

DOES THE UNITED STATES' WITHDRAWAL FROM THE PARIS AGREEMENT ON CLIMATE CHANGE PASS THE COST-BENEFIT ANALYSIS TEST?

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ABSTRACT

On June 1, 2017, President Donald Trump announced that the United States would withdraw from the Paris Agreement on Climate Change. The United States, the biggest producer of carbon dioxide in history, was actively involved in the negotiation and approval of the Agreement. Most considered the Paris Agreement an overall success, and it was cited as the only effective institutional solution to climate change. According to its legal framework, the U.S.'s nationally determined contribution (NDC) required the country only to continue its trend on reducing carbon emissions. As such, the United States' withdrawal was a contentious topic even between members of the Trump administration. CEOs of major U.S. companies and members of both political parties criticized the decision, so did world leaders. In light of this controversy, this Article assesses the domestic and international costs and benefits of the withdrawal to the United States. The baseline for comparison is the period during which the United States was party to the Agreement, including the benefits accrued. Accordingly, this

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Article focuses on the cost-benefit analysis of the withdrawal itself—not on the existence of the Agreement.

From a theoretical perspective, this Article fills a void in the international environmental law literature, because to date no studies on the cost-benefit analysis of the withdrawal have been published. In addition, it contributes to the environmental law literature because it addresses a contemporary example of a public policy enacted without the normative use of economics, one that disregarded cost-benefit analysis as a methodological tool for maximizing U.S. overall well-being. This research is particularly relevant due to the significant increase of U.S. carbon dioxide emissions in 2018, and the limited improvement in global energy efficiency that year. This Article also advances a trending topic on climate change studies, because it is the first to research the current U.S. litigation on the Paris Agreement specifically. Moreover, it provides unique arguments to be used in future litigation and policy assessments.

This Article is organized as follows: Part I provides an overview of the Paris Agreement and the U.S. withdrawal, establishing foundational concepts to be addressed. Part II presents a cost-benefit analysis of such withdrawal, focusing on the manner in which it was decided, and finds evidence that it was not reasoned. The Article argues that this unreasoned approach increases legal uncertainty, contributing to an increase in litigation. Part III addresses the costs and benefits of the withdrawal based on its substantive terms, i.e., its merits. It assesses the quantitative and qualitative effects of the withdrawal for the United States, and related challenges. Likewise, it considers the international impact of such a withdrawal for the country. Part IV concludes that the U.S. withdrawal does not pass the comprehensive cost-benefit test developed in this Article.

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I. INTRODUCTION

On June 1, 2017, U.S. President Donald Trump announced the country would withdraw from the Paris Agreement on Climate Change.¹ The United States, the largest emitter of carbon dioxide in history,² was actively involved in the negotiation and approval of this Agreement.³ Most consider the Paris Agreement an overall success,⁴ and it is often cited as “perhaps, the only, effective institutional response to climate change.”⁵ According to its legal

¹ Donald J. Trump, President of the U.S., Statement by President Trump on the Paris Climate Accord (June 1, 2017), <https://www.whitehouse.gov/briefings-statements/statement-president-trump-paris-climate-accord/> [https://perma.cc/5D]2-39JD]. For an overview on the Paris Agreement, see Izzet Ari & Ramazan Sari, *Differentiation of Developed and Developing Countries for the Paris Agreement*, 18 ENERGY STRATEGY REV. 175, 181 (2017) (emphasizing the need to develop an international agreement meant to combat climate change that accounts for the differences in carbon emissions between developed and developing countries).

² For historical data since 1850, see Justin Gillis & Nadja Popovich, *The U.S. is the Biggest Carbon Polluter in History. It Just Walked Away From the Paris Climate Deal.*, N.Y. TIMES (June 1, 2017), <https://www.nytimes.com/interactive/2017/06/01/climate/us-biggest-carbon-polluter-in-history-will-it-walk-away-from-the-paris-climate-deal.html> [https://perma.cc/EH32-CGV9]. For data on current emissions and per capita contributions to the Paris Agreement, see Table 2 in Appendix I.

³ Barack Obama, President of the U.S., Statement by the President on the Paris Climate Agreement (Dec. 12, 2015), <https://obamawhitehouse.archives.gov/the-press-office/2015/12/12/us-leadership-and-historic-paris-agreement-combat-climate-change> [https://perma.cc/C5TA-LK98]. President Obama committed the United States to a 26% to 28% reduction of the 2005 levels of GHG emissions by 2025. See *Fact Sheet: U.S. Reports its 2025 Emissions Target to the UNFCCC*, OFF. OF THE PRESS SEC'Y (Mar. 31, 2015), <https://obamawhitehouse.archives.gov/the-press-office/2015/03/31/fact-sheet-us-reports-its-2025-emissions-target-unfccc> [https://perma.cc/4AZW-3AG3].

⁴ See Maria L. Banda, *The Bottom-Up Alternative: The Mitigation Potential of Private Climate Governance After the Paris Agreement*, 42 HARV. ENVTL. L. REV. 325, 327 (2018) (explaining how the Paris Agreement has “energized unprecedented commitments by a wide range of non-State actors, including all levels of government . . . as well as private citizens, companies, and civil society.”). Environmentalists, however, consider the U.S. target modest. See, e.g., Luke Kemp, *Better out than in*, 7 NATURE CLIMATE CHANGE 458, 458 (2017) (describing the U.S.’s target under the Paris Agreement as “inadequate”).

⁵ Mark Cooper, *Governing the Global Climate Commons: The Political Economy of State and Local Action, After the U.S. Flip-Flop on the Paris Agreement*, 118 ENERGY POL'Y 440, 441 (2018).

framework, the U.S. nationally determined contribution (“NDC”)⁶ requires only that the country continue its trend of reducing carbon emissions.⁷ As such, the U.S. withdrawal, which will likely take effect in late 2020,⁸ was a contentious topic even within the Trump administration.⁹ CEOs of major U.S. companies¹⁰ and members of both political parties criticized the decision,¹¹ as did European

⁶ “Each Party shall prepare, communicate and maintain successive nationally determined contributions that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions.” U.N. Framework Convention on Climate Change Conference of Parties, Twenty-First Session, *Adoption of the Paris Agreement*, art. 4(2), U.N. Doc. FCCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015) [hereinafter *Paris Agreement*]. Nationally determined contributions (“NDCs”) are voluntary targets determined by each country. *Id.*

⁷ See Dana Nuccitelli, *Fact Check: China Pledged Bigger Climate Action than the USA; Republican Leaders Wrong*, *GUARDIAN* (Nov. 14, 2014), <https://www.theguardian.com/environment/climate-consensus-97-percent/2014/nov/14/fact-check-china-pledged-bigger-climate-action-republican-leaders-wrong> [https://perma.cc/E9BX-LEPN] (discussing President Barack Obama’s pledge to reduce carbon pollution in 2014—prior to the signing of the Paris Agreement).

⁸ *Paris Agreement*, *supra* note 6, art. 28 (outlining the withdrawal mechanism). The Paris Agreement entered into force on November 4, 2016. *Paris Agreement—Status of the Ratification*, UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (2020), <https://unfccc.int/process/the-paris-agreement/status-of-ratification> [https://perma.cc/RV8R-T8U2]. According to Article 28, the first date for parties to validly withdraw was November 4, 2019. This was the exact date the U.S. confirmed its intent to withdraw. See Lisa Friedman, *Trump Serves Notice to Quit Paris Climate Agreement*, *N.Y. TIMES* (Nov. 4, 2019), <https://www.nytimes.com/2019/11/04/climate/trump-paris-agreement-climate.html> [https://perma.cc/P75U-NKKT].

⁹ Energy Secretary Rick Perry, former National Security Advisor H. R. McMaster, former economic advisor Gary Cohn, and now-departed Secretary of State Rex Tillerson were against the withdrawal. HAROLD HONGJU KOH, *THE TRUMP ADMINISTRATION AND INTERNATIONAL LAW* 53 (2019).

¹⁰ See Richard Luscombe, *Top U.S. Firms Including Walmart and Ford Oppose Trump on Climate Change*, *GUARDIAN* (Dec. 1, 2017), <https://www.theguardian.com/environment/2017/dec/01/trump-climate-change-paris-withdrawal-ford-walmart> [https://perma.cc/U48E-VN7S] (noting the commitment of Walmart, General Motors, Ford, and Mars to sustainability and their disappointment regarding the U.S.’s decision to withdraw from the Paris Agreement).

¹¹ See Philip Rucker & Jenna Johnson, *Trump Announces U.S. Will Exit Paris Climate Deal, Sparking Criticism at Home and Abroad*, *WASH. POST* (June 1, 2017), https://www.washingtonpost.com/politics/trump-to-announce-us-will-exit-paris-climate-deal/2017/06/01/fbcb0196-46da-11e7-bcde-624ad94170ab_story.html [https://perma.cc/L7X8-8AKT] (discussing the “deep divide within the Trump administration over” the withdraw from the Paris Climate Agreement).

leaders.¹² In light of this controversy, the Article assesses the domestic and international costs and benefits of withdrawal for the United States.¹³ The baseline for comparison is the period the United States was party to the Agreement, including benefits accrued.¹⁴ Accordingly, this Article focuses on the cost-benefit analysis of the withdrawal itself—not on the mere existence of the Paris Agreement. The comprehensive cost-benefit analysis developed within the Article demonstrates the U.S. withdrawal is not justified.¹⁵

Scientific consensus correlates climate change with global warming, of which one human-induced cause is the accumulation of greenhouse gases (GHGs) in the atmosphere.¹⁶ A primary goal of

¹² In a joint statement, French President Emmanuel Macron, German Chancellor Angela Merkel, and then-Italian Prime Minister Paolo Gentiloni rebuked President Trump's intention to renegotiate the Paris Agreement, stating: "We deem the momentum generated in Paris in December 2015 irreversible and we firmly believe that the Paris Agreement cannot be renegotiated, since it is a vital instrument for our planet, societies and economies." *Paris Agreement Cannot be Renegotiated*, PERMANENT MISSION OF FR. TO THE UNITED NATIONS IN N.Y. (June 1, 2017), <https://onu.delegfrance.org/Paris-Agreement-cannot-be-renegotiated> [<https://perma.cc/VW9B-7R26>]. Moreover, the other 190 state parties to the Paris Agreement have no incentive to renegotiate the treaty with a "flailing American administration." KOH, *supra* note 9, at 42.

¹³ Cost-benefit analysis is used as a technique to systematically assess the "efficiency impacts" of policies. DAVID L. WEIMER & AIDAN R. VINING, *POLICY ANALYSIS: CONCEPTS AND PRACTICE* 398 (Routledge 6th ed. 2017).

¹⁴ The Agreement entered into force on Nov. 4, 2016. Paris Agreement, *supra* note 6, art. 21(1).

¹⁵ The costs are significant. A recent study on heat-related mortality avoided from lowering current emissions in line with the Paris Agreement found that, with a high degree of confidence and using conservative estimations, the United States would avoid between 70 to 1980 annual heat-related deaths. Y. T. Eunice Lo et al., *Increasing Mitigation Ambition to Meet the Paris Agreement's Temperature Goal Avoids Substantial Heat-Related Mortality in U.S. Cities*, 5 *SCI. ADVANCES* 1, 6-8 (2019). According to the EPA, natural disasters in 2017 (e.g., wildfires, floods, earthquakes, hurricanes, tornadoes, winter storms) caused \$306.2 billion in cumulative damages, making the year the most expensive on record. The report also emphasizes that climate change is expected to increase the frequency and intensity of such events. See ENVIRONMENTAL PROTECTION AGENCY, *PLANNING FOR NATURAL DISASTER DEBRIS* 1 (Apr. 2019), https://www.epa.gov/sites/production/files/2019-05/documents/final_pndd_guidance_0.pdf [<https://perma.cc/3LY9-9X95>].

¹⁶ The majority of the scientific community acknowledges the existence of climate change, and that GHG emissions are a primary cause. See Richard S. J. Tol, *Quantifying the Consensus on Anthropogenic Global Warming in the Literature: A Re-Analysis*, 73 *ENERGY POL'Y* 701 (2014) (discussing the position of various members of the scientific community). See also Richard S. J. Tol, *The Elusive Consensus on Climate Change* 8 (Univ. Sussex Bus. Sch., Working Paper Series No. 0319, 2019) (noting that 97% of scientific studies point to human activity as the most important factor in climate change since 1950).

the United Nations Framework Convention on Climate Change (UNFCCC) is the stabilization of GHG emissions.¹⁷ One aim of the Paris Agreement is to limit the global increase in mean temperature well below 2°C compared to pre-industrial levels.¹⁸ Because the Agreement targets the reduction of GHGs,¹⁹ it was a contentious topic in the United States even before the country announced its intent to withdraw.²⁰ Despite the scientific consensus,²¹ preeminent U.S. politicians remain skeptical about the existence of climate

¹⁷ United Nations Framework Convention on Climate Change, U.N. Doc. FCCC/INFORMAL/84 (May 9, 1992) [hereinafter UNFCCC]. The UNFCCC entered into force on March 21, 1994. *Id.* art. 23. The scientific consensus regarding the existence of climate change and the necessity of mitigation were paramount considerations during UNFCCC negotiations. John Houghton, *Science and International Environmental Policy: The Intergovernmental Panel on Climate Change*, in ENVIRONMENTAL LAW, THE ECONOMY AND SUSTAINABLE DEVELOPMENT 353, 355-57 (Richard Revesz et al. eds., 2001).

¹⁸ "This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by: (a) Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change." Paris Agreement, *supra* note 6, art. 2.

¹⁹ The Paris Agreement, with its goal of reducing GHGs, was negotiated following the legal framework of the UNFCCC "a treaty with 196 state parties to which the Senate gave its advice and consent in 1992." See KOH, *supra* note 9, at 39.

²⁰ Traditionally, coal producers and electric power companies have resisted GHG regulation. For instance, American Electric Power (AEP), then the nation's largest electricity generator and consumer of coal, testified in Congress against regulations. Elisabeth Smick, *U.S. Companies and Greenhouse Gas Regulations*, COUNCIL ON FOREIGN REL. 2 (Sept. 14, 2006), <https://www.cfr.org/backgrounder/us-companies-and-greenhouse-gas-regulations> [<https://perma.cc/7SX8-XHHA>].

²¹ The EPA acknowledges that the combustion of fossil fuels is the "main human activity" that emits carbon dioxide into the atmosphere. See *Overview of Greenhouse Gases*, U.S. ENVTL. PROTECTION AGENCY (Oct. 31, 2018), <https://www.epa.gov/ghgemissions/overview-greenhouse-gases#carbon-dioxide> [<https://perma.cc/GVJ8-S4XG>]. *But see* Craig D. Idso et al., *Climate Science, in CLIMATE CHANGE RECONSIDERED II: FOSSIL FUELS* 107, 109 (Joseph L. Bast & Diane Carol Bast eds., 2019) (highlighting the reasons for disagreements among scientists about the causes of climate change, including bias and lack of causation).

change.²² The U.S. Congress, however, recognizes climate change as a direct threat to national security.²³

In light of this skepticism, a methodological note is required. This research is based on the general law and economics assumption—and a tenet of cost-benefit analysis—that regulation should aim to increase overall well-being rather than economic efficiency.²⁴ In the climate change arena, the former is more suitable. “Unregulated competitive markets can generate seriously excessive amounts of residuals, including pollution, hazardous waste, and other forms of environmental degradation.”²⁵ These market failures justify strong regulatory measures.²⁶ Moreover, climate change is

²² President Trump claimed that global warming was “created by” China to undermine the competitiveness of U.S. manufacturing. Donald J. Trump (@realDonaldTrump), TWITTER (Nov. 6, 2012, 11:15 AM), <https://twitter.com/realDonaldTrump/status/265895292191248385> [<https://perma.cc/7G5Q-5HWK>]. His understanding contradicts the most recent scientific report issued by a panel of experts from thirteen U.S. administrative agencies. See *Climate Science Special Report: Fourth National Climate Assessment*, U.S. GLOBAL CHANGE RESEARCH PROGRAM 35-72 (2018), <https://www.globalchange.gov/nca4> [<https://perma.cc/VC8G-XSEG>] (“[The report] concludes that the evidence of human-caused climate change is overwhelming and continues to strengthen, that the impacts of climate change are intensifying across the country, and that climate-related threats to Americans’ physical, social, and economic well-being are rising.”).

²³ See National Defense Authorization Act For Fiscal Year 2018, Pub. L. No. 115-91, § 335, 131 Stat. 1283, 1358 (2017) (outlining the national security concerns associated with the future effects of climate change). Congress is also concerned with the impact of climate change at localities where U.S. Armed Forces operate, and where strategic implications for future conflict exist. *Id.* (“[C]limate change is a direct threat to the national security of the United States and is impacting stability in areas of the world both where the United States Armed Forces are operating today, and where strategic implications for future conflict exist”). *Id.*

²⁴ See MATTHEW D. ADLER & ERIC A. POSNER, *NEW FOUNDATIONS OF COST-BENEFIT ANALYSIS* 25 (2006) (“[Cost-benefit analysis] is an imperfect but practicable tool by which governmental decision-makers implement the criterion of overall welfare—a criterion that differs from the Kaldor Hicks efficiency in important ways.”). The current consensus is that efficiency is difficult to define. Therefore, the modern foundation of cost-benefit analysis rests upon the maximization of overall well-being, which is one of several criteria mentioned in law and economics literature. For a discussion about Pareto efficiency, Kaldor-Hicks efficiency, and cost-benefit-analysis, see *id.* at 21-23.

²⁵ Richard Stewart, *Economic Incentives for Environmental Protection: Opportunities and Obstacles*, in *ENVIRONMENTAL LAW, THE ECONOMY AND SUSTAINABLE DEVELOPMENT* 171, 172 (Richard L. Revesz et al. eds., 2001).

²⁶ *Id.*

the “quintessential global-scale collective action problem,”²⁷ because it affects those who do not contribute to it, while the benefits of carbon abatement are not restricted to those who pursue it.²⁸ Hence, the involved parties have incentives to free ride.²⁹

Beyond its global scale, climate change is unique because it refers primarily to future events,³⁰ with “implications that require policy coordination and multi-level governance” (national and international levels, specifically).³¹ Two factors contribute to this complexity. First, human behavior discounts the value of long-term challenges in favor of present gains.³² Second, the majority of countries in the developed world are democracies based on electoral cycles that tend to reward short-term considerations.³³ Therefore, it is crucial to enact climate change regulation under international treaties.³⁴

The Paris Agreement, which is aligned with the modern framework on climate governance, reconciles elements of bottom-

²⁷ Daniel C. Esty & Anthony L. I. Moffa, *Why Climate Change Collective Action Has Failed and What Needs to be Done Within and Without the Trade Regime*, 15 J. INT'L ECON. L. 777, 777 (2012). Pollution is the paradigmatic example of the tragedy of the commons, for which coercive laws and taxation are cited as potential solutions. See Garrett Hardin, *The Tragedy of the Commons*, 162 SCI. 1243, 1245-47 (1968) (incentivizing individuals to reduce pollution requires “coercive laws or taxing devices that make it cheaper for the polluter” to not to pollute than pollute). Summarizing the tragedy of the commons, he states: “The rational man finds that his share of the cost of the wastes he discharges into the commons is less than the cost of purifying his wastes before releasing them. Since this is true for everyone, we are locked into a system of ‘fouling our own nest,’ so long as we behave only as independent, rational, free-enterprisers.” *Id.* at 1245.

