2022

The Injustice of 1.5°C–2°C: The Need for a Scientifically Based Standard of Fundamental Rights Protection in Constitutional Climate Change Cases

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THE INJUSTICE OF 1.5°C–2°C: THE NEED FOR A SCIENTIFICALLY BASED STANDARD OF FUNDAMENTAL RIGHTS PROTECTION IN CONSTITUTIONAL CLIMATE CHANGE CASES

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In 2015, signatories to the Paris Agreement agreed to the goal of keeping global temperature rise this century to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C. Although the adoption of the Paris Agreement was in many ways a political triumph, seven years later many climate advocates are presenting the Paris target to judicial bodies as the de facto legal standard for fundamental rights protection in climate change cases. Yet, the history leading up to the signatories' ultimate adoption of the Paris Agreement target suggests that the target is somewhat arbitrary and not a product of scientific debate, but rather the outcome of political diplomacy. There is no scientific support for the notion that 1.5°C or 2°C will stabilize the Earth's Energy Imbalance, a metric scientists deem fundamental for assessing the mitigation of climate change. The scientific consensus suggests that the impacts of 1.5°C or 2°C of global heating will result in the eradication of entire populations and places, causing devastating climate change impacts and placing many people in peril. The IPCC's Special Report on Global Warming of 1.5°C, as well as peer-reviewed climate science, illustrates that in a world 1.5°C warmer, humanity will suffer, with the most disadvantaged and vulnerable communities threatened the most.

This Article describes how the global community came to coalesce around the Paris Agreement target and asks a controversial question: whether a target obtained through international agreement should be used by climate advocates and judicial bodies as a proxy legal standard for fundamental rights protection and the fair administration of justice

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The authors are indebted to John Boone for his thorough research assistance, Claire McMoy for her research assistance, the librarians at the Gallagher Law Library for their research support, Cindy Fester for her indispensable polishing skills, Julia Olson for her vision, and their children's teachers and caregivers, who helped make the writing of this article possible.

when the science says otherwise? Part One of this Article describes the history of the 1.5°C–2°C target and its subsequent acceptance and popularization as a limit based on "science." Part Two analyzes how legal practitioners and courts are relying on the Paris Agreement as the basis for establishing legal standards of protection for fundamental rights in climate change litigation and how judicial endorsement of an unsafe target threatens human rights. Part Three proposes that science-based climate mitigation standards are a more appropriate legal standard for protecting human rights in climate change cases.

INTRODUCTION

Judicial bodies are perilously adopting the Paris Agreement target, a limit negotiated by governments to limit global average heating to 1.5°C–2°C, as the legal standard for protecting fundamental rights in the climate

change context.[1] By design, the Paris Agreement target began as a heuristic intended to guide policy decisions addressing climate change. A review of the history leading up to the Paris Agreement reveals the target was based on intergovernmental compromise, not science.[2] Yet, the Paris Agreement target is frequently ascribed by climate advocates as "science based."[3] In fact, current climate science does not support the notion that limiting warming to 1.5°C or 2°C would stabilize the Earth's Energy Imbalance ("EEI"), a metric scientists deem "fundamental" to determining "how well the world is doing in the task of bringing climate change under control,"[4] or to avoid triggering several critical climate tipping points.[5] This Article argues that climate change advocates should present judicial bodies with science-based standards to achieve climate stability, rather than rely on the Paris Agreement target, as the touchstone for compliance with governments' human rights obligations.

Although the Paris Agreement target of "[h]olding the increase in the global average temperature to well below 2°C above industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels"[6] has been tacitly accepted as the end goal in popular media and by many governments around the world, the Intergovernmental Panel on Climate Change ("IPCC")—the consensus-based scientific body informing the United Nations Framework Convention on Climate Change ("UNFCCC")—characterized 1.5°C of

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[1] Paris Agreement art. 2, § 1(a), 12 Dec. 2015, 3156 U.N.T.S. 54113, https://unfccc.int/sites/default/files/english_paris_agreement.pdf.

[2] Johannes Urpelainen, *Here's What Political Science Can Tell Us About the Paris Climate Deal*, WASH. POST (Dec. 14, 2015), https://www.washingtonpost.com/news/monkey-cage/wp/2015/12/14/heres-what-political-science-can-tell-us-about-the-paris-climate-deal/ (examining the political undertones behind the Paris Agreement); Samuel Randalls, *History of the 2°C Climate Target*, 1 WILEY INTERDISC. REV. CLIMATE CHANGE 598, 602 (2010) (noting briefly the political undertones behind the widespread acceptance of a 2°C target).

[3] *See, e.g.*, Reto Knutti, Joeri Rogelj, Jan Sedláček & Erich M. Fischer, *A Scientific Critique of the Two-Degree Climate Change Target*, 9 NATURE GEOSCIENCE 1, 1 (2016) [hereinafter Knutti et al.] ("This target was a political decision informed by science, but no scientific assessment ever defended or recommended a particular target."); Randalls, *supra* note 2, at 601–02 (acknowledging the scientific skepticism surrounding the 2°C target, but noting that it has been widely embraced); Hans Joachim Schellnhuber, Stefan Rahmstorf & Ricarda Winkelmann, *Why the Right Climate Target Was Agreed in Paris*, 6 NATURE CLIMATE CHANGE 649, 653 (2016) ("Almost miraculously, the countries of the world . . . have agreed on a sensible, science-based climate target . . . .").

[4] *See* Karina von Schuckmann et al., *Heat Stored in the Earth System: Where Does the Energy Go?*, 12 EARTH SYS. SCI. DATA, 2013, 2029, 2029 (2020) (defining the metric of stabilizing the Earth's energy system imbalances).

[5] *See* David I. Armstrong McKay et al., *Exceeding 1.5°C Global Warming Could Trigger Multiple Climate Tipping Points*, 377 SCIENCE 1171, 1171, 1178 (2022) (citing nine core tipping points, five of which have lower bounds that become likely at the Paris Agreement range of 1.5°C–2°C, and suggesting "that ~1°C is a level of global warming that minimizes the likelihood of crossing [climate tipping points]").

[6] Paris Agreement, *supra* note 1.

heating as "not . . . safe for most . . . communities."[7] Even at present levels of heating of approximately 1°C, climate impacts are devastating communities around the world, and the science suggests that any additional heating is highly dangerous, particularly for those most exposed to the impacts of climate change.[8] In a 1.5°C–2°C warmer world, those most vulnerable to climate impacts—peoples who live in the Arctic and low-lying island nations, youth, and those already experiencing socioeconomic or political vulnerabilities, for example—will be denied the ability to exercise fundamental rights on this planet.[9]

This Article critiques the trend of climate advocates using the Paris Agreement target as a proxy symbolizing the outer bounds of global climate policy in the fundamental rights context. In addition, this Article argues that if the Paris Agreement target becomes the de facto equivalent legal standard for fundamental rights protections, multilateral environmental negotiators become the arbiters of the rights of peoples whose lives that very target expends. Although judicial bodies can and often do draw lines in the sand to define the scope of fundamental rights, legal standards for climate rights should not automatically be imported from the realm of political negotiations, particularly when the science says otherwise.

