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Climate Change's Free Rider Problem: Why We Must Relinquish Freedom to Become Free

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CLIMATE CHANGE'S FREE RIDER PROBLEM: WHY WE MUST RELINQUISH FREEDOM TO BECOME FREE

NATALIE M. ROY*

We are faced with the fact that tomorrow is today. Over the bleached bones and jumbled residues of numerous civilizations are written the pathetic words 'Too Late.'

—Martin Luther King Jr., April 4, 1967¹

ABSTRACT

Despite the increasing urgency of climate change, countries continue to struggle to cooperate on even modest solutions. Of international accords that are successfully ratified, agreed-upon commitments are mostly hortatory and vague, succeeding only in engendering a fragmented, voluntary compliance scheme. Unsurprisingly, decades of tepid climate action and procrastination have begotten a staggering emissions gap for the world to close by 2030—requiring a collective greenhouse gas reduction of about fifty percent to limit global warming to the 1.5°C benchmark. Yet, global greenhouse emissions have generally risen, not fallen in the last decade, with 2018 marking a record high despite pledges made in compliance with the celebrated 2015 Paris Agreement. In short, international models of climate cooperation thus far have descriptively been unequal to the task of securing adequate global climate action. Once we recognize and agree that global warming cannot go unaddressed, the conclusion follows that change, perhaps of a radical nature, is required. This Article argues that decades of insufficient international cooperation militate against tweaking current models, and instead proposes a blueprint for a concrete, market-driven compliance scheme that, importantly, would be operative without a world government or divestment of individual sovereignty.²

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¹ Martin Luther King Jr., Address at the Clergy and Laity Concerned at Riverside Church (Apr. 4, 1967).

² To be sure, the solution proposed *infra*, would not, and could not, be implemented tomorrow—international and domestic politics would forbid it, and this Article does not suggest otherwise. Rather, this Article operates with the futuristic presupposition that

INTRODUCTION	822
I. IMPEDIMENTS TO EFFECTIVE CLIMATE ACTION.	825
A. <i>Psychological Headwinds</i>	825
1. Perception	826
2. Ambiguity Effect.	827
B. <i>Constrained Politics</i>	829
1. The Global Climate Coalition.	829
2. Political-Economic Inertia	830
C. <i>The Anarchical International System</i>	832
1. The (All but Foregone) Failure of Climate Accords	834
2. The Free Rider Problem	837
II. THE (UNAVOIDABLE) NEED FOR A BINDING MECHANISM	839
A. <i>[Controlling] Psychological Headwinds</i>	842
B. <i>[Un-]Constrained Politics</i>	842
C. <i>[Reimagining] the Anarchical International System</i>	845
D. <i>The Solution</i>	847
III. THE BINDING MECHANISM	848
A. <i>The Mechanics of a Climate Enforcement Mechanism</i>	849
1. The WTO as a Model of (Relative) Success . .	850
2. The Collateral Model Proposed	851
a. Potential Problems	855
CONCLUSION	856

INTRODUCTION

Since the late nineteenth century, largely as a result of anthropogenic greenhouse gas emissions, the planet's average surface temperature has risen about 1°C.³ Consequent glacial and ice sheet melting has

the visible consequences from climate change have become sufficiently threatening to the average world citizen so as to radically alter public opinion. With this in mind, the binding framework proposed is simply meant to suggest one way to set the table for when world leaders are prepared to meaningfully sit down. As this Article will later argue, current international law and institutions are ill-suited for the unprecedented levels of cooperation climate action demands, and future solutions (even those proposed with the presupposed urgency and earnestness) will continually fall prey to free riding absent a concrete binding mechanism.

³ *Climate Change: How Do We Know?*, NASA [hereinafter *How Do We Know?*], <https://climate.nasa.gov/evidence/> [<https://perma.cc/A5R4-3BRB>] (last visited Mar. 10, 2021).

contributed to an eight-inch rise in global sea levels in the last century, with a nearly doubled rate of rise in the last two decades, increasing every year.⁴ Upticks in the frequency and intensity of hurricanes have wrought greater destruction to affected populations and abnormally devastating fires have recently raged through California and Australia, exacerbated by the hotter temperatures and dryer conditions.⁵ Since the Industrial Revolution, ocean acidity has increased by about thirty percent, which, in conjunction with hotter waters and pollution, threaten (further) mass extinctions of our current marine biodiversity and human livelihoods.⁶

A recent report released by the Intergovernmental Panel on Climate Change (“IPCC”) warned that we have now nine years to limit global warming to 1.5°C to mitigate our risk of hitting local and global tipping points that would precipitate (further) permanent ecological collapse and mass animal and plant extinctions.⁷ Failure to timely limit warming reportedly will have devastating impacts on our species as well, exposing humanity to significantly increased risks of heat-related illness and mortality, vector borne diseases, extreme droughts and floods, and food insecurity.⁸ More alarmingly, a long-term failure to address the crisis may have

⁴ *Id.* On top of threatening to swallow swathes of low-lying land entirely, rising sea levels also put infrastructure at risk in coastline urban settings including, *inter alia*, roads, bridges, subways, water supplies, oil and gas wells, power plants, sewage treatment plants, and landfills. Rebecca Lindsey, *Climate Change: Global Sea Level*, NOAA (Aug. 14, 2020), <https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level> [<https://perma.cc/JA5V-ZBXC>].

⁵ Nerilie Abram, *Australia's Angry Summer: This Is What Climate Change Looks Like*, SCI. AM. (Dec. 31, 2019), <https://blogs.scientificamerican.com/observations/australias-angry-summer-this-is-what-climate-change-looks-like/> [<https://perma.cc/YQA5-8CRK>]; Jeff Berardelli, *How Climate Change Is Making Hurricanes More Dangerous*, YALE CLIMATE CONNECTIONS (July 8, 2019), <https://www.yaleclimateconnections.org/2019/07/how-climate-change-is-making-hurricanes-more-dangerous/> [<https://perma.cc/2CNE-AKFF>]; Haley Smith & Rong-Gone Lin II, *The Frightening Implications of California's First Million-Acre Fire*, L.A. TIMES (Oct. 6, 2020), <https://www.latimes.com/california/story/2020-10-06/the-frightening-implications-california-first-million-acre-wildfire> [<https://perma.cc/ZFC3-LSKP>].

⁶ *Ocean Acidification*, NOAA, <https://www.noaa.gov/education/resource-collections/ocean-coasts-education-resources/ocean-acidification> [<https://perma.cc/GE9Z-QGLK>] (Apr. 2020); see also John C. Kunich, *Losing Nemo: The Mass Extinction Now Threatening the World's Ocean Hotspots*, 30 COLUM. J. ENV'T L. 1 (2005).

⁷ See generally *Global Warming of 1.5 °C*, IPCC, <https://www.ipcc.ch/sr15/> [<https://perma.cc/RP3M-BVJG>] (last visited Mar. 10, 2021).

⁸ Alan Buis, *A Degree of Concern: Why Global Temperatures Matter*, NASA (June 19, 2019), <https://climate.nasa.gov/news/2865/a-degree-of-concern-why-global-temperatures-matter/> [<https://perma.cc/G6XJ-HJ2X>]. Climate change will also have devastating impacts on infrastructure and the economy. If current greenhouse gas emissions do not change, extreme

existential consequences for our species as scientists fear that enough heat will trigger feedback loops in our ecosystems, such as the melting of the world's permafrost—estimated to store approximately 1,500 billion tons of carbon (almost double the amount currently in the atmosphere)—thus kick-starting irreversible, runaway climate cycles outside of human control.⁹

Part I of this Article offers a diagnosis for our collective failure thus far to secure meaningful climate action. Part II argues that future action will likely fail without concrete means to bind participating countries to their climate commitments. Part III then provides a possible solution to this problem by blueprinting a market-based binding mechanism that could be appended to future climate agreements. The Article concludes by exploring some potential shortfalls of this hypothetical solution. Even if the specific mechanism proposed herein does not gain traction, I hope this Article helps energize our collective pursuit of solutions that can meet the crisis at hand.

heat is projected to result in the loss of almost two billion labor hours in the agricultural, construction, and other outdoor sectors by 2090 with attendant estimated lost wages of \$160 billion. *Fourth National Climate Assessment Vol. II—Impacts, Risks, and Adaptation in the United States: Report-in-Brief*, U.S. GLOB. CHANGE RSCH. PROGRAM 1, 41 (2018), https://nca2018.globalchange.gov/downloads/NCA4_Report-in-Brief.pdf [<https://perma.cc/4KPG-7V6Q>].

⁹ Renee Cho, *Why Thawing Permafrost Matters*, EARTH INST. COLUM. UNIV. (Jan. 11, 2018), <https://blogs.ei.columbia.edu/2018/01/11/thawing-permafrost-matters/> [<https://perma.cc/UC84-ALD5>]. In fact, a recent physics study suggests that climate change not only represents an apocalyptic threat to humanity, but to any energy-intensive civilization, concluding that unaddressed planetary feedback is a logical answer to the famous Fermi Paradox. Adam Frank et al., *The Anthropocene Generalized: Evolution of Exo-Civilizations and Their Planetary Feedback*, 18 *ASTROBIOLOGY* 503 (2018); see also Seth D. Baum, *Is Humanity Doomed? Insights from Astrobiology*, 2 *ASTROBIOLOGY & SUSTAINABILITY* 591 (2010). The “Fermi Paradox” is a paradox capturing the perplexing question of why—despite the enormous probability that other life exists in the universe and would have had billions of years longer than our relatively young civilization to master galactic travel—have we not seen aliens? This failure to find any sign of extraterrestrial life given the enormous likelihood of its (advanced) existence suggests something is going wrong for everyone—a notion conceptualized as the “Great Filter,” representing the theory that intelligent life continually meets its end at a certain point before reaching the ability to explore the rest of the galaxy. Using basic mathematical models of population biology, Frank postulates that the Great Filter may simply be the universal failure of all advanced life to achieve sustainability with its planet as, after all, any energy-intensive civilization will invariably have planetary feedback as it grows and harnesses resources. For a summary of his findings, see Kevin Loria, *There's a Compelling Explanation for Why We've Never Found Aliens—And It Could Mean Humanity Is Doomed*, *BUS. INSIDER* (June 25, 2018), <https://www.businessinsider.com/climate-change-could-answer-fermi-paradox-2018-6> [<https://perma.cc/SJ3E-VAQY>].

I. IMPEDIMENTS TO EFFECTIVE CLIMATE ACTION

Given that no nation will be immune from the serious repercussions of unchecked global warming, why has there not yet been lucid, meaningful cooperation among countries to address this foreseeable crisis? Despite the recorded severity of climate change and alarming predictions for further consequences, three factors in particular impede effective action to address the issue. *One*, notwithstanding the overwhelming scientific evidence of climate change's existence, the science is less clear as to the exact consequences that we can expect from failure to reform our practices.¹⁰ This ambiguity affects both how the issue is perceived and subsequently acted upon.¹¹ *Two*, lobbying and politics, particularly from the energy sector, have stymied and constrained policy action contrary to established, profitable business practices.¹² Finally, *three*, the current structure of our international system is inherently ill-suited to coordinating binding international action and is instead dependent upon altruistic, voluntary action from individual countries.¹³ In the context of climate mitigation—at its core a global public good—we are all victims of an unchecked free rider problem.¹⁴

A. *Psychological Headwinds*

Most people today realize and agree that climate change is real, significant, and problematic.¹⁵ That said, even the most ardent climate

¹⁰ See generally JONATHAN ROUGIER & MICHEL CRUCIFIX, UNCERTAINTY IN CLIMATE SCIENCE AND CLIMATE POLICY (2014), <https://arxiv.org/pdf/1411.6878.pdf> [<https://perma.cc/ZSF2-EWMP>].

¹¹ See Janet Swim et al., *Psychology and Global Climate Change: Addressing a Multi-faceted Phenomenon and Set of Challenges*, AM. PSYCH. ASS'N 6, 8 (2009), <https://www.apa.org/science/about/publications/climate-change-booklet.pdf> [<https://perma.cc/DU7X-FXCQ>].

¹² Andrew C. Revkin, *Industry Ignored Its Scientists on Climate*, N.Y. TIMES (Apr. 23, 2009), <https://www.nytimes.com/2009/04/24/science/earth/24deny.html> [<https://perma.cc/46F6-5DMJ>].