²⁸ See MICHAEL J. TREBILCOCK, *DEALING WITH LOSERS: THE POLITICAL ECONOMY OF POLICY TRANSITIONS* 120 (2014) (“Because the benefits of carbon abatement cannot be restricted to those who contributed to creating them, all parties have an incentive to freeride.”).

²⁹ *Id.*

³⁰ ANTHONY GIDDENS, *THE POLITICS OF CLIMATE CHANGE* 2 (2ed. 2011).

³¹ Esty & Moffa, *supra* note 27, at 777.

³² See GIDDENS, *supra* note 30, at 2-3 (explaining *future discounting*, or the idea that humans prefer a small reward in the present instead of a large reward in the future). See also Peter C. Fishburn & Ariel Rubinstein, *Time Preference*, 23 INT'L ECON. REV. 677, 677 (1982) (discussing how decisions are affected by time on the “relative desirability of an outcome”).

³³ See GIDDENS, *supra* note 30, at 7 (“In democratic countries, governments come and go. Moreover, in real-life contexts many issues jostle for attention . . .”).

³⁴ See Charles F. Sabel & David G. Victor, *Governing Global Problems Under Uncertainty: Making Bottom-Up Climate Policy Work*, 144 CLIMATIC CHANGE 15, 18 (2017) (arguing that combatting climate change requires widespread collaboration).

top measures, such as NDCs,³⁵ with the joint efforts of member states to reduce carbon emissions (top-down mechanisms).³⁶ According to this Agreement, all countries are obligated to establish a target and to report and evaluate their progress within two years after signing, and every five years after.³⁷ While this Article acknowledges the controversy concerning the legal status of the Paris Agreement under U.S. law,³⁸ it dismisses it because both the Obama and Trump administrations considered it an agreement.³⁹ Under international law, however, the Paris Agreement is a treaty,⁴⁰

³⁵ See Paris Agreement, *supra* note 6, art. 3-4, 6 (codifying the voluntary commitments that parties to the Agreement are making to reduce GHG emissions).

³⁶ These bottom-top measures require countries to establish NDCs with more demanding targets than those set in the past. Each country voluntarily determines its targets, considering their own national priorities, circumstances, and capabilities. Jennifer Morgan et al., *Elements and Ideas for the 2015 Paris Agreement* 12 (World Resources Inst., Working Paper, 2015).

³⁷ Paris Agreement, *supra* note 6, art. 4(2), 4(3), 4(9), 4(11).

³⁸ U.S. domestic law on treaties is complex, because the terminology used in international law and U.S. domestic law differs. Under international law, all written international agreements governed by international law are referred to as "treaties," whereas in U.S. law, only some are labeled as such. According to U.S. law, the President has the power to sign a treaty, but it does not go into effect until it is ratified by two-thirds of the Senate. U.S. CONST. art. 2, § 2. Executive agreements are international agreements concluded by the President under independent constitutional authority in his capacity as commander-in-chief, but these agreements are treaties for international law purposes. See BARRY E. CARTER ET AL., *INTERNATIONAL LAW* 70 (7th ed. 2018).

³⁹ For more information, see Daniel Bodansky, *The Legal Character of the Paris Agreement*, 25 REV. EUR. COMMUNITY & INT'L ENVTL. L. 142 (2016) (examining the ambiguity surrounding whether the Paris Agreement is a legally binding agreement). The Department of State determined the Paris Agreement did not address substantive legal obligations beyond those stated in its parent treaty, the UNFCCC (*supra* note 17), and concluded there was no need to submit it to the Senate. See U.S. DEP'T OF STATE, FOREIGN AFFAIRS MANUAL 711 FAM 723 (2001) (requiring that international agreements receive consent from two-thirds of the Senate).

⁴⁰ Under international law, the Paris Agreement is unequivocally a treaty. See Vienna Convention on the Law of Treaties, art. 2(1)(a), May 23, 1969, 1155 U.N.T.S. 332. The United States signed the Paris Agreement on April 22, 2016, and the treaty entered into force on November 4, 2016. See Paris Agreement, *supra* note 6, art. 21. See, e.g., Bodansky, *supra* note 39, at 142. But cf. Radoslav S. Dimitrov, *The Paris Agreement on Climate Change: Behind Closed Doors*, 16 GLOBAL ENVTL. POL. 1, 3 (2016) (detailing the efforts of the Obama administration in negotiating the Paris Agreement as an executive agreement). For purposes of the cost-benefit analysis developed in this Article, the controversy is not determinative because the United States is legally bound to its provisions under international law, regardless of domestic determinations. The Paris Agreement also determines a three-year minimum period after its entry into force for parties to withdraw. See Paris

and the United States is legally bound until the withdrawal becomes effective.⁴¹ Importantly, cost-benefit analysis theorists have long defended respect for international law.⁴²

From a theoretical perspective, this Article fills a void in the international environmental law literature, because, to-date, few to no studies on the cost-benefit analysis of the withdrawal have been published.⁴³ The framework chosen for this research also contributes to the literature on cost-benefit analysis,⁴⁴ because it addresses a contemporary example of a public policy enacted without the normative use of economics.⁴⁵ This Article builds on the use of cost-benefit analysis to improve the environment,⁴⁶ aiming at

Agreement, *supra* note 6, art. 28. Importantly, “[i]nternational law makes clear that U.S. presidents cannot simply delete prior signatures from treaties.” KOH, *supra* note 9, at 40.

⁴¹ According to the framework established in the Paris Agreement, the U.S. can withdraw after November 4, 2020. See Paris Agreement, *supra* note 6, art. 28.

⁴² See e.g., JACK L. GOLDSMITH & ERIC A. POSNER, *THE LIMITS OF INTERNATIONAL LAW* 185 (2005).

⁴³ According to Westlaw and Google Scholar searches targeting cost-benefit analysis of U.S. withdrawal, as of July 10, 2019, no studies had been published. The only exception is an earlier note focusing on the moral dimension of cost-benefit analysis and related international law principles and contrasting U.S. behavior with India’s engagement. See Carolina Arlota, *Cost & Benefit Analysis of the United States’ Withdrawal from the Paris Agreement*, 1 *GNLU J.L. & ECON.* 45, 52 (2018).

⁴⁴ This topic is timely because the Trump administration is accused of using cost-benefit analysis methodology without scientific criteria. See Antonio M. Bento et al., *Flawed Analyses of U.S. Auto Fuel Economy Standards*, 362 *SCI.* 1119, 1119-21 (2018) (emphasizing fundamental flaws and inconsistencies related to basic economic theory and empirical studies in the proposed rule by the current administration). For more information, see Rena Steinzor, *Cost-Benefit Analysis According to the Trump Administration*, *REG. REV.* (July 23, 2019), <https://www.theregreview.org/2019/07/23/steinzor-cost-benefit-analysis-according-trump-administration/> [<https://perma.cc/NB2U-MWWX>] (arguing that the Trump administration has discredited cost-benefit analysis: “As practiced by the Trump Administration, cost-benefit analysis has become a perversion of a neutral approach to policymaking.”).

⁴⁵ Cost-benefit analysis as a regulatory tool has different meanings, ranging from the normative use of economics to using the criterion of wealth maximization when evaluating a particular policy. See generally RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 402-03 (7th ed. 2007). This Article does not distinguish between cost-benefit analysis and benefit-cost analysis. To understand this distinction, see Richard O. Zerbe Jr., *Is Cost-Benefit Analysis Legal? Three Rules*, 17 *J. POL’Y ANALYSIS & MGMT.* 419, 419-56 (1998) (differentiating benefit-cost analysis). But see Richard O. Zerbe Jr., *The Legal Foundation of Cost-Benefit Analysis*, *U. WASH.* 1, 3 n.2 (2007) (noting the terms are typically used interchangeably).

⁴⁶ See, e.g., RICHARD L. REVESZ & MICHAEL A. LIVERMORE, *RETAKING RATIONALITY: HOW COST-BENEFIT ANALYSIS CAN BETTER PROTECT THE ENVIRONMENT AND OUR HEALTH* (2008).

the maximization of overall well-being.⁴⁷ This research is particularly relevant due to the significant increase in U.S. carbon dioxide emissions in 2018.⁴⁸ The limited improvement in global energy efficiency in 2018, attributed to the static energy policy environment that year, further advances an interest in the U.S. withdrawal.⁴⁹

This Article aims to make two significant contributions. First, the goal of this Article is to evaluate the manner in which the U.S. withdrawal from the Paris Agreement was decided. This procedural account of the cost-benefit analysis illustrates how the Trump administration's decision abruptly departs from reasoned regulatory action. This Article highlights the actions of interest groups, the absence of a scientific advisor, and the lack of sound scientific studies. Because of this unreasoned action and the corresponding legal uncertainty, litigation is likely to increase.⁵⁰ Given this likely increase, the Article reviews current U.S. litigation related to the Paris Agreement. This Article is the first to review current U.S. litigation specifically mentioning the withdrawal of the Paris Agreement by name.⁵¹ The Article argues that the manner in which the administration decided to withdraw contributes to increased legal challenges and related transaction costs. As such, it provides new arguments that might be used for future claims.

Second, this Article focuses on a cost-benefit analysis based on substantive accounts, namely, the merits of the withdrawal itself. It

⁴⁷ "Cost-benefit analysis is best defended as a *welfarist* decision procedure. Cost-benefit analysis is justified as a decision procedure to the extent that it advances overall well-being—that is, the well-being of the public generally, if not necessarily every member of the public—relative to alternative decision procedures, including the null case of doing nothing." ADLER & POSNER, *supra* note 24, at 6. "Public" for purposes of this Article, is the U.S. general population.

⁴⁸ INT'L ENERGY AGENCY, GLOBAL ENERGY & CO2 STATUS REPORT: EMISSIONS 7 (2019).

⁴⁹ *Id.* at 3.

⁵⁰ See ROBERT D. COOTER & THOMAS S. ULEN, LAW AND ECONOMICS 400-04 (6th ed. 2016) (discussing how legal uncertainty is likely to foster litigation and therefore increase transaction costs).

⁵¹ A Google Scholar search having as criteria "Paris Agreement," and "litigation" in April 2020 shows that previous articles focus on the number of lawsuits in the U.S. considering climate litigation, in general. This literature did not control for actual reference to the treaty itself or addressed its withdrawal. See, e.g., Michael Burger & Justin Gundlach, *The Status of Climate Change Litigation a Global Review*, U.N. ENV'T 10-14 (May 2017), <http://columbiaclimatelaw.com/files/2017/05/Burger-Gundlach-2017-05-UN-EnvT-CC-Litigation.pdf> [<https://perma.cc/V8YK-FYES>] (providing an overview of climate change litigation).

examines the challenges in quantifying the withdrawal and confronts its domestic and international costs and reputed benefits. This research demonstrates that the costs are much higher than the arguable benefits, especially due to the disregard of the social cost of carbon. In addition, this Article addresses the role of subnational entities and finds that they are unable to compensate for such a withdrawal. This Article also discusses the loss of a window of opportunity regarding climate action, the potential consequences should the United States be perceived as free riding, and why the withdrawal from the Paris Agreement ultimately jeopardizes the position of the United States as a global leader. Accordingly, this Article contributes to future policy assessments.

This Article is organized as follows: Part I, the section you are currently reading, provides an overview. Part II presents a cost-benefit analysis of the withdrawal, focusing on its procedural terms, i.e., the manner in which it was decided. Part III addresses the costs and benefits of the withdrawal based on its substantive terms, i.e., targeting the merits, assessing the quantitative and qualitative effects of the withdrawal for the country, and the related challenges. Part III also considers the international impact of such a withdrawal, particularly the costs to the United States. Part IV concludes that the U.S. withdrawal from the Paris Agreement does not pass the comprehensive cost-benefit analysis developed in this Article.

II. THE U.S. WITHDRAWAL FROM THE PARIS AGREEMENT IS NOT JUSTIFIED BY COST-BENEFIT ANALYSIS BASED ON ITS PROCEDURAL ACCOUNT

This portion of the Article argues that, based on its procedural account (the manner by which it was decided and implemented), the U.S. withdrawal from the Paris Agreement does not satisfy the cost-benefit analysis. This Article acknowledges that cost-benefit analysis, as a technique, is not mandatory to all administration policies because it carries its own costs.⁵² International treaties are

⁵² At the federal level, cost-benefit analysis is traditionally required for all policies considered *significant regulatory actions*. See Exec. Order No. 12866, 58 Fed. Reg. 51735, § 3 (Sept. 30, 1993) (defining a “significant regulatory action” as one with an annual effect on the economy of \$100 million or more). These rules are subject to the White House Office of Information and Regulatory Affairs (OIRA). This provision is supplemented by Exec. Order No. 13771, 82 Fed. Reg. 9339, § 3

traditionally dismissed due to the foreign affairs exemption.⁵³ Reasoned decision-making, however, is a requisite for any administrative action under the Administrative Procedure Act (APA).⁵⁴ The impact of withdrawal on the U.S. economy is likely to be above the general threshold that triggers cost-benefit analysis.⁵⁵ A cost-benefit analysis was not required when the APA was approved, and it is a relatively new practice.⁵⁶

Procedure matters; in fact, the actual consideration of costs and benefits⁵⁷ is indicative of reasoned administrative action, i.e., that it is justified and not based on arbitrariness. Extrapolating the requirements of reasoned administrative action to processes involving foreign affairs is a logical step. These matters generally demand some level of confidentiality and often entail weighing factors relating to national security, emergencies relating to international crisis, flexibility, and the global impact of U.S. policy

(Jan. 30, 2017) (regarding reducing regulations and controlling regulatory costs). This executive order determines that when an agency considers new regulation it should repeal a minimum of two regulations aiming at offsetting the costs of the proposed regulation.

⁵³ See Exec. Order No. 13563, 76 Fed. Reg. 3821, § 4(a) (Jan. 18, 2011).

⁵⁴ See Administrative Procedure Act, 5 U.S.C. § 706 (authorizing judicial review and compelling the court to set aside actions found to be “arbitrary and capricious, abuse of discretion or otherwise not in accordance with the law”).

⁵⁵ The *threshold* is the annual effect of the policy on the economy, which is \$100 million. See Exec. Order No. 12866, *supra* note 52. The EPA estimates that repealing the Clean Power Plan, which implements the country’s NDCs under the Paris Agreement, could save \$33 billion in compliance costs through 2030. *Fact Sheet for the Proposal to Repeal the Clean Power Plan*, ENVTL. PROTECTION AGENCY (2017), https://www.epa.gov/sites/production/files/2017-10/documents/fs-proposed-repeal-cpp-final_oct10.pdf [<https://perma.cc/PC3V-Y6ZS>]. Withdrawal from the Paris Agreement easily meets this threshold. Section B discusses the deficiencies of the EPA’s analysis of such repeal.

⁵⁶ See Cass R. Sunstein, *Cost-Benefit Analysis and Arbitrariness Review*, 41 HARV. ENVTL. L. REV. 1, 8-9 (2017) (“The APA was enacted in 1946, and cost-benefit analysis became entrenched within the executive branch of the federal government only since the 1980s and perhaps as late as 1993 or even 2011.”).

⁵⁷ See *Michigan v. EPA*, 135 S. Ct. 2699, 2706-08 (2015) (finding that cost is a required consideration for executive agencies). See Sunstein, *supra* 56, at 3 (discussing the rise of the cost-benefit state and the trend of judicial decisions requiring cost considerations as indicative of non-arbitrariness).

choices.⁵⁸ Reasoned analysis fosters uniform criteria for policies.⁵⁹ Deregulation, which involves removing regulations in place in a particular market, needs to be reasoned.⁶⁰ Such reasoning does not need to be exhaustive but should inform the administrative action. Where regulatory norms exist, the administration is required to justify their revocation of the regulations.⁶¹ Assuming that cost-benefit analysis is a neutral check on administrative government initiatives, deregulatory policies should be restricted by cost-benefit analysis in the same manner as regulatory ones.⁶²

Section A discusses the lack of formal consideration of the actual costs and benefits of the withdrawal as indicative of unreasoned administrative action. The absence of a scientific advisor, citations to unsound science, repetitive behavior that undermines scientific evidence on climate change that is likely attributable to lobbying and political factors, and the lack of consideration of alternative policies with less stringent consequences are all notable indicators. Section B addresses the potential consequences of the lack of formal cost-benefit analysis. Specifically, this section reviews the current U.S. litigation on the Paris Agreement, and concludes the withdrawal creates significant uncertainty for all actors, thus increasing the transaction costs.

⁵⁸ See ARTHUR M. SCHLESINGER, JR., *THE IMPERIAL PRESIDENCY*, 282-83 (1973) (criticizing the expansion of presidential powers on traditional arguments of secrecy and superior expertise of the executive and describing how this led to the Vietnam War).

⁵⁹ See REVESZ & LIVERMORE, *supra* note 46, at 13 (“Cost-benefit analysis can be used to ensure that . . . decisions are based on reasoned analysis and not . . . on the unaccountable whim of an official”).

⁶⁰ Cf. Daniel Hemel et al., *How Antonin Scalia’s Ghost Could Block Donald Trump’s Wall*, N.Y. TIMES (Jan. 25, 2017), <https://www.nytimes.com/2017/01/25/opinion/how-antonin-scalias-ghost-could-block-donald-trumps-wall.html> [https://perma.cc/E3X5-DY4E] (quoting Justice Scalia explaining how “[n]o regulation is ‘appropriate’ if it does significantly more harm than good”).

⁶¹ *Id.*

⁶² See Daniel A. Farber, *Regulatory Review in Anti-Regulatory Times*, 94 CHI.-KENT L. REV. 383, 385 (2019) (“If advocates of CBA are right that CBA functions in the administrative state as a neutral check on government initiatives, deregulatory policies should be as much restricted by CBA as regulatory ones.”).