Part I of this Article describes the history of the Paris Agreement target as a vehicle of political consensus, its acceptance by the international political community, and the dangers of adopting the Paris Agreement target as the legal standard for protecting fundamental rights. Part II describes the role of *Juliana v. United States*, one of the first human rights-centered climate change cases, in utilizing scientific evidence to support recognition of a U.S. Constitutional right "to a climate system capable of sustaining human life,"[10] as well as the international trend of advocates adopting the Paris Agreement target as protective of human

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[7] Joyashree Roy et al., *Sustainable Development, Poverty Eradication and Reducing Inequalities*, *in* GLOBAL WARMING OF 1.5°C: AN IPCC SPECIAL REPORT ON THE IMPACTS OF GLOBAL WARMING OF 1.5°C ABOVE PRE-INDUSTRIAL LEVELS AND RELATED GLOBAL GREENHOUSE GAS EMISSION PATHWAYS, IN THE CONTEXT OF STRENGTHENING THE GLOBAL RESPONSE TO THE THREAT OF CLIMATE CHANGE, SUSTAINABLE DEVELOPMENT, AND EFFORTS TO ERADICATE POVERTY 445, 447 (Valérie Masson-Delmotte et al. eds., 2018) [hereinafter GLOBAL WARMING OF 1.5°C], https://www.ipcc.ch/sr15/chapter/chapter-5/.

[8] *Id.* ("Warming of 1.5°C is not considered 'safe' for most nations, communities, ecosystems and sectors and poses significant risks to natural and human systems as compared to current warming of 1°C . . . . The impacts of 1.5°C of warming would disproportionately affect disadvantaged and vulnerable populations . . . ."); Armstrong McKay et al., *supra* note 5, at 1171 ("We show that even the Paris Agreement goal of limiting warming to well below 2°C and preferably 1.5°C is not safe as 1.5°C and above risks crossing multiple tipping points.").

[9] *See id.*

[10] Juliana v. United States, 217 F. Supp. 3d 1224, 1250 (D. Or. 2016).

rights to life, liberty, security of the person, and privacy, among others. Finally, Part III critiques the use of the Paris Agreement target from a legal perspective and proposes that advocates present the best available scientific evidence of EEI and urge the adoption of a scientifically based legal standard when seeking fundamental rights protections in climate change cases.

I. A LIMIT IS NOT A GOAL: HOW 2°C BECAME POPULARIZED AS A CLIMATE TARGET AND LEGAL STANDARD OF PROTECTION

This section chronicles the historic emergence of the Paris Agreement target across disciplines, its solidification in consensus-driven climate conferences, and its subsequent popularization and acceptance as a legal standard of protection.

A. The Acceptance and Popularization of 2°C as a Consensus-Driven Target

The first mentions of limiting warming to 2°C were largely tangential. After World War II, scientists within the U.S. Office of Naval Research took note of the rising levels of atmospheric carbon dioxide ("CO_2") and began exploring what level of warming would result from a doubling of CO_2.[11] The science on this question continued to develop, and in 1967, Syukuro Manabe and Richard Wetherald co-authored a paper in the Journal of Atmospheric Sciences, *Thermal Equilibrium of the Atmosphere with a Given Distribution of Relative Humidity*,[12] that estimated that a doubling of CO_2 concentrations in the atmosphere would result in warming of approximately 2°C.[13] A decade later, in 1977, economics Professor William Nordhaus authored two papers noting that warming of more than 2°C would exceed historical limits:

> According to most sources the range of variation between distinct climatic regimes is on the order of [around] 5°C, and at present time the global climate is at the high end of this range. If there were global temperatures more than 2 or 3°C above the current average temperature, this would take the climate outside of the

[11] Expert Report of James E. Hansen, Ph.D. at 8–9, Juliana v. United States, 217 F. Supp. 3d 1224 (D. Or. 2016) [hereinafter *Juliana*, Hansen Expert Report].

[12] Syukuro Manabe & Richard T. Wetherald, *Thermal Equilibrium of the Atmosphere with a Given Distribution of Relative Humidity*, 24 J. ATMOSPHERIC SCI. 241 (1967).

[13] *Id.* at 241. *See also* Piero Morseletto, Frank Biermann & Philipp Pattberg, *Governing by Targets: Reductio Ad Unum and Evolution of the Two-Degree Climate Target*, 17 INT'L ENV'T AGREEMENTS: POL., L. & ECON. 655, 658 (2017).

> range of observations which have been made over the last several hundred thousand years.[14]

Although this was a tangential point in a paper otherwise focused on economics, it was, "perhaps, the first suggestion to use 2°C as a critical limit for climate policy . . . ."[15] Importantly, in these early papers, the number appeared as a heuristic, not as normative policy guidance or as a limit grounded in science.[16]

In 1988, the 2°C threshold emerged as an aspirational warming limit in a World Meteorological Organization report, *Developing Policies for Responding to Climatic Change*, which summarized findings from two meetings of the Advisory Group on Greenhouse Gases ("AGGG").[17] The report offered "recommendations for the development of a climate convention by examining the underlying science and its implications for policy[makers]."[18] At that time, 1988 had been the warmest year on record.[19] This fact was made publicly known by NASA scientist Dr. James Hansen, who famously testified to the United States Congress that year about the causal link between a warming world and the emission of greenhouse gases ("GHGs") and the impacts of an accumulation of CO_2 in the atmosphere on more frequent and extreme weather events.[20] He presented the following graph during his congressional testimony:[21]

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[14] *See, e.g.*, William D. Nordhaus, *Strategies for the Control of Carbon Dioxide* 39–40 (Yale U. Cowels Found. for Rsch. in Econ., Working Paper No. 443, 1977). *See generally Two Degrees: The History of Climate Change's Speed Limit*, CARBON BRIEF (Aug. 12, 2014, 10:45 AM), https://www.carbonbrief.org/two-degrees-the-history-of-climate-changes-speed-limit (noting Professor Nordhaus's two papers).

[15] Carlo C. Jaeger & Julia Jaeger, *Three Views of Two Degrees*, 11 REGUL. ENV'T CHANGE, at S15, S16 (2011).

[16] Morseletto, Biermann & Pattberg, *supra* note 13, at 658.

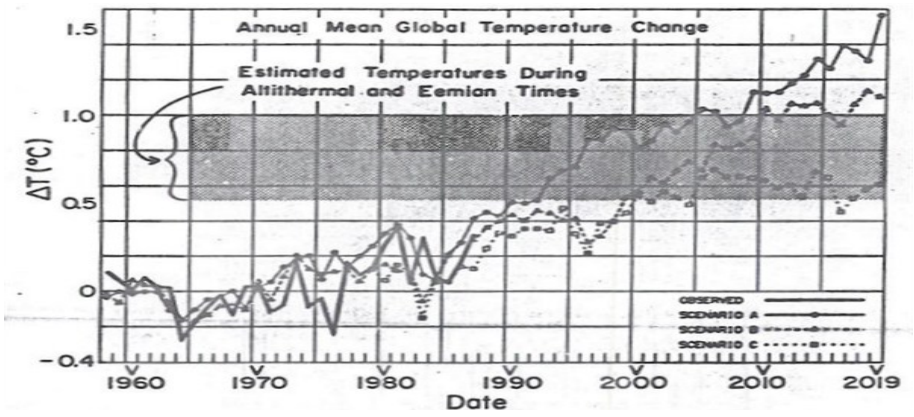
[17] *Id.* For the report, see REPORT OF THE FIRST SESSION OF THE WMO/INEP INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (Nov. 1988).

[18] *See* Morseletto, Biermann & Pattberg, *supra* note 13, at 658.

[19] *The Greenhouse Effect: Impacts on Current Global Temperature and Regional Heat Waves Before the Comm. on Energy & Nat. Res.*, 100th Cong. 39 (1988) (statement of Dr. James Hansen, Director, NASA Goddard Institute for Space Studies).

[20] *Id.*

[21] *Id.* at 48 fig.3.