¹³ President Donald Trump's decision to pull the United States out of the celebrated Paris Agreement, with impunity, is a perfect illustration of the system's infirmity. See *Statement by President Trump on the Paris Climate Accord*, WHITE HOUSE (June 1, 2017) [hereinafter *Statement by President Trump*], <https://trumpwhitehouse.archives.gov/briefings-statements/statement-president-trump-paris-climate-accord/> [<https://perma.cc/YP7W-K4KJ>].

¹⁴ Martin L. Weitzman, *On a World Climate Assembly and the Social Cost of Carbon*, 84 ECONOMICA 559, 562–63 (2017).

¹⁵ There are, of course, still some people, particularly in the United States, who remain unconvinced that climate change is a product of man-made actions. See Oliver Milman & Fiona Harvey, *US Is Hotbed of Climate Change Denial, Major Global Survey Finds*, GUARDIAN (May 8, 2019), <https://www.theguardian.com/environment/2019/may/07/us-hot>

advocates cannot exhort the imperative of change with any specificity or certainty as to the consequences of nonaction because such concreteness is currently beyond the reach of predictive science.¹⁶ Climate science lecturer at the University of Melbourne Andrew King put it this way: “Without a doubt [climate change] is a huge threat to human civilization—it’s the details that we need to pin down.”¹⁷ However, the ambiguity in the “details” regarding global warming’s consequences, in itself, has consequences.

1. Perception

Ambiguity shapes our very perception of climate change as an issue. The wide variation in climate predictions has naturally spurred wide variation in public rhetoric used to discuss global warming, which in turn informs how we perceive the severity of the issue.¹⁸ For example, some current studies go as far as to insist that we are headed down a path toward human extinction, even as early as 2050.¹⁹ Meanwhile, other predictions acknowledge that climate change will likely be deleterious to our living conditions, particularly for poorer populations, but firmly belie any suggestion that climate change presents an existential threat to humanity.²⁰ This discord matters, and disproportionately so, when considering an issue such as climate change because most people today do not directly experience climate change—our perception of the problem is formed almost entirely from various media and educational sources and personal interactions.²¹ Yet, our perception of the problem directly informs our level of concern, and thus our motivation to act or support policy changes that

bed-climate-change-denial-international-poll [https://perma.cc/U66J-ADQ6]. It goes without saying that this population believes that no level of international action is needed given that to them global warming is either not occurring, or is a natural process not deserving of alarm. *See id.*

¹⁶ *See Predicting the Climatic Future Is Riddled with Uncertainty*, ECONOMIST (Sept. 21, 2019), <https://www.economist.com/science-and-technology/2019/09/21/predicting-the-climatic-future-is-riddled-with-uncertainty> [https://perma.cc/T3GP-GFE9].

¹⁷ Julia Hollingsworth, *Climate Change Could Pose ‘Existential Threat’ by 2050: Report*, CNN (June 4, 2019), <https://www.cnn.com/2019/06/04/health/climate-change-existential-threat-report-intl/index.html> [https://perma.cc/84YG-3G8R].

¹⁸ *See* Swim et al., *supra* note 11.

¹⁹ David Spratt & Ian Dunlop, *Existential Climate-Related Security Risk: A Scenario Approach*, BT POL’Y PAPER, May 2019, at 8.

²⁰ *See, e.g.*, Jonah Goldberg, *Climate Change Is a Real Concern—Not an Existential Crisis*, NAT’L REV. (Sept. 6, 2019), <https://www.nationalreview.com/2019/09/climate-change-excuse-democrats-transform-economy/> [https://perma.cc/5323-DP2A].

²¹ *See* Swim et al., *supra* note 11, at 17.

address the issue.²² Put simply, the less concrete our perception of a problem and attendant concern, the less urgent our motivation to act.²³

Now introduce the dimension of time and distance. These nebulous “consequences” of climate change will supposedly only occur in the “future” and mostly in “other places.”²⁴ Humans have the unfortunate proclivity to discount or undervalue future or distant risks.²⁵ Thus, our perception of the importance of climate change is inexorably discounted consonant with the limits of our temporal and spatial processing.²⁶ Put simply, even for the most receptive vessel (someone who is willing and eager to understand the issue), climate change is not internalized with certainty, urgency, or immediacy.²⁷ While this may accurately reflect the further away, less urgent and certain consequences than say touching one’s hand to a hot stove, it is mismatched to the nexus of action.²⁸ That is to say that the faraway catastrophe does not come as a result of faraway action—it is linked to action occurring now.²⁹ Now reconsider ambiguity in the context of decision-making.

2. Ambiguity Effect

Our cognitive inclination is to select options for which the probability of a favorable outcome is known over an option where the probability of a favorable outcome is unknown.³⁰ This is known in economics as the “ambiguity effect.”³¹ This concept plays out in two important ways regarding climate change. One, on a meta level, because we do not have a clear understanding of the gravity or shape of climate change and its consequences, we cannot accurately ascribe a value to the would-be favorable result of mitigating it.³² In other words, we are unsure of the size and character of the potential harm we would be avoiding, and therefore

²² *Id.* at 22.

²³ *Id.*

²⁴ Rachel I. McDonald, *Perceived Temporal and Geographic Distance and Public Opinion About Climate Change*, OXFORD RES. ENCYCLOPEDIA (Sept. 2016).

²⁵ *Id.*; see also Swim et al., *supra* note 11, at 25, 66.

²⁶ See Swim et al., *supra* note 11, at 25, 66.

²⁷ See *id.*

²⁸ See *id.*

²⁹ *The Causes of Climate Change*, NASA, <https://climate.nasa.gov/causes/> [<https://perma.cc/WE86-LXH9>] (last visited Mar. 10, 2021).

³⁰ Deborah Frisch & Jonathan Baron, *Ambiguity and Rationality*, 1 COLUM. J. BEHAV. DECISION MAKING 149, 152 (1988).

³¹ *Id.*

³² See Swim et al., *supra* note 11, at 65.

ambiguity taints even our conception of a favorable outcome.³³ Two, on a practical level, we cannot be sure that our actions will even produce the desired result (of which we cannot ascribe a value), which further reduces our inclination to opt for that option, particularly where costs attend it and where more certain options for favorable outcomes sit on the table.³⁴

To illustrate, a world leader faced with the choice to pursue an economic policy that is reasonably certain to advance her country's prosperity, or a climate policy that will cost her country millions of dollars to abate ambiguous consequences—with an uncertain probability of success³⁵—will naturally find herself disinclined to choose the latter.³⁶ This logic also extends to her citizen who chooses to drive his car to work, for which the benefits of expediency and convenience are known, over taking the public bus, for which the probability of producing the favorable outcome attending such option (ostensibly mitigating climate change), is unknown to him.³⁷ In short, there are built-in psychological headwinds against individuals making climate-based decisions inhering in the ambiguous nature of the issue.³⁸

³³ *See id.*

³⁴ *Id.* at 25 (“While the costs of mitigating actions are incurred immediately, their uncertain and future benefits get discounted, making the deliberative consideration of such actions unlikely to arrive at socially responsible and long-term sustainable behavior.”).

³⁵ The success of such a policy is inherently dependent on the behavior of other actors over which the world leader has no control, further reducing her likelihood of acting. This is what is known as the “collective action problem.” *Id.* at 67 (“Stated in psychological language, people sometimes do not act because they perceive that they have little behavioral control over the outcome.”).

³⁶ *Id.* at 25.

³⁷ *Id.*

³⁸ It is more than worth noting that the lack of certainty surrounding global warming also aids our tendency to affirmatively minimize or ignore the issue, particularly when to lucidly address it would inconvenience or revolutionize our lifestyles. *See* Swim et al., *supra* note 11, at 66–67 (“Habit may be one of the most important obstacles to the mitigation of climate change impacts.” (citations omitted)). Another culprit of this type of behavior is a phenomenon known in the psychology community as “cognitive dissonance.” *Cognitive Dissonance*, CAMBRIDGE DICTIONARY, <https://dictionary.cambridge.org/dictionary/english/cognitive-dissonance> [<https://perma.cc/R29T-E4A7>] (last visited Mar. 10, 2021) (“[A] state in which there is a difference between your experiences or behaviour and your beliefs about what is true”). As applied to climate change, it represents the ability to feel internal anxiety and concern regarding the issue while persisting in environmentally destructive behavior. *See How Your Brain Stops You from Taking Climate Change Seriously*, NPR (Jan. 7, 2019), <https://www.pbs.org/newshour/science/how-your-brain-stops-you-from-taking-climate-change-seriously> [<https://perma.cc/TNV8-7UT3>]. Rare exceptions to this phenomenon may be individuals such as Greta Thunberg. *See* Jonathan Watts, *Greta Thunberg Sets Sail for New York on Zero-Carbon Yacht*, GUARDIAN (Aug. 14, 2019), <https://>

B. *Constrained Politics*

Meaningful climate action has been stymied by more than just our individual cognitive limitations—such efforts have been systematically undermined for years by the energy sector, particularly in the United States.³⁹ Indeed, residual damage remains from the infamous lobbying campaign by the Global Climate Coalition before the turn of the century, credited for producing much of the domestic resistance to climate policy in the United States today.⁴⁰ Perhaps even more intractable for the struggle toward meaningful policy, however, is the change-resistant natural inertia inherent in the political-economic relationship between incumbent energy firms and government, a relationship further entrenched by active lobbying efforts today.⁴¹

1. The Global Climate Coalition

It is axiomatic that the main reform necessary to combat global warming—namely, a severe reduction in the global emission of greenhouse gases—is diametrically opposed to the current operation and profitability of the fossil fuel industry. Unsurprisingly, the industry has fought tooth and nail to secure its economic health and prospects against growing calls for climate action.⁴² Among these efforts has been the aggressive crusade promulgated by the well-organized, well-funded “Global Climate Coalition,”

www.theguardian.com/environment/2019/aug/14/greta-thunberg-sets-sail-plymouth-climate-us-trump [<https://perma.cc/X5CR-BXQA>] (noting Greta Thunberg’s choice to eschew flying to the United States in lieu of a two-week carbon-neutral boat ride). For most of us, however, cognitive dissonance explains how we can passionately scold our climate-denier grandfathers about the realities of climate change over a steak dinner, or drive a gas guzzling car to a climate rally. See Kate Cohen, *Most of Us Are Hypocrites on Climate Change. Maybe That’s Progress.*, WASH. POST. (Aug. 25, 2019), https://www.washingtonpost.com/opinions/most-of-us-are-hypocrites-on-climate-change-maybe-thats-progress/2019/08/25/21e49b4e-c5cd-11e9-b5e4-54aa56d5b7ce_story.html [<https://perma.cc/CY4R-WBGH>].

³⁹ Shannon Hall, *Exxon Knew About Climate Change Almost 40 Years Ago*, SCI. AM. (Oct. 26, 2015), <https://www.scientificamerican.com/article/exxon-knew-about-climate-change-almost-40-years-ago/> [<https://perma.cc/4KAX-XF9B>].

⁴⁰ See Revkin, *supra* note 12.

⁴¹ Frank W. Geels, *Regime Resistance Against Low-Carbon Transitions: Introducing Politics and Power into the Multi-Level Perspective*, 31 THEORY, CULTURE & SOC’Y, Sept. 2014, at 21, 22, 26–27.

⁴² See Wendy E. Franz, *Science, Skeptics and Non-State Actors in the Greenhouse*, BELFER CTR. FOR SCI. & INT’L AFFS., Sept. 1988, at 13–18.

founded in 1988 by a coalition of over 250,000 firms.⁴³ Before the coalition was disbanded in 2002, it rigorously executed a political lobbying and public relations crusade that involved “(1) raising public concern about unemployment from emission regulations, (2) releasing reports that questioned whether global warming was actually taking place, (3) attending climate negotiation meetings ‘en masse,’ (4) sending a letter ‘signed by 119 of the United States’ most prominent business leaders’ to President Clinton, asking that all current climate proposals be rejected, and (5) insisting that developing countries commit to the same stringent reductions as industrialized nations.”⁴⁴ These coordinated efforts⁴⁵ not only sowed confusion and mistrust surrounding climate change science among the average individual,⁴⁶ but reportedly helped precipitate the decision of the United States, the world’s second largest emitter of CO₂,⁴⁷ to withdraw from the Kyoto Protocol in 2001.⁴⁸

2. Political-Economic Inertia

In addition to decades of confusion and mistrust sown from the fossil fuel industry’s misinformation and delegitimization campaign, climate policy has also been structurally impeded by inertia to change inhering in the relationship between incumbent energy firms and government.⁴⁹ This relationship can be understood as a dependence regime—firms and industries rely on the government to establish property rights, contractual obligations, and general regulation of legal and illegal forms of corporate

⁴³ Donald O. Mayer, *Symposium: Corporate Governance, Stakeholder Accountability, and Sustainable Peace: Corporate Governance in the Cause of Peace: An Environmental Perspective*, 34 VAND. J. TRANSNAT'L L. 585, 612 (2002).