A. Indications that the Administration Disregarded Costs and Benefits

A plethora of evidence indicates that the Trump administration ignored the costs and benefits of withdrawing from the Paris Agreement. At the time of the decision, the Trump administration lacked a director of the Office of Science and Technology Policy,⁶³ which suggests the administration could not have acted in a reasoned manner when deciding to withdraw from the Agreement.⁶⁴ No U.S. president has ever taken so long to fill this administrative post.⁶⁵ Congress understands the need for a science advisor to provide the president with “independent, expert judgment and assistance on policy matters which require accurate assessments of the complex scientific and technological features involved.”⁶⁶ A scientific advisor would have assisted with the technical data, ensuring formal consideration of the costs and benefits of withdrawal.

Further evidence that the withdrawal neglected to weigh the costs and benefits is the lack of sound scientific studies supporting it.⁶⁷ Sound scientific evidence, defined in this Article as one based

⁶³ Commonly known as the science advisor.

⁶⁴ See Neal F. Lane & Michael Riordan, *Trump's Disdain for Science*, N.Y. TIMES (Jan. 4, 2018), <https://www.nytimes.com/2018/01/04/opinion/trump-disdain-science.html> [<https://perma.cc/Z9U2-DDN6>] (“[T]he lack of good science advice has not slowed the president and his administration in their assaults on health and environmental policy and in weighing in on national-security issues involving science and technology. His decision to pull the nation out of the Paris climate agreement is one example.”).

⁶⁵ See Mythili Sampathkumar, *Donald Trump has Not had a Science Advisor for Longer than Any Other President*, INDEPENDENT (July 27, 2018), <https://www.independent.co.uk/news/world/americas/us-politics/white-house-science-advisor-donald-trump-us-climate-change-global-warming-a8467076.html> [<https://perma.cc/LR5B-7PMK>] (noting that, at the time, the highest-ranked administrator associated with science was a thirty-one-year-old with a bachelor's degree in political science). The Senate confirmed the extreme-weather expert Kelvin Droegemeier early this year. Tony Romm & Ben Guarino, *Senate Confirms Trump's Science and Tech Advisor After Lengthy Vacancy*, WASH. POST (Jan. 3, 2019), <https://www.washingtonpost.com/technology/2019/01/03/senate-confirms-trumps-science-tech-adviser-after-lengthy-vacancy/> [<https://perma.cc/7AM8-3Y6J>].

⁶⁶ 42 U.S.C. § 6602 (2020).

⁶⁷ Rachel Becker, *Trump Used Misleading Job Stats to Justify Pulling Out of Paris Climate Agreement*, VERGE (June 1, 2017), <https://www.theverge.com/2017/6/1/15727398/donald-trump-paris-climate-change-agreement-us-pulls-out-million-jobs> [<https://perma.cc/A22V-B34E>].

on the best evidence and science available,⁶⁸ is particularly relevant to climate change matters because it avoids bias. Sound science also fosters a common ground approach in the international arena, incentivizing countries to cooperate to combat climate change. Climate change itself is complex, but scientific knowledge outlining broad principles on the topic is unimpeachable.⁶⁹ Domestically, withdrawing from the Paris Agreement contradicts the findings of the panel of U.S. experts representing federal agencies.⁷⁰

This was not the first time the Trump administration contradicted itself.⁷¹ It consistently engages in practices that are scientifically questionable at the very least;⁷² this includes the elimination of the projected effects of increased carbon dioxide pollution after 2040 in their estimations.⁷³

Cost-benefit analysis enables reasoned decision-making because it clarifies government choices by making them more transparent; this analysis aims to isolate government decisions from the effects of

⁶⁸ PATRICIA PARK, *INTERNATIONAL LAW FOR ENERGY AND THE ENVIRONMENT* 11 (2d ed. 2013).

⁶⁹ See Antony Millner et al., *Ambiguity and Climate Policy* 3 (Nat'l Bureau of Econ. Research, Working Paper No. 16050, 2010) (explaining that broad scientific principles include laws of thermodynamics and "[carbon dioxide] traps outgoing long-wave radiation, causing warming"). The authors also emphasize that detailed empirical predictions based on sophisticated models used to translate such principles into predictions may lead to different forecasts. *Id.*

⁷⁰ U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 22, at 35-72.

⁷¹ The current administration continues to undermine science and climate change regulation. Since 2017, the current administration has attempted to relax or remove most of the environmental regulations implemented during the Obama administration. The withdrawal from the Paris Agreement is one of many of such deregulatory initiatives such as the Clean Water Rule, the Clean Power Plan, and the clean car standards.

⁷² The Obama administration engaged in reasoned decision making when signing the Paris Agreement. See Obama, *supra* note 3. Meanwhile, the Trump administration has been accused of stopping the congressional testimony of a State Department senior official regarding climate science. See Lisa Friedman, *White House Tried to Stop Climate Science Testimony, Documents Show*, N.Y. TIMES (June 8, 2019), <https://www.nytimes.com/2019/06/08/climate/rod-schoonover-testimony.html> [<https://perma.cc/TH8G-U4QU>].

⁷³ The administration likely chose to do so because the effects of global warming will be particularly severe after 2050. Coral Davenport & Mark Landler, *Trump Administration Hardens Its Attack on Climate Science*, N.Y. TIMES (May 27, 2019), <https://www.nytimes.com/2019/05/27/us/politics/trump-climate-science.html> [<https://perma.cc/TEP5-P3D9>]. The authors quote Michael Oppenheimer, a professor of geosciences and international affairs at Princeton, who criticized the administration, saying "[n]obody in the world does climate science like that. It would be like designing cars without seatbelts or airbags." *Id.*

interest groups attempting to advance their agendas.⁷⁴ This is particularly important in the case of climate change, because the main contributors of carbon emissions deny its existence⁷⁵ and lobby to dismiss effective regulation.⁷⁶ In addition, Donald Trump's presidential campaign was financed by substantial contributions from oil tycoons.⁷⁷ The President's views on climate change are reportedly influenced by friends and donors in the oil industry.⁷⁸ This is concerning because relevant experts in the Trump administration were against the withdrawal.⁷⁹ Others would have preferred the administration to remain a party to the Agreement, although they would have liked to see a reduction in U.S. NDCs.⁸⁰ Given that the reasons for withdrawing from the Paris Agreement remain unclear, the transparency that accompanies cost-benefit analysis is particularly necessary.

⁷⁴ See POSNER, *supra* note 45, at 402-03.

⁷⁵ Major polluters in the U.S. are borrowing the tactics perfected by the tobacco industry. This 1998 quote from the American Petroleum Institute illustrates their efforts to discredit scientific knowledge: "Victory will be achieved when . . . average citizens 'understand' (recognize) uncertainties in climate science; recognition of uncertainties becomes part of the 'conventional wisdom' . . . Those promoting the Kyoto treaty on the basis of extant science appear to be out of touch with reality." See CIEL, SMOKE AND FUMES: THE LEGAL AND EVIDENTIARY BASIS FOR HOLDING BIG OIL ACCOUNTABLE FOR THE CLIMATE CRISIS 3 (Nov. 2017), <https://www.ciel.org/wp-content/uploads/2017/11/Smoke-Fumes-FINAL.pdf> [<https://perma.cc/G7D5-UCXY>] (emphasizing the recurring misleading actions of the oil industry across a variety of public and environmental issues).

⁷⁶ *Id.* at 18-20 (noting the actions of then-CEO of ExxonMobil, Rex Tillerson, who later became Secretary of State). See also Jane Mayer, *In the Withdrawal from the Paris Climate Agreement, the Koch Brothers' Campaign Becomes Overt*, NEW YORKER (June 5, 2017), <https://www.newyorker.com/news/news-desk/in-the-withdrawal-from-the-paris-climate-agreement-the-koch-brothers-campaign-becomes-overt> [<https://perma.cc/9QNW-BJWE>] (discussing President Donald Trump's association with the Koch brothers).

⁷⁷ See Mayer, *supra* note 76 (connecting President Donald Trump, Vice-President Mike Pence, and the then-head of the EPA Scott Pruitt to the Koch brothers).

⁷⁸ See Davenport & Landler, *supra* note 73 (discussing the influence of donors like investor Carl Icahn and the oil-and-gas billionaire Harold Hamm—both of whom "pushed Mr. Trump to deregulate the energy industry").

⁷⁹ KOH, *supra* note 9, at 53.

⁸⁰ See Thomas A. Utzinger, *Trump Administration Climate Policy and the Paris Agreement: Mitigating Factors Will Continue Emissions Reductions*, 20 A.B.A. AIR QUALITY COMMITTEE NEWSL. 3, 4 (2017). See also Paris Agreement, *supra* note 6 art. 4(11) (recommending each party increase its NDCs). The treaty does not mandate any specific emissions reductions, but its procedural obligations, such as the transparency framework, are legally binding. See Banda, *supra* note 4, at 331.

As much as one is agnostic, the presidential statement raises concerns that he was actually catering to his political base at the expense of the United States' best interests.⁸¹ Democrats and Republicans are divided on environmental issues.⁸² The former tend to support related policies, whereas the latter often disregard and/or deny climate change.⁸³ This distinct divide between the two parties is unique to U.S. politics.⁸⁴ When addressing the withdrawal, the president presented questionable numbers⁸⁵ and used his campaign slogan, suggesting that political motivations rather than reasoned decision-making were at play.⁸⁶ This indicates

⁸¹ The longest shutdown in United States history, which jeopardized the U.S. economy and inflicted significant damages on thousands of public employees, demonstrates that President Trump will pander to his base at the expense of U.S. residents. See Jim Tankersley, *Shutdown's Economic Damage Starts to Pile Up, Threatening an End to Growth*, N.Y. TIMES (Jan. 15, 2019), <https://www.nytimes.com/2019/01/15/us/politics/government-shutdown-economy.html> [https://perma.cc/6BMA-A3AH].

⁸² This divide has not always been the case. Then-Vice-President George H. W. Bush campaigned as the "environmental" president. Once elected, he introduced the cap-and-trade program that controlled acid rain pollution. See Richard Conniff, *The Political History of Cap and Trade*, SMITHSONIAN MAG. (Aug. 2009), <https://www.smithsonianmag.com/science-nature/the-political-history-of-cap-and-trade-34711212/> [https://perma.cc/7SKM-6JCE]. President Reagan, despite his stance against interventionism, promoted and signed the Montreal Protocol on the Conservation of the Ozone Layer based on cost-benefit analysis. See CASS R. SUNSTEIN, *THE COST-BENEFIT REVOLUTION* 15 (2018).

⁸³ See Matto Mildemberger et al., *The Spatial Distribution of Republican and Democratic Climate Opinions at State and Local Scales*, 145 CLIMATIC CHANGE 539 (2017) (emphasizing how the division is not only along party lines but also along state lines). It is noteworthy that climate change is now tied to health care on Democratic primary voters' deciding factors. See Maggie Astor & Lisa Friedman, *Beto O'Rourke Releases \$5 Trillion Climate Change Proposal*, N.Y. TIMES (Apr. 29, 2019), <https://www.nytimes.com/2019/04/29/us/politics/beto-orourke-climate-change.html> [https://perma.cc/6YYX-HJL7].

⁸⁴ In Europe, conservative parties also recognize the need for climate action, so the success of Green Parties in the 2019 European Parliament elections is striking. See Amy Davidson Sorkin, *Europe's Fragmented Center*, NEW YORKER (June 2, 2019), <https://www.newyorker.com/magazine/2019/06/10/europes-fragmented-center> [https://perma.cc/Y6X9-D9BQ].

⁸⁵ See Jon Greenberg, *Fact-Checking Donald Trump's Statement Withdrawing from the Paris Climate Agreement*, POLITIFACT (June 1, 2017), <https://www.politifact.com/article/2017/jun/01/fact-checking-donald-trumps-statement-withdrawing-/> [https://perma.cc/PN7Z-CQTS] (stating that President Trump relied on a study by NERA Economic Consulting that "makes assumptions that gave several economics and environmental professors pause").

⁸⁶ See Trump, *supra* note 1 ("The Paris Agreement handicaps the United States economy in order to win praise from the very foreign capitalists and global activists that have long sought to gain wealth at our country's expense. They don't put America first. I do, and I always will.").

a decision process based on populist governance as opposed to a rational determination of what is in the best interest of the American people.⁸⁷

Another indicator that the Trump administration neglected cost-benefit analysis as a method to help maximize overall well-being⁸⁸ is the omission of alternative policies.⁸⁹ The president preemptively stated the Paris Agreement was exclusively in the interest of foreign countries, without considering the benefits to the U.S. of remaining party to the treaty.⁹⁰ Under international law, the definition of “treaty” includes mutual benefits,⁹¹ but the Trump administration did not acknowledge so. This is concerning because it departs from previous U.S. policy. In the case of the Paris Agreement, President Obama clearly understood that regulating,⁹² (meaning, in this case, committing to voluntary standards aiming at curbing carbon emissions) has a net benefit.⁹³ Moreover, the more extreme weather events that scientists attribute to climate change, the higher the

⁸⁷ President Trump caused controversy when he stated, “I was elected to represent the citizens of Pittsburgh, not Paris.” See Greenberg, *supra* note 85. President Trump referred to a city that has coal and oil – as opposed to considering the national interest of the United States. *Id.*

⁸⁸ See WEIMER & VINING, *supra* note 13, at 399-434 (concerning the tenets of cost-benefit analysis).

⁸⁹ Trump, *supra* note 1.

⁹⁰ See Trump, *supra* note 1 (“As President, I can put no other consideration before the wellbeing of American citizens. The Paris Climate Accord is simply the latest example of Washington entering into an agreement that disadvantages the United States to the *exclusive* benefit of other countries, leaving American workers – who I love – and taxpayers to absorb the cost in terms of lost jobs, lower wages, shuttered factories, and vastly diminished economic production.” (emphasis added)).

⁹¹ Vienna Convention, *supra* note 40, arts. 2, 26, 27. See PARK, *supra* note 68, at 3 (discussing how the ultimate goal of treaties is the protection of human dignity). For an overview of the literature discussing the normative dimension of international law, see Allen Buchanan & David Golove, *Philosophy of International Law*, in THE OXFORD HANDBOOK OF JURISPRUDENCE AND PHILOSOPHY OF THE LAW 838 (Jules Coleman et al. eds., 2004).

⁹² See Exec. Order No. 13563, *supra* note 52, at § 6 (showing that President Obama embraced cost-benefit analysis and issued executive orders requesting regulatory impact analyses (RIAs), including the requirement that agencies must consider their previous estimations in RIAs and assess these in light of the actual consequences of a particular action).

⁹³ See Barack Obama, *The Irreversible Momentum of Clean Energy*, SCI. 126-29 (Jan. 13, 2017), <https://science.sciencemag.org/content/sci/355/6321/126.full.pdf> [<https://perma.cc/27TX-23WS>] (arguing the Paris Agreement is not a partisan issue, as it fosters the U.S.'s low emissions economy and renewable energy industry, thereby maintaining U.S.'s economic competitiveness while enhancing the country's climate security).

pressure for governmental regulation⁹⁴—not deregulation. Hence, scrutiny concerning the withdrawal (as a deregulatory policy) increases.

Non-modification of the status quo was not considered, as the Trump administration never weighed the benefits of remaining in the Paris Agreement or the dangerous consequences of the withdrawal.⁹⁵ Neither was a reduction in U.S. NDCs considered as an alternative.⁹⁶ The administration made no determination of whose costs and benefits count, compiled no catalogue of predicted effects and future alterations, performed no calculation of present values of net benefits, and offered no related recommendations⁹⁷—not even regarding the potential costs of increased pollution after the withdrawal.⁹⁸ It is worth mentioning that had the U.S. not complied with the stipulated targets, no international sanctions would have been imposed—the country would not have been penalized.⁹⁹

B. Consequences of Disregarding Procedural Cost-Benefit Analysis

By neglecting to consider alternative policies that would result in less dire consequences both domestically and internationally, and instead withdrawing from the Paris Agreement completely, the Trump administration caused significant legal uncertainty in both spheres.

After *Trail Smelter* in 1941, countries are obligated to refrain from causing transboundary harm.¹⁰⁰ This prohibition, as well as the

⁹⁴ See Michael B. Gerrard, *United States Climate Change Law*, in THE OXFORD HANDBOOK OF INTERNATIONAL CLIMATE CHANGE LAW 631 (Cinnamon P. Carlarne et al. eds., 2016).

⁹⁵ The Obama administration engaged in reasoned decision-making when joining the Paris Agreement, because the President justified the net benefits of joining the Agreement, including job creation in renewable energy. See Obama, *supra* note 3.

⁹⁶ Paris Agreement, *supra* note 6, art. 4(11) (recommending that each party to the agreement increase its NDCs).

⁹⁷ WEIMER & VINING, *supra* note 13, at 404. For details on cost-benefit analysis, see also OFF. OF MGMT. & BUDGET, CIRCULAR A-4 ON REGULATORY ANALYSIS (2003).

⁹⁸ Trump, *supra* note 1.

⁹⁹ Nuccitelli, *supra* note 7.

¹⁰⁰ The Trail Smelter Arbitration (1941) involved a Canadian smelter that produced fumes that caused damages to Washington State. The tribunal ruled that

duty to compensate (the “polluter pays” principle),¹⁰¹ means that state responsibility is a double-edged sword, and the international regime both assumes harm will occur and encourages preventing that harm.¹⁰² More recently, the 1972 Stockholm Declaration and the 1992 Rio Declaration also obligate countries not to cause transboundary harm, although the obligation is not absolute.¹⁰³ However, countries are required to undertake due diligence¹⁰⁴ and, perhaps most importantly, the obligation has become part of customary international law.¹⁰⁵ Moreover, in the domestic sphere, if the EPA has reason to believe that any air pollutants emitted in the United States “cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare in a foreign country,” the agency must act.¹⁰⁶ These two factors strongly suggest the U.S. withdrawal is not justified under a cost-benefit analysis based on the procedural account, because withdrawal may subject the country to international scrutiny and potential liability for climate harm, while increasing uncertainty about applicable laws.

Analysis of such uncertainty is relevant because the current administration’s deregulation efforts have been met with an

the activity of the smelter needed to be reduced and regulated in accordance with the regime determined in the award. *Trail Smelter Arbitration (U.S. v. Canada)*, Arbitral Trib., 3 U.N. REP. INT’L ARB. AWARDS 1905 (1941) http://legal.un.org/riaa/cases/vol_III/1905-1982.pdf [<https://perma.cc/UZZ2-C7R8>]. In addition to the duty to prevent transboundary harm, *Trail Smelter* determined that, under the “polluter pays” principle, the polluting state must compensate for the transboundary harm it caused. See Rebecca M. Bratspies & Russel A. Miller, *Transboundary Harm in International Law*, in *TRANSBOUNDARY HARM IN INTERNATIONAL LAW: LESSONS FROM THE TRAIL SMELTER ARBITRATION 3* (Rebecca M. Bratspies & Russel A. Miller eds., 2006).

