU and lower than average per capita emissions in most developing countries. It emissions increase continues to be coupled with its economic development output.[415] Total electricity output is primarily responsible for the increase, but India expanded its renewable energy by 13.7 percent in 2015, and nuclear energy by 9.6 percent. It aims to reach 40 percent non-fossil energy sources by 2030 in its INDC.[416]

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410 "Trends in Global CO2 Emissions: 2016 Report," European Commission Joint Research Centre and PBL Netherlands Environmental Assessment Agency, 2017, 19.
411 *Ibid,* 21.
412 *Ibid,* 22.
413 *Ibid.*
414 *Ibid,* 30.
415 *Ibid.*
416 *Ibid.,* 31.

Though India and China certainly share mitigation duties, the existence of these duties do not eliminate the need for U.S. leadership, nor do they diminish the special responsibilities held by the United States. The world is right to recognize that the development of these countries presents significant emissions challenges, but those who think that the U.S. is off the hook because China now emits more than we do are missing the nuances of the issue. Multiple parties can share in responsibility; the U.S. maintains a heightened special responsibility to mitigate based on its cumulative harms and its position as a world leader.

B. Donald Trump

On May 26, 2016, a few months ahead of his election, Donald Trump made a speech specifically relating to climate change and the Paris Agreement. In this speech, Trump referred to the U.S.'s domestic policies of mitigation as the "totalitarian tactics" of the Environmental Protection Agency, promising that his presidency would dismantle the agency and eliminate the "draconian climate rules" which were costing the American economy.[417] He then directly addressed the Paris Agreement, stating that he would "cancel" it by withdrawing funding for any U.N. programs associated with global warming and removing domestic policies for U.S. emission targets.[418] He identified the Paris Agreement as being "bad for U.S. business," with "foreign bureaucrats [controlling] how much energy we use."[419]

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[417] Benjy Sarlin, "Donald Trump Pledges to Rip Up Paris Climate Agreement in Energy Speech," NBCUniversal News Group, May 26, 2016.
[418] *Ibid.*
[419] Matt McGrath, "Donald Trump would 'cancel' Paris climate deal," BBC News, May 27, 2016.

Fast-forward to January of 2017, when President Trump took office. Myron Ebell, the head of Trump's EPA transition team, verbalized what he perceived to be Trump's likely course of action in the coming months on climate change, stating that Trump's presidency would reflect a shift and reversal of the climate change policy course set by the Obama administration.[420] Ebell stated that Trump had made it clear to him that under his leadership, the United States would withdraw from the Paris Agreement entirely.[421] Whether or not this statement accurately reflects Trump's actions – what he says, what others say he said, and what he actually does are far different things – Ebell's and Trump's statements give the world a reason to fear that the next four years will cripple the United States' ability to meet its own emission targets, and will certainly damper its ability to exert global influence.

In March of 2017, this fear became more solidified as Trump released his proposed budget. President Trump's blueprint for the next fiscal year cut funding for the Environmental Protection Agency by a gutting 31 percent.[422] Though this was by no means the only cut Trump made, the EPA was arguably the hardest-hit bureaucratic federal agency, stripping $2.6 billion from its $8.2 billion budget, and giving the agency the lowest funding it has received in 40 years when adjusted for inflation.[423] This cut was radical even from a Republican perspective; in the previous year, the House Spending subcommittee suggested a cut to EPA funding in the amount of $291 million, leaving $8 billion allocated to

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[420] Reuters, "President Trump Prepares to Withdraw from Groundbreaking Climate Change Agreement, Transition Official Says," Fortune, January 30, 2017.
[421] *Ibid.*
[422] Glenn Thrush and Coral Davenport, "Donald Trump Budget Slashes Funds for E.P.A. and State Department," The New York Times, March 15, 2017.
[423] *Ibid.*

the agency.[424] The detrimental cut signals not only practical limitations in U.S. ability to implement mitigation policy, but also signals that Trump has no plans to make environmental activism or carbon mitigation a priority in his administration. Rather than making advancements, his administration intends to in fact reverse policies already in place; for that reason, his presidency stands as the largest pragmatic roadblock to the U.S. involvement in the Paris Agreement and in global environmental leadership, and also might give us reason to question placing heightened responsibility onto the United States as an institution.

However, while the leadership of Donald Trump does not seem to bode well for domestic climate change policy, the existence of pragmatic obstacles to reaching domestic obligations does not mean that no such obligations exist, nor lessen their veracity. Obstacles in the way of a graduate paying off student loan debt do not clear the debt nor her responsibility to pay. Similarly, the difficulty of solving a math problem does not mean that no solution exists, merely that it is yet unsolved. Donald Trump's presidency and budget cuts to the EPA give us reason to worry, for the rest of the world to voluntarily increase its mitigation, and for us to protest, but the obstacle alone does not stand as an objection to the existence of a responsibility. Rather, it increases the imperative for innovative solutions to domestically combat climate change and meet our obligations in spite of contrary public policy.

VI. Conclusion

U.S. climate policy has had a profound impact upon the success or failure of international environmental law agreements, most notably in its role in the Kyoto and

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[424] *Ibid.*

Montreal Protocols. Given the historical emissions of the United States, as well as its status as a professed leader in climate change policy, the U.S. has incurred special obligations to lead both domestic and international mitigation strategies beyond the shared responsibility common to all stakeholders. These special obligations can be met through meeting its Paris commitments, and through support of developing nations as requested by their INDCs and joint position statements. Though other parties, such as China and India, must also play a significant role in securing meaningful global mitigation, responsibilities of other parties to not pose a direct objection to the special responsibilities held by the United States. Furthermore, the administration of a leader generally opposed to climate change mitigation policy does not diminished the responsibility of the United States in that dimension; rather it imposes a pragmatic obstacle that must be overcome through private and state-led initiatives that the administration cannot touch rather than through federal policy. As such, U.S. leadership plays an essential role in climate change mitigation on the international level, regardless of particular domestic laws or administrations, and the world has a right to hold that the United States ethically ought to deliver on the promises and expectations it has cultivated in international contexts.