Dr. Hansen, while presenting the scientific data of global warming and stating a high degree of confidence that a cause-and-effect relationship between global warming and human-caused GHG emissions existed, did not offer guidance on a safe limit of warming, nor did he suggest that 1.5°C–2°C of warming is supported by the science as safe or desirable from a planetary science perspective.[22]

Later that same year, the AGGG convened three working groups coordinated by the Stockholm Environmental Institute to specifically examine the impacts of warming at a rate of a 0.1°C increase per decade and to analyze a 1°C or 2°C increase as potential temperature targets guiding policy-making efforts.[23] In 1990, these working groups compiled a "Targets and Indicators of Climate Change" report that recommended two absolute temperature targets for committed warming, each with a different level of risk: (i) "A maximum temperature increase of 1.0°C above pre-industrial global mean temperature"; and (ii) "A maximum temperature increase of 2.0°C above pre-industrial global mean temperature."[24] The report assumed that "temperature changes greater than the lower limit may be unavoidable due to greenhouse gases already emitted," but explicitly cautioned that "[a]n absolute temperature limit of 2.0°C can be viewed as an upper limit beyond which the risks of grave damage to ecosystems, and of non-linear responses, are expected to increase rapidly." [25] Importantly, this thirty-year-old report never condoned 2°C as "safe."

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[22] *Id.* at 39–46.

[23] Morseletto, Biermann & Pattberg, *supra* note 13, at 658.

[24] TARGETS AND INDICATORS OF CLIMATIC CHANGE, at viii (Frank R. Rijsberman & Rob J. Swart, R. J. eds., 1990) [hereinafter SEI TARGETS AND INDICATORS DRAFT REPORT].

[25] *Id.* at viii–ix.

The "Targets and Indicators of Climate Change" working group was aware of the advantages and shortcomings of using a "target approach" to frame allowable temperature increase:

> The clear advantage of the target approach is that—once appropriate targets are universally adopted—progress towards them should be quantifiable and unambiguous. Other authors criticize the target approach because of the difficulty of setting appropriate targets that are generally acceptable.
>
> Where there is no universal agreement over the usefulness of climate policy targets, there is certainly not yet agreement as to what such targets should be.[26]

The working group also acknowledged that it was "difficult to obtain a good understanding of the implications of specific targets" given the complexity of the climate system and interrelated systems: "e.g., what the cost will be of adopting targets, and the impacts thereof on the economy." [27] Indeed, it advocated for periodically reviewing and adjusting targets to accommodate new developments in science.

Efforts to create an objective limit of global warming emerged in the international political arena shortly after the convergence of these working groups. In 1990, the IPCC published an assessment report to provide objective scientific and technical assessments on global warming.[28] The IPCC "provide[s] policymakers with regular scientific assessments on climate change, its implications and potential future risks, [and] put[s] forward adaptation and mitigation options."[29] As a quasi-political body of scientists, "[t]he IPCC is mandated to produce consensus" [30] and provides guidance that is "policy-relevant but not policy-prescriptive."[31] In keeping with its role, the IPCC has neither endorsed nor recommended the adoption of 1.5°C or 2°C as a target in its 1990 report nor in any subsequent reports; rather, the IPCC reports on the scientific consensus on climate impacts associated with different levels of warming. Although IPCC reports have summarized a significant body of science projecting that warming of 1.5°C or 2°C would be

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[26] F.R. Rijsberman, G.W. Geil & B.T. Bower, *Setting Targets for Climate Policies*, *in id.* at 9 (internal citations omitted).

[27] *Id.*

[28] G.A. Res. 43/53, Protection of Global Climate for Present and Future Generations of Mankind (Dec. 6, 1988).

[29] *The Intergovernmental Panel on Climate Change*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE [hereinafter *IPCC*], https://www.ipcc.ch/ (last visited Sept. 10, 2022).

[30] Martin Mahony & Mike Hulme, *The Colour of Risk: An Exploration of the IPCC's "Burning Embers" Diagram*, 6 SPONTANEOUS GENERATIONS: J. HIST. & PHIL. SCI. 75, 81 (2012).

[31] *IPCC*, *supra* note 29.

catastrophic,[32] the IPCC does not dictate what temperature target should be adopted to be protective of fundamental rights.[33] Instead, IPCC assessments "present projections of future climate change based on different scenarios and the risks that climate change poses and discuss the implications of response options, but they do not tell policymakers what actions to take."[34]

The 1990 IPCC report indicated that the global mean temperature would likely increase "about 1°C above the present value by 2025 (about 2°C above that in the pre-industrial period), and 3°C above today's value before the end of the next century (about 4°C above pre-industrial)."[35] These projections indicated that the impact of concurrent drought or heat stress could be severe, glaciers and ice sheets would decrease, permafrost would degrade, ecosystems would be dramatically altered, and major health impacts would be possible.[36] The report urged quick strategic action given the severity of these predictions: "The potentially serious consequences of climate change on the global environment . . . give sufficient reasons to begin by adopting response strategies that can be justified immediately even in the face of such significant uncertainties."[37]

The UNFCCC, which was adopted at the 1992 Rio Earth Summit and came into force in 1994,[38] was designed to achieve "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."[39] However, the treaty did not define "dangerous," nor did it promote a specific numeric temperature target. The UNFCCC established a Conference of the Parties ("COP"), a "legislative-like body that meets annually and is charged with devising ways to implement the UNFCCC's

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[32] *See* Jaeger and Jaeger, *supra* note 15, at S18.

[33] IPCC FACTSHEET: WHAT IS THE IPCC? 1 (July 2021), https://www.ipcc.ch/site/assets/uploads/2021/07/AR6_FS_What_is_IPCC.pdf. *See also IPCC*, *supra* note 29 ("IPCC reports are neutral, policy-relevant but not policy-prescriptive.").

[34] *See* IPCC FACTSHEET: WHAT IS THE IPCC? 1 (July 2021), https://www.ipcc.ch/site/assets/uploads/2021/07/AR6_FS_What_is_IPCC.pdf.

[35] *See Preface to the IPCC Overview*, *in* THE IPCC FIRST ASSESSMENT REPORT 51, 52 (1990), https://www.ipcc.ch/site/assets/uploads/2018/05/ipcc_90_92_assessments_far_overview.pdf.

[36] *Id.* at 55–56.

[37] CLIMATE CHANGE: THE 1990 AND 1992 IPCC ASSESSMENTS 124 (June 1992), https://www.ipcc.ch/site/assets/uploads/2018/05/ipcc_90_92_assessments_far_full_report.pdf.

[38] U.N. Framework Convention on Climate Change, May 1992, 1771 U.N.T.S. 30822 [hereinafter U.N. Framework]; *What is the United Nations Framework Convention on Climate Change?*, U.N. CLIMATE CHANGE, https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change (last visited Sept. 10, 2022).

[39] U.N. Framework, *supra* 38, at art. 2.

goals."[40] The Parties, currently 197 states and one regional economic integration organization,[41] rely upon the reports issued by the IPCC to inform their negotiations and political decision-making, but the parties are by no means bound to heed the science. By the end of this period, in the early 1990s, consensus existed that there should be a target, but precisely what it should be was an open question that both scientists and policy makers continued to explore.

B. Promotion of the 2°C Target and its Influence on International Political Consensus

After the UNFCCC was established and before the first COP in 1995, European governmental institutions began honing in on 2°C as a numeric target to meet the narrative standard of "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."[42] The number itself, however, was a "suitable simplification for non-specialists" and not intended to represent a warming limit informed by science or tied to the protection of fundamental rights.[43] In fact, the authors of the 1990 "Targets and Indicators" report recognized that the choice of a target for purposes of the UNFCCC process should be "a product of the political process of negotiation," presumably because that is how international agreement among governments is achieved.[44] But, during this time, scientists' "ability to understand the mechanisms driving global warming and predict the impacts more precisely had improved dramatically."[45] Particularly, scientists gained "[a]nother layer of quantitative verification of [their] understanding of global climate change": EEI.[46] According to Dr. James Hansen:

> It had long been understood that when greenhouse gases such as CO_2 increase, they would cause a planetary energy imbalance by reducing Earth's heat radiation to space: thus the energy in absorbed sunlight would temporarily exceed the energy returned to space. The planet must warm in response to this positive energy

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[40] Michael B. Gerrard, *Introduction and Overview*, *in* GLOBAL CLIMATE CHANGE AND U.S. LAW 18 (Michael B. Gerrard ed., 2007).