¹⁰¹ *Trail Smelter Arbitration*, *supra* note 100. See also Bratspies & Miller, *supra* note 100, at 4 (emphasizing the modern declaration of state responsibility for transboundary harm, while criticizing the narrowness of the decision, because the defendant was held liable only if the resulting harm was of “serious economic consequence”).

¹⁰² Bratspies & Miller, *supra* note 100, at 9.

¹⁰³ Declaration of the United Nations Conference on the Human Env’t, princ. 22, U.N. Doc. A/Conf.48/14/Rev.1 (1972); Rep. of the United Nations Conference on Env’t and Dev., Rio Declaration on Environment and Development, princ. 2, U.N. Doc. A/Conf.151/5/Rev.1 (1992).

¹⁰⁴ Jesse L. Reynolds, *International Law*, in *CLIMATE ENGINEERING AND THE LAW* 116 (Michael B. Gerrard & Tracy Hester eds., 2018).

¹⁰⁵ Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. Rep. 226 (July 8), <https://www.icj-cij.org/files/case-related/95/095-19960708-ADV-01-00-EN.pdf> [<https://perma.cc/8VCW-B2KQ>].

¹⁰⁶ 42 U.S.C. § 7415 (2020).

unprecedented low success rate in domestic courts.¹⁰⁷ Research on deregulation efforts related to the environment and public health shows the Trump administration has suffered significant and recurrent losses in court since the inauguration.¹⁰⁸ The Trump administration intends to repeal the Clean Power Plan,¹⁰⁹ which is crucial to achieve the U.S. NDCs.¹¹⁰ The EPA claims the repeal will save \$33 billion in avoided compliance costs through 2030.¹¹¹ As this calculation is disputed, litigation ensued.¹¹² Other recent changes relating to cost-benefit analysis in general are also dubious.¹¹³ Such changes are particularly concerning because the Clean Power Plan

¹⁰⁷ See Anna M. Phillips, *In California vs. Trump, the State is Winning Nearly All its Environmental Cases*, L.A. TIMES (May 7, 2019), <https://www.latimes.com/politics/la-na-pol-california-trump-environmental-lawsuits-20190507-story.html> [<https://perma.cc/TN4N-Z2CV>] (“Legal experts said they couldn’t recall agencies under any recent president having such a low success rate in court.”).

¹⁰⁸ See *Roundup: Trump-Era Agency Policy in the Courts*, INST. FOR POL’Y INTEGRITY (last visited Apr. 24, 2020), <https://policyintegrity.org/deregulation-roundup> [<https://perma.cc/QXP5-ZU2T>] (tracking the outcome of litigation involving the Trump administration’s deregulation efforts).

¹⁰⁹ *Electric Utility Generating Units: Repealing the Clean Power Plan: Proposal*, ENVTL. PROTECTION AGENCY (2017), <https://www.epa.gov/stationary-sources-air-pollution/electric-utility-generating-units-repealing-clean-power-plan-0> [<https://perma.cc/F7EF-AE33>].

¹¹⁰ See Anna McGinn, *Understanding the Paris Agreement*, SCHOLARS STRATEGY NETWORK (Apr. 12, 2019), <https://scholars.org/contribution/understanding-paris-agreement> [<https://perma.cc/V6KA-8V8G>] (explaining that the NDCs contributions of the U.S. were based almost entirely on the Clean Power Plan).

¹¹¹ *Fact Sheet for the Proposal to Repeal the Clean Power Plan*, *supra* note 55.

¹¹² See Stuart Shapiro, *A Recipe for Improving Regulatory Analysis*, REG. REV. (Feb. 28, 2018), <https://www.theregreview.org/2018/02/28/shapiro-improving-regulatory-analysis/> [<https://perma.cc/8W94-CYJX>] (explaining that, under the Trump administration, regulatory agencies have been criticized for their use of “shoddy analysis” and for concealing the regulatory process from the public).

¹¹³ The EPA’s fact sheet acknowledges other changes that differ from the Obama administration: No longer are domestic costs compared to domestic benefits, nor is energy efficiency viewed as a benefit but rather as an avoided cost showing “the true magnitude of the Clean Power Plant’s costs.” See *Fact Sheet for the Proposal to Repeal the Clean Power Plan*, *supra* note 55. See also *Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide*, NAT’L ACADS. SCI., ENGINEERING, & MED. 51 (2017) (disputing the administration’s focus on domestic contributions instead of considering the global impact of emissions and climate change); SUNSTEIN, *supra* note 82, at 159 (contending the change from global to domestic emissions is unjustified as “the height of arbitrariness”).

is an example of how stable regulation fosters voluntary climate action.¹¹⁴

In such context, litigation over Trump administration policies on climate change has increased,¹¹⁵ also following international strategies. Globally, when seeking redress from damages arising from climate change, plaintiffs focused on private parties, such as corporations.¹¹⁶ Recently, the lawsuits expanded to include governments,¹¹⁷ with citizens and non-governmental organizations basing their claims on international treaties.¹¹⁸ Therefore, it is

¹¹⁴ See Lily Hsueh, *Credible and Stable Regulation Encourages Voluntary Climate Action*, REG. REV. (Sept. 19, 2018), <https://www.theregreview.org/2018/09/19/hsueh-credible-stable-regulation-voluntary-climate-action/> [<https://perma.cc/2BLV-9M2L>] (arguing that under the Clean Power Plan, companies increased transparency regarding their carbon emissions).

¹¹⁵ For a comprehensive study on environmental litigation during the first year of the Trump presidency, see Dena P. Adler, *U.S. Climate Change Litigation in the Age of Trump: Year One*, COLUM. L. SCH.: SABIN CTR. FOR CLIMATE CHANGE L. (2018), <http://columbiacimatelaw.com/files/2018/02/Adler-2018-02-U.S.-Climate-Change-Litigation-in-the-Age-of-Trump-Year-One.pdf> [<https://perma.cc/A4AP-YKJA>]. See also Dena P. Adler, *U.S. Climate Change Litigation in the Age of Trump: Year Two*, COLUM. L. SCH.: SABIN CTR. FOR CLIMATE CHANGE L. 16-21 (2019), <http://columbiacimatelaw.com/files/2019/06/Adler-2019-06-US-Climate-Change-Litigation-in-Age-of-Trump-Year-2-Report.pdf> [<https://perma.cc/R4SQ-4XG6>] (emphasizing how certain climate litigation actually supports the administration's deregulatory policies, despite the government not having won a case).

¹¹⁶ Geetanjali Ganguly et al., *If at First You Don't Succeed: Suing Corporations for Climate Change*, 38 OXFORD J. LEGAL STUD. 841, 846 (2018).

¹¹⁷ Environmentalists are pursuing a strategy known as *litigate-to-mitigate*, believing judges are "less likely than politicians to be influenced by oil, coal, and gas companies". See Jonathan Watts, *'We Should Be on the Offensive'—James Hansen Calls for Wave of Climate Lawsuits*, GUARDIAN (Nov. 17, 2017), <https://www.theguardian.com/environment/2017/nov/17/we-should-be-on-the-offensive-james-hansen-calls-for-wave-of-climate-lawsuits> [<https://perma.cc/GS9Y-2CSM>]. In the United States, twenty-one environmentalists who are too young to vote, calling themselves guardians of future generations, filed suit seeking declaratory and injunctive relief against the U.S. president and several executive agencies. The plaintiffs claim, *inter alia*, that GHG emissions from carbon dioxide—produced by burning fossil fuels—jeopardize the environment, violating their due process and that the defendants "violated their obligation to hold certain natural resources in trust for the people and for future generations." See *Juliana v. United States*, 217 F.Supp.3d 1224, 1233 (D. Or. 2016).

¹¹⁸ The case often referenced is *Urgenda Found. v. Kingdom of Netherlands* (2015), in which the plaintiffs argued the Dutch government's then-recently enacted reduction of GHG emissions was insufficient to achieve the country's contribution to the Paris Agreement goals. See Burger & Gundlach, *supra* note 51, at 15 (providing a discussion of the case).

unsurprising that plaintiffs have initiated litigation specifically related to the Paris Agreement.¹¹⁹ A Hawaiian Supreme Court decision mentions the Paris Agreement in the context of advancing environmental protections.¹²⁰ Another decision invokes the Agreement to dismiss claims that a single polluter could not affect GHG emissions.¹²¹ Other courts are less sympathetic.¹²² The only case that refers to the U.S. withdrawal from the Agreement does so incidentally and dismisses a removal based on a federal question.¹²³

However, as an updated communication concerning the U.S. intent to withdraw was issued in November 2019, related litigation involving presidential limits to unilaterally withdraw may follow.¹²⁴ Although the U.S. president has significant authority regarding foreign affairs (and related political-question doctrine),¹²⁵ he must comply with legal requirements.¹²⁶ Commentators argue that President Trump's decision to withdraw from NAFTA should be barred due to congressional authority to regulate commerce under

¹¹⁹ The Westlaw database was used to search "Paris Agreement" in federal and state courts. With false positives removed, as of July 10, 2019, only four cases actually referred to the Agreement.

¹²⁰ *In re. Haw. Elec. Light Co.*, 445 P.3d 673, 695 n.21 (Haw. 2019).

¹²¹ *See Cleveland Nat'l Forest Found. v. San Diego Ass'n of Gov'ts*, 397 P.3d 989, 1000 (Cal. 2018) ("The fact that a regional plan's contribution to reducing greenhouse gas emissions is likely to be small on a statewide level is not necessarily a basis for concluding that its impact will be insignificant in the context of a statewide goal.").

¹²² *See Western Org. of Res. v. U.S. Bureau of Land Mgmt.*, CV 16-21-GF-BMM, 2018 WL 1456624, at *14 (D. Mont. Mar. 23, 2018) (dismissing the plaintiffs' claims that the social cost of the carbon and global carbon budget – both based on the Paris Agreement – should be used in a NEPA cost-benefit analysis, the court held that the plaintiffs had no case).

¹²³ *Mayor of Baltimore v. BP P.L.C.*, 388 F.Supp.3d 538, 550, 559 (D. Md. 2019).

¹²⁴ KOH, *supra* note 9, at 50 (explaining that this might be a possibility because the withdrawal can only be effective after three years of entry into force of the Paris Agreement). The text of the Agreement only determines when the actual withdrawal can take effect but does not explicitly require the communication to be within a year before the intended withdrawal. Paris Agreement, *supra* note 6, art. 28. As previously stated, the U.S. confirmed its intent to withdrawal in Nov. 4, 2019. *See* Friedman, *supra* note 8.

¹²⁵ *See* ERWIN CHEREMINSKY, *CONSTITUTIONAL LAW: PRINCIPLES AND POLICIES* 140-43 (6th ed. 2006) (noting the difficulty in determining which foreign policy issues are justifiable and which actually present political questions).

¹²⁶ *See Zivotofsky v. Clinton*, 566 U.S. 189 (2012) (redrawing the legal boundaries of presidential powers involving the denunciation of treaties). Chief Justice John Roberts asserted that the political question doctrine did not bar judicial review. *Id.* at 201. *See also* KOH, *supra* note 9, at 173-74 (discussing the omission in *Zivotofsky* of the famous political question test introduced in *Baker v. Carr*, 369 U.S. 186 (1962)).

the Commerce Clause.¹²⁷ Using the same rationale, scholars argue withdrawing from a climate change agreement, which has a significant impact on domestic and foreign commerce, would also be prohibited.¹²⁸

Finally, the uncertainty caused by the unreasoned withdrawal from the Paris Agreement¹²⁹ is also likely to increase domestic litigation, at the very least. After all, the more uncertain a particular rule or its interpretation is, the higher the likelihood that the parties will refrain from negotiating,¹³⁰ and instead pursue litigation. Accordingly, the transaction costs for all domestic and foreign actors involved in environmental, energy, and related areas will likely increase.¹³¹

III. THE U.S. WITHDRAWAL IS NOT JUSTIFIED BY COST-BENEFIT ANALYSIS BASED ON ITS SUBSTANTIVE TERMS

This Part assesses the costs and benefits of the U.S. withdrawal from the Paris Agreement, focusing on its merits rather than how the decision was reached and implemented (see Part II for information on the procedure). Part III addresses whether the withdrawal produces more benefits than costs both qualitatively (analyzing the descriptive data) and quantitatively (examining the numerical data). Section A discusses the challenges of such an assessment. Section B explores the domestic costs of the withdrawal, followed by its arguable benefits in Section C. Section D analyzes the impact of the U.S. decision at the global level. It is worth reiterating that the baseline for this research is the withdrawal from the Paris Agreement itself, so the benefits that accrued during the

¹²⁷ KOH, *supra* note 9, at 50-51.

¹²⁸ *Id.*

¹²⁹ Because the withdrawal was not justified at the time, additional questions about it keep occurring, contributing to more uncertainty. In July 2019, the head of the EPA wrongfully argued that § 115 of the Clean Air Act would make the Paris targets domestically binding. See Jean Chemnick, *Wheeler: Obscure Air Provision Behind Paris Withdrawal*, CLIMATE WIRE (July 15, 2019).

¹³⁰ All things being equal, investors will look for the reduced risk opportunity. This is based on the economic assumptions that human beings are reluctant to change (status quo bias) and generally risk-averse. For more information, see Daniel Kahneman et al., *Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias*, 5 J. ECON. PERSPECTIVES 193, 197-203 (1991).

¹³¹ Legal uncertainty often leads to litigation, which increases transaction costs. COOTER & ULEN, *supra* note 50, at 400-04.

Agreement that will be terminated once the withdrawal is implemented are included. In this vein, a methodological note is required. A cost-benefit analysis performed by a U.S. agency may be limited to the consideration of the interests of the country's citizens.¹³² Nonetheless, cost-benefit analyses of policies on topics related to foreign affairs have previously considered the interests of those outside the United States.¹³³ This Part considers these interests because climate change encompasses collective rights beyond national borders.¹³⁴

A. The Challenges of Measuring the Costs and Benefits of the Withdrawal

Quantifying the U.S. withdrawal from the Paris Agreement is not a trivial task, due to the complexity of climate change and its impact.¹³⁵ Estimations include market damages (infrastructure, tourism, and increased energy demand), and non-market damages (ecological impact and culture values, often measured in terms of "willingness to pay").¹³⁶ Predictions are perennially affected by uncertainty, speculation, and lack of information regarding future emission of GHGs, the effects of past and future emission on the climate system, the impact of changes in climate on the physical and biological environment, and the translation of such environmental

¹³² OFFICE OF MGMT. & BUDGET, CIRCULAR A-4, *supra* note 97.

¹³³ See, e.g., Lynn A. Karoly & Francisco Perez-Arce, *A Cost-Benefit Framework for Analyzing the Economic and Fiscal Impacts of State-Level Immigration Policies*, RAND CORP. (2016); Carolina Arlota, *Is the Rescission of Deferred Action for Childhood Arrivals (DACA) Justified by the Results of Cost-Benefit Analysis?*, 29 BERKELEY LA RAZA L. J. 93 (2018).

¹³⁴ See DOUGLAS A. KYSAR, *REGULATING FROM NOWHERE: ENVIRONMENTAL LAW AND THE SEARCH FOR OBJECTIVITY* 123-200 (2010) (arguing that environmental policy should include the interests of existing members of the political community as well as those of people overseas, future generations, and even other species).

¹³⁵ There is no consensus as to when climate change-related costs will incur or the monetary amount of those costs. ERIC POSNER & ALAN O. SYKES, *ECONOMIC FOUNDATIONS OF INTERNATIONAL LAW* 230 (2013).

¹³⁶ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Climate Change 2014: Mitigation of Climate Change*, 212 (2014), https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter3.pdf [<https://perma.cc/DP6X-9HCH>].

effects into economic damages.¹³⁷ The current literature consists primarily of studies focusing on the consequences of the U.S. withdrawal on climate governance.¹³⁸ Studies addressing the quantitative impact of the U.S. withdrawal are scarce and based on incomplete modeling assumptions. A recent study finding potential economic gain for carbon-intense energy sectors, for example, neglects to address environmental costs.¹³⁹

Estimating the impact of the withdrawal involves additional challenges. The effects of recently enacted policies by U.S. cities,¹⁴⁰ states,¹⁴¹ and international actors (parties to the Paris Agreement, U.N. organs, and non-governmental organizations [NGOs])¹⁴² are

¹³⁷ Interagency Working Grp. on Soc. Cost of Greenhouse Gases, United States Government, *Technical Support Document: - Technical Update on the Social Cost of Carbon for Regulatory Impact Analysis - Under Executive Order 12866*, ENVTL. PROTECTION AGENCY 3 (2016), https://www.epa.gov/sites/production/files/2016-12/documents/sc_co2_tsd_august_2016.pdf [<https://perma.cc/3CDH-7S5H>].

¹³⁸ See, e.g., Zhang Hai-Bin et al., *U.S. Withdrawal from the Paris Agreement: Reasons, Impacts, and China's Response*, 8 *ADVANCES IN CLIMATE CHANGE RES.* 220, 222 (2017); Miranda Schreurs, *The European Union and the Paris Climate Agreement: Moving Forward Without the United States*, 15 *CHINESE J. POPULATION RESOURCES & ENV'T* 192, 192 (2017).

¹³⁹ Duy Nong & Mahinda Siriwardana, *Effects on the U.S. Economy of its Proposed Withdrawal from the Paris Agreement: A Quantitative Assessment*, 159 *ENERGY* 621, 623 (2018).

¹⁴⁰ New York City intends to rid itself of \$5 billion of investments it has made in fossil fuel companies and reduce its carbon emissions. Oliver Milman, *New York Plans to Divest \$5bn from Fossil Fuels and Sue Oil Companies*, *GUARDIAN* (Jan. 10, 2018), <https://www.theguardian.com/us-news/2018/jan/10/new-york-city-plans-to-divest-5bn-from-fossil-fuels-and-sue-oil-companies> [<https://perma.cc/Q69P-66V7>].

¹⁴¹ Several states, led by California and New York, are setting their own limits for GHG emissions. Thirty-four U.S. states are committed to reducing global warming despite President Trump's decision. See Chelsea Harvey, *These are the States Fighting to Save the Earth*, *MOTHER JONES* (Apr. 10, 2017), <https://www.motherjones.com/environment/2017/04/trumps-domestic-war-climate-action-has-propelled-states-battle/> [<https://perma.cc/EM8Y-K6UW>]. In addition, the Regional Greenhouse Gas Initiative, a cap-and-trade system of cooperation to reduce carbon dioxide emissions from the power sector, includes nine states (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont). See *Program Overview and Design*, *THE REGIONAL GREENHOUSE INITIATIVE* (2018), <https://www.rggi.org/program-overview-and-design/elements> [<https://perma.cc/5AEA-4TTD>].