⁴⁴ *Id.* (internal brackets and ellipsis omitted).

⁴⁵ Other efforts included advertising campaigns from trade and union associations such as the American Petroleum Institute and the United Mine Workers of America that warned of general increases in prices that would supposedly result from climate agreements, and stressed the inequity of exempting developing countries from binding commitments. *See id.* at 612–13.

⁴⁶ *See* Franz, *supra* note 42 (reporting fossil fuel coalition’s memo pledging to sow doubt surrounding climate change contained stark quote to the effect that “[v]ictory will be achieved when the average person is uncertain about climate science.”).

⁴⁷ *Each Country’s Share of CO₂ Emissions*, UNION OF CONCERNED SCI. (Aug. 12, 2020), <https://www.ucsusa.org/resources/each-countrys-share-co2-emissions> [<https://perma.cc/F4UB-C676>].

⁴⁸ John Vidal, *Revealed: How Oil Giant Influenced Bush*, GUARDIAN (June 8, 2005), <https://www.theguardian.com/news/2005/jun/08/usnews.climatechange> [<https://perma.cc/DM45-JW8D>].

⁴⁹ Geels, *supra* note 41, at 27–28.

behavior, while governments in capitalist societies are incentivized for industries within their economies to succeed.⁵⁰ Unsurprisingly, this alliance is geared toward maintaining the status quo.⁵¹

As a byproduct of the mutualistic relationship, the fossil fuel sector also enjoys enhanced access to governmental policy, allowing it to actively combat changes that threaten its practices, and even influence the passage of favorable policy.⁵² Indeed, dependency facilitates close contacts and relational networks between industry leaders and policymakers, leading many policymakers to consult energy lobbies about new proposals and to even “internalize the ideas and interests of industries.”⁵³ Firms also independently employ corporate political strategies to secure influence, such as organized pressure, direct lobbying, and confrontation strategies like litigation.⁵⁴

This entrenched relationship, carefully deepened by the fossil fuel industry, is a daunting prospect to climate policy.⁵⁵ Some argue that making environmentalism profitable to the energy sector, or “commoditizing the environment,” is the key to future policy success.⁵⁶ Others exhort that the heart of the infirmity is capitalism itself and that environmental sustainability cannot be achieved in our current market system.⁵⁷ At the very least, it is clear that the fossil fuel industry as it currently operates today can have little to no place in a world economy that is emitting the requisite low levels of greenhouse gases to avoid further global warming.⁵⁸

⁵⁰ *Id.* (“[C]apitalist societies are systematically dependent on economic growth, which implies that a central role of the state is to advance the general interests of capital.” (citation omitted)).

⁵¹ *Id.* at 26.

⁵² *Id.* at 27–28.

⁵³ *Id.* at 27.

⁵⁴ *Id.*

⁵⁵ See, e.g., Alexander C. Kaufman, *Senators Not Backing Green New Deal Received on Average 7 Times as Much Fossil Fuel Cash*, HUFF. POST (Feb. 21, 2019), https://www.huffpost.com/entry/senate-green-new-deal-fossil-fuel-donations_n_5c6dc9b2e4b0e2f4d8a24e83 [<https://perma.cc/JP7A-37C2>].

⁵⁶ CHRISTOPHER WRIGHT & DANIEL NYBERG, CLIMATE CHANGE, CAPITALISM, AND CORPORATIONS: PROCESSES OF CREATIVE SELF-DESTRUCTION 4 (2015) (“[O]ur only hope to stop climate change is for industry to make money from it.” (citation omitted)).

⁵⁷ See, e.g., Jonathan T. Park, *Climate Change and Capitalism*, 14 CONSILIENCE: J. SUSTAINABLE DEV. 189, 189 (2015); see also HANS A. BAER, GLOBAL CAPITALISM AND CLIMATE CHANGE: THE NEED FOR AN ALTERNATIVE WORLD SYSTEM 149 (2012); Phil McDuff, *Ending Climate Change Requires the End of Capitalism. Have We Got the Stomach for It?*, GUARDIAN (Mar. 18, 2019), <https://www.theguardian.com/commentisfree/2019/mar/18/ending-climate-change-end-capitalism> [<https://perma.cc/5F45-7Y8M>].

⁵⁸ See Ståle Holgersen & Rikard Warlenius, *Destroy What Destroys the Planet: Steering*

Thus, a green way forward must find a way to impose sufficient pressure or economic incentives on the energy sector to ensure its “creative destruction,” or, put another way, to force the sector to redesign itself consonant with the surrounding climate exigency.⁵⁹

This Article does not attempt to address the granular economic details of how the domestic or international energy industry would have to adjust on a practical level to still provide its basic, necessary functions without conflicting with carbon limits. Certainly, new green innovation and technology will be a necessary part of that process and many papers do and will continue to grapple with that level of detail.⁶⁰ Rather, this Article is concerned with first laying the groundwork to produce the requisite pressure that has been sorely absent on a national level,⁶¹ and systematically impracticable on an international level.⁶²

C. *The Anarchical International System*

Put simply, our international system is not a hospitable environment for enforceable collective action.⁶³ Since 1648, our world has functioned primarily upon a concept called Westphalian Sovereignty, whereby every country, no matter how big or small, has exclusive sovereignty over its territory.⁶⁴ This concept is even enshrined in the United

Creative Destruction in the Dual Crisis, 40 CAP. & CLASS 511 (2016); see also Geels, *supra* note 41, at 37.

⁵⁹ See Holgersen & Warlenius, *supra* note 58, at 523.

⁶⁰ See, e.g., Xiaodong Lai & Qian Shi, *Green and Low-Carbon Technology Innovations*, in INNOVATION STRATEGIES IN ENVIRONMENTAL SCIENCE 209, 210 (2020); Mario Cervantes et al., *Accelerating the Development and Diffusion of Low-Emissions Innovations*, OECD 5 (2018); Rasi Kunapatarawong & Ester Martínez-Ros, *Towards Green Growth: How Does Green Innovation Affect Employment?*, 45 RSCH. POL'Y 1218 (2016).

⁶¹ Some countries, of course, have been relatively successful in establishing strong domestic climate policies. Switzerland and France, for example, are exalted for green practices within their borders, earning them the top spots on the “Environmental Performance Index” chart. See 2018 EPI, ENV'T. PER. INDEX, SEDAC, <https://sedac.ciesin.columbia.edu/data/set/epi-environmental-performance-index-2018/maps> [<https://perma.cc/BJ3R-PBPL>] (last visited Mar. 10, 2021). However, Switzerland and France combined account for less than two percent of the world's CO₂ emissions, whereas the United States alone accounts for sixteen percent, and China accounts for a whopping twenty-nine percent. See UNION OF CONCERNED SCI., *supra* note 47. To meaningfully address global warming, solutions must subsume China and the United States.

⁶² Weitzman, *supra* note 14, at 2.

⁶³ See *id.*

⁶⁴ Derek Croxton, *The Peace of Westphalia of 1648 and the Origins of Sovereignty*, 21 INT'L HIST. REV. 569, 569–70 (1999).

Nations (“UN”) Charter⁶⁵ and, as a consequence, international treaties or accords bind countries only by their word.⁶⁶ Indeed, absent a world government (or supernational body capable of controlling nations like states control their citizens), all international agreements are *de facto* voluntary, even if they purport to be otherwise, which few do.⁶⁷ While soft consequences may follow a decision to renege—such as international reproach, or even backlash as severe as economic sanctions (assuming other countries can effectively cooperate)—no true coercive power exists to bind countries to the agreements they sign.⁶⁸

While interdependence and international norms temper full “global anarchy,” the upshot of our sovereignty regime is the reality that nations, particularly powerful ones, mainly cooperate only when it suits them and diverge when international goals threaten self-interest.⁶⁹ Yet, while this system has doubtlessly produced deadweight on myriad, potentially avoidable, military, moral, and economic issues, on balance, the world generally continues to deem the trade-off of self-determination to be worth it.⁷⁰ This regime, however, has predictably had ruinous consequences for the functional success of climate accords, where the strain on self-interest is high, and the benefits are uncertain, diluted, and unavoidably collective.⁷¹

⁶⁵ See U.N. Charter, art. 2, para. 4 (“All members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the purposes of the United Nations.”).

⁶⁶ Weitzman, *supra* note 14, at 3–4.

⁶⁷ The 2015 Paris Agreement does include a series of “mandatory” measures for monitoring, verification, and public reporting of countries’ success in meeting emission targets. See Paris Agreement to the United Nations Framework Convention on Climate Change art. 13, Dec. 12, 2015, T.I.A.S. No. 16-1104. However, as discussed *infra*, given the structure of our international system, mandatory never really means mandatory.

⁶⁸ See Weitzman, *supra* note 14, at 561–62.

⁶⁹ See JACK L. GOLDSMITH & ERIC A. POSNER, *THE LIMITS OF INTERNATIONAL LAW* 27–28 (2005).

⁷⁰ Certainly, the European Union offers a counterexample to the general preference toward unfettered sovereignty. However, the United Kingdom’s recent “Brexit” underscores countries’ continuing proclivity toward maintaining control within their own borders. See Graham Gee & Alison L. Young, *Regaining Sovereignty? Brexit, the UK Parliament and the Common Law*, 22 *EURO. PUB. L.* 131 (2016).

⁷¹ See Weitzman, *supra* note 14, at 561; see also John A. Barrett, Jr., *The Global Environment and Free Trade: A Vexing Problem and a Taxing Solution*, 76 *IND. L.J.* 829, 848–49 (2001) (“Furthermore, even those parties interested in negotiating and joining a treaty do so from the perspective of their economic, environmental, and political needs. As a consequence, the compromises that are generally necessary for an effective environmental treaty acceptable to large number of countries often result in a treaty with relatively modest goals, requirements, and obligations.”).

1. The (All but Foregone) Failure of Climate Accords

UN talks on climate change began as early as 1992 at the Rio Earth Summit, producing the United Nations Framework Convention on Climate Change (“UNFCCC”), a nonbinding document that mostly acknowledged the existence of anthropogenic climate change and urged cooperation and frequent meetings between the signatory parties.⁷² Discussions continued for the UNFCCC signatories (or the “Conference of Parties”) in Berlin in 1995, where again, no binding agreement was reached.⁷³ The subsequent Kyoto Protocol, negotiated in December 1997 and entered into force in February 2005, marked the first “legally binding” international accord on climate change.⁷⁴

The Kyoto Protocol divided the world’s countries into two blocs, the high-income, industrialized nations (Annex I) and those countries not in Annex I, consisting of the still industrializing countries.⁷⁵ The Protocol purported to bind the participating Annex I countries to reduce their greenhouse gas emissions by at least five percent below 1990 levels in the commitment period of 2008 to 2012,⁷⁶ while declining to impose any hard commitments on the countries still “undergoing the process of transition to a market economy.”⁷⁷ The success of the Kyoto Protocol rested on the hope that the good-faith compliance of the developed world would spur the developing countries to follow suit while developed nations would continue to increase the robustness of their reduction commitments.⁷⁸

Not only did no such synchronized cooperation ensue, but with the refusal of the United States and Australia to even ratify the agreement, as well as Canada’s subsequent withdrawal, the Kyoto Protocol was all but dead out of the gate.⁷⁹ Even for the still participating members, a majority did not meet their emission targets by 2012.⁸⁰

Subsequent efforts to renegotiate a Kyoto Protocol 2.0 were frustrated in large part by the same concerns that ostensibly animated the

⁷² United Nations Framework Convention on Climate Change, May 9, 1992, S. Treaty Doc. No. 102-38, 1771 U.N.T.S. 107.

⁷³ *UN Climate Talks*, COUNCIL ON FOREIGN RELS., <https://www.cfr.org/timeline/un-climate-talks> [<https://perma.cc/N5RQ-W2CK>] (last visited Mar. 10, 2021).

⁷⁴ Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, 2303 U.N.T.S. 162.

⁷⁵ *See id.*

⁷⁶ *Id.* at art. 3.

⁷⁷ *Id.* at Annex B.

⁷⁸ Weitzman, *supra* note 14, at 561.