[41] *Status of Ratification of the Convention*, U.N. CLIMATE CHANGE, https://unfccc.int/process-and-meetings/the-convention/status-of-ratification/status-of-ratification-of-the-convention (last visited Aug. 28, 2022).

[42] U.N. Framework, *supra* note 38, at art. 2.

[43] Morseletto, Biermann & Pattberg, *supra* note 13, at 660.

[44] *See* SEI TARGETS AND INDICATORS DRAFT REPORT, *supra* note 24, at viii; *see also* Morseletto, Biermann & Pattberg, *supra* note 13, at 660.

[45] *Juliana*, Hansen Expert Report, *supra* note 11, at 17.

[46] *Id.* at 18. *See also* von Schuckmann et al., *supra* note 4, at 2014.

> imbalance, but full response to the forcing could require a very long time, decades or even centuries, because of the great thermal inertia of the ocean. The question we undertook to study was the extent of such an energy imbalance and whether it was quantitatively consistent with estimates of climate sensitivity. . . . [O]n the basis of climate model simulations for the period 1979–1996 with several alternative representations of the ocean, there should have been a planetary energy imbalance of about +0.5 W/m^2 averaged over the entire planet in 1979, and this would grow to as much as 0.7-1 W/m^2 at the end of the 20th century.
>
> It is the ocean's thermal inertia that slows the planet's response to changing climate forcing, so the planetary energy imbalance (the net incoming energy) is largely flowing into the ocean. Much smaller amounts of energy go into a net melting of ice and a warming of the ground and atmosphere. . . .
>
> . . . .
>
> Measurements of ocean heat gain, and smaller heat gains inferred from melting ice and warming land and atmosphere, meant that Earth was substantially out of energy balance by the year 2000, by 0.5 to 1 W/m^2.[47]

As scientists were furthering their understanding of the causes and implications of global heating, the target selection process was less concerned with scientific precision and more concerned with forming international consensus. The eventual adoption of the 2°C target in the Paris Agreement is due, in large part, to the influence of the Netherlands and Germany.[48] Both nations adopted the target internally and subsequently promoted the target to other European nations. In 1996, the Council of the European Union, working closely with the German Advisory Council on Global Change, identified the 2°C target as a means to avoid dangerous risk, noting that "[g]iven the serious risk of such an increase [in temperature], the Council believes that global average temperatures should not exceed 2 degrees above pre-industrial level and that therefore concentration levels lower than 550 ppm $CO_{[2]}$ should guide global limitation and reduction efforts."[49] The United States, by

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[47] *Juliana*, Hansen Expert Report, *supra* note 11, at 18–19 (citing James E. Hansen et al., *Forcings and Chaos in Interannual to Decadal Climate Change*, 102 J. GEOPHYSICAL RSCH. 25679 (1997)).

[48] Morseletto, Biermann & Pattberg, *supra* note 13, at 660.

[49] European Commission Press Release PRES/96/188, 1939th Council Meeting Community Strategy on Climate Change (June 25–26, 1996), https://ec.europa.eu/commission/presscorner/detail/en/PRES_96_188.

contrast, opposed accepting any clear target during the early 2000s.[50] Although the United States was formally in favor of stabilizing GHG concentrations, it preferred that the IPCC lead this charge, not the AGGG.[51] This created "instability at the political level" as the world's two largest economic zones and emitters of GHGs proposed different global climate change policy approaches.[52]

Meanwhile, by the early 2000s, according to Dr. Hansen's testimony in the *Juliana v. United States* climate change case brought by twenty-one young Americans in 2015, scientists were becoming "reasonably convinced, mainly on the basis of [EEI and] paleoclimate evidence [to determine climate sensitivity], that 2°C global warming (equivalent to an atmospheric CO_2 concentration of approximately 450 ppm) would be highly dangerous."[53] He explained that: "Our scientific understanding indicated an initial target of no more than 350 ppm CO_2 to avoid dangerous impacts, but the target must be continually evaluated as the world [makes] progress in turning around CO_2 growth (CO_2 in 2007 was already 358 ppm)."[54]

Nevertheless, for the next decade, institutions around the world began embracing 2°C as a long-term, set-in-stone target, "even though there was substantial scientific evidence showing such a target was highly dangerous to humanity."[55] For example, in 2005, the International Climate Change Taskforce[56] reported "a long-term objective of preventing average global surface temperature from rising by more than 2°C . . . ."[57] In 2009, the Major Economies Forum on Energy and Climate, a forum of seventeen international economies,[58] recognized that

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[50] Morseletto, Biermann & Pattberg, *supra* note 13, at 660. *See generally* NATHANIEL RICH, LOSING EARTH: A RECENT HISTORY (2019) (summarizing the United States' political role and influence in the UNFCCC process, and how the United States wielded its power to thwart meaningful progress on climate change on the international level by detailing the United States' political machinations to avoid effective action on climate change in the domestic and international realms).

[51] Morseletto, Biermann & Pattberg, *supra* note 13, at 660.

[52] *Id.*

[53] *Juliana*, Hansen Expert Report, *supra* note 11, at 22.

[54] *Id.*

[55] *Id.* at 23.

[56] An alliance of the Institute for Public Policy Research in the United Kingdom, the Center for American Progress in the United States, and the Australia Institute. INTERNATIONAL CLIMATE CHANGE TASKFORCE, MEETING THE CLIMATE CHALLENGE: RECOMMENDATIONS OF THE INTERNATIONAL CLIMATE CHANGE TASKFORCE 9 (2005), https://www.ippr.org/files/images/media/files/publication/2011/05/meeting_the_climate_challenge_1331.pdf.

[57] *Id.* at 3.

[58] *President Obama Announces Launch of the Major Economies Forum on Energy and Climate*, WHITE HOUSE (Mar. 28, 2009), https://obamawhitehouse.archives.gov/the-press-office/president-obama-announces-launch-major-economies-forum-energy-and-climate. This forum of seventeen

global temperatures should not exceed 2°C.[59] Most notably, the 2009 Copenhagen and 2010 Cancun COPs recognized 2°C as an objective target.[60]

At the 2009 COP in Copenhagen, 141 countries endorsed the 2°C target and suggested that they would consider a more ambitious target of 1.5°C—a number initially raised by small island states threatened by sea-level rise—in the future.[61] However, consensus around the 2°C target was mainly symbolic and useless as a practical matter.[62] The Parties did not specify any emissions reductions or a timeline for achieving it, which "depriv[ed] the target of both a specific context and instruments for its concrete fulfilment."[63] Furthermore, the United States, China, and many other developing nations prioritized their economic growth over commitments toward a binding 2°C target.[64] Therefore, the target remained symbolically resilient, despite the dearth of scientific evidence supporting 2°C as a means to prevent dangerous climate change and protect fundamental human rights.

The 2°C temperature goal was ultimately memorialized into a major climate governance agreement in the 2015 Paris Agreement. The governments that signed the Paris Agreement agreed to the long-term goal of limiting the global average temperature increase to "well below 2°C above pre-industrial levels" and to "pursu[e] efforts to limit the temperature increase to 1.5°C above pre-industrial levels . . . ."[65] The ultimate acceptance of the 2°C limit with an aspiration toward 1.5°C was the product of negotiations around three target options. Negotiators

large economies brought together the G8 along with: Australia, Brazil, China, Indonesia, Korea, Mexico, Russia, and South Africa. *Id.*

[59] Morseletto, Biermann & Pattberg, *supra* note 13, at 662. *See Declaration of the Leaders the Major Economies Forum on Energy and Climate*, WHITE HOUSE (July 9, 2009), https://obamawhitehouse.archives.gov/the-press-office/declaration-leaders-major-economies-forum-energy-and-climate.