¹⁴² In April 2019, the Canadian federal government extended its carbon-pricing program by imposing a tax on fossil fuels in the four provinces that had declined to enact their own climate action plans. See Brad Plumer & Nadja Popovich, *These Countries Have Prices on Carbon. Are They Working?*, *N.Y. TIMES* (Apr.

unclear. Meanwhile, President Trump directed agencies to review (modify, suspend, or rescind) regulations that may “unduly burden” energy development—including those aimed at reducing GHG emissions.¹⁴³

Another relevant challenge in quantifying “before” and “after” withdrawal scenarios is how to measure potential adaptation to climate change. Specific data is not available. Adaptation is not the best approach to curb emissions,¹⁴⁴ and climate change is a dynamic event scientists are still trying to understand.¹⁴⁵ The volatile approach the Trump administration is taking in many areas increases the complexity of the assessment. If the trade war with China continues, for instance, emissions may be reduced, whereas if the President succeeds in expanding the U.S. economy by 5% or 6%, emissions will likely increase.¹⁴⁶ The U.S. withdrawal from the Paris Agreement, in and of itself, opened the country to carbon-tariff conflicts, as China and the European Union may impose retaliatory tariffs on all goods imported from the United States.¹⁴⁷

2, 2019), <https://www.nytimes.com/interactive/2019/04/02/climate/pricing-carbon-emissions.html> [<https://perma.cc/X4AL-X34N>]. See also *State and Trends of Carbon Pricing Report*, WORLD BANK GROUP (May 2018) (listing the forty countries with carbon prices).

¹⁴³ Exec. Order No.13783, 82 Fed. Reg. 16093 (Mar. 31, 2017).

¹⁴⁴ BENJAMIN K. SOVACOO ET AL., *FACT AND FICTION IN GLOBAL ENERGY POLICY* 187 (2016).

¹⁴⁵ *Id.* at 184-85.

¹⁴⁶ Kate Larsen et al., *Taking Stock 2017: Trump's Regulatory Rollback Begin*, RHODIUM GROUP (Mar. 27, 2017), <https://rhg.com/research/trumps-regulatory-rollback-begins/> [<https://perma.cc/2EKR-L2HV>].

¹⁴⁷ Christoph Böhringer & Thomas F. Rutherford, *U.S. Withdrawal from the Paris Agreement: Economic Implications of Carbon-Tariff Conflicts*, HARV. PROJECT ON CLIMATE AGREEMENTS (Aug. 2017); Edward Taylor, *German Carmakers Fear Losing Competitive Edge After U.S. Paris Exit*, REUTERS (June 2, 2017), <https://www.reuters.com/article/us-usa-climatechange-german-carmakers/german-carmakers-fear-losing-competitive-edge-after-u-s-paris-exit-idUSKBN18T1Q0> [<https://perma.cc/TRH8-WC8J>] (following the announcement of the U.S. withdrawal, German interest groups expressed concerns about the competitiveness of their automobiles in relation to those produced in the United States).

B. *The Domestic Costs of the U.S. Withdrawal from the Paris Agreement*

As discussed in Part II, the Trump administration disregarded the benefits of remaining in the Paris Agreement and the costs of rescinding it. The United States will bear the costs of implementing the withdrawal, which have not been publicized yet. No estimations of the effects of the withdrawal were considered.¹⁴⁸ Astonishingly, not even environmental costs were accounted for.¹⁴⁹

The presidential announcement was also silent on the social cost of carbon,¹⁵⁰ the present value of which is measured as the damages incurred by the presence of an additional ton of carbon dioxide in the atmosphere.¹⁵¹ The social cost of carbon is of paramount importance in climate policy,¹⁵² although estimating it is notoriously difficult.¹⁵³ Predictions for this cost are even more complex when focusing solely on the domestic level, due to the limited empirical literature addressing regions or a single country.¹⁵⁴ The EPA previously estimated the social cost of carbon as \$42 for 2020—

¹⁴⁸ Nuccitelli, *supra* note 7.

¹⁴⁹ See Trump, *supra* note 1 (summarizing his claims, the President stated: “This agreement is less about the climate and more about other countries gaining a financial advantage over the United States. The rest of the world applauded when we signed the Paris Agreement—they went wild; they were so happy—for the simple reason that it put our country, the United States of America, which we all love, at a very, very big economic disadvantage.”).

¹⁵⁰ *Id.*

¹⁵¹ William D. Nordhaus, *Revisiting the Social Cost of Carbon*, 10 PROC. NAT’L ACAD. SCI. U.S. 1518, 1518 (2017).

¹⁵² See *Ctr. for Biological Diversity v. Nat’l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1203 (9th Cir. 2008) (determining that agency regulations must consider the social cost of carbon). See also Daniel A. Farber, *Coping with Uncertainty: Cost-Benefit Analysis, the Precautionary Principle, and Climate Change*, 90 WASH. L. REV. 1659, 1708-09 (2015) (elaborating on the Ninth Circuit’s decision in *Center for Biological Diversity v. National Highway Traffic Safety Administration*).

¹⁵³ Interagency Working Grp. on Soc. Cost of Greenhouse Gases, *supra* note 137, at 1 (describing how monetized damages associated with an incremental increase in carbon emissions per year are intended to include—but are not limited to—human health, net agricultural productivity, property damages from increased flood risk, and the value of ecosystem services due to climate change).

¹⁵⁴ *Id.* at 11.

assuming a 3% discount rate,¹⁵⁵ which is disputable.¹⁵⁶ Experts contend the social cost of carbon is typically underestimated in climate policies.¹⁵⁷ The National Academy of Sciences argues that global warming is subject to global emissions, so damages should be considered globally.¹⁵⁸ The Trump administration disagrees, although it did not provide a reason,¹⁵⁹ and its proposed new rule estimates the social cost of carbon from \$1 to \$6.¹⁶⁰

In light of these omissions and controversies, it is vital to analyze costs in specific defining terms, which includes cost as a *relational concept*, i.e., focusing on defining the interests involved before calling it a cost or a benefit.¹⁶¹ This application of the notion of cost as a *relational concept*¹⁶² requires a nuanced understanding that

¹⁵⁵ See ENVTL. PROT. AGENCY SOCIAL COST OF CARBON FACT SHEET (Dec. 2016), https://19january2017snapshot.epa.gov/climatechange/social-cost-carbon_.html [<https://perma.cc/3LR8-6G9P>] (showing values as of 2016).

¹⁵⁶ *Id.* (acknowledging one of the most difficult challenges regarding the social cost of carbon estimations is the calculation of discount rates). See also Lisa Heinzerling, *Regulatory Costs of Mythic Proportions*, 107 YALE L.J., 1981, 2051 (1998) (criticizing discounting assumptions, specifically the use of income-influence economic methods of valuing life, and concluding that assuming an increase future income implies that future lives are more worth than current ones); Douglas A. Kysar, *Climate Change, Cultural Transformation, and Comprehensive Rationality*, 31 B.C. ENVTL. AFF. L. REV. 555, 579 (2004).

¹⁵⁷ See Richard L. Revesz et al., *Global Warming: Improve Economic Models of Climate Change*, 508 NATURE 173, 174-75 (2014) (discussing discounting rates and the fact that models tend to omit damages to labor productivity and growth productivity, among other factors).

¹⁵⁸ NAT'L ACADS. SCI., ENGINEERING & MED., *supra* note 113, at 50-51.

¹⁵⁹ The Trump administration's departure from the previous use of the global figure for the social cost of carbon in favor of the domestic figure is a decision that "may or may not be justifiable. But it was not justified. No explanation was given. That is the high of arbitrariness, and it should be invalidated in court." SUNSTEIN, *supra* note 82, at 159.

¹⁶⁰ Jason Bordoff, *Trump vs. Obama on the Social Cost of Carbon—and Why It Matters*, WALL STREET J. (Nov. 15, 2017), <https://blogs.wsj.com/experts/2017/11/15/trump-vs-obama-on-the-social-cost-of-carbon-and-why-it-matters/> [<https://perma.cc/H3DL-M53D>]. During the Trump administration, scientists subjected the EPA's proposed new regulation on the Clean Power Plan to significant criticism because it disregarded, for instance, the impact of global emissions. By considering only domestic emissions, it ultimately increased costs while reducing the benefits of regulatory action, which contributed to lowering the social cost of carbon significantly. *Id.* See also criticisms by the NAT'L ACADS. SCI., ENGINEERING & MED., *supra* note 113.

¹⁶¹ WARREN J. SAMUELS ET AL., *THE ECONOMY AS A PROCESS OF VALUATION* 216-31 (1997).

¹⁶² See Daniele Bertolini & Carolina Arlota, *Why Michigan v. EPA Requires that the Meaning of the Cost/Rationality Nexus Be Clarified*, 29 FORDHAM ENVTL. L. REV. 125,

benefits to some are costs to others.¹⁶³ Even if costs are considered in relational terms, it would not validate the U.S. withdrawal from the Paris Agreement, as this Section demonstrates. After all, whose interests count? Whose interests does the withdrawal benefit? As the time of this writing, it remains unclear whose interests the administration officially took into account.¹⁶⁴

The withdrawal from the Paris Agreement and the resulting increase of carbon emissions affects a myriad of interests. Because an increase in GHGs is among the leading cause of climate change, rain, snow, tornados, flooding, droughts, tsunamis, famine, and natural disasters will occur more frequently across the globe after the U.S. withdrawal.¹⁶⁵ The cleaning and removal of debris carries significant costs and requires input from all levels of government and assistance from the entire community.¹⁶⁶ Climate change negatively affects health, causing illnesses that incapacitate and even kill.¹⁶⁷ This decreases productivity, devastates family unity, and related social networks.¹⁶⁸ Natural disasters will increase demand for hospital care and emergency services. Healthcare companies and insurers will raise their prices accordingly. The changes will jeopardize wildlife, water sources, and the overall global ecosystem.¹⁶⁹

The specific consequences of the U.S. withdrawal from the Paris Agreement on the country's population will be severe. Travel will be disrupted due to destruction of infrastructure. Energy services and electronic communication may be interrupted more

155 (2017) (arguing that the Supreme Court neglected to consider cost as a relational concept).

¹⁶³ See SAMUELS ET AL., *supra* note 161, at 216-34.

¹⁶⁴ See Trump, *supra* note 1 (noting that while the presidential statement mentions loss of jobs, it refers to a study that did not consider job creation in the green economy).

¹⁶⁵ For a legal discussion about the causes of climate change and their connection with such disasters, see CHRIS WOLD ET AL., CLIMATE CHANGE AND THE LAW 5-31 (Matthew Bender & Co. Inc. ed., 2009).

¹⁶⁶ ENVTL. PROT. AGENCY, *supra* note 15, at 1.

¹⁶⁷ See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, GLOBAL WARMING OF 1.5°C, 11-12 (2018), https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf [<https://perma.cc/3Y3D-NQD9>] (explaining the increase in number of deaths as well as the costs of malnutrition, respiratory conditions, infectious vector-borne diseases and other public health costs).

¹⁶⁸ *Id.* at 9-11 (discussing global predictions on the increase in temperature that the Paris Agreement aims to avoid).

¹⁶⁹ *Id.* at 11-12.

frequently.¹⁷⁰ Family and friends will not see each other and business may falter or go under completely. Banks may lose their investments in new clean-energy technology that would have been needed under the Paris Agreement. Tourism activities will be adversely impacted. Residents may be forced to migrate within the United States. Refugees whose lands are no longer fertile and/or cannot live in their own countries due to desertification or significant change in the weather will consider immigrating to the United States.¹⁷¹ This, at a minimum, will increase the U.S. budget, compromising economic resources. Even as this occurs, money will need to be spent to rebuild infrastructure as opposed to investing in improvements. Finally, because of the withdrawal, the U.S. military may face more challenges abroad.¹⁷²

Rising sea levels are perhaps the most indicative evidence available of global warming.¹⁷³ A more significant change in water levels in addition to increased water pollution¹⁷⁴ is likely to occur after the U.S. withdrawal.¹⁷⁵ In the United States, 91% of electricity is produced by thermoelectric (nuclear and fossil-fueled) power plants, which rely on the availability of water resources and depend

¹⁷⁰ JOEL B. EISEN ET AL., *ENERGY, ECONOMICS AND THE ENVIRONMENT* 730-31 (Foundation Press 5th ed. 2015).

¹⁷¹ Statistics on the predicted refugee population vary significantly. A renowned study estimates that by 2050, there will be approximately 150 million refugees who have left their homes due to the consequences of global warming. See Norman Myers, *Environmental Refugees in a Globally Warmed World*, 43 *BIOSCIENCE* 752, 753 (1993).

¹⁷² This argument is based generally on the congressional assessment. See National Defense Authorization Act for Fiscal Year 2018, *supra* note 23, at 1358.

¹⁷³ Even with the Paris Agreement in place, the current scenario is alarming. A recent study shows that the rate of ice loss in Greenland in 2012 was of 400 billion tons per year, almost four times the rate in 2013. See John Schwartz, *Greenland's Melting Ice Nears a "Tipping Point," Scientists Say*, *N.Y. TIMES* (Jan. 21, 2019), <https://www.nytimes.com/2019/01/21/climate/greenland-ice.html> [<https://perma.cc/DL46-HFSA>].

¹⁷⁴ Water pollution is among the most severe consequences of climate change. See P.C.D. Milly et al., *Stationary is Dead: Whither Water Management*, 319 *SCI.* 573, 573 (2008) (emphasizing that researchers have had to change their assumptions, such as their belief that natural systems fluctuate within an unchanging envelope of variability, due to climate change).

¹⁷⁵ See *THE IMPACT OF CLIMATE CHANGE ON THE UNITED STATES ECONOMY* (Robert Mendelsohn & James E. Neuman eds., 2004) (providing an early (and detailed) attempt to quantify the economic impact of climate change in the United States). The work cites multiple studies estimating the cost of damages caused by climate change as 1.5% to 2% of the U.S. GDP. *Id.* at 2.

on them to be a certain temperature.¹⁷⁶ As such, an increase in temperature will affect the cooling of water necessary in the production of electricity. Electricity production will suffer should the availability of water significantly change or decrease.¹⁷⁷ Meanwhile, heating and air conditioning will be used more often, increasing energy consumption and GHG emissions.

Research shows that an increase in the average summer temperature negatively affects all industries, not only those most assume will suffer such as fishing, tourism, and agriculture.¹⁷⁸ Industries such as retail, wholesale, services, finances, and construction, which jointly represent more than a third of the U.S. gross domestic product (GDP), will suffer, whereas very few sectors such as utilities (1.8% of GDP) would benefit from an increase in temperature.¹⁷⁹

Recent research shows that the extreme heat waves of the summer of 2018 are not an isolated incident.¹⁸⁰ Predictions considering the long-term effect of higher temperatures estimate GDP will decrease by as much as 10% from 2070 to 2099, with reductions being more significant in the higher emission scenario considered by the World Bank.¹⁸¹

Documented weather events leading to extreme heat and droughts have been recorded in U.S. states since 1880.¹⁸² Texas, Oklahoma, New Mexico, and Louisiana lost three million acres due to wildfires, suffering \$6 to \$8 billion in losses due to record-breaking summer heat in 2011.¹⁸³ Early in 2019, California electricity

¹⁷⁶ Michelle T. H. van Vliet et al., *Vulnerability of U.S. and European Electricity Supply to Climate Change*, 1546 NATURE CLIMATE CHANGE 676, 676 (2012).

¹⁷⁷ *Id.*

¹⁷⁸ Ric Colacito et al., *Climate Change and the Cost of Inaction*, VOX CEPR POL'Y PORTAL (Oct. 28, 2016), <https://voxeu.org/article/climate-change-and-cost-inaction> [<https://perma.cc/SX8B-UEZ2>].

¹⁷⁹ *Id.*

¹⁸⁰ See M. M. Vogel et al., *Concurrent 2018 Hot Extremes Across Northern Hemisphere due to Human-Induced Climate Change*, EARTH'S FUTURE 692, 702 (2019) (finding the planet is entering a "new climate regime," with "extraordinary" heat waves intensified by global warming).

¹⁸¹ See Colacito et al., *supra* note 178 (noting that the impact per year on GDP is not significant in the short term).

¹⁸² *Turn Down the Heat: Why a 4°C Warmer World Must Be Avoided*, WORLD BANK [WB] 18 (2012), <http://documents.worldbank.org/curated/en/865571468149107611/pdf/NonAsciiFileName0.pdf> [<https://perma.cc/9P75-BVA6>]. The World Bank calls mitigation action the best insurance against uncertain future. *Id.* at 2.

¹⁸³ *Id.* at 18.

provider Pacific Gas and Electric declared bankruptcy due to billions of dollars in liability costs accrued during two years of wildfires.¹⁸⁴ In the first half of the same year, floods and tornadoes in the Midwest caused over \$12.5 billion in damages.¹⁸⁵ It is noteworthy that the Intergovernmental Panel on Climate Change estimates, with high confidence, that extreme events may be more devastating economically than the impact of climate change overall.¹⁸⁶ Nevertheless, residences and private businesses, and schools, universities, and other public institutions, will incur greater costs as people adapt their surroundings to become more resilient to the effects of climate change, from rising temperatures to natural catastrophes.

Certain segments of the population will feel the effects of climate change and extreme weather much more than others. This regressive nature of carbon-pricing means consumers bear the costs, and those with lower incomes who spend a greater percentage of their income on non-discretionary goods and services will suffer more.¹⁸⁷ If it is true that climate change does not affect people in isolation, it certainly affects the less well-off disproportionately, in a vicious cycle.¹⁸⁸ In addition, native and indigenous peoples will experience more difficulties due to their lifestyles, which rely more on nature.¹⁸⁹ Remaining in the Agreement is therefore justified on a distributional basis under *prioritarianism*, the understanding that

¹⁸⁴ See Coral Davenport, *Climate Change Poses Major Risks to Financial Markets, Regulator Warns*, N.Y. TIMES (June 11, 2019), <https://www.nytimes.com/2019/06/11/climate/climate-financial-market-risk.html> [<https://perma.cc/M2PA-TJQT>] (noting that some experts believe that bankruptcy “could be an early indicator of a wider economic toll” due to climate change, as it makes wildfires “more frequent and destructive”).

¹⁸⁵ Erin Ailworth, *After Months of Floods and Tornadoes, Midwest Officials Tally Billions in Damage*, WALL STREET J. (July 4, 2019), <https://www.wsj.com/articles/after-months-of-floods-and-tornadoes-midwest-officials-tally-billions-in-damage-11562232602> [<https://perma.cc/JVB5-TE76>].