Overall Conclusions

The purpose of this paper was to examine the connection between United States leadership and the matrix of international environmental law, and to further assess the ethical duties of the United States in light of its role. Beginning with a harm-based approach to mitigation ethics, I rooted my thesis on the moral assertion that it is prima facie wrong to cause harm to other people, and explored the extent to which climate change and related emissions constitutes a global harm. By concluding that climate change is causing real harms to people in both the present and future, and that emissions were disproportionately allocated amongst developed countries, namely the United States, I established a causal link between U.S. emissions and climate change harm. I concluded this section by establishing an ethical duty to combat climate change through aggressive mitigation in the present.

I then turned my attentions to international institutions, whose record in establishing and coordinating effective environmental law treaties has been mixed. The Intergovernmental Panel on Climate Change and United Nations Framework Convention on Climate Change are the most relevant institutions best-suited to combatting climate change in international contexts. While the IPCC has consistently met its intended function in collecting international data on emissions, assessing present harms, and measuring the likelihood of future outcomes, the policy results of the UNFCCC have been largely ineffective. By introducing both the Montreal Protocol/Vienna Convention and Kyoto Protocol, I attempted to analyze the factors which led to the relative success and failure of each. I ultimately concluded that the UNFCCC, by virtue of its high membership and

establish structures, was in a good position to create effective treaties with the addition of more flexible methods of inclusion in meeting its intended goals.

I then turned my attentions to the most recent UNFCCC treaty: the landmark Paris Climate Agreement signed in 2015. This agreement was revolutionary for the UNFCCC in that it met the UNFCCC's commitment to the principle of common but differentiated responsibilities through new manners. The UNFCCC established the global goal of limiting warming to 2 degrees Celsius by the year 2100; with that mammoth task in mind, it asked all countries to be as ambitious as possible in setting their targets. The Intended Nationally Determined Contributions (INDCs) thus allowed for inclusion of developing countries previously excluded under the annex system of the Kyoto Protocol, while understanding that developing nations were less able to combat climate change then developed ones. The rapid pace with which the Paris Agreement entered into force – within a year of initial signing – displays the high levels of willingness within the global community to make individual sacrifices for the collective good of climate change mitigation. Though the Agreement will not be sufficient to meet the stated warming goals, it nevertheless stands as a testament to potential of the international community, and acts as a starting point for future negotiations in the post-2020 period.

Chapter 4 analyzed the United States specifically, and established a case for special responsibilities on behalf of that particular nation. Though the impetus to stop climate change is a global problem, and all countries share in the responsibility to care for the planet, the burdens of mitigation derive from duties that are not equally dispersed across nations. Following a harm-based approach established in Chapter 1, this chapter aims to show that the harms caused by the U.S. give us reason to place special responsibilities on

that nation to mitigate climate change aggressively, above and beyond those responsibilities shared by the rest of the world. Furthermore, additional responsibilities have been incurred by the U.S. through their voluntarily incurred role as a leader in U.S. climate change. By shaping these institutions and declaring themselves a world leader, the United States has established a long history of global expectations that it has consciously cultivated through the way it prefers to be viewed. In taking on this role, the United States has incurred further responsibilities to meet these expectations. Though pragmatic considerations, such as rising emissions elsewhere and the present administration, ought to be considered by the globe in approaching the next four years of climate change policy, objections on pragmatic grounds do not negate the ethical imperatives established in this chapter.

Further exploration into U.S. leadership and international environmental law should likely begin in the technological sector. Mission Innovation, funded by Bill Gates, might very well be the only Paris commitment that the U.S. is able to fulfill because it depends on the private rather than public sector. Furthermore, the strength of U.S. leadership demonstrated during the Montreal Protocol, as well as the heightened quality of ambitions articulated by that country during those negotiations, might give us reason to believe that potential for U.S. profit largely drives U.S. enthusiasm in international environmental law. For that reason, potential for technology profit in developing countries might incentivize the U.S. to drive ambitious bargains and protocols in the future once sufficient research and development is launched through private investors.

In regards to the leadership of the present Trump administration, policy research should greatly explore the extent to which Paris Agreement commitments could be fully

realized without the help of any federal policy. State-wide initiatives in implementing regulations under the Clean Power Plan on a voluntary, non-federally mandated basis could allow us to meet our international obligations without compliance from coal states or the administration. Coordination on the state level, separate from the institution of the federal government, might play a similar role to the UNFCCC within the domestic sphere, though the extent to which states could organize bilateral and multilateral agreements amongst themselves is highly limited. However, just as the U.S. has incurred special responsibilities through its leadership role in global environmental politics, so might certain states have special responsibilities to lead domestic mitigation and encourage other states to do likewise. California might be a candidate for a domestic state-wide leader on this charge, as might the other deep-blue West-Coast states of Oregon and Washington. Further investigation as to the ethical nature and potential of special responsibilities on the state level would be required, though it seems intuitive that the allocation of these special responsibilities to mitigate and coordinate might similarly derive from considerations of harm, capacity, and declared roles, much as it does on the international level.

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