[60] Morseletto, Biermann & Pattberg, *supra* note 13, at 665.

[61] *Id.* at 664; *Information Provided by Parties to the Convention Relating to the Copenhagen Accord*, U.N. CLIMATE CHANGE, https://unfccc.int/process/conferences/pastconferences/copenhagen-climate-change-conference-december-2009/statements-and-resources/information-provided-by-parties-to-the-convention-relating-to-the-copenhagen-accord (last visited Sept. 10, 2022).

[62] Morseletto, Biermann & Pattberg, *supra* note 13, at 665.

[63] *Id.* at 664. The Copenhagen conference, originally touted as "Hopenhagen," *see, e.g.*, Martin Mark Jones, *"Hopenhagen" to "Nopenhagen"? The Role of Public Expectation at the Copenhagen Summit*, E-INT'L REL. (July 3, 2011), https://www.e-ir.info/2011/07/03/"hopenhagen"-to-"nopenhagen"-the-role-of-public-expectation-at-the-copenhagen-summit/, failed to achieve meaningful implementation strategies largely due to the influence of the United States, which refused legally binding accords. Morseletto, Biermann & Pattberg, *supra* note 13, at 664.

[64] Morseletto, Biermann & Pattberg, *supra* note 13, at 664.

[65] Paris Agreement, *supra* note 1, at art. 2, § 1(a).

presented (1) a 2°C goal, (2) a 1.5°C goal, and (3) a 2°C goal with an aspiration toward 1.5°C.[66]

Although the Paris Agreement was quickly adopted by most nations, like the predecessor agreements from Copenhagen and Cancun, the agreement lacked any legally binding emissions reduction targets or strict deadlines for achieving interim goals.[67] The drafters of the Paris Agreement were likely influenced by the perceived failures of the 1997 Kyoto Protocol and the non-ratification of the agreement by the United States Senate, which objected to the country-specific emissions targets.[68] The Paris Agreement, by contrast, and once again accommodating economic influencers such as the United States, avoided enforcement of specific emissions targets. It focused, instead, on achieving consensus through a loosely expressed target range of "well below 2°C" and through the promotion of nonbinding, voluntary Nationally Determined Contributions ("NDCs"), seemingly enforceable only if translated into national laws and policies.[69]

Under the Paris Agreement, governments agreed to pursue "the highest possible ambition" when establishing their NDCs.[70] Yet, "target culture" typically leads to minimization, where "[e]ven if you say 'this target is the minimum', as the [Paris Agreement] does, politicians treat it as merely the line they need to cross."[71] Under current NDCs, for example, many countries are "pursuing efforts" that will result in approximately

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[66] Hari Osofsky et al., *The 2015 Paris Agreement on Climate Change: Significance and Implications for the Future*, 46 ENV'T L. REP. NEWS & ANALYSIS 10267, 10271 (2016).

[67] Maria L. Banda, *The Bottom-Up Alternative: The Mitigation Potential of Private Climate Governance After the Paris Agreement*, 42 HARV. ENV'T L. REV. 325, 331 (2018).

[68] *See, e.g.*, *id.* at 332.

[69] *See, e.g.*, Commune de Grande-Synthe v. France [CE] [highest administrative court], July 1, 2021, http://climatecasechart.com/climate-change-litigation/non-us-case/commune-de-grande-synthe-v-france/ (issuing a decision on July 1, 2021 ordering the government to "take all the measures necessary" to reduce GHG emissions in line with its Paris Agreement commitment by 40% in 2030 compared to 1990 levels, "noting that . . . current climate regulations were insufficient to meet the target" and "[t]he Council ordered the government to take the necessary measures by March 31, 2022"). *See generally* Lisa Benjamin & Adelle Thomas, *1.5°C to Stay Alive?: AOSIS and the Long Term Temperature Goal in the Paris Agreement* (2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3392503.

[70] Paris Agreement, *supra* note 1, at art. IV, § 3. *See also Key Aspects of the Paris Agreement*, U.N. CLIMATE CHANGE, https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement/key-aspects-of-the-paris-agreement.

[71] George Monbiot, Opinion, *Let's Abandon Climate Targets, and Do Something Completely Different*, GUARDIAN (Jan. 29, 2020), https://www.theguardian.com/commentisfree/2020/jan/29/climate-targets-committee-on-climate-change-report.

2.9°C or higher of heating;[72] a strategy that has irreversible consequences.[73] Many countries that purport to align domestic emissions laws to the Paris Agreement's target are woefully off track, thereby illustrating that political ambition does not necessarily equate to changes on the ground without enforcement mechanisms in place.[74]

Notwithstanding persistent pleas for more aggressive, enforceable limits on the amount of allowable heating,[75] the Copenhagen Accord enshrined 2°C as the central goal of international climate politics, stating only that countries would "consider" limiting temperature increases to less than 1.5°C (no country did at the time).[76] Similarly, the Paris Agreement agreed only to "pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels."[77] All the while, these agreements, rightly celebrated as successes in international diplomacy, obfuscate the reality that there is no scientific support for the notion that achieving such goals will restore EEI, avert dangerous climate change, or protect human rights. The Paris Agreement target, if achieved, essentially sanctions dangerous climatic interference by setting allowable levels of global heating too high, which begs the question of its relevance in the realm of fundamental rights protection.

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[72] CLIMATE ACTION TRACKER: PARIS AGREEMENT TURNING POINT 1 (Dec. 2020), https://climateactiontracker.org/documents/829/CAT_2020-12-01_Briefing_GlobalUpdate_Paris5Years_Dec2020.pdf.

[73] Monbiot, *supra* note 71. *See also* Martin Parry, Jason Lowe & Clair Hanson, *Overshoot, Adapt and Recover*, 458 NATURE 1102 (2009) (arguing that more attention should be paid to the importance of adaptation); W. Neil Adger & Jon Barnett, *Four Reasons for Concern about Adaptation to Climate Change*, 41 ENV'T & PLAN. A: ECON. & SPACE 2800 (2009) (expressing concern about the ability to successfully adapt to the realities of climate change).

[74] *See Australia*, CLIMATE ACTION TRACKER (Aug. 2, 2022), https://climateactiontracker.org/countries/australia (rating Australia's NDC under the Paris Agreement as "insufficient" because "its recent support for new gas projects and ongoing backing of fossil fuel projects indicates a discrepancy with its new NDC target"); *Canada*, CLIMATE ACTION TRACKER (Sept. 15, 2022), https://climateactiontracker.org/countries/canada (rating Canada's NDC under the Paris Agreement as "highly insufficient" because "[r]ecent climate policy developments, while positive, are insufficient to address the climate crisis" and their "2030 target is not quite Paris compatible" and "are only in line with 4°C warming"); *USA*, CLIMATE ACTION TRACKER (Aug. 16, 2022), https://climateactiontracker.org/countries/usa/ (rating the United States' NDC under the Paris Agreement as "insufficient" because while "President Biden signed into law the Inflation Reduction Act (IRA), the most ambitious and potentially impactful climate policy in US history," the "US will need to implement additional policies to reach its proposed 50-52% reduction target").

[75] Robin Webster, *A Brief History of the 1.5C Target*, CLIMATE HOME NEWS (Oct. 12, 2015), https://www.climatechangenews.com/2015/12/10/a-brief-history-of-the-1-5c-target/. Since at least 2008, a key demand of the Alliance of Small Island States ("AOSIS") has been to limit global heating to 1.5°C as compared to pre-industrial levels. *Id.*

[76] *Id.*

[77] Paris Agreement, *supra* note 1, at art. 2, § 1(a).