¹⁸⁶ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 136, at 212.

¹⁸⁷ TREBILCOCK, *supra* note 28, at 121.

¹⁸⁸ See Mark Nuttall, *Environmental Institutions and Governance*, WILEY ONLINE LIBRARY 1, 3 (2018) (contending that climate change does not affect people in isolation, but may impact indigenous people more severely).

¹⁸⁹ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 167, at 11 (emphasizing, with high confidence, that indigenous peoples, coastal and island populations, and developing world inhabitants would be more exposed to the consequences of climate change).

regulations should maximize the well-being of all, with priority given to those who are worse off.¹⁹⁰

The economic impact of climate change on the U.S. economy worries market experts. Recently, a top financial regulator who sits on the Commodity Futures Trading Commission—a powerful agency that oversees major financial markets including grain futures, oil trading, and complex derivatives—posited that financial risks from climate change are comparable to those posed by the mortgage meltdown that triggered the 2008 financial crisis.¹⁹¹ As climate change causes volatile weather events to occur more frequently, larger providers of financial products—mortgages, pensions, insurance, real estate—will not be able to shift risk away from their portfolios.¹⁹² More significant, perhaps, is that U.S. companies, which make up the vast majority of the top 400 companies in the Carbon Disclosure Project (CDP) report, underreport the risks of climate change, pegging it at \$110 billion (10% of the global risks reported to CDP).¹⁹³

President Trump cited economic motivations such as protecting the U.S. economy, particularly U.S. jobs.¹⁹⁴ A few commentators eagerly agreed that withdrawal would be good for the U.S. economy while having little effect on climate change.¹⁹⁵ This, of course, does not align with the best scientific data—economics included.¹⁹⁶ Effective policy-making is based on the assessment of complete

¹⁹⁰ Mathew D. Adler, *Future Generations: A Prioritarian View*, 77 GEO. WASH. L. REV. 1478, 1478-79 (2009).

¹⁹¹ Davenport, *supra* note 184.

¹⁹² *Id.*; see also *The Cost of Inaction: Recognising the Value at Risk from Climate Change*, ECONOMIST INTELLIGENCE UNIT (2015) (finding that approximately 30% of the world's total stock of manageable assets may be at risk due to climate change, and stressing that costs associated with climate change are a significant blind spot for companies and their investors).

¹⁹³ See *Global Climate Change Analysis 2018*, CDP 6 (2018), <https://www.cdp.net/en/research/global-reports/global-climate-change-report-2018> [<https://perma.cc/S389-XCDP>] (recommending investors and policymakers focus on demanding improved climate-related risk assessments from companies headquartered in the United States).

¹⁹⁴ Trump, *supra* note 1.

¹⁹⁵ See *Paris Climate Discord: U.S. Emissions Targets Could Trap Trump if He Stays in the Accord*, WALL STREET J. (May 31, 2017), <https://www.wsj.com/articles/paris-climate-discord-1496272448> [<https://perma.cc/M3EM-MHZ8>] (“The reality is that withdrawing [from the Paris Agreement] is in America’s economic interest and won’t matter much to the climate.”).

¹⁹⁶ For details, see Part II, Section B and Part III, Section C.

policy impacts, including ancillary costs and ancillary benefits.¹⁹⁷ In U.S. policymaking, “the heuristic bias in favour of avoiding certain losses may lead to an under-weighting of catastrophic scenarios of climate change, at least in the context of U.S. policy-making.”¹⁹⁸ Moreover, the Trump administration has a reputation for focusing on costs while neglecting benefits.¹⁹⁹ Even when the administration actually engages in cost-benefit analysis, research finds it to be significantly flawed.²⁰⁰

In contrast, President Obama clearly believed the Paris Agreement benefitted the United States, as it would create “more jobs and economic growth driven by low-carbon investment.”²⁰¹ This is in line with European Union policy regarding climate change.²⁰² Many European countries have combined their desire to protect the environment with their interest in technology. They understand that to remain competitive, they need to be at the forefront of science and renewable energy.²⁰³

This is one reason why significant economical actors such as Shell, Apple, Walmart, Exxon Mobil, and General Electric support

¹⁹⁷ See Jonathan B. Wiener, *Precaution and Climate Change*, in THE OXFORD HANDBOOK OF INTERNATIONAL CLIMATE CHANGE LAW 171 (Cinnamon P. Carlarne et al. eds., 2016) (emphasizing the need for cost-effectiveness in the application of the precautionary principle). For an in-depth discussion about ancillary harms and benefits, see REVESZ & LIVERMORE, *supra* note 46, at 151-70.

¹⁹⁸ David Dana, *The Contextual Rationality of the Precautionary Principle*, 35 QUEEN'S L.J., 67, 69 (2009).

¹⁹⁹ SUNSTEIN, *supra* note 82, at 159.

²⁰⁰ Farber, *supra* note 62, at 431. Farber also states, “President Trump has placed agenda controls on agencies that focus primarily on eliminating regulatory costs rather than maximizing regulatory benefits. The Administration has also begun initiatives to limit the evidence that can be considered in EPA cost-benefit analysis and to eliminate an important class of regulatory benefits from consideration.” *Id.*

²⁰¹ Obama, *supra* note 3.

²⁰² The European Union is famous for its environmental policies and its “win-win” negotiation strategy, which emphasizes the economic benefits of environmental protection. See Dimitrov, *supra* note 40, at 9.

²⁰³ Schreurs, *supra* note 138. In addition to leaving the Paris Agreement, President Trump authorized oil drilling in Alaska, a decision ruled unlawful in *League of Conservation Voters v. Donald J. Trump*. See *League of Conservation Voters v. Trump*, 303 F. Supp.3d 985 (D. Alaska 2018). Meanwhile, Norway ceased offshore drilling in the Lofoten Islands, located in the Arctic Ocean. See Mikael Holter, *Norway is Walking Away from Billions of Barrels of Oil*, BLOOMBERG (Apr. 7, 2019), <https://www.bloomberg.com/news/articles/2019-04-08/norway-is-walking-away-from-billions-of-barrels-of-oil-and-gas> [https://perma.cc/5G5A-6M7S].

the Paris Agreement.²⁰⁴ Because it aims at curbing the effects of global warming, it reduces uncertainty for such key players. Any uncertainty makes business decisions more complex, increasing the transaction costs for the parties.²⁰⁵ In an open letter to President Trump, more than thirty U.S. CEOs urged him to remain in the Paris Agreement.²⁰⁶ Modernization, competitiveness, and predictability are among the core justifications mentioned.²⁰⁷ U.S. withdrawal from the Agreement will likely increase the costs of doing business in the country, while removing economic opportunities that would have been generated if the administration took climate change seriously.²⁰⁸ It may also signal that U.S. companies have lost government support and regulatory certainty.²⁰⁹

C. *The Domestic Benefits of the Withdrawal*

This Section delves into the supposed benefits of the U.S. withdrawal from the Paris Agreement, focusing on presidential justifications.²¹⁰ The President believes the agreement “disadvantages the United States to the exclusive benefit of other countries” and contends U.S. taxpayers would have to absorb the costs of lower wages, lost jobs, closed factories, and a diminished economy.²¹¹ However, the data cited by President Trump²¹² is from

²⁰⁴ Paul Wiseman, *Analysts: Leaving Climate Deal Likely Wouldn't Add U.S. Jobs*, ASSOCIATED PRESS NEWS (June 1, 2017), <https://apnews.com/f89a55b6fcd0428eab02a6f41b24776b/Analysts:-Leaving-climate-deal-likely-wouldn-t-add-US-jobs> [<https://perma.cc/U8BW-BAY3>].

²⁰⁵ COOTER & ULEN, *supra* note 50, at 400-04.

²⁰⁶ *CEOs of Major U.S. Companies Urge Trump: Stay in Paris*, B TEAM (May 10, 2017), <https://bteam.org/our-thinking/news/30-major-ceos-call-on-trump-stay-in-paris> [<https://perma.cc/X8KR-TBS5>].

²⁰⁷ *Id.*

²⁰⁸ U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 22, at 1311-34 (arguing that the use of scientific information enabling people to prepare for climate change in advance can provide economic opportunities while proactively managing the risks, diminishing the negative effects and costs of climate change over time).

²⁰⁹ Kemp, *supra* note 4, at 459.

²¹⁰ Trump, *supra* note 1. The President says the United States “[w]ill withdraw from the Paris Climate Accord but begin negotiations to reenter either the Paris Accord or a really entirely new transaction on terms that are fair to the United States, its business, its workers, its people, its tax payers.”

²¹¹ *Id.*

²¹² *Id.*

a discredited study.²¹³ Yet as of February 2020, the administration's position has not changed, and their arguments continue to revolve around economic reasons.²¹⁴

Economists quickly refuted President Trump's arguments. They contend rescinding the Paris Agreement will aggravate domestic problems because it would not lead to job creation.²¹⁵ Yet despite the upcoming Paris withdrawal and the support of the Trump administration, coal-fired power plants are closing across the country.²¹⁶ Jobs that might be preserved by the President's decision, such as those in the coal and oil industries, will not be created in the renewable energy sector.²¹⁷ Experts argue that the Paris Agreement does not cost net jobs, because jobs in clean energy industries attract more investment, creating a virtuous circle.²¹⁸ Fostering a green

²¹³ President Trump invoked a study by NERA Economic Consulting. One of the primary flaws of the study is that only the costs of compliance with the Paris Agreement were factored in; benefits were disregarded. See Greenberg, *supra* note 85. The Trump administration appears to make a habit of spreading misinformation. When justifying their regulatory agenda, the administration cited a study estimating that excessive regulatory action would cost the U.S. economy \$2 trillion a year. The article, however, was based on a flawed methodology and was never published by external sources—let alone peer-reviewed. See Richard W. Parker, *Hyping the Cost of Regulation*, REG. REV. (June 25, 2019), <https://www.theregreview.org/2018/06/25/parker-hyping-the-cost-of-regulation/> [https://perma.cc/F2MQ-GJ7J].

²¹⁴ In December 2018, during the Conference of Parties, an annual meeting of the parties of the UNFCCC, the U.S. stated its energy-related CO₂ emissions had fallen by 14% since 2005, even as the U.S. economy grew by 19.4%. *Outcome of the 24th Session of the Conference of the Parties (COP24) to the U.N. Framework Convention on Climate Change*, U.S. DEP'T ST. (Dec. 15, 2018), <https://www.state.gov/outcome-of-the-24th-session-of-the-conference-of-the-parties-cop24-to-the-un-framework-convention-on-climate-change-unfccc/> [https://perma.cc/2YXS-KKEJ].

²¹⁵ Wiseman, *supra* note 204. For information on the general impact of environmental regulation, and evidence that environmental regulation does not reduce or increase overall jobs in the United States, see Cary Coglianese & Christopher Carrigan, *The Jobs and Regulation Debate*, in *DOES REGULATION KILL JOBS?* 1, 1-5 (Cary Coglianese et al. eds., 2014).

²¹⁶ INT'L ENERGY AGENCY, *GLOBAL ENERGY & CO₂ STATUS REPORT: COAL* 5 (2019).

²¹⁷ Rolf Färe et al., *Environmental Regulatory Rigidity and Employment in the Electric Power Sector*, in *DOES REGULATION KILL JOBS?* 89, 89-108 (Cary Coglianese et al. eds., 2014).

²¹⁸ As the EU and countries such as China and South Korea enact climate change policies, they foster investment in advanced energy, materials, electronics, including related technologies. Over time, such advancements become commercially competitive, ultimately resulting in trade advantages for those countries. See JANE A. LEGGETT & RICHARD K. LATINIZE, *CONG. RES. SERV.*, IF10668,

economy and providing training and funding that allow workers to transition to new jobs is seen as a viable alternative.²¹⁹

Clean energy enabled the Obama administration to lower greenhouse gas emissions to 1994 levels while creating 11.3 million jobs.²²⁰ Meanwhile, the Trump administration cut 70% of investments in clean energy,²²¹ impeding job creation and jeopardizing U.S. competitiveness in the sector.²²² A frequent argument for U.S. reliance on coal is its cheap price, as the infrastructure is already in place. There is no need to create wind farms, establish extra grids, offer additional training, or require further education.²²³ However, constructing such infrastructure would create jobs. Moreover, continuing to use coal produces significant externalities such as global warming,²²⁴ and increases the social cost of carbon, as it is the highest emitter of carbon dioxide.²²⁵ Should the U.S. persist in choosing coal, the country will only hasten the day they will need to cope with the consequences of climate change.

National leadership is needed to achieve a higher impact. Scholars and politicians argue that increased state and local action could help the United States achieve its NDCs.²²⁶ In the U.S.,

POTENTIAL IMPLICATIONS OF U.S. WITHDRAWAL FROM THE PARIS AGREEMENT ON CLIMATE CHANGE (Apr. 5, 2019).

²¹⁹ This argument builds on the social resilience analysis discussed by Sidney Shapiro and Robert Verchick. See Sidney A. Shapiro & Robert R.M. Verchick, *Inequality, Social Resilience, and the Green Economy*, 86 UMKC L. REV. 963, 984 (2018).

²²⁰ Gina McCarthy, *If Trump Dumps the Paris Accord, China Will Rule the Energy Future*, FOREIGN POL'Y (May 31, 2017), <https://foreignpolicy.com/2017/05/31/its-time-for-the-united-states-to-lean-in-to-climate-change/> [<https://perma.cc/8WHF-B4PA>].

²²¹ Varun Sivaram & Sagatom Saha, *Power Outrage: Cutting U.S. Government Funding for Energy Innovation Would Be a Grave Mistake*, FOREIGN AFF. (May 17, 2017), <https://www.foreignaffairs.com/articles/united-states/2017-05-17/power-outage> [<https://perma.cc/4Y6Z-T3JP>].

²²² This is in sharp contrast with China, which invests significantly in renewables and is leading the race for innovation. See Peter Haas, *Parxit, the United States, and the World*, 15 CHINESE J. POPULATION, RESOURCES, & ENV'T 186, 188 (2017).

²²³ See EISEN ET AL., *supra* note 170, at 729-30 (presenting similar arguments in the context of renewable resources).

²²⁴ *Id.*

²²⁵ See *infra* Table 1 in Appendix I (showing the amount of carbon dioxide produced per type of fuel).

²²⁶ Cooper, *supra* note 5, at 441; see AMERICA'S PLEDGE, <https://www.americaspledgeonclimate.com/about/> [<https://perma.cc/CCM5-27QB>]. See also Bloomberg Philanthropies, *Hundreds of Mayors, Governors, CEOs and*

meaningful climate change action has been occurring at the state and local levels for some decades.²²⁷ This should continue after the U.S. withdrawal, as states, cities, and businesses join forces to meet the goals of the Paris Agreement.²²⁸ These arrangements, however, cannot substitute for federal action.²²⁹ While on the one hand, the America's Pledge arrangement comprises more than half of the U.S. economy—if it were a separate country, it would boast the third-largest economy in the world²³⁰—on the other hand, it only encompasses 35% of total U.S. GHG emissions.²³¹

Local and state legal actions have their own limitations and require significant legal expertise to be effective. The 2005 green building code enacted in Albuquerque, New Mexico was deemed to override federal law.²³² Other similar ordinances were approved but required fine legal crafting to substantively differentiate the local scheme from national standards.²³³ Additional challenges arise based on the dormant commerce clause²³⁴ or the argument that

Others Pledge U.S. Commitment to Paris Climate Agreement, NAT'L GEOGRAPHIC (June 6, 2017), <https://blog.nationalgeographic.org/2017/06/06/hundreds-of-mayors-governors-ceos-and-others-pledge-u-s-commitment-to-paris-climate-agreement/> [<https://perma.cc/VK2N-JBZT>] (referencing Michael Bloomberg's declaration to the U.N. Secretary General and the U.N. Framework Convention on Climate Change). America's Pledge is an initiative to fight climate change which includes citizens, universities, businesses, cities, and states.

²²⁷ See Reuven S. Avi-Yonah & David M. Uhlmann, *Combating Global Climate Change: Why a Carbon Tax is a Better Response to Global Warming than Cap and Trade*, 28 STAN. ENVTL. L.J. 3, 20 (2009) (“[T]he most significant efforts in the United States to address climate change have occurred at the state and local level.”).

²²⁸ See, e.g., Bloomberg Philanthropies, *supra* note 226.

²²⁹ See *America's Pledge: Phase 1 Report: States, Cities and Business in the United States are Stepping up on Climate Action*, AMERICA'S PLEDGE 9, 9-10 (Nov. 2017), <https://www.bbhub.io/dotorg/sites/28/2017/11/AmericasPledgePhaseOneReportWeb.pdf> [<https://perma.cc/AV6L-ZZV7>] (acknowledging that subnational units cannot replace national policy on climate change).

²³⁰ *Id.* at 9.

²³¹ Amy Harder, *Reality Checking Carbon Reduction Efforts*, AXIOS (Nov. 15, 2017), <https://www.axios.com/reality-checking-carbon-reduction-efforts-1513306919-1bf3422c-a904-4640-ba87-8cc95dadefdf.html> [<https://perma.cc/3KRL-BAU7>].

²³² See Cary Coglianese & Shana Starobin, *The Legal Risks of Regulating Climate Change at the Subnational Level*, REG. REV. (Sept. 18, 2019), <https://www.theregreview.org/2017/09/18/coglianese-starobin-legal-risks-climate-change-subnational/> [<https://perma.cc/CEY4-CXL6>] (discussing the challenges that arise from regulating climate change at the state and local level).

²³³ *Id.*

²³⁴ *Id.*

climate policy falls under foreign affairs.²³⁵ Moreover, subnational entities should consider that carbon-intensive industry would simply transfer to less stringent jurisdictions nearby—so-called “leakage.”²³⁶ Such efforts may even lead to greater harm,²³⁷ such as the hardships that would occur if these jurisdictions have less developed safety nets for their own population.

The reality is that the withdrawal “will neither bring back jobs nor help the taxpayers, but it will most certainly hurt the United States and the world.”²³⁸ A global problem such as climate change is best addressed through action at the highest governance level (national and global) because implementing a myriad of local policies is costly, complicated, and ultimately inefficient as they are limited to their geographical location.²³⁹ Subnational units are not well suited for regulatory action on national conduct leading to global externalities.²⁴⁰

Having established the absence of benefits in the medium and long term in withdrawing from the Paris Agreement, a note on the precautionary principle is needed. This principle enunciates that action is required to avoid potential environmental threats in the absence of scientific certainty.²⁴¹ This Article, thus, reconciles cost-benefit analysis and the precautionary principle. It assumes the precautionary principle is determinative in relation to which risks should be regulated, but not the stringency of regulation itself.²⁴²

²³⁵ Jean Galbraith, *Cooperative and Uncooperative Foreign Affairs Federalism*, 130 HARV. L. REV. 2131, 2148-51 (2017) (reviewing MICHAEL J. GLENNON & ROBERT D. SLOANE, *FOREIGN AFFAIRS FEDERALISM: THE MYTH OF NATIONAL EXCLUSIVITY* (2016)).