⁷⁹ *Id.*

⁸⁰ Christopher Napoli, *Understanding Kyoto’s Failure*, 32 SAIS REV. INT’L AFFS. 183 (2012).

United States and Australia's refusal to participate in the first version—namely, the perceived unfairness of exempting developing countries from similar binding commitments.⁸¹ Indeed, the Conference of Parties failed to reach a binding accord in Copenhagen in 2009, and failed again when the United States opposed a proposal by the European Union in Durban in 2011.⁸² While the Kyoto Protocol was extended until 2020 in wake of these failures, the remaining members accounted for only fifteen percent of global greenhouse gas emissions at the time.⁸³ After another disappointing resolution in Warsaw in 2013, the Conference of Parties finally agreed upon the landmark Paris Agreement in 2015.⁸⁴

Unlike the Kyoto Protocol, the Paris Agreement does not formally distinguish between developed and developing countries in its requirement that countries set, and abide by, emissions reduction goals.⁸⁵ These reduction goals, or “nationally determined contributions,” are voluntarily set by the countries themselves, and are to be collectively reviewed and verified every five years.⁸⁶ While many laud the agreement to be the most significant climate agreement yet (particularly given that its participants account for about ninety-five percent of the world's greenhouse gas emissions), the Paris Agreement suffers from the same fatal flaw as the Kyoto Protocol—namely, the model's failure to cure the free rider problem, or, put differently, the lack of enforceability.⁸⁷

Indeed, imagine, as late Harvard Professor Martin Weitzman counterfactually hypothesized in his paper, if instead of the current regulatory regime, the United States Clean Air Amendments of 1990 had assigned a sulfur dioxide cap-and-trade system for power plants but allowed the power plants “to voluntarily negotiate between themselves their own initial caps on [sulfur dioxide] emissions.”⁸⁸ Further imagine that no penalties followed “either under-ambitious voluntary targets or under-fulfillment of [those] under-ambitious voluntary targets.”⁸⁹ To extend the metaphor even further, now imagine that the second largest powerplant could pull out of even *participating* in the voluntary, nonpunitive counterfactual

⁸¹ Weitzman, *supra* note 14, at 561; *see also UN Climate Talks, supra* note 73.

⁸² *UN Climate Talks, supra* note 73.

⁸³ *Id.*

⁸⁴ *Id.*

⁸⁵ Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12, 2015, T.I.A.S. No. 16-1104.

⁸⁶ *Id.* at art. 4.

⁸⁷ Weitzman, *supra* note 14, at 561–62.

⁸⁸ *See id.* at 562.

⁸⁹ *See id.*

Clean Air Amendments, because, the CEO did not like the “economic burdens the [legislation] imposes.”⁹⁰ Certainly, no one would suggest with a straight face that these amendments were a realistic way to reduce sulfur dioxide emissions in the United States; yet this is essentially the worldwide system set up through the nationally determined contributions in the Paris Agreement.⁹¹

Indeed, in a sobering check-in on the real life Paris Agreement, on November 4, 2019, the Trump Administration, in charge of the world's second largest CO₂ emitter, began its formal withdrawal from the accord, citing disagreement with the “economic burdens” the agreement imposed on the United States.⁹² In Trump's own words, the collective climate agreement, and its supporters, “don't put America first.”⁹³ While many around the world and even some within Trump's own country loudly decried this decision,⁹⁴ the international system, by structure, had no response.⁹⁵

Unfortunately, despite the global community's subsequent efforts in December 2019 to hammer out further details of the Paris Agreement notwithstanding the United States' disappointing withdrawal, the Madrid talks were widely considered a failure.⁹⁶ Attending countries failed to

⁹⁰ Cf. *Statement by President Trump*, *supra* note 13.

⁹¹ See Weitzman, *supra* note 14, at 561–62.

⁹² Rebecca Hersher, *U.S. Formally Begins to Leave the Paris Climate Agreement*, NPR (Nov. 4, 2019), <https://www.npr.org/2019/11/04/773474657/u-s-formally-begins-to-leave-the-paris-climate-agreement> [<https://perma.cc/43KR-GLJK>]; *Statement by President Trump*, *supra* note 13; Umair Irfan, *UN Climate Talks in Madrid Ended Without Resolving Their Toughest Issue*, VOX (Dec. 15, 2019), <https://www.vox.com/2019/12/15/21022674/cop25-madrid-climate-change-greta-thunberg> [<https://perma.cc/D29N-EY7J>].

⁹³ *Statement by President Trump*, *supra* note 13. This kind of rationale directly highlights the tension between the global public good of climate mitigation and domestic economic considerations, underscoring the argument that perhaps climate policy should be isolated and disaggregated from nations' normal legislative operations. See *infra* Section II.C.

⁹⁴ Carbon Brief Staff, *Global Reaction: Trump Pulls US Out of Paris Agreement on Climate Change*, CARBON BR. (June 2, 2017), <https://www.carbonbrief.org/global-reaction-trump-pulls-us-out-paris-agreement-climate-change> [<https://perma.cc/YQV3-HSGZ>].

⁹⁵ That is to say, the international community could not enforce the United States' original commitment to the agreement nor punish the country for reneging, even despite the obvious imperative of securing the cooperation of the high-emission country. Cf. Weitzman, *supra* note 14, at 561–62.

⁹⁶ See, e.g., Kate Dooley, *The Madrid Climate Talks Failed Spectacularly. Here's What Went Down*, CONVERSATION (Dec. 15, 2019), <https://theconversation.com/the-madrid-climate-talks-failed-spectacularly-heres-what-went-down-128921> [<https://perma.cc/5QWV-9EK3>]; Sagatom Saha, *Why U.N. Climate Talks in Madrid Were a Massive Failure*, WORLD POL. REV. (Dec. 19, 2019), <https://www.worldpoliticsreview.com/articles/28424/on-climate-change-un-talks-depends-on-national-politics-most-of-all> [<https://perma.cc/YQV3-HSGZ>]; Irfan, *supra* note 92.

find consensus on several key issues relating to Article 6 of the Paris Agreement, in particular, on a schematic to govern an international carbon market.⁹⁷ Underlying this failure is the longstanding reluctance of wealthier, industrialized countries such as Australia and the United States to commit to larger emissions cuts or open the door to be held liable for climate-related damage.⁹⁸ Indeed, when our international system licenses states to forego collective action at odds with their immediate self-interest, it cannot be not surprising when they do exactly that.⁹⁹

2. The Free Rider Problem

While our international system presents obvious challenges for cooperation, another structural factor (in this case, specific to climate cooperation) frustrating meaningful action is the underlying free rider problem.¹⁰⁰ Climate change mitigation is a non-excludable, non-rival public good.¹⁰¹ This means that it is not possible to exclude a noncompliant country from enjoying the benefits of another nation's contribution to reducing its greenhouse gas output, nor can the public good be depleted by one country's enjoyment of it.¹⁰² To illustrate, if China decides to implement a domestic law severely limiting its greenhouse gas emissions, it cannot exclude, for example, the United States from enjoying the benefits of a safer climate if the United States does not reciprocate with a similar policy.¹⁰³

⁹⁷ Irfan, *supra* note 92.

⁹⁸ *Id.*

⁹⁹ See John W. Head, *Addressing Global Challenges Through Pluralistic Sovereignty: A Critique of State Sovereignty as a Centerpiece of International Law*, 67 U. KAN. L. REV. 727, 784 (2019).

¹⁰⁰ Christian Gollier & Jean Tirole, *Negotiating Effective Institutions Against Climate Change*, ECON. ENERGY & ENV'T. POL'Y 5, 6 (2015) ("The free-rider problem is well-known to generate the 'tragedy of commons', as illustrated by a myriad of case studies in other realms. When herders share a common parcel of land on which their herds graze, overgrazing is a standard outcome, because each herder wants to reap the private benefit of an additional cow without taking account of the fact that what he gains is matched by someone else's loss. Similarly, hunters and fishers do not internalize the social cost of their catches; overhunting and overfishing led to the extinction of species, from the Dodo of the island of Mauritius to the bears of the Pyrenees and of the buffalos of the Great Plains." (citation omitted)).

¹⁰¹ Mary B. Russell, *What's It to You?: The Difficulty of Valuing the Benefits of Climate Change Mitigation and the Need for a Public-Goods Test Under Dormant Commerce Clause Analysis*, 94 IOWA L. REV. 727, 739 (2009).

¹⁰² *Id.*

¹⁰³ See *id.*

Further, countries implementing environmental policies will bear 100% of the cost of the green policy but will in turn only receive say one percent of the benefits (assuming they have about one percent of the world's population and average exposure to climate-related disasters), with the bulk of benefit instead accruing to other countries.¹⁰⁴ As such, it is in any individual country's best interest to not incur the costs associated with climate action and instead just enjoy the benefits of others' sacrifices, or put another way, to "free ride."¹⁰⁵ The end result of such a system, however, is what economists ominously call "a race to the bottom."¹⁰⁶ In the context of climate mitigation, it represents the choice of individual countries to continue their own self-interested utilization of greenhouse gases, in part, because they cannot guarantee that others will abstain even if they do, and so the world grows hotter to the detriment of everyone.¹⁰⁷

The cure to environmental free riding long proposed by economists is the "polluter pays principle."¹⁰⁸ This model ensures that polluting entities internalize the negative externalities inflicted from their actions, thus coalescing the interests of the harmed and the harmer, and in theory, consequently reducing the damaging behavior.¹⁰⁹ In practice, this looks like a tax, for example, on a factory's usage of carbon that is monetarily consonant with the actual damage imposed by the pollution on the surrounding community that the factory would otherwise not have to suffer (the externality).¹¹⁰ This forced internalization ensures that the factory must grapple with the true cost of its actions on its spreadsheets when deciding how much carbon to use going forward.¹¹¹ To this end, a uniform carbon tax or price on all carbon producers globally has been proposed as an attractive solution for reducing global carbon usage.¹¹²

However, for a global carbon tax or price to work, enforceability is imperative.¹¹³ This means that any universal carbon tax imposed upon countries and the companies within their borders going forward *needs* to

¹⁰⁴ See Gollier & Tirole, *supra* note 100.

¹⁰⁵ Russell, *supra* note 101.

¹⁰⁶ *Id.*

¹⁰⁷ *See id.*

¹⁰⁸ Gollier & Tirole, *supra* note 100, at 8.

¹⁰⁹ *See id.*

¹¹⁰ *See id.*

¹¹¹ *See id.*

¹¹² *See, e.g., id.*; Weitzman, *supra* note 14, at 564; *see also* Michael G. Pollitt, *A Global Carbon Market?* (Univ. Cambridge Energy Pol'y Rsch. Grp. Working Paper No. 1608, 2016).

¹¹³ *See* Scott Barrett, *Climate Treaties and the Imperative of Enforcement*, 24 OXFORD REV. ECON. POL'Y 239, 244 (2008).

be binding in a concrete way to be effective.¹¹⁴ Indeed, imagine that our planet is like a public field of grass currently being overgrazed by surrounding farmers who allow their own cows unfettered access in a tragic race to the bottom. Despite everyone's anticipated loss of the shared resource, no individual farmer rationally wants to self-restrain, particularly if he cannot be sure that his neighbor will do the same.¹¹⁵ One solution is for the municipality to impose a uniform tax on farmers who graze more than an individual share in step with the field's grazing capacity, thus discouraging overgrazing.¹¹⁶ However, you can imagine how this solution falls apart when farmers are not *bound* to pay the tax. Like Weitzman's counterfactual on the 1990 Clean Air Amendments, what if the farmers instead just signed an agreement stating they would agree to be taxed for grazing above the safe limit, but at any time could avoid paying the tax by simply withdrawing from the agreement, with impunity.¹¹⁷ Indeed, under that model, my money would not be on the survival of the field.¹¹⁸

One may reasonably argue that a public field of grass, while perhaps a precious resource to the local farmers, is a far cry from the preciousness of our planet, for which there is no alternative or replacement, and thus the actors on *that* issue would surely cooperate to achieve preservation. In theory, that logic is sound. In reality, empirical data makes a fool of that hope.¹¹⁹

II. THE (UNAVOIDABLE) NEED FOR A BINDING MECHANISM

It is not necessarily a foregone conclusion that the achievement of international cooperation requires concrete enforcement. Certainly, coalitions of nations have been relatively successful in voluntarily coordinating

¹¹⁴ *See id.*; *see also* Gollier & Tirole, *supra* note 100, at 14 (“[I]n no other area has voluntary action succeeded as a solution to the problem of undersupply of a public good. In a sense, the pledge-and-review process is similar to an income tax system in which each household would be allowed to freely determine its fiscal contribution.”) (internal quotation marks omitted).