C. The Popularization and Acceptance of the 2°C Target as a Standard to Protect Fundamental Rights

The Paris Agreement target became popularized and accepted because it brought a complex, multi-dimensional problem down to a scale that was "readable for policymakers" while still, in theory, "retaining the flexibility needed to integrate both scientific and political uncertainties."[78] A more blunt assessment of the forward-looking target is that it enabled countries to continue emitting vast quantities of GHG emissions, passing the conundrum of decarbonizing economies onto the young and future generations. One clear value of the target is that it communicates the policy direction adopted by the international community, even if it obscures other scientific complexities and truths. A downside is that such oversimplification tends to focus on a single, static indicator (e.g., an absolute temperature target), when, in fact, attention to the relationship between a series of scientifically supported and measurable indicators (e.g., EEI) would allow for a more precise, equally manageable policy prescription.[79]

Despite the known risks of oversimplification and the lack of scientific support, the 2°C target nevertheless grew in popularity as it was echoed and repeated throughout social and political outlets leading up to and after the Paris Agreement. An analysis of media communications regarding 2°C, for example, reveals that, throughout the 1990s and leading up to Copenhagen in 2009, news reports around the world relied on the use of "anonymous expertise to legitimate claims of a two degree dangerous limit."[80] In fact, major newspapers began to report that there was a "growing consensus around two degrees" and indicated that scientists had endorsed this number, noting it was "determined on the basis of the science" or the opinion of unidentified "many scientists."[81] Moreover, news coverage of the G8 Summit in 2009 championed that world leaders

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[78] Béatrice Cointe, Paul-Alain Ravon & Emmanuel Guérin, *2°C: The History of a Policy–Science Nexus* 1 (IDDRI SciencesPo, Working Paper No. 19, 2011), https://www.researchgate.net/publication/303018742_2C_the_history_of_a_policy-science_nexus.

[79] *See* Knutti et al., *supra* note 3, at 1 (noting that temperature increase was only one of many available metrics for measuring dangerous anthropogenic warming. Other targets assessed included limits to GHG concentrations, energy uptake, sea-level rise, ocean acidification, rates of temperature change, regional climate change, specific local impacts, emissions reductions, and avoidance of tipping points like loss of the Greenland ice sheet); *see also* von Schuckmann et al., *supra* note 4, at 2015 (explaining that EEI is the most crucial measure of climate change because "EEI is less subject to decadal variations associated with internal climate variability than global surface temperature and therefore represents a robust measure of the rate of climate change").

[80] Christopher Shaw, *Choosing a Dangerous Limit for Climate Change: Public Representations of the Decision Making Process*, 23 GLOB. ENV'T CHANGE 563, 567 (2013).

[81] *Id.*

had embraced the 2°C target. A representative headline stated: "World leaders last night pledged to stop the planet's temperature rising by more than two degrees."[82] If the science itself supported a lower target, as explained by Dr. Hansen and others, how did such a value become so widely accepted?

One theory is that the target found favor with political leaders because it was "'the vaguest and the least directly binding' target."[83] Political leaders could endorse the 2°C target, secure with the knowledge that the "target [was] vague enough to avoid the perils of policy implications," particularly those that are politically difficult to achieve.[84] In fact, according to John Holdren, President Barack Obama's Science Advisor, "[t]he 2°C figure was agreed [to] not because it would be 'safe', but because multiple analyses had indicated that doing much better would be extremely difficult technologically and economically."[85] However, these analyses did not change what was scientifically necessary for the planet. In addition, scholars have observed that the "primary function of the two degree limit is not to accurately communicate scientific knowledge about likely future climate impacts so much as to act as an anchoring device that frames climate change in a language commensurate with policy making and simplifies complexities for a non-expert, public audience."[86] In short, from a policy perspective, many held the opinion that "any limit is better than no limit at all."[87]

Policymakers and many others presumed the 2°C target was "science based," an assumption now advanced by many climate change advocates today. Even subsequent publications of the UNFCCC are at odds with its own mandate.[88] Some scholars have postulated that the implicit trust in viewing 2°C as an acceptable target may have been a product of the "opportunism of policymakers in placing responsibility for action onto the scientists or on misinterpretation by policymakers of the meaning and

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[82] *Id.*

[83] Morseletto, Biermann & Pattberg, *supra* note 13, at 663.

[84] *Id.*

[85] Eric Larson et al., Princeton Univ., Net-Zero America: Potential Pathways, Infrastructure, and Impacts, at 4 (Dec. 15, 2020), https://environmenthalfcentury.princeton.edu/sites/g/files/toruqf331/files/2020-12/Princeton_NZA_Interim_Report_15_Dec_2020_FINAL.pdf.

[86] Shaw, *supra* note 80, at 568.

[87] *Id.*

[88] *See* Knutti et al., *supra* note 3, at 1 ("Following the Copenhagen Accord in 2009, the UNFCCC formally decided in 2012 to pursue actions in line with a 2 °C global temperature increase target. This target was a political decision informed by science, but no scientific assessment ever defended or recommended a particular target. Policymakers like to hide behind scientific evidence, ask for 'actionable science' and claim to make 'science-based decisions'. Some argue that this process 'has more in common with a salad bar — where people pick and choose convenient studies — than with the balanced search for truth that science aspires to'.").

implications of the 2°C target."[89] Whatever the reason, the 2°C target was assigned scientific support it simply lacks. According to Sir David King, Chief Scientific Advisor to the UK government from 2007–2013, the Foreign Secretary's Permanent Special Representative on Climate Change from 2013–2017, and a highly influential negotiator leading up to the Paris Agreement's embrace of the 1.5°C aspirational target: "The analyses of the IPCC show that even an average temperature rise from 1.5 to 2.0 degrees C above pre-industrial levels would severely impact on [sic] human well-being, worldwide."[90] As a result, he said, "I have now changed my position. I'm now saying to everyone, I was wrong. 1.5 degrees is far too much," a conclusion clearly supported by the science as described below.[91]

D. The Impacts of Current Warming and Projected Heating of 1.5°C–2°C on Human Rights

There is near-universal scientific agreement that planetary heating of 1.5°C–2°C will have disastrous consequences. Our current situation, after all, is wholly unprecedented.[92] In 2020, global average CO_2 levels reached 412.5 ppm.[93] May 2021 saw a monthly average of 419 ppm:

> [This] is now comparable to where it was during the Pliocene Climatic Optimum, between 4.1 and 4.5 million years ago, when CO_2 was close to, or above 400 ppm. During that time, sea level was about 78 feet higher than today, the average temperature was 7 degrees Fahrenheit higher than in pre-industrial times, and studies indicate large forests occupied areas of the Arctic that is now tundra.[94]

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[89] Morseletto, Biermann & Pattberg, *supra* note 13, at 661 (internal citations omitted).

[90] Zoe Blackler, *Defence Statement by Sir David King in Support of Five Extinction Rebellion Defendants*, EXTINCTION REBELLION (Jan. 31, 2020), https://extinctionrebellion.uk/2020/01/31/defence-statement-by-sir-david-king-in-support-of-five-extinction-rebellion-defendants/. *See also* Alberto Lidji, *Guest Profile: Sir David King*, CLIMATE REPAIR (Oct. 4, 2020), https://www.lidji.org/sir-david-king.

[91] Lidji, *supra* note 90.

[92] BRUNO LATOUR, DOWN TO EARTH 44 (Catherine Porter trans., 2018) ("We understand nothing about the vacuity of contemporary politics if we do not appreciate the stunning extent to which the situation [of the Anthropocene] is unprecedented."). *See also* SUMMARY FOR POLICYMAKERS 6 (2021), https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf (reflecting a summary of the major findings in the Sixth Assessment Report conducted by the IPCC in 2021).

[93] *Despite Pandemic Shutdowns, Carbon Dioxide and Methane Surged in 2020*, NOAA RSCH. NEWS (Apr. 7, 2021), https://research.noaa.gov/article/ArtMID/587/ArticleID/2742/Despite-pandemic-shutdowns-carbon-dioxide-and-methane-surged-in-2020.