²³⁶ Coglianesi & Starobin, *supra* note 232.

²³⁷ Jonathan B. Wiener, *Think Globally, Act Globally: The Limits of Local Climate Policies*, 155 U. PA. L. REV. 1961, 1964 (2007).

²³⁸ Robert N. Stavins, *Why Trump Pulled the U.S. out of the Paris Accord and What the Consequences Will Be*, FOREIGN AFF. (June 5, 2017), <https://www.foreignaffairs.com/articles/2017-06-05/why-trump-pulled-us-out-paris-accord> [https://perma.cc/4R5Y-VV8H].

²³⁹ Coglianesi & Starobin, *supra* note 232.

²⁴⁰ Wiener, *supra* note 237, at 1962.

²⁴¹ John S. Applegate, *The Taming of the Precautionary Principle*, 27 WM. & MARY ENVTL. L. & POL'Y REV. 13, 13 (2002).

²⁴² David M. Driesen, *Cost-Benefit Analysis and the Precautionary Principle: Can they be Reconciled?*, 2013 MICH. ST. L. REV. 771, 791-812 (2013). See also Farber, *supra* note 152, at 1721-24 (proposing different uses for the precautionary principle and cost-benefit analysis to avoid key economic uncertainties).

As such, the precautionary principle applies to climate change policy,²⁴³ because no definitive analysis can adequately capture the full costs of not taking regulatory measures to mitigate the risks.²⁴⁴ In that vein, and considering that the United States is a party to the UNFCCC,²⁴⁵ the country remains obliged to reduce GHG emissions, the impact of which is notoriously difficult to reverse.

Accordingly, the precautionary principle would at least oblige the United States to achieve its voluntary quota under the Paris Agreement. Following this line of reasoning, countries should not move backward in climate change matters. After all, in the case of climate policy, precaution is largely applicable to placing limitations on old technologies, such as fossil fuels.²⁴⁶ Furthermore, the world is beyond precaution now, as “we probably blew past our precautionary opportunity sometime in the 1980s. We are now, and have been for some time, in a post-cautionary world.”²⁴⁷

D. The Impact of the U.S. Withdrawal on the International Sphere

This Section addresses the impact of the U.S. withdrawal on the international sphere and explains its consequences for the country as well as for climate change governance. The U.S. State Department emphasizes that, despite the country’s withdrawal of the Paris Agreement, the U.S. will continue to work to reduce its emissions, adopting a balanced approach to climate policy and reconciling economic growth with energy security and lowered pollutants.²⁴⁸ Economic growth and preserving the environment are not exclusionary goals, as the goals of the UNFCCC exemplify.²⁴⁹ The

²⁴³ See Kysar, *supra* note 156, at 558 (criticizing cost-benefit analysis and its limitations regarding the pursuit of efficiency in environmental contexts, specifically on moral foundations).

²⁴⁴ See Dana, *supra* note 198, at 70. See also Kysar, *supra* note 156, at 566.

²⁴⁵ UNFCCC, *supra* note 17, art. 3(3); See Wiener, *supra* note 197, at 166-68 (emphasizing the need for cost-effectiveness in the application of the precautionary principle).

²⁴⁶ See Wiener, *supra* note 197, at 170.

²⁴⁷ See Lisa Heinzerling, *Climate Change, Human Health, and the Post-Cautionary Principle*, 96 GEO. L.J. 445, 452 (2008) (advocating for a post-cautionary principle and its policy implications).

²⁴⁸ *Communication Regarding the Intent to Withdraw from the Paris Agreement*, U.S. DEP’T ST. (Aug. 4, 2017), <https://www.state.gov/communication-regarding-intent-to-withdraw-from-paris-agreement/> [<https://perma.cc/U7QD-FBPM>].

²⁴⁹ Paris Agreement, *supra* note 6, arts. 4, 6.

Paris Agreement itself was designed to be exceedingly flexible regarding its goals and accommodating of new challenges.²⁵⁰ Experts differ about how much weight the U.S. withdrawal will carry. Several can see the positives.²⁵¹ However, the overwhelming majority contends that U.S. leadership is crucial to expand cooperation beyond the Paris Agreement.²⁵²

Determining the international relevance of the U.S. withdrawal requires climate governance analysis. The Paris Agreement established a new system of responsibilities for developed and developing countries,²⁵³ although it does not define which countries belong to each category.²⁵⁴ Developed countries should lead by meeting their absolute emission reduction targets, while developing countries should reduce their emissions in accordance with their unique national circumstances.²⁵⁵ Governments in developing nations face increasing pressure to achieve economic prosperity, frequently at the expense of the environment.²⁵⁶ Nonetheless, the growth of renewable energy has helped displace the once dominant assumption that economic development and increasing GHG emissions must be tied.²⁵⁷ Moreover, such countries have greater incentives to reduce GHGs, due to the likelihood that developing

²⁵⁰ See David G. Victor, *America Exits the Climate Stage*, BROOKINGS INST. (June 1, 2017), <https://www.brookings.edu/blog/order-from-chaos/2017/06/01/america-exits-the-climate-stage/> [<https://perma.cc/6PF4-CJYM>] (“Indeed, the United States, China, France, and others designed Paris so that it would be highly flexible—able to change in response to new realities, even the exit of the world’s most powerful nation.”).

²⁵¹ See Kemp, *supra* note 4, at 460 (contending that a “rogue” United States would be worse than its leaving, due to the potential for imploding commitments from within). This article, however, strongly disagrees, because this “rogue” United States would not be as publicly scrutinized as the U.S. withdrawal itself. More significantly, perhaps, is that at least the U.S. monetary commitments to the Green Climate Fund would be fulfilled.

²⁵² See Victor, *supra* note 250.

²⁵³ Paris Agreement, *supra* note 6, arts. 4, 9, 10, 13.

²⁵⁴ See Ari & Sari, *supra* note 1, at 175.

²⁵⁵ Paris Agreement, *supra* note 6, art. 4(4). The treaty itself does not define those circumstances.

²⁵⁶ See Andrew Watson Samaan, *Enforcement of International Environmental Treaties: An Analysis*, 5 FORDHAM ENVTL. L. REV. 261, 272 (1993) (discussing conflicting policy choices).

²⁵⁷ See Brian Deese, *Paris Isn't Burning: Why the Climate Agreement Will Survive Trump*, FOREIGN AFF. (July/Aug. 2017), <https://www.foreignaffairs.com/articles/2017-05-22/paris-isnt-burning> [<https://perma.cc/3U59-K6ME>] (explaining how reductions in the price of renewable resources contributed to an increase in the “efficiency of energy consumption”).

nations will suffer more from harm related to climate change than those in the developed world.²⁵⁸ Developed countries have more resources, and are located primarily in the Northern Hemisphere, where temperatures are likely to be more temperate than in the Southern Hemisphere.²⁵⁹

In his announcement, President Trump insisted that China and India would be allowed to build additional coal plants while the United States would not be permitted to increase its emissions.²⁶⁰ This is not accurate, as all countries are obligated to establish a target and to report and evaluate their progress periodically.²⁶¹ President Trump also mentioned that the Agreement intruded on U.S. sovereignty, as over time the targets will increase, while the United States needed to focus on “unlocking the restrictions on America’s abundant energy reserves.”²⁶² The Paris Agreement, despite not imposing sanctions, encourages all countries to review their targets, under the assumption that countries will become more ambitious over time.²⁶³ As countries now see the benefits of adopting clean energy practices, they are more likely to increase their targets to enable them to profit more from this industry.²⁶⁴ However, the United States is unlikely to have such benefits as long as it remains committed to withdrawing from the Agreement. Therefore, significant consequences of the United States withdrawal from the Paris Agreement are the increase of the country’s GHG emissions and related pollution.

Another adverse consequence of the withdrawal refers to global climate action. According to the Paris Agreement, which promotes countries’ review of their targets under external monitoring, countries review their own targets and overall progress as well as those of other parties.²⁶⁵ Civil society also scrutinizes their

²⁵⁸ POSNER & SYKES, *supra* note 135, at 232.

²⁵⁹ See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 167, at 7 (finding, with high confidence, that the impact of climate change varies in accordance with the geographical location and level of development, among other factors).

²⁶⁰ Trump, *supra* note 1.

²⁶¹ Paris Agreement, *supra* note 6, art. 4(2), 4(3), 4(9), 4(11).

²⁶² Trump, *supra* note 1.

²⁶³ See Hai-Bin et al., *supra* note 138, at 223.

²⁶⁴ *Id.*

²⁶⁵ Paris Agreement, *supra* note 6, art. 3-7.

decisions.²⁶⁶ Although emissions targets for each country are quite different, “the inclusivity of the agreement motivates each country to scrutinize the performance of others. When participation rates in social dilemmas are very high or very low, both stigma and honor are maximized for deviant behavior.”²⁶⁷ Such scrutiny is relevant, as the outcome is predicated on a global choice architecture system in which decisions are made by different actors such as consumers, large corporations, and governments; markets play a significant role in the system.²⁶⁸ The two primary issues that permit environmental harm to continue are the presence of incentives that are not properly aligned, and the absence of feedback on polluting activities.²⁶⁹ This external monitoring minimizes both challenges, mitigating market failures.²⁷⁰ Monitoring also generates negative publicity, which is an effective mechanism to decrease a lack of compliance with international treaties.²⁷¹ Because fear of earning a negative reputation is used to pressure countries to comply with international instruments, it is likely the United States will be subject to this negative repercussion. The current President, however, seems indifferent to such effect.

More significantly, perhaps, the President’s decision to withdraw ignores studies estimating that the United States stands to gain \$2 trillion in direct benefits from global environmental action by 2030.²⁷² His view also disregards international law and the principle of *common but differentiated responsibilities and respective capabilities* (CBDRRC), which refers specifically to different

²⁶⁶ Paris Agreement, *supra* note 6, art. 6. See also Jennifer Jacquet & Dale Jamieson, *Soft but Significant Power in the Paris Agreement*, 6 NATURE CLIMATE CHANGE 643, 644 (2016), <https://jenniferjacquet.files.wordpress.com/2010/05/nclimate3006.pdf> [<https://perma.cc/A9TL-M9H5>] (detailing how civil society may help mobilize climate action fostering the goals of the Paris Agreement).

²⁶⁷ Jacquet & Jamieson, *supra* note 266, at 645.

²⁶⁸ RICHARD H. THALER & CASS R. SUNSTEIN, *NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS* 187 (2009).

²⁶⁹ *Id.*

²⁷⁰ The introduction to this article discusses the necessity of environmental regulation due to market failure. See also Stewart, *supra* note 25, at 172.

²⁷¹ Samaan, *supra* note 256, at 274.

²⁷² See Peter Howard & Jason Schwartz, *Foreign Action, Domestic Windfall*, INST. FOR POL’Y INTEGRITY 2 (2015) (describing the results from saving on non-incurred costs of pollution, including health and avoided environmental harms).

responsibilities allocated among countries.²⁷³ Under this principle, which still binds the United States because it remains party to the UNFCCC,²⁷⁴ responsibility for current and historical emissions need to be factored in.²⁷⁵ The data is clear: from 1800 to 2002, the developed world contributed more than 80% of GHG emissions.²⁷⁶ As developing states have had a far lesser impact on the current concentration of GHGs and the overall threshold on carbon saturation,²⁷⁷ developed countries must provide climate financing to less developed countries in the terms determined in the Paris Agreement.²⁷⁸

The United States has contributed the most carbon emissions in history,²⁷⁹ yet committed to a rather small financial contribution under the Paris Agreement.²⁸⁰ The contribution of the parties of the Paris Agreement finances the Green Climate Fund, which was established by the Conference of the Parties in 2010 (under the UNFCCC and as part of the Conventions' financial mechanism).²⁸¹ If the United States were to pay the amount it originally agreed to,

²⁷³ UNFCCC, *supra* note 17, art. 3(1) (“The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities.”).

²⁷⁴ The United States is a party to the UNFCCC. UNITED NATIONS TREATY COLLECTION, https://treaties.un.org/Pages/ViewDetailsIII.aspx?src=IND&mtdsg_no=XXVII-7&chapter=27&Temp=mtdsg3&clang=_en [<https://perma.cc/7SKA-TRMA>].

²⁷⁵ The principle itself is disputed, because even when costs and benefits are carefully calculated, and the policy choices and related values are explicit, different countries may reach different conclusions regarding the optimal level of emission reduction. *See, e.g.,* Esty & Moffa, *supra* note 27, at 779.

²⁷⁶ *See* DONALD A. BROWN, AMERICAN HEAT: ETHICAL PROBLEMS WITH THE UNITED STATES' RESPONSE TO GLOBAL WARMING 156 (2002) (stating the United States is the world leader in cumulative GHG global emissions, with approximately 30%).

²⁷⁷ *See, e.g.,* Gillis & Popovich, *supra* note 2.

²⁷⁸ Paris Agreement, *supra* note 6, art. 9. *See also* Hai-Bin et al., *supra* note 138, at 222 (discussing the cumulative impact of developing countries' emissions).

²⁷⁹ Gillis & Popovich, *supra* note 2. *See also* Table 2 in Appendix I (showing the top emitters of carbon dioxide).

²⁸⁰ *See* Paris Agreement, *supra* note 6, art. 9 (outlining the guidelines for financial contributions).

²⁸¹ The Green Climate Fund technically aims to finance equal amounts to mitigation and adaptation initiatives under the UNFCCC. Its initial mobilization started in 2014, and after the Paris Agreement (2015), it plays a key role in fostering the goals of such agreement. *Green Climate Fund*, UNITED NATIONS (Jan. 23, 2019), <https://unfccc.int/process/bodies/funds-and-financial-entities/green-climate-fund> [<https://perma.cc/6SNK-24DH>].

it would be the eleventh highest financing country per capita.²⁸² However, because the United States suspended its financial contributions to the Green Climate Fund,²⁸³ the country will ultimately pay less than \$3 per capita.²⁸⁴ For the sake of comparison, the United Kingdom contributes \$18.77 per capita, while Norway, the highest contributor, pays \$50.56.²⁸⁵ Hence, another major consequence of the United States withdrawal from the Paris Agreement is the adverse impact on financing the Green Climate Fund, which promotes adaptation to climate change as well as the reduction of GHG emissions in the developing world.²⁸⁶

Additional consequences of the withdrawal are plentiful. In light of the changes pursued by the Trump administration, scientific data produced by U.S. researchers regarding climate change may no longer be available after the withdrawal, which is likely to have an adverse effect on global data sharing related to climate change.²⁸⁷ Another potential negative effect of the U.S. withdrawal is that the Paris Agreement provides a mechanism for the development and transfer of technology.²⁸⁸ Furthermore, other countries rely heavily on U.S. leadership to reach more ambitious goals.²⁸⁹ U.S. leadership could push momentum towards curbing emissions (as done under the previous administration), instead of sponsoring a free-riding approach.

International cooperation is dynamic and complex, subject to domestic, international, and supranational interests. It is crucial that

²⁸² See Gillis & Popovich, *supra* note 2 (explaining the original U.S. contribution would rank still behind the following nations, if per capita indexes were considered: Sweden, Luxembourg, Norway, Monaco, Britain, France, Denmark, Germany, Switzerland, and Japan). For complete data regarding the pledges of each country, its GDP, and its contribution per capita, see Table 2 in Appendix I.

²⁸³ Trump, *supra* note 1.

²⁸⁴ Gillis & Popovich, *supra* note 2. See also Kemp, *supra* note 4, at 459 (revealing that although the United States pledged to contribute \$3 billion, it has paid only a third of that amount).

²⁸⁵ Additional data involving comparative analysis is available at Table 2 of Appendix 1.

²⁸⁶ The fund is attentive to the needs of those who are highly vulnerable to the effects of climate change, specifically in Least Developed Countries (LDCs), Small Island Developing States (SIDs), and African States. See *Green Climate Fund*, *supra* note 281.

²⁸⁷ If United States scientists do not share their data, global data on the subject will likely be far less comprehensive. See Davenport & Landler, *supra* note 73.

²⁸⁸ Paris Agreement, *supra* note 6, art. 10.

²⁸⁹ *Id.* arts. 4, 9(3), 9(4).

actors are consistent in their international behavior. Therefore, it is no surprise that former UN Chief Ban Ki-Moon claimed that the U.S. withdrawal would affect climate change and may have a significant impact on the prospects of the Paris Agreement.²⁹⁰ Experts contend that it may jeopardize global climate cooperation, specifically on NDCs.²⁹¹ Considering the fragility of international cooperation, the U.S. withdrawal sets a terrible precedent. Even if other countries, like Australia, merely entertain the possibility of withdrawal,²⁹² that consideration might be blamed on the United States, as it will be the first (and, so far, only) country to actually withdraw. Australia's behavior provides evidence of a possible domino effect that the U.S. withdrawal could set in motion because Australia recently relaxed its emission targets.²⁹³

Complicating this scenario is the *déjà vu* the U.S. withdrawal would bring to the international order, given its non-ratification of the Kyoto Protocol.²⁹⁴ Legal scholarship suggests this decision led to changes in national leadership across the globe, inconsistent domestic policies, and exacerbation of mutual distrust among countries.²⁹⁵ Like when local entities take charge of environmental policies, the U.S. decision not to ratify the Kyoto Protocol increased the possibility that parties to the treaty would experience leakage,

²⁹⁰ Harini V, *U.S. Withdrawal from Paris Agreement May Affect Climate Change: Former UN Chief Ban Ki-moon*, CNBC (July 10, 2018), <https://www.cnbc.com/2018/07/10/i-sincerely-hope-that-the-us-will-come-back-says-ban-ki-moon.html> [<https://perma.cc/Z3A6-PRV7>].

²⁹¹ See Hai-Bin et al., *supra* note 138, at 223.

²⁹² Colin Packham & Erin Cooper, *Australia Weakens Commitment to Climate Accord After Government Fractures*, REUTERS (Aug. 20, 2018), <https://www.reuters.com/article/us-climatechange-accord-australia/australia-weakens-commitment-to-climate-accord-after-government-fractures-idUSKCN1L507Y> [<https://perma.cc/X6MA-XLGR>].