¹¹⁵ David J. C. MacKay et al., *Price Carbon—I Will if You Will*, NATURE INT'L WKLY. J. SCI. (Oct. 12, 2015) (“A strategy of “I will if you will” stabilizes higher levels of cooperation. It is the most robust pattern of cooperation seen in laboratory and field studies of situations open to free-riding.” (citation omitted)).

¹¹⁶ *See id.*

¹¹⁷ *Cf.* Weitzman, *supra* note 14, at 561–62.

¹¹⁸ Yet, again, this is essentially the system we have set to protect our most precious resource—the planet. *See id.*

¹¹⁹ *Emissions Gap Report 2019 Executive Summary*, U.N. ENV'T PROGRAMME 5 (2019), <https://wedocs.unep.org/bitstream/handle/20.500.11822/30798/EGR19ESEN.pdf?sequence=13> [<https://perma.cc/7WZP-7YK9>]. Moreover, the inaction of civilizations like the one that used to inhabit Easter Island warn against too much reliance on human common sense to avoid its own (foreseeable) destruction.

joint endeavors including with peacekeeping,¹²⁰ eliminating diseases,¹²¹ and even environmental treaties.¹²² However, climate change is not like other problems, even global ones. It is singularly the largest collective action problem this world has ever faced.¹²³ Therefore, unlike other treaties, a climate treaty must do three things simultaneously and without exception to have a hope of success: 1) get most if not all countries to participate, with the largest carbon emitters as imperatives; 2) get participants to comply; and 3) do both of these things while requiring that parties *substantially* reduce their greenhouse gas emissions.¹²⁴ It is painfully clear that no climate treaty to date has achieved this.¹²⁵

¹²⁰ Many consider the U.N.'s peacekeeping efforts in Liberia to have been a success. *See, e.g.,* Robert A. Blair, *In Liberia, the U.N. Mission Helped Restore Confidence in the Rule of Law*, WASH. POST (Apr. 30, 2019), <https://www.washingtonpost.com/politics/2019/04/30/liberia-un-mission-helped-restore-confidence-rule-law/> [<https://perma.cc/3BJK-7NZP>]; Dee Maxwell Saah Kemayah, Sr., *The Success of Peacekeeping in Liberia*, MEDIUM (Dec. 6, 2018), <https://medium.com/@UNPeacekeeping/the-success-of-peacekeeping-in-liberia-9efd440d19d> [<https://perma.cc/F7W2-729N>].

¹²¹ *See* Mark L. Goldberg, *The Inside Story of How India Eliminated Polio*, U.N. DISPATCH (Oct. 24, 2018), <https://www.undispatch.com/podcast-the-inside-story-of-how-india-eliminated-polio/> [<https://perma.cc/KGW7-924Y>]; Kenneth Pornillos, *A Polio-Free India Is One of the Biggest Achievements in Global Health*, WORLD BANK (May 29, 2014), <https://www.worldbank.org/en/news/feature/2014/05/29/polio-free-india-biggest-achievements-global-health> [<https://perma.cc/YG9D-UCSL>].

¹²² Generally regarded to be the most effective international environmental accord to date, the Montreal Protocol is credited for facilitating the successful international efforts to eliminate the usage of chlorofluorocarbons in response to the discovery of significant holes in the ozone layer. *See* Mark L. Goldberg, *The Inside Story of How the World Closed the Hole in the Ozone Layer*, U.N. DISPATCH (July 23, 2018), <https://www.undispatch.com/podcast-the-inside-story-of-how-the-world-closed-the-hole-in-the-ozone-layer/> [<https://perma.cc/4PZA-7M89>]; Gillian Nelson, *Montreal Protocol: Successful Ozone and Climate Agreement Turns 30*, IISD (Sept. 19, 2017), <http://sdg.iisd.org/news/montreal-protocol-successful-ozone-and-climate-agreement-turns-30/> [<https://perma.cc/DJ34-ZDYL>]. It is accordingly tempting to believe that the international cooperation achieved in Montreal on an issue arguably also presenting a collective action free rider problem in its own right suggests that climate change is similarly manageable under volitional conditions; but concrete differences (as well as the empirical record) belie this hope. *See, e.g.,* Andrew Long, *Complexity in Global Energy-Environment Governance*, 15 MINN. J.L. SCI. & TECH. 1055, 1060–62 (2014) (arguing that global ozone depletion was “caused by a discrete and identifiable group of actors within developed countries” where technological fixes were readily available, whereas the greenhouse gas reductions necessary to mitigate climate change raised deep equity concerns and required “major changes across a wide economics sectors (such as energy and transportation) without any clear technological means of accomplishing them”); *see also* Barrett, *supra* note 71, at 248–49.

¹²³ Barrett, *supra* note 113, at 240.

¹²⁴ *Id.* at 244.

¹²⁵ *See supra* Part I.

Indeed, for almost three decades, the world has tried and empirically failed to meaningfully address global warming through the negotiation of volitional, altruistic accords.¹²⁶ As of today, the latest accord, the Paris Agreement, has been demonstrably deficient in its task to curtail global greenhouse emissions.¹²⁷ The UN warns that countries must *triple* their nationally determined contributions to be on track for the 2°C goal and increase by *fivefold* to stay under 1.5°C.¹²⁸ If current policies do not change,¹²⁹ the world is projected to, conservatively, heat up 2.8°C to 3°C by the end of the century,¹³⁰ all but certain to bring catastrophic change across the globe.¹³¹ Yet, global momentum has alarmingly been in the direction of *increasing*, not *decreasing* emissions, and those currently responsible for the most greenhouse gas emissions recently demonstrated in Madrid that they are still not prepared to self-impose the requisite cuts anytime soon.¹³²

Once we recognize and agree that the climate emergency cannot go unaddressed, the conclusion follows that a different model entirely is likely required. For the reasons argued below, this Article proposes that a multilateral, market-driven enforcement platform, similar to that used by the World Trade Organization (“WTO”), be utilized for future climate enforcement.

¹²⁶ See *supra* Part I.

¹²⁷ See generally *Emissions Gap Report 2019 Executive Summary*, *supra* note 119.

¹²⁸ See *id.* at 10.

¹²⁹ Right now, the globe’s biggest greenhouse gas emitters’ current policy regimes are all insufficient to meet the goal of staying below 1.5°C global warming. See *Climate Target Update Tracker*, CLIMATE ACTION TRACKER, <https://climateactiontracker.org/> [<https://perma.cc/MX4K-28UT>] (last visited Mar. 10, 2021). The United States and Russia are “critically insufficient,” China and Japan are “highly insufficient,” and Germany and India’s policies are “2°C compatible.” *Id.* Even Norway and Switzerland fall under “insufficient,” meaning that a continuation of their specific policies, while better, is still liable to allow global warming up to 3°C. *Id.*

¹³⁰ Less conservative models indicate an expected 6°C temperature rise if current emissions levels do not change. See U.S. GLOB. CHANGE RSCH. PROGRAM, *supra* note 8, at 32–33.

¹³¹ See *Emissions Gap Report 2019 Executive Summary*, *supra* note 119, at 10. Indeed, consonant with this alarming warning, in December 2019, Australia recorded its hottest day in history. Sahar Esfandiari, *Australia Just Recorded Its Hottest Day in History, Caping a Year of Extreme Temperatures Around the World*, BUS. INSIDER SA (Dec. 18, 2019), <https://www.businessinsider.co.za/extreme-weather-australia-records-hottest-day-in-history-2019-12?r=US&IR=T> [<https://perma.cc/P55T-QZC5>].

¹³² See *supra* note 96; see also Laura M. Lombrana et al., *Climate Fight Takes a Blow with No Deal on Carbon Markets*, BLOOMBERG, <https://www.bloomberg.com/news/articles/2019-12-15/carbon-markets-fail-to-win-backing-at-un-climate-talks> [<https://perma.cc/QPY2-5T7S>] (Dec. 16, 2019); Karl Mathiesen, *How Cop25 Turned Its Back on Climate Action*, CLIMATE HOME NEWS (Dec. 16, 2019), <https://www.climatechangenews.com/2019/12/16/madrid-talks-turned-back-climate-action/> [<https://perma.cc/Y999-K2G6>].

A. *[Controlling] Psychological Headwinds*

As discussed in detail above, humanity is impeded by cognitive limitations on our ability to perceive or make decisions consonant with the severity of global warming.¹³³ Further, our existent habits actually disincline us to fully acknowledge the issue, let alone act upon it; yet, ironically, to some, clarity may be counterproductive as the gargantuan size and attendant collective action problem may leave a subject despondent, rather than energized to act.¹³⁴

Accordingly, climate policies would do well to operate without dependence on individual leaders' consistent prioritization of climate action over short-term gain.¹³⁵ As this Article later proposes, a potential solution is to require only a one-time buy-in from a sovereign country, then operate with built-in safeguards against future shortsighted decisions or changing political whims attending regime change.¹³⁶ In this way, an enforcement platform can act as a backstop to our own cognitive deficiencies, protecting us from our proclivity to ignore, minimize, or soft-pedal the issue.¹³⁷

B. *[Un-]Constrained Politics*

Though the powerful Global Climate Coalition has since been disbanded, it may not come as a surprise that attendees to the 2019 Madrid talks included big oil companies like Shell that pitched hard for carbon

¹³³ See Swim et al., *supra* note 11, at 67.

¹³⁴ See *id.* Though it is axiomatic, it may be worth emphasizing that a frog in a pot of water will boil irrespective of whether he opts to ignore the changes, regardless of how he *feels* about the water temperature rising, and despite his reasonable lack of uncertainty as to how hot the water will actually get. To ground this (imperfect) metaphor: the consequences began the second the stove was turned on (the Industrial Revolution) and our perception of the water or our attitude toward it will not change the fact that the temperature will continually rise until we do something about it. See *How Do We Know?*, *supra* note 3. Whether the flames will get hot enough to actually boil us to death or simply continue to increasingly make our pot less comfortable to be in, that result will occur regardless of our ignorance, denial, or unrealized concern. Put another way, logic dictates that (more) consequences of climate change are certain to come, and the ambiguity of our current prediction models has no bearing on what will actually come to pass. Let us further be sure that a retroactive appeal to our previous lack of certainty once it is too late will find no audience in an unfeeling climate that will continue to respond only to the level of greenhouse gases we emit, and not our feelings on the matter.

¹³⁵ See Swim et al., *supra* note 11, at 65.

¹³⁶ Such as President Trump's decision to retreat from the Paris Agreement. See *Statement by President Trump*, *supra* note 13.

¹³⁷ See *id.*

trading schemes and geoengineering technology that would permit their continual production of fossil fuels.¹³⁸ It may, however, be surprising that the Paris Agreement, which ran sixteen pages, did not once mention the words “fossil fuels,” “coal,” “oil,” or “gas” despite the fact that fossil fuels are responsible for approximately *two-thirds* of global greenhouse gas emissions.¹³⁹ “Unlike the World Health Organization, which bans tobacco lobbyists from [participating] in . . . tobacco cessation efforts, the UNFCCC has no [such corruption protection]” and fossil fuel lobbyists have been involved since the beginning, working hard to make “fossil fuel” a dirty word in discussions.¹⁴⁰ As a result, global climate negotiations have long been pressured to steer clear of addressing fossil fuels directly, thus largely sparing the industry from attention and pressure proportional with its role in the crisis.¹⁴¹ Luckily, that culture has begun to shift in recent years, thanks in large part to the tireless efforts of activists,¹⁴² however, the problem of deep political-economic inertia within individual nations stubbornly remains.¹⁴³

Because both energy corporations and government are incentivized to guard the health of the energy sector, potentially disruptive national climate policies must overcome a deep-seated entrenchment of mutual interests within each individual country.¹⁴⁴ Even farsighted political leaders who may be keen to implement domestic environmental policies are often blocked by members of their own governments who are either unwilling to risk a market shake-up or who may be directly beholden to energy interests.¹⁴⁵ Indeed, it is no secret that the fossil fuel industry exerts significant influence over many governments around the world,

¹³⁸ See Megan Rowling, *Trading Carbon Credits from Nature Sparks Fiery Debate at U.N. Talks*, REUTERS (Dec. 5, 2019), <https://www.reuters.com/article/us-climate-change-accord-carbontrading/trading-carbon-credits-from-nature-sparks-fiery-debate-at-u-n-talks-idUSKBN1Y92TB> [<https://perma.cc/KKQ3-FGMW>].