[94] *Carbon Dioxide Peaks Near 420 Parts Per Million at Mauna Loa Observatory*, NOAA RSCH. NEWS (June 7, 2021) (internal citations omitted), https://research.noaa.gov/article/ArtMID/587/ArticleID/2764/Coronavirus-response-barely-

Already, impacts at current levels of warming (~1.0°C–1.2°C)[95] are threatening entire irreplaceable ecosystems and harming the communities around the globe who depend on them, disproportionately burdening the most poor and vulnerable—especially the young.[96] In regions such as the Arctic, for instance, the migration of climate zones toward the poles is causing a "new climate state," with such shifts "changing the geography of the planet":[97]

> Because warming is not equally distributed across the globe, a 2 degree C average warming across the globe implies a 4 to 6 degrees C warming in the Arctic. This means seasonal sea ice cover will be gone, [the] Greenland ice sheet will melt almost completely and all Antarctic ice shelves will break up and disappear, entraining rapid speed up of the glaciers and multiple meter[s] of sea level rise per century.[98]

Other physical systems, such as the Amazon Rainforest and permafrost, are similarly nearing irrecoverable tipping points. Coral reefs are already in "considerable irreversible decline," and "restraining warming to 'well below' 2°C (equivalent to approximately 450 ppm of CO_2) will still result in the loss of 90% of today's corals."[99]

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slows-rising-carbon-dioxide. *See also Highest-Ever Mauna Loa CO2 Levels*, CO2-EARTH, https://www.co2.earth/co2-records (last visited Aug. 28, 2022) (recording 422.06 ppm of CO_2 in the Earth's atmosphere on April 26, 2021, the highest level ever recorded).

[95] At present, current figures estimate that human activities are responsible for causing 1.0°C of global warming. SUMMARY FOR POLICYMAKERS, *supra* note 92, at 5.

[96] *Climate Justice*, U.N. SUSTAINABLE DEV. GOALS (May 31, 2019), https://www.un.org/sustainabledevelopment/blog/2019/05/climate-justice/.

[97] Andrew Glikson, *Polar-Ward Climate Zones Shift and Consequent Tipping Points*, ARCTIC NEWS (Dec. 4, 2020), https://arctic-news.blogspot.com/2020/12/polar-ward-climate-zones-shift-and-consequent-tipping-points.html. *See generally* Laura Landrum & Marika M. Holland, *Extremes Become Routine in an Emerging New Arctic*, 10 NATURE CLIMATE CHANGE 1108 (2020).

[98] Expert Report of Eric Rignot, Ph.D. at 2, Juliana v. United States, 339 F. Supp. 3d 1062 (D. Or. 2018) (No. 262-1).

[99] Expert Report of Ove Hoegh-Guldberg, Ph.D. at 8, Juliana v. United States, 339 F. Supp. 3d 1062 (D. Or. 2018) (No. 21-11) (internal citations omitted). *See also* Armstrong McKay et al., *supra* note 5, at 1177, 1178.

In 2020 alone, deadly wildfires burned in Australia,[100] Siberia,[101] the American West,[102] and South America,[103] and torched a quarter of Brazil's Pantanal, the world's largest tropical wetland, in some instances with devastating health consequences.[104] In 2021, "heat domes" shrouded the Western U.S., smashing temperature records in June and baking an already desiccated landscape, setting the stage for more deadly wildfires.[105] The heat wave of 2021 "erased" the Canadian town of Lytton, British Columbia, with incalculable consequences for its residents.[106] In 2022, Malaysia experienced heavy rain and massive flooding forcing the evacuation of nearly 125,000 people,[107] Antarctica had an unprecedented heat wave in March setting a new world record for

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[100] Matthew Cappucci, *Australian Fires Had Bigger Impact on Climate than Covid-19 Lockdowns in 2020*, WASH. POST (July 27, 2021), https://www.washingtonpost.com/weather/2021/07/27/australian-bushfires-smoke-climate-covid/ ("More than 42 million acres burned in an unprecedented outbreak of extreme fires, which produced lightning, launched smoky aerosols into the stratosphere and turned New Zealand's glaciers brown with ash. The suffocating smoke was blamed for hundreds of deaths.").

[101] *Why Forest Fires in Siberia, Russia Threaten Us All*, BBC NEWS (Sept. 17, 2020), https://www.bbc.com/news/av/science-environment-54126762 ("Wildfires in Siberia have been releasing record amounts of greenhouse gases, scientists say, contributing to global warming.").

[102] *A Wall of Smoke on the U.S. West Coast*, EARTH OBSERVATORY (Sept. 9, 2020), https://earthobservatory.nasa.gov/images/147261/a-wall-of-smoke-on-the-us-west-coast ("Wildfires continue to rage in the Western United States. . . . The smoke was so thick and widespread that it was easily visible from 1.5 million kilometers (1 million miles) away from Earth.").

[103] Uki Goñi, Sam Cowie & William Costa, *'Total Destruction': Why Fires Are Tearing Across South America*, GUARDIAN (Oct. 9, 2020), https://www.theguardian.com/environment/2020/oct/09/a-continent-ablaze-why-fires-are-tearing-across-south-america ("Argentina, Brazil, Paraguay and Bolivia this year have seen a raging tsunami of fires, in what may become the longest and most destructive environmental crisis faced by the four neighboring countries.").

[104] Catrin Einhorn, Maria Magdalena Arréllaga, Blacki Migliozzi & Scott Reinhard, *The World's Largest Tropical Wetland Has Become an Inferno*, N.Y. TIMES (Oct. 13, 2020), https://www.nytimes.com/interactive/2020/10/13/climate/pantanal-brazil-fires.html. *See, e.g.*, Yisi Liu et al., *Health Impact Assessment of the 2020 Washington State Wildfire Smoke Episode: Excess Health Burden Attributable to Increased $PM_{2.5}$ Exposures and Potential Exposure Reductions*, 5 GEOHEALTH 1, 6 (2021), https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/2020GH000359 ("According to [the] health impact assessment using the [concentration reform function] for total $PM_{2.5}$, the 13-day exposure to wildfire smoke exposure may have led to 92.2 (95% CI: 0.0, 178.7) cases of excess all-cause mortality.").

[105] Matthew Cappucci, *Yet Another Major Heat Wave Is Set to Roast the Western U.S. and Canada by the Weekend*, WASH. POST (July 15, 2021), https://www.washingtonpost.com/weather/2021/07/14/western-heat-wave-rockies/.

[106] Vjosa Isai, *Heat Wave Spread Fire That 'Erased' Canadian Town*, N.Y. TIMES (July 10, 2021), https://www.nytimes.com/2021/07/10/world/canada/canadian-wildfire-british-columbia.html.

[107] *Malaysia Floods Hit Seven States Forcing Thousands to Evacuate*, CNN WORLD (Jan. 2, 2022), https://www.cnn.com/2022/01/02/asia/malaysia-floods-evacuation-intl-hnk/index.html.

the largest temperature increase above normal,[108] India had its hottest March in 122 years,[109] and Yellowstone National Park had so much rainfall it caused substantial flooding and mudslides.[110]

This current planetary emergency is simultaneously triggering a societal emergency. Climate-induced migration is but one example. Although it is difficult to know the true number of people displaced directly or indirectly by climate change, estimates range from 25 to over 200 million.[111] In 2018 alone, sudden-onset natural disasters displaced 17.2 million people.[112] In March 2021, it was reported that "[o]ver 12 million people around the world have been pushed out of their homes in the last six months . . . 80 percent of whom were displaced due to natural and climate-related disasters."[113] In August 2022, unprecedented flooding resulted in a third of Pakistan being underwater, with a half a million people forced to flee their homes.[114] A second example of societal turmoil comprises the profound and worsening health impacts of climate change, especially on those, including children, who are most susceptible. A recent United Nations report, which introduces a children's climate risk index, frames the climate crisis as a "child rights crisis" that creates

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[108] *Antarctic Heatwave: A Rapid Analysis of the March 2022 Dome C Record Heatwave*, BERKELEY EARTH (Apr. 12, 2022), https://berkeleyearth.org/antarctic-heatwave-rapid-attribution-review-dome-c-record/.