²⁹³ *Id.*

²⁹⁴ In 2001, before the Kyoto Protocol entered into force, the United States Senate, believing the principle of differentiated responsibilities was not in the U.S. domestic interest, refused to ratify the treaty. See Delali Benjamin K. Dovie & Shuaib Lwasa, *Correlating Negotiation Hotspot Issues, Paris Climate Agreement and the International Climate Policy Regime*, 77 ENVTL. SCI. & POL'Y 1, 2 (2017). On that occasion, European governments opted to expand the Protocol. The Kyoto Protocol was negotiated by the Clinton administration and, after the controversial election of President George W. Bush, environmental protection was no longer a priority.

²⁹⁵ See Lisa Schenck, *Climate Change "Crisis"—Struggling for Worldwide Collective Action*, 19 COLO. J. INT'L ENVTL. L. & POL'Y, 319, 328 (2008) (explaining how a "mutual distrust and threat of leakage hinder an adequate global response to climate change").

seeing their businesses move to unregulated countries.²⁹⁶ Similar concerns have arisen in relation to the U.S. withdrawal from the Paris Agreement, as local opposition to global action on climate change increased.²⁹⁷

The Trump administration's decision to withdraw is likely to contribute to anti-U.S. sentiment, as it creates the perception that the United States would be free-riding. The country's attempt at free-riding jeopardizes U.S. leadership on a global level,²⁹⁸ and the withdrawal could turn the U.S. into a climate pariah.²⁹⁹ The withdrawal will enable the United States to emit more pollutants and reduce its mitigation costs. After the withdrawal, the United States will begin "squeezing other countries' emission space and raising their mitigation costs."³⁰⁰ Game theory suggests this opportunistic behavior may lead to U.S. isolation, and perhaps even retaliatory actions by other parties to the Paris Agreement.³⁰¹ In addition, it would be unsurprising if non-governmental actors consider boycotting U.S. products, due to the country's blatant disregard for the environment.

²⁹⁶ *Id.*

²⁹⁷ Because of the U.S. withdrawal, the European Union, China, and Canada face increased domestic opposition, despite being committed to the Paris Agreement. See Emre Peker, *Around the World, Climate Goals Clash with Reality*, WALL STREET J. (Dec. 12, 2018), <https://www.wsj.com/articles/around-the-world-climate-goals-clash-with-reality-11544616000> [<https://perma.cc/3EZM-EK6H>].

²⁹⁸ See KOH, *supra* note 9, at 42 (arguing that despite presidential claims that U.S. leadership has been enhanced, the withdrawal will galvanize China and other BASIC (Brazil, South Africa, India, China) countries to reinforce their environmental commitments).

²⁹⁹ Kemp, *supra* note 4, at 460. Of the top twenty emitting nations, only Iran and Turkey have not ratified the Paris Agreement. *Paris Climate Agreement Countries 2020*, WORLD POPULATION REV. (last visited Apr. 19, 2020), <http://worldpopulationreview.com/countries/paris-climate-agreement-countries/> [<https://perma.cc/DXE2-VZUX>]. Russia has recently ratified the Paris Agreement, despite limited NDCs. See Alec Luhn, *Russia Ratifies Paris Climate Accord but Targets Are 'Critically Insufficient'*, TELEGRAPH (Sept. 23, 2019), <https://www.telegraph.co.uk/news/2019/09/23/russia-ratifies-paris-climate-accord-targets-critically-insufficient/> [<https://perma.cc/GR2F-JW25>].

³⁰⁰ Hai-Bin et al., *supra* note 138, at 222.

³⁰¹ This argument assumes that treaties are evidence of true cooperation among states, rather than representative of interests that coincide. A related argument is that states would find themselves in a repeated prisoner's dilemma or a coordination game. A situation may also develop that involves the retaliation effect. See, e.g., Mark A. Chinen, *Game Theory and Customary International Law: A Response to Professors Goldsmith and Posner*, 23 MICH. J. INT'L L. 143, 160-70 (2001), <https://repository.law.umich.edu/cgi/viewcontent.cgi?article=1337&context=mji> 1 [<https://perma.cc/X66J-FHD3>].

The absence of the United States as a global player leaves a leadership vacuum³⁰² that provides an unprecedented opportunity for China and India to boost their international reputations and soft power.³⁰³ Commentators suggest the U.S. withdrawal is more than relinquishment of its leadership, as it ultimately enables China to become the leading player in the energy sector.³⁰⁴ Global warming itself may bring gains to Russia.³⁰⁵ A few countries wasted no time in taking action to mitigate the impact of the U.S. decision.³⁰⁶ Meanwhile, it is clear that U.S. leadership in international matters is eroding under President Trump due to sudden changes and the uncertainties they bring.³⁰⁷ Although this Article focuses on the Paris Agreement, the U.S. denunciation of the Joint Comprehensive Plan of Action (or the “Iran deal”),³⁰⁸ the Trans-Pacific Partnership,³⁰⁹ and the Intermediate-Range Nuclear Forces Treaty³¹⁰

³⁰² See KOH, *supra* note 9, at 42 (arguing that despite presidential claims that U.S. leadership has been enhanced, the withdrawal will galvanize China and other BASIC (Brazil, South Africa, India, China) countries to reinforce their environmental commitments).

³⁰³ Kemp, *supra* note 4, at 460.

³⁰⁴ McCarthy, *supra* note 220.

³⁰⁵ See POSNER & SYKES, *supra* note 135, at 231-232 (explaining that territory currently frozen would be accessible).

³⁰⁶ On June 1, 2017, French President Emmanuel Macron introduced a program for domestic and international researchers, graduate students, and post-docs to develop studies on climate change. The English name of this initiative is “Make our Planet Great Again,” which obviously alludes to Donald Trump’s campaign slogan. *Make Our Planet Great Again*, CAMPUS FR. (2017), <https://www.campusfrance.org/en/make-our-planet-great-again-en> [<https://perma.cc/4WPR-HKTU>].

³⁰⁷ The United States was unable to exert influence at COP 23, and is currently the only UN member who is soon to be out of the Paris Agreement. See Cooper, *supra* note 5, at 450.

³⁰⁸ Donald J. Trump, President of the U.S., Remarks by President Trump on the Joint Comprehensive Plan of Action (May 8, 2018), <https://www.whitehouse.gov/briefings-statements/remarks-president-trump-joint-comprehensive-plan-action/> [<https://perma.cc/CC7F-8BDG>]. This controversial condemnation also appears to be unreasoned, considering the misleading statements in the President’s remark.

³⁰⁹ DONALD J. TRUMP, PRESIDENTIAL MEMORANDUM REGARDING WITHDRAWAL OF THE UNITED STATES FROM THE TRANS-PACIFIC PARTNERSHIP NEGOTIATIONS AND AGREEMENT (Jan. 23, 2017), <https://www.whitehouse.gov/presidential-actions/presidential-memorandum-regarding-withdrawal-united-states-trans-pacific-partnership-negotiations-agreement/> [<https://perma.cc/3K7Y-AFGC>].

³¹⁰ The current administration withdrew from this Agreement with Russia, despite its previous praise for the treaty, which was signed by President Reagan. For a limited justification of the withdrawal, see Donald J. Trump, Remarks by

all demonstrate that choices made by this administration occur with little notice, involve limited, if any, reasoning, and are considered contentious by the international community. The choice to withdraw from the Paris Agreement being similar, it will likely cause similar reactions across the world, further eroding US power.

The lack of U.S. leadership has put more pressure on the United Nations, which has been actively pursuing environmental protection and seeking ways to reduce the impact of climate change. The UN Security Council recently recognized climate change as a “threat multiplier,” as climate-related risks and conflicts are already a reality for millions of people around the globe, threatening peace and security.³¹¹ As part of its 2030 Agenda for Sustainable Development, the UN created the Sustainable Development Goals (SDGs), which are meant to serve as an urgent call to action to citizens across the globe.³¹² Although all member states adopted the Agenda in 2015, and consequently are meant to uphold the SDGs, the U.S. withdrawal from the Paris Agreement conflicts with those stated goals.

Despite global efforts and policies to mitigate climate change, it remains to be seen whether other countries will continue to comply with the Paris Agreement after the United States withdraws. The withdrawal is perceived as undermining the legitimacy of the agreement and jeopardizing the effectiveness of climate change governance.³¹³ It is possible that countries will elect to sign on to the Agreement or decide to make their voluntary compliance more effective. India’s compliance with its NDCs, despite the upcoming U.S. withdrawal, provides evidence that other countries may follow

President Trump Before Air Force One Departure (Oct. 20, 2018), <https://www.whitehouse.gov/briefings-statements/remarks-president-trump-air-force-one-departure-4/> [<https://perma.cc/SM35-43NK>].

³¹¹ See *Climate Change Recognized as ‘Threat Multiplier’*, UN Security Council Debates its Impact on Peace, UN NEWS (Jan. 25, 2019), <https://news.un.org/en/story/2019/01/1031322> [<https://perma.cc/URH4-V6VL>] (discussing desertification and food and energy security).

³¹² Of the seventeen principles, Goal 7 (affordable and clean energy) and Goal 13 (climate action) are particularly relevant to the topic at hand. They demonstrate the need for all countries—developed and developing nations alike—to commit to effective and responsible actions to protect the environment and curb global warming. See *Sustainable Development Goals*, UNITED NATIONS (2015), <https://www.un.org/sustainabledevelopment/sustainable-development-goals/> [<https://perma.cc/J7VH-8HAT>].

³¹³ Hai-Bin et al., *supra* note 138, at 222.

this route.³¹⁴ Meanwhile, Australia's behavior, ultimately electing not to comply with its original NDCs, indicates other parties may refuse to be bound to their targets.³¹⁵

The latter scenario becomes much direr when considering that President Trump's decision may mean the world misses its one window of opportunity regarding climate change mitigation,³¹⁶ particularly as research shows the ten years after the Paris Agreement are crucial for achieving its targets.³¹⁷ Mitigation is vital,³¹⁸ because it is the only way to reduce carbon emissions effectively.³¹⁹ A recent study by Nobel Laureate William Nordhaus concludes that limited global action on climate change means the reduction of 2°C is unattainable, and the need for policies to slow climate change is growing more pressing.³²⁰ The U.S. withdrawal not only hinders the country's ability to maintain its leadership position in the global arena, but—more significantly—possibly hampers the possibility of taking meaningful global action on climate change. Regardless, should the United States withdraw from the Paris Agreement, a race to the bottom will have begun, exposing all to the extreme consequences of global warming in a manner that certainly will not improve the overall well-being of either U.S. residents or those residing elsewhere on the planet.

IV. CONCLUSION

This Article finds that the U.S. withdrawal from the Paris Agreement is not justified under the rigorous cost-benefit analysis

³¹⁴ Annie Gowen & Simon Denyer, *As U.S. Backs Away from Climate Pledges, India and China Step Up*, WASH. POST (June 1, 2017), https://www.washingtonpost.com/world/asia_pacific/as-us-backs-away-from-climate-pledges-india-and-china-step-up/2017/06/01/59ccb494-16e4-4d47-a881-c5bd0922c3db_story.html [https://perma.cc/E4RA-J9LM].

³¹⁵ Packham & Cooper, *supra* note 292.

³¹⁶ The urgency of climate change action was a significant factor addressed in the Paris Agreement, and there was international consensus about it. *See* Morgan et al., *supra* note 36, at 9.

³¹⁷ Hai-Bin et al., *supra* note 138, at 223.

³¹⁸ WB, *supra* note 182, at 2.

³¹⁹ SOVACOOL ET AL., *supra* note 144, at 184.

³²⁰ William Nordhaus, *Projections and Uncertainties About Climate Change in an Era of Minimal Climate Policies*, 10 AM. ECON. J. 333, 358 (2018), <https://pubs.aeaweb.org/doi/pdfplus/10.1257/pol.20170046> [https://perma.cc/DA8T-RCCK].

test outlined therein. First, the manner in which this decision was reached was evaluated, focusing on its procedural terms. This assessment shows the current administration did not make a reasoned decision regarding the U.S. withdrawal from the Paris Agreement, and illustrates how the withdrawal abruptly departs from previously reasoned regulatory action. The absence of a scientific advisor, the lack of sound science, and lobbying efforts are considered factors indicative of unreasoned action. The Article analyzes the existing litigation on the Paris Agreement, contextualizing its potential increase after the withdrawal. Current trends involving such litigation, which are unveiled in this Article, provide evidence of such an increase. The legal uncertainty provoked by the intended withdrawal indicates transaction costs for the involved parties are increasing and will likely continue to do so.

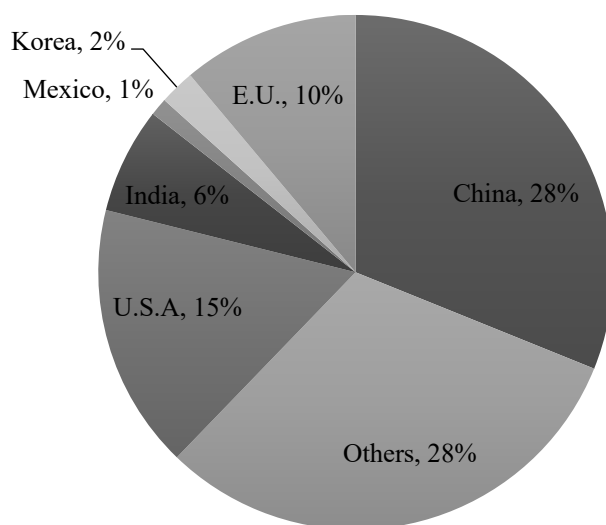
Second, this Article assesses the costs and benefits of the policy decision itself, concentrating on the merits (substantive terms) of the withdrawal. It addressed the pertinent challenges for this assessment and discussed the domestic costs and arguable benefits of the U.S. withdrawal. This analysis finds that subnational units are unfit substitutes for national climate policy. The Article shows how the withdrawal will create more costs than benefits for the United States in the medium and long term, while the limited short-term benefits will be restricted to the coal-industry. Moreover, these so-called "benefits" are unlikely to be actual gains, as the withdrawal disregarded the social cost of carbon and the divested investments on renewable energy. The estimated strong impact of the withdrawal on the GDP demonstrates how it is detrimental to the U.S. economy. This shows President Trump's decision does not maximize overall well-being.

Furthermore, this Article establishes that the U.S. withdrawal has and will continue to have an adverse global impact. It lessens the country's leadership role in the international arena, which will take several years to recover, and may prove detrimental to immediate trade considerations. More significantly, the withdrawal may cost the United States, and the world, to miss out on a narrow window of opportunity to combat climate change. Consequently, the United States and the rest of the international community are potentially more susceptible to the devastating consequences of climate change.

Finally, as the U.S. withdrawal from the Paris Agreement does not pass the cost-benefit analysis test, it demonstrates that the United States should remain in the Agreement and continue to be a

leading force in reducing carbon emissions and mitigating the effects of climate change. The criticism regarding the withdrawal will continue alongside the desire for climate change being taken seriously. Harshly dismissing climate change as a Chinese invention and announcing his intention to withdraw from the Paris Agreement, as President Trump did, is unreasoned. It does not maximize the overall well-being of U.S. residents, it adversely impacts global action on climate change, and ultimately fails the comprehensive cost-benefit analysis conducted in this Article.

APPENDIX I: FIGURES

CHART 1: GLOBAL CARBON DIOXIDE EMISSIONS IN 2016³²¹

³²¹ This chart was developed by the author based on the carbon emissions of fossil combustibles during 2016. See *IEA Atlas of Energy*, INT'L ENERGY AGENCY (2016), <http://energyatlas.iea.org/#!/tellmap/1378539487> [https://perma.cc/G8NT-4K48]. For per capita emissions, see Table 2.

TABLE 1: CARBON DIOXIDE PRODUCED PER TYPE OF FUEL³²²

Fuel Type	Pounds of CO2 emitted (per million BTU)
Coal (anthracite)	228.6
Coal (bituminous)	205.7
Coal (lignite)	215.4
Coal (subbituminous)	214.3
Diesel fuel and heating oil	161.3
Gasoline (without ethanol)	157.2
Propane	139.0
Natural Gas	117.0

TABLE 2: CONTRIBUTIONS TO THE GREEN FUND BY COUNTRY AND EMISSIONS PER CAPITA³²³

Contributor	Announced (Millions, USD)	Signed Per Capita	GDP Per Capita (K)	Emissions Per Capita (Rounded metric tons per capita)
Australia	187	7.92	62	17
Austria	34.8	4.01	51	8
Belgium	66.9	6.18	48	9
Bulgaria	0.10	0.02	8	7
Canada	277	7.79	50	14
Chile	0.30	0.02	15	5
Colombia	0.30	<0.01	8	2
Cyprus	0.47	0.40	27	7
Czech Republic	5.32	0.57	20	10
Denmark	71.8	12.73	61	7
Estonia	1.30	0.99	20	14
Finland	107	19.40	50	10

³²² *Frequently Asked Questions: How Much Carbon Dioxide is Produced When Different Fuels Are Burned*, U.S. ENERGY INFO. ADMIN. (last reviewed June 4, 2019), <https://www.eia.gov/tools/faqs/faq.php?id=73&t=11> [<https://perma.cc/H798-CVV8>].

³²³ *Status of Pledges and Contributions Made to the Green Climate Fund*, GREEN CLIMATE FUND (Feb. 3, 2020), <https://www.greenclimate.fund/how-we-work/resource-mobilization> [<https://perma.cc/9UNR-LVQB>].

France	1035	15.64	43	5
Germany	1003	12.40	48	9
Hungary	4.30	0.43	14	5
Iceland	1.00	2.10	52	6
Indonesia	0.30	<0.01	4	2
Ireland	10.7	0.58	53	8
Italy	317.5	4.54	35	7
Japan	1,500	11.80	36	9
Latvia	0.50	0.24	16	4
Liechtenstein	0.10	1.48	135	1
Lithuania	0.10	0.04	16	5
Luxembourg	46.8	58.63	111	21
Malta	0.60	0.70	23	6
Mexico	10.0	0.08	10	4
Monaco	2.30	28.89	163	-
Mongolia	0.1	0.02	4	7
Netherlands	133.8	7.94	52	10
New Zealand	2.6	0.57	42	7
Norway	272.2	50.56	97	9
Panama	1.00	0.25	12	3
Peru	6.00	0	7	2
Poland	0.10	<0.01	14	8
Portugal	2.70	0.26	22	5
Rep. of Korea	100	1.99	28	12
Romania	0.10	<0.01	10	4
Spain	160.5	3.46	30	6
Sweden	581.2	59.31	59	6
Switzerland	100	12.21	85	5
United Kingdom	1,211	18.77	46	7
United States	3000	9.41	55	17
Vietnam	1.00	-	2	2