¹³⁹ Catherine Abreu & Jamie Henn, *Finally Saying the F-words at UN Climate Talks: International Negotiations Have Always Focused on Carbon Emissions, Not the Coal, Oil and Gas That Create Them. That's Changing*, CLIMATE HOME NEWS (Dec. 16, 2019), <https://www.climatechangenews.com/2019/12/16/finally-saying-f-words-un-climate-talks/> [<https://perma.cc/PY5D-8WY3>].

¹⁴⁰ *Id.*

¹⁴¹ *See id.*

¹⁴² *See id.*

¹⁴³ *See* Geels, *supra* note 41, at 27–28.

¹⁴⁴ *See id.*

¹⁴⁵ *See, e.g.*, Kaufman, *supra* note 55. Even policymakers who do not receive a dime from energy interests have natural incentives for industries within their economies to succeed. *See* Geels, *supra* note 41, at 27–28.

particularly in the United States and Australia, making it difficult even for progressive administrations to take the necessary action.¹⁴⁶ This reality reinforces the need for an external binding mechanism on individual governments, in effect, to insulate climate policy from the fossil fuel industry's influence. Without it, the consistency needed for global green policies to be effective would likely suffer defeating interruptions from varying countries' intermittent relapses into corporate capture.¹⁴⁷

Further, given that a sustainable long-term solution to climate change requires (at the very least) radical evolution of the energy sector, it is vital that external pressure be applied on the industry both uncompromisingly and consistently.¹⁴⁸ Otherwise, corporations, which naturally veer toward "business as usual" with an eye on quarterly or short-term profits, will avoid radical transformations in favor of incremental shifts.¹⁴⁹ In other words, if they are not sufficiently pressured to be creatively destroyed (and subsequently rebuilt as truly green),¹⁵⁰ they will continue to "green wash" for the public relations campaigns but fail to address the heart of the issue—namely, their greenhouse gas emissions.¹⁵¹

¹⁴⁶ See Christopher Knaus, *Mining Firms Worked to Kill Off Climate Action in Australia, Says Ex-PM*, GUARDIAN (Oct. 10, 2019), <https://www.theguardian.com/environment/2019/oct/10/mining-firms-worked-kill-off-climate-action-australia-ex-pm-kevin-rudd> [<https://perma.cc/5CXV-C96U>]; Karl Evers-Hillstrom & Raymond Arke, *Fossil Fuel Companies Lobby Congress on Their Own Solutions to Curb Climate Change*, OPEN SECRETS (May 17, 2019), <https://www.opensecrets.org/news/2019/05/fossil-fuel-lobby-congress-on-climate-change/> [<https://perma.cc/C6EJ-CYP3>].

¹⁴⁷ See WRIGHT & NYBERG, *supra* note 56, at 72.

¹⁴⁸ See *id.*

¹⁴⁹ See *id.* (“[C]orporate risk framings remain wedded to ‘business as usual’ scenarios and singularly fail to acknowledge the desperate exigencies of a carbon-constrained world. Precisely the kind of devastating environmental change that is supposedly being anticipated and avoided is thus locked in to an even more terrifying degree.”).

¹⁵⁰ It is worth noting that outside pressure can also come from consumers. Indeed, many corporations have already begun shifting toward greener practices to appease a consumer base growing in consciousness of environmental issues. See David Hodari, *For Business, Climate Change Has Become Real*, WALL ST. J. (Dec. 17, 2019), <https://www.wsj.com/articles/for-business-climate-change-has-become-real-11576630804> [<https://perma.cc/FBA8-C9XS>]. However, complete reliance on public pressure to alter corporate practice is likely misplaced as, while consumers may push hard enough to spur United Airlines' investments in its “Eco-Friendly Skies” program, they are less likely to push toward complete eradication of air travel as they know it, which many rely on, even if that were the soundest way to ensure reduced greenhouse gas emissions. See Swim et al., *supra* note 11, at 66–68. Consumers are in many ways beholden to their habits as corporations are to their spreadsheets. See *id.*

¹⁵¹ See WRIGHT & NYBERG, *supra* note 56, at 36–37; Stanley Reed, *Oil Companies Ponder Climate Change, but Profits Still Rule*, N.Y. TIMES (Oct. 7, 2019), <https://www.nytimes.com/2019/10/07/business/energy-environment/oil-companies-climate-change-profits.html>

However, sufficient pressure *can* beget sufficient change. U.S. companies in the 1990s began the wholesale phase out of ozone-damaging chlorofluorocarbons (“CFCs”) and *bona fide* investment in alternatives after the passage of the 1990 Clean Air Act Amendments which banned almost all CFCs under penalty of law.¹⁵² In fact, the destructive power of CFCs was publicly known as early as the 1970s, yet even after the United States’ piecemeal ban on their specific usage in aerosol products in 1978, U.S. companies continued to expand their production of the inexpensive gas into new profitable products such as refrigerants, computer chip solvents, and foam-blowing agents—until 1990.¹⁵³ Likewise, currently, European companies and investors are being forced to structurally greenify their practices under binding pressure from stricter EU laws and regulations, without much room to appease by “green washing.”¹⁵⁴ It follows that what the world requires is likely a similar application of binding pressure, on a global scale.

C. *[Reimagining] the Anarchical International System*

Perhaps the most compelling mandate for unprecedented concrete climate enforcement is the unchecked free rider problem.¹⁵⁵ Indeed, even if every world leader could consistently rise above his or her own cognitive limits *and* the fossil fuel industry went uncharacteristically silent, each nation would still be faced with individual negative incentives to

[<https://perma.cc/7845-DG4L>] (“Critics say that oil companies are not backing up their talk of concern about climate change with dollars. While companies are making green-energy investments, a much larger proportion of most oil companies’ spending is going into oil and gas projects that produce greenhouse gas emissions.”).

¹⁵² *Ozone Protection Under Title VI of the Clean Air Act*, EPA, <https://www.epa.gov/ozone-layer-protection/ozone-protection-under-title-vi-clean-air-act> [<https://perma.cc/BNG5-L8V7>] (last visited Mar. 10, 2021).

¹⁵³ See Michael Weisskopf, *U.S. to End CFC Production 4 Years Earlier Than Planned*, WALL ST. J. (Feb. 12, 1994), <https://www.washingtonpost.com/archive/politics/1992/02/12/us-to-end-cfc-production-4-years-earlier-than-planned/e9202a0d-3bba-4883-bda0-da3562e332bb/> [<https://perma.cc/JRG8-BCFG>].

¹⁵⁴ See Katy Dartford & Julián López Gómez, *How Companies Across Europe Are Creating Sustainable Products Using No Fossil Fuels*, EURONEWS (May 31, 2019), <https://www.euronews.com/2019/05/27/how-companies-across-europe-are-creating-sustainable-products-using-less-water-and-less-en> [<https://perma.cc/DHK2-M3S4>]; Emre Peker, *What Qualifies as a Green Investment? EU Sets Rules*, WALL ST. J. (Dec. 17, 2019), <https://www.wsj.com/articles/eu-seals-deal-to-create-regulatory-benchmark-for-green-finance-11576595600> [<https://perma.cc/549J-VP4Q>].

¹⁵⁵ See Gollier & Tirole, *supra* note 100, at 12–14.

act;¹⁵⁶ each nation, i.e., would remain individually best served by free riding off of other countries' sacrifices, and not risking the disadvantages or costs themselves.¹⁵⁷

That is not to say that every country will, or even *has* refused to act for the collective good given these parameters. To be sure, certain countries and coalitions have laudably engaged in forms of self-sacrifice,¹⁵⁸ notably, the European Union, through its passage of the recent "European Green New Deal," which outlines an ambitious plan for Europe to achieve carbon neutrality by 2050.¹⁵⁹ Contrary to conventional theories about free riding, this plan has been implemented by the European Union without any reciprocal commitment from other nations.¹⁶⁰

However, the EU only accounts for approximately eight percent of the world's greenhouse gas emissions.¹⁶¹ The actions of this bloc of nations, however encouraging, are mathematically inadequate to alone sufficiently reduce the globe's collective greenhouse gas output.¹⁶² Nations like China, the United States, and India (which together, account for approximately fifty-two percent of the world's emissions) *must* be subsumed in any plan going forward for a solution to be meaningful.¹⁶³

¹⁵⁶ *See id.*

¹⁵⁷ *See id.*

¹⁵⁸ It is not quite accurate to wholesale consider green reforms as a "sacrifice" *per se*; many convincingly argue that green reforms may ultimately be economically beneficial to the countries that employ them. *See, e.g.,* Kate Whiting, *This Is What a Green New Deal for Europe Could Look Like*, WORLD ECON. F. (May 21, 2019), <https://www.weforum.org/agenda/2019/05/this-is-what-a-green-new-deal-for-europe-could-look-like/> [<https://perma.cc/F45G-RG9T>] (suggesting that the European Green New Deal is an improvement on the prior program, the European Fund for Strategic Investments, which since 2015 has "helped almost a million small and medium-sized companies, while creating more than 750,00 jobs, mobilising investments worth almost \$440 billion"). However, given that most markets are still some time away from widescale production of reliable, inexpensive energy alternatives, there is inevitably some significant economic strain on countries that decide to make the transition.

¹⁵⁹ *See* Claudia Kemfert, *Green Deal for Europe: More Climate Protection and Fewer Fossil Fuel Wars*, 54 INTERECONOMICS 353, 353, 355, 357–58 (2019).

¹⁶⁰ *Cf.* Peter Asch & Gary A. Gigliotti, *The Free-Rider Paradox: Theory, Evidence, and Teaching*, 22 J. ECON. EDUC. 33, 33, 35 (1991) (arguing that although the classical economic theory of free riding requires coercion or sanctions to solve, the model fails to account for individual behavior guided by a sense of commitment or morality rather than pure self-interest).

¹⁶¹ *See* UNION OF CONCERNED SCI., *supra* note 47.

¹⁶² *See id.*

¹⁶³ *See id.*

Yet all three of these countries currently have domestic policies demonstrably insufficient to keep the world below the 1.5°C mark,¹⁶⁴ with China and the United States rated as “highly insufficient” and “critically insufficient,” respectively.¹⁶⁵

D. *The Solution*

The solution to a global free rider problem is no different than to a national one—a process which externally aligns the actions of the problematic actor with the interests of the public good.¹⁶⁶ As discussed *supra*, options for achieving this alignment include forcing the internalization of the damaging behavior (in this case, through a uniform carbon price or tax) or employing legislation like the U.S. Clean Air Act that regulates individual behavior by imposing sufficient penalties for non-compliance.¹⁶⁷ We are quite comfortable employing these solutions at the national level—unlike the counterfactual version of the Clean Air Amendments of 1990, the real version actually tightened and expanded enforcement of powerplants’ sulfur emissions levels¹⁶⁸—yet when the problem is conceptualized at an international level, we are paralyzingly reticent to extend that logic. It may be true that the political reality presently renders the notion of concrete climate enforcement unrealistic and fanciful, but if this Article is trying to argue anything, it is that our continuing reliance on the hope that countries’ self-disciplined altruism will, across the board,

¹⁶⁴ Much is being made of the 1.5°C mark. This is because scientists believe that rising above that temperature exponentially increases the risk of hitting feedback loop tipping points. *Special Report Global Warming of 1.5 °C*, *supra* note 7. Truthfully, we may already be beyond a realistic path toward staying below 1.5°C or even 2°C. The fight for climate mitigation does not end, however, if we pass these benchmarks; if anything, it only increases the urgency to limit slips into further, hotter temperatures. For a humanist take on the matter, see Jonathan Franzen, *What If We Stopped Pretending?*, *NEW YORKER* (Sept. 8, 2019), <https://www.newyorker.com/culture/cultural-comment/what-if-we-stopped-pretending> [<https://perma.cc/UT7U-TSRU>].

¹⁶⁵ See CLIMATE ACTION TRACKER, *supra* note 129.

¹⁶⁶ See Gollier & Tirole, *supra* note 100, at 12–13.

¹⁶⁷ Another potential solution is privatization, inapposite here. See Prateek Agarwal, *Free Rider Problem*, *INTELLIGENT ECON.* (May 17, 2018), <https://www.intelligenteconomist.com/free-rider-problem/> [<https://perma.cc/KD24-Y5WH>].

¹⁶⁸ *Clean Air Act (CAA) and Federal Facilities*, EPA, <https://www.epa.gov/enforcement/clean-air-act-caa-and-federal-facilities> [<https://perma.cc/ES23-LPAR>] (last visited Mar. 10, 2021) (stating that, for example, penalty for federal facility noncompliance is a fine up to \$37,500 per day).

realize sufficient climate mitigation is, itself, fanciful.¹⁶⁹ In other words, it's not working. Time to try something new.

III. THE BINDING MECHANISM

It is tempting when considering how to design a system capable of international enforcement to return to a familiar model—namely, a government.¹⁷⁰ Indeed, when contemplating putting an end to any one of the variety of problems plaguing our globe, proposals and ideas for a world government are abundant (alongside equal countervailing critiques).¹⁷¹ However, whatever the merits of a world government, the challenges attending a road toward it are undoubtedly steep and require protracted discussion, with an end goal perhaps ultimately not worth pursuing.¹⁷² For even putting aside concerns of despotism, how would a global sovereign be able to reconcile in any sort of uniform agenda or justice the enormous plurality of differing identities, religions, and cultures that live across the globe?¹⁷³ And, in a sobering return to tyranny concerns, how would this same world government be able to enforce its laws or rulings? A massive world army? The targeted use of drone strikes? Cyber control?

If the path to world government is ever to be walked down, it is not one on which climate change must rely. That is because climate change is not like other world problems, and the procedure to address it does not require the same institutional complexity and sensitivity as would be required for a supernational body to, for example, successfully broker and enforce a peace agreement between the Israelis and Palestinians.

¹⁶⁹ See Russell, *supra* note 101; see also Gollier & Tirole, *supra* note 100, at 13 (“[I]n no other area has voluntary action succeeded as a solution to the problem of undersupply of a public good. In a sense, the pledge-and-review process is similar to an income tax system in which each household would be allowed to freely determine its fiscal contribution.”) (internal quotation marks omitted).

¹⁷⁰ Indeed, a government is a natural entity to impose something like a carbon tax, or pass legislation like the 1990 Amendments to the Clean Air Act.

¹⁷¹ See, e.g., Amin R. Yacoub, *A World Government: A Critical Look into The Present, to Foresee the Future*, 50 N.Y.U. J. INT'L L. & POL. 1443 (2018); Vincent J. Samar, *A Preface to World Government: A Comparison of the Current State of International Governance with the State of Governance that Followed Adaptation of the American Articles of Confederation*, 27 CONN. J. INT'L L. 1 (2011).

¹⁷² See Yacoub, *supra* note 171, at 1465–66.

¹⁷³ To that end, some proposals suggest regional unions centered around more homogenous parts of the globe, such as an African Group or Asia-Pacific Group, rather than one world union. See *id.* at 1463.

Rather, the issue of climate change can and must be properly categorized as completely “other” to the other crises this world has known, even global ones. That is because, climate change, unlike war or human rights violations, does not have winners and losers.¹⁷⁴ It only has losers. Put another way, global warming is an objective threat to every nation and every individual on this planet without exception—it is a zero-sum game, except this time we are all on the same side.¹⁷⁵

Therefore, as an analytical matter, climate change, and by relation, climate policy, should be conceptually detangled from other areas in which we otherwise grant sovereign nations the ability to subjectively self-determine within their borders, such as education or even human rights.¹⁷⁶ Indeed, when contemplating the interplay of self-determination and global governance, climate policy is better conceptualized as a natural carve-out to self-determination, not as a threat to its existence.¹⁷⁷ As all countries independently share the desire for a stable climate (even if they are less consistent about the role they individually want to play in the achievement of this goal), enforced climate mitigation is actually a triumph of self-determination (albeit a paternalistic one), but not its enemy.¹⁷⁸ Even more meta, unless countries intend self-determination to be a suicide pact, enforced climate mitigation actually preserves the very existence of self-determination, as it is difficult to self-determine when you are extinct.¹⁷⁹

A. *The Mechanics of a Climate Enforcement Mechanism*

As a threshold matter, it is important to note that this Article is agnostic as to exactly what type of climate policy or policies may be best

¹⁷⁴ Nor does it require an exercise in subjectivity or cultural sensitivity.

¹⁷⁵ While it is certainly true that some nations will suffer more than others, particularly in the earlier stages of climate transformation, ultimately every nation will feel the impacts of a hotter climate and the consequences of attendant ecosystem collapses. Not to mention every country will suffer the market and refugee consequences of social and political chaos following global food and water shortages. See *Climate Change and Disaster Displacement*, UNHCR, <https://www.unhcr.org/en-us/climate-change-and-disasters.html> [<https://perma.cc/K5PF-28L9>] (last visited Mar. 10, 2021).

¹⁷⁶ U.N. Charter art. 1, para. 2 (“To develop friendly relations among nations based on respect for the principle of equal rights and *self-determination* of peoples, and to take other appropriate measures to strengthen universal peace” (emphasis added)).

¹⁷⁷ Cf. Head, *supra* note 99, at 784 (arguing for a new version of sovereignty that anticipates “a new age in which agriculture is practiced differently and environmental restoration is a fundamental and non-derogable value”).

¹⁷⁸ Cf. *id.*

¹⁷⁹ Allegedly.

suited to achieving the global carbon cuts necessary.¹⁸⁰ For ease, however, this Article will refer to a uniform carbon price as the desirable program in need of enforcement.¹⁸¹

1. The WTO as a Model of (Relative) Success

The enforcement model underlying the WTO, the global organization governing trade, is informative when considering how to fashion an enforceable climate agreement.¹⁸² Unlike many other international agreements which rely on “self-inflicted” punishment, the WTO’s rules are enforced by other nations.¹⁸³ In practice, countries utilize the WTO as an inanimate platform to bring noncompliant nations into compliance with free trade rules, and can be successful in doing this by offering a credible threat of non-self-inflicted punishment—namely, retaliatory trade tariffs.¹⁸⁴ The system largely works because the WTO creates an incentive for countries to comply (the very real threat of non-self-inflicted punishment), while offering reduced trade barriers as a strong incentive for participation and for *continued* participation even after unfavorable verdicts as nonmembers can be legally excluded from the free trade zone.¹⁸⁵

In a way, climate change agreements and WTO agreements already share an important commonality—a universal, desirable incentive for participation: climate mitigation and free trade respectively.¹⁸⁶ However, a country that responds to another country’s climate violation with retaliatory climate violations would likely: 1) have little to no success in positively altering the first country’s behavior, and 2) be descriptively living out the free rider problem to the detriment of the entire goal.¹⁸⁷

¹⁸⁰ Certainly, the best plan may involve a country-specific hybrid of different policies best suited to each country’s unique needs.

¹⁸¹ A currently popular proposal. See Pollitt, *supra* note 112, at 10.

¹⁸² See Barrett, *supra* note 113, at 244.

¹⁸³ See *id.*

¹⁸⁴ For example, in 2002, the EU brought the United States before the WTO for allegedly violating the rules by imposing tariffs on steel imports. The WTO agreed with the EU and permitted it to legally rebalance tariffs against the United States. Shortly before the EU’s carefully chosen package of goods to tariff was imposed, President Bush lifted the tariffs. Barrett, *supra* note 113, at 244.

¹⁸⁵ *Id.*

¹⁸⁶ However, because climate mitigation does not presently have the same immediate, tangible desirability as reduced trade barriers, this Article’s proposal largely remains futuristic and impractical until such time that the visible threat of climate change is so high that its mitigation is valued similarly, if not more, than favorable trading conditions.

¹⁸⁷ See Gollier & Tirole, *supra* note 100.

The challenge therefore is to fashion a similar but practicable credible threat of non-self-inflicted punishment for climate violations.¹⁸⁸

2. The Collateral Model Proposed

Assuming countries remain (perhaps wisely) unwilling to fully submit sovereignty to a world government, how can they effectively ensure that other nations will make and maintain the same costly cuts and transformations? In short, how can sovereign countries guarantee the “I will if you will” principle of free riding?¹⁸⁹ The answer: the most tried and true motivator of all—money.¹⁹⁰

Indeed, if countries do not want to submit actual lawmaking authority to a supernational legislature (which, to be effective, would alarmingly require sufficient force to independently realize its legislative mandates), they can instead grant another more contained means of influencing their own domestic legislatures, and in turn, assure their neighbors’ reciprocal legislative behavior. Much like individuals must relinquish freedom in the state of nature to secure greater freedom,¹⁹¹ this Article proposes a mutual collateral system whereby individual countries issue bonds of sovereign debt,¹⁹² representing a percentage of their annual gross domestic product (“GDP”), to be held as a guarantee of climate compliance.¹⁹³

To be more specific, upon ratifying the hypothetical treaty in question, signatory countries would issue a bond (“Climate Bond”) representing

¹⁸⁸ Indeed, “[t]he essential difference between enforcing a trade agreement and a climate agreement is that trade is a bilateral activity whereas climate-change mitigation is a global public good. Bilateral agreements are easy to enforce; multilateral agreements seeking to supply a global public good are much harder to enforce.” Barrett, *supra* note 113, at 246.

¹⁸⁹ MacKay et al., *supra* note 115 (“A strategy of ‘I will if you will’ stabilizes higher levels of cooperation. It is the most robust pattern of cooperation seen in laboratory and field studies of situations open to free-riding.” (citation omitted)).

¹⁹⁰ See Immanuel Kant, *Toward Perpetual Peace: A Philosophical Sketch*, in TOWARD PERPETUAL PEACE AND OTHER WRITINGS ON POLITICS, PEACE, AND HISTORY 67, 92 (Pauline Kleingeld ed., David L. Colclasure trans., 2006) (1795) (finding that the power of money might be the most reliable tool in uniting nations).

¹⁹¹ See THOMAS HOBBS, LEVIATHAN 1588–1679 (1968).

¹⁹² Cf. Gollier & Tirole, *supra* note 100, at 24 (arguing that “non-compliance with a climate agreement should be treated as committing future administrations and treated as sovereign debt”).

¹⁹³ Given that different countries have differing levels of wealth and budgets, a uniform number has been eschewed in favor of a proportional amount graduated in step with each country’s individual economy.

a portion of their annual GDP, call it three percent,¹⁹⁴ to be held by the treaty's compliance institution as sovereign debt.¹⁹⁵ These Climate Bonds would remain perennially unvested, conditional upon countries' continuing successful compliance with domestic policies consistent with the universal carbon price. Assuming a country never violated the climate treaty, the only money that that country would owe on the bond would be the yearly interest, used to fund the treaty's institutional and administrative costs.¹⁹⁶

Much like the WTO, enforcement of this agreement would consist of individual or coalitions of member countries bringing an allegedly non-compliant country before the judiciary organ of the treaty's platform.¹⁹⁷ The judiciary organ would first determine if the charged country's domestic policies were indeed noncompliant, and if so determined, the offending country's sovereign guarantee would be called in for full payment. At that point, a country would be left with three options: 1) comply with the climate agreement, 2) pay out its sovereign guarantee, or 3) default on its sovereign debt.¹⁹⁸

A country considering violating the universal carbon price would thus face a substantial and credible threat of non-self-inflicted punishment.¹⁹⁹ That country would either have to make good on its sovereign

¹⁹⁴ This number is only a filler estimation for a more precise figure that would have to balance being small enough to not make countries balk at the idea of underwriting but large enough to make the cost of noncompliance more costly than compliance.

¹⁹⁵ To be clear, neither the international institution nor any private banks would be actually purchasing any country's sovereign debt. The bonds would instead be like the funds pledged, for example, from the United States to the International Monetary Fund, except in this case they would only be called in upon violations of the climate treaty. See *The Budgetary Effects of the United States' Participation in the International Monetary Fund*, CONG. BUDGET OFF. (June 16, 2016), <https://www.cbo.gov/publication/51663> [<https://perma.cc/E4TX-YG3H>].

¹⁹⁶ Given that these interest rates would reflect countries' risk profiles—meaning the United States, for example, will pay less than Argentina—it may be worth considering a rebate system to reconcile that difference so that the least financially healthy countries are not paying the most. See *Sovereigns Rating List*, COUNTRYECONOMY.COM, <https://countryeconomy.com/ratings> [<https://perma.cc/6L54-T88Z>] (last visited Mar. 10, 2021).

¹⁹⁷ The judiciary body would be similar to the WTO's with a rotating non-permanent panel. See *WTO Bodies Involved in the Dispute Settlement Process*, WTO, https://www.wto.org/english/tratop_e/dispu_e/dispu_settlement_cbt_e/c3s3p1_e.htm [<https://perma.cc/N85J-5MKH>] (last visited Mar. 10, 2021).

¹⁹⁸ "Political default" is not an entirely foreign concept in international relations. The United States strongly considered declaring Poland in sovereign default "not solely or even principally for financial or economic reasons" during the country's period of martial law in the 1980s. See Kathleen M.H. Wallman, *The Politics of Default: Politically Motivated Sovereign Debt Default and Repudiation*, 20 TEX. INT'L L. J. 475, 476 (1985).

¹⁹⁹ Cf. Barrett, *supra* note 113, at 244.

guarantee by issuing actual debt to pay out the Climate Bond, or else suffer the market consequences of a downgraded sovereign risk rating, including an increased future interest rate.²⁰⁰

In theory, this set-up undercuts the normal political expedience of withdrawing from such an agreement during regime change or under pressure from changing political winds.²⁰¹ Now a president or prime minister considering pulling out of his predecessor's agreement cannot do so without the steep political costs of either incurring immediate and significant debt to honor the Climate Bond or facing the market consequences of downgrading his country's credit rating.²⁰² As such, this structure inverts the typical decision matrix that pushes democracies toward eschewing long-term gain to avoid short-term pain—now there is a very real short-term pain to be suffered if a country foregoes long-term gain.²⁰³

The question begged at this point is, of course, why would any country voluntarily hamstring itself in this way? It is undoubtedly true that this system would mark a significant departure from current international norms for any country, much less a plurality of countries, to volitionally give an international body this much concrete leverage over their individual behavior.²⁰⁴ However, climate change is an unprecedented crisis—indeed, one that threatens our very existence.²⁰⁵ At the

²⁰⁰ See JULIANNE AMS ET AL., CHAPTER 7 SOVEREIGN DEFAULT, IMF 1, 2–3, 22 (2018) (“One channel by which [sovereign] defaults affect market access and borrowing costs are credit rating downgrades. It is well-known that ratings decrease markedly before and after sovereign default events (see, e.g., S&P 2018). Post-default ratings can also remain low for long periods, deterring institutional investors from buying and holding these low-rated bonds.”); see also Guido Sandleris, *The Costs of Sovereign Default: Theory and Empirical Evidence*, ECONOMÍA 1, 13 (2016).

²⁰¹ Cf. *Statement by President Trump*, supra note 13.

²⁰² Which, in turn, increases the interest rate of future sovereign borrowing. See AMS ET AL., supra note 200, at 20.

²⁰³ Thomas Carothers, *Is Democracy the Problem?*, CARNEGIE ENDOWMENT FOR INT'L PEACE (Jan. 16, 2019), <https://carnegieendowment.org/2019/01/16/is-democracy-problem-pub-78137> [<https://perma.cc/YX77-UFWT>] (“To the limited extent they do manage to look to the long term, democratic politicians are averse to imposing near-term pain for long-term gain because of their need to keep voters happy for the next election.”).

²⁰⁴ Cf. Weitzman, supra note 14, at 562.

²⁰⁵ See Timothy M. Lenton et al., *Climate Tipping Points—Too Risky to Bet Against*, NATURE (Nov. 28, 2019), <https://www.nature.com/articles/d41586-019-03595-0> [<https://perma.cc/82TH-VN6R>]; see also DAVID R. GRIFFIN, UNPRECEDENTED: CAN CIVILIZATION SURVIVE THE CO2 CRISIS? (2015). Moreover, public opinion and pressure surrounding global warming is already rapidly changing, getting closer to a social tipping point. Indeed, more articles and news stories are starting to use language such as “crisis,” “emergency,” “apocalypse,” and “catastrophe” to describe the issue. See, e.g., Enrique Dans, *Australia and the Climate*

very least, unchecked climate change will put unparalleled pressure on global food production and water security, promising pervasive economic, political, and social chaos and unrest in its wake (not to mention devastating consequences for plant and animal species other than our own).²⁰⁶ Further,²⁰⁷ unlike other global issues, countries, even powerful ones, are finding themselves increasingly powerless to keep the consequences from spilling into their borders and threatening their citizens.²⁰⁸ Unlike the Syrian refugee crisis or even the ongoing coronavirus pandemic, countries cannot simply declare their borders closed to climate disasters.²⁰⁹ Indeed, as the climate emergency grows and grows with increasingly dire domestic consequences, a collateral model may become more palatable to individual countries for its promise to secure the assured cooperation of other similarly sovereign nations.²¹⁰ Countries may decide that the price of binding their own hands is worth the power to realize the “I will

Apocalypse, FORBES (Jan. 4, 2020), <https://www.forbes.com/sites/enriquedans/2020/01/04/australia-and-the-climate-apocalypse/#2b93d8654722> [<https://perma.cc/CM3W-W94M>]; Laure Fillion, *How 2019 Became the Year When the World Woke Up to the Climate Emergency*, SCI. ALERT (Dec. 29, 2019), <https://www.sciencealert.com/how-2019-became-the-year-when-the-world-woke-up-to-the-climate-emergency> [<https://perma.cc/KJK9-TBUA>]; Paul Krugman, *Apocalypse Becomes the New Normal: We're Already in the Early Stages of Climate Crisis*, N.Y. TIMES (Jan. 2, 2020), <https://www.nytimes.com/2020/01/02/opinion/climate-change-australia.html> [<https://perma.cc/8BWK-CLCY>]; Robin McKie, *Portrait of a Planet on the Verge of Climate Catastrophe*, GUARDIAN (Dec. 2, 2018), <https://www.theguardian.com/environment/2018/dec/02/world-verge-climate-catastrophe> [<https://perma.cc/MSG2-QYUZ>].

²⁰⁶ See Buis, *supra* note 8.

²⁰⁷ Though it seems odd there should be a “further” after accepting climate change undeniably has the very real potential to end our civilization. See Lenton et al., *supra* note 205.

²⁰⁸ Countries may be able to block or mitigate, for example, personal involvement with the Syrian refugee crisis, but climate disasters are another animal entirely. See *Country Responses to the Syrian Refugee Crisis*, CTR. MIGRATION STUD., <http://web.archive.org/web/20210201015209/https://cmsny.org/jmhs-syrian-refugee-crisis/> [<https://perma.cc/8Z4M-F279>] (last visited Mar. 10, 2021). Climate change by nature knows no national borders.

²⁰⁹ See, e.g., *Coronavirus: US and Australia Close Borders to Chinese Arrivals*, BBC (Feb. 1, 2020), <https://www.bbc.com/news/world-51338899> [<https://perma.cc/8HTW-KHG5>].

²¹⁰ In practice, imagine that the United States is halfway through an extremely expensive green restructuring of its infrastructure pursuant to the uniform carbon price when India declares that it intends to repeal or loosen its own domestic implementation of the carbon price to bolster its economy. India must now contend with the very credible threat that the United States, or indeed any member nation, including even Tuvalu, could challenge its anticipated violation and India could stand to outright lose the 3% chunk of GDP (approximately 78 billion dollars), or suffer the consequences of sovereign default. See *India GDP*, TRADING ECON., <https://tradingeconomics.com/india/gdp> [<https://perma.cc/3WNH-A7WK>] (last visited Mar. 10, 2021).

if you will” concept in the collective fight against the climate crisis.²¹¹ In other words, to become powerful, nations must first give up power.²¹²

To guard against (the ironic) possibility of countries now free riding off of others’ commitment to join and enforce this system, member countries could use international carrots and sticks to further motivate membership and ensure that the costs of not joining grow more expensive with each new nation that decides to participate. For example, member countries could institute a free trade zone only available to members, similar to the carbon trading zone the European Union is already considering.²¹³ Or charge nonmembers an exorbitant annual fee or tax to access the free trading bloc, until they agree to comply with the climate treaty and issue a Climate Bond as assurance.²¹⁴ Additionally, if enough powerful nations join, members could coordinate economic sanctions against holdouts or even hold in abeyance nonmembers’ seats in other international bodies, such as the United Nations, until those countries agree to join.²¹⁵

a. Potential Problems

While this proposal faces a tough adaptation path given present political realities, it also presents numerous other potential problems, including:

1. How would the arbiters of compliance be chosen, and how can we ensure their independence?
2. How would the arbiters make decisions in cases where the question of compliance is genuinely unclear or ambiguous?

²¹¹ See MacKay et al., *supra* note 115, at 315–16.

²¹² See HOBBS, *supra* note 191, at 104–05.

²¹³ Ewa Krukowska & Jonathan Stearns, *Trade Rules Emerge as Weapon to Fight Climate Change in Europe*, BLOOMBERG (Oct. 8, 2019), <https://www.bloomberg.com/news/articles/2019-10-08/trade-rules-emerge-as-weapon-to-fight-climate-change-in-europe> [<https://perma.cc/774R-65SE>].

²¹⁴ Another possibility is to assess a substantial “per transaction” tax on all nonmembers in the otherwise free trade zone which would put the most pressure on high carbon emitters like China and the United States given their robust trade activity. See Johannes Friedrich et al., *This Interactive Chart Shows Changes in the World’s Top 10 Emitters*, WORLD RES. INST. (Dec. 10, 2020), <https://www.wri.org/blog/2020/12/interactive-chart-top-emitters> [<https://perma.cc/8A6N-8BMC>].

²¹⁵ It would go without saying as well that, similar to the WTO, only compliant members states would have the right to bring complaints before the panel. See Barrett, *supra* note 113, at 244. Further, receipt of climate aid from multilateral funds could also be conditioned on membership and compliance with the treaty.

3. Would portions of Climate Bonds be called in step with the magnitude of a violation, or would a *bona fide* violation of any size result in a 100% call of a bond?
4. How can we ensure that the enforcement mechanism is not abused or used to control countries on issues other than climate change, such as nuclear proliferation?
5. Is there a concern with centralizing power in the face of climate change's anticipated resource scarcity and the related expected increase in social and political tensions? In other words, if we are already too late to mitigate severe climate transformation, is it better for humanity to adjust in fragmented nations and communities, with less risk of despotism, or is it better to have an insulated system in place capable of enforcing rational decisions for the good of the collective?

These and more are all questions that further research and consideration would have to answer. As always, any cure must be examined for its potential to be worse than the disease. Further, and importantly, this model does not directly address the embedded inequity from the industrialized versus non-industrialized world dimension of the climate problem. Indeed, not only are non-industrialized nations to date objectively less responsible for the damage—past, present, and future—but non-industrialized economies are also descriptively less capable of undergoing radical, necessary market transformations toward renewable energies.²¹⁶ A comprehensive solution to climate change must therefore find a way to reconcile this reality, while still securing the developed world's support.²¹⁷

CONCLUSION

We have less than a decade to limit climate change to 1.5°C—the point at which scientists fear we will trigger potentially irreversible

²¹⁶ U.S. GLOB. CHANGE RSCH. PROGRAM, *supra* note 8, at 11; *see also Unprecedented Impacts of Climate Change Disproportionately Burdening Developing Countries, Delegate Stresses, as Second Committee Concludes General Debate*, U.N. MEETINGS & PRESS COVERAGES (Oct. 8, 2019), <https://www.un.org/press/en/2019/gaef3516.doc.htm> [<https://perma.cc/C7CQ-WXLA>].

²¹⁷ *See* U.S. GLOB. CHANGE RSCH. PROGRAM, *supra* note 8, at 11.

tipping points. Projections reveal that our current efforts, if unchanged, will be resoundingly unequal to this urgent task. The Paris Agreement, whatever its merits, is not working. At the very least, it is not working fast enough. We need a *binding* agreement. And we need it fast.

The irony of this Article's proposal is that its success might depend on climate consequences being so visible and devastating that their very arrival signals that the time frame for significant mitigation has passed. However, as of today, there is still time. Scientific models support the possibility of genuine mitigation, and this Article proposes in earnest a potential solution in the unlikely event that we reach a societal tipping point in time.

Ideas like the one proposed here, however, are not moot if we fail to stay below safe temperature thresholds. Indeed, the imperative to continue to mitigate and adapt to climate change does not disappear once we pass those benchmarks—if anything, aggressive and enforceable action only becomes more vital as the climate emergency continues to worsen and threaten civilization. Given our current trajectory, however, the next author proposing climate solutions may better spend her energy focusing on how to strengthen and maintain stable democracies in unstable times given the inevitable resource and immigration crises that lie ahead if we fail to timely act. Let's hope we don't get that far.