[109] Soumya Sarkar, *India Experiences its Hottest March in 122 Years,* QUARTZ INDIA (Apr. 19, 2022), https://qz.com/india/2156332/india-experiences-its-hottest-march-in-122-years/.

[110] Jim Robbins, Thomas Fuller & Christine Chung, *Flooding Chaos in Yellowstone, a Sign of Crises to Come,* N.Y. TIMES (June 15, 2022), https://www.nytimes.com/2022/06/15/us/yellowstone-national-park-floods.html.

[111] KANTA KUMARI RIGAUD ET AL., GROUNDSWELL: PREPARING FOR INTERNAL CLIMATE MIGRATION 21 (2018), https://openknowledge.worldbank.org/handle/10986/29461; VIVIANE CLEMENT ET AL., GROUNDSWELL PART 2: ACTING ON INTERNAL CLIMATE MIGRATION, at xx, xxii (2021), https://openknowledge.worldbank.org/handle/10986/36248 (noting that "[t]he two reports' combined findings provide, for the first time, a global picture of the potential scale of internal climate migration . . . allowing for a better understanding of how [slow-onset] climate change impacts, population dynamics, and development contexts shape mobility trends"); *Climate Change Could Displace 216 Million by 2050: Report*, ALJAZEERA (Sept. 14, 2021), https://www.aljazeera.com/news/2021/9/14/climate-change-could-displace-216-million-by-2050-report.

[112] GLOBAL REPORT ON INTERNAL DISPLACEMENT 1 (2019), http://www.internal-displacement.org/sites/default/files/publications/documents/2019-IDMC-GRID.pdf.

[113] Katelyn Weisbrod, *Warming Trends: Climate Refugees, Ocean Benefits and Tropical Species Moving North*, INSIDE CLIMATE NEWS (Mar. 20, 2021), https://insideclimatenews.org/news/20032021/warming-trends-natural-disasters-create-the-most-refugees-new-climate-benefits-from-ocean-protections-and-tropical-species-moving-to-the-southern-us/.

[114] Emily Atkinson, *Pakistan Floods: Third of Country Under Water with Half a Million Forced from Homes*, INDEPENDENT (Aug. 29, 2022), https://www.independent.co.uk/climate-change/news/pakistan-floods-climate-minister-b2155169.html.

"incredibly challenging environments for children to live, play and thrive."[115]

In a world with 1.5°C of warming, virtually all natural and human systems will be altered, and disadvantaged and vulnerable communities will be hit the hardest.[116] As the IPCC acknowledges, "Compared to current conditions, 1.5°C of global warming would nonetheless pose heightened risks to eradicating poverty, reducing inequalities and ensuring human and ecosystem well-being."[117] The IPCC concludes:

> Warming of 1.5°C is not considered 'safe' for most nations, communities, ecosystems and sectors and poses significant risks to natural and human systems as compared to the current warming of 1°C (*high confidence*). The impacts of 1.5°C of warming would disproportionately affect disadvantaged and vulnerable populations through food insecurity, higher food prices, income losses, lost livelihood opportunities, adverse health impacts and population displacements (*medium evidence, high agreement*). Some of the worst impacts . . . are expected to be felt among agricultural and coastal dependent livelihoods, indigenous people, children and the elderly, poor labourers, poor urban dwellers in African cities, and people and ecosystems in the Arctic and Small Island Developing States (SIDS) (*medium evidence, high agreement*).[118]

Experiencing these impacts firsthand, climate vulnerable states have advocated for a revised target below 1.5°C. The International Indigenous Peoples' Forum on Climate Change, [119] CARICOM (Caribbean

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[115] NICHOLAS REES ET AL., THE CLIMATE CRISIS IS A CHILD RIGHTS CRISIS: INTRODUCING THE CHILDREN'S CLIMATE RISK INDEX 6 (2021), https://www.unicef.org/media/105376/file/UNICEF-climate-crisis-child-rights-crisis.pdf ("Almost every child on earth is exposed to at least one climate and environmental hazard, shock or stress such as heatwaves, cyclones, air pollution, flooding and water scarcity. But a record-breaking 850 million—approximately one-third of all children—are exposed to four or more stresses . . . .").

[116] Ove Hoegh-Guldberg et al., *Impacts of 1.5°C of Global Warming on Natural and Human Systems*, *in* GLOBAL WARMING OF 1.5°C, *supra* note 7, at 178, https://www.ipcc.ch/site/assets/uploads/sites/2/2019/02/SR15_Chapter3_Low_Res.pdf

[117] Joyashree Roy et al., *Sustainable Development, Poverty Eradication and Reducing Inequalities*, *in* GLOBAL WARMING OF 1.5°C, *supra* note 7, at 446, https://www.ipcc.ch/sr15/chapter/chapter-5/.

[118] *Id.*

[119] Press Release, International Indigenous Peoples Forum on Climate Change, Durban Platform for Enhanced Action (ADP) Negotiations, Bonn, Germany (June 4, 2014), https://www.forestpeoples.org/sites/default/files/news/2014/06/ADP_IIPFCC2_0.pdf.

Community),[120] and the Climate Vulnerable Forum[121] have called for limiting global average surface warming to well *below* 1.5°C above pre-industrial levels, with the Climate Vulnerable Forum further requiring the "long-term stabilisation of atmospheric greenhouse gas concentrations at well below 350ppm [sic]."[122] Coalitions of the world's most climate-vulnerable nations have taken on the additional role of gap-filling IPCC science, given its "overly-conservative"[123] nature as a consensus body that does not conduct the primary scientific research "compared to the most recent, real-world observations and peer-reviewed literature."[124] Although those most susceptible to the consequences of climate change may not have a powerful voice at the UNFCCC negotiating tables, they are documenting their stories in judicial fora around the world, presenting judicial bodies with important legal questions as to how to uphold fundamental rights in the face of the climate crisis.

II. THE ROLE OF COURTS IN ADJUDICATING FUNDAMENTAL RIGHTS IN THE CLIMATE CHANGE CONTEXT

This section briefly surveys several judicial decisions that have considered climate change as a fundamental rights issue and identifies the legal risks inherent in an advocate's use of the Paris Agreement target as a proxy legal standard designed to protect fundamental rights.

A. Courts Are Finding Climate Change Infringes Fundamental Rights

Legal arguments that climate change infringes fundamental rights have largely succeeded. The central challenge for judicial bodies hearing climate change cases has been assigning a remedy that actually protects fundamental rights. Although an increasing number of climate change

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[120] Press Release, CARICOM, CARICOM Declaration for Climate Action (June 5, 2015), https://caricom.org/caricom-declaration-for-climate-action/.

[121] Press Release, Climate Vulnerable Forum, Declaration of the Climate Vulnerable Forum (Nov. 10, 2009), https://daraint.org/wp-content/uploads/2010/12/Declaration-of-the-CVF-FINAL2.pdf.

[122] *Id.*

[123] Declaration of Kevin E. Trenberth in Support of Plaintiffs' Urgent Motion Under Circuit Rule 27-3(b) for Preliminary Injunction at 4–5, Juliana v. United States, 947 F.3d 1159 (9th Cir. 2020) (No. 18-36082).

[124] *Id. See also* Indigenous Women of the Americas Defenders of Mother Earth Treaty Compact, Sept. 27, 2015, http://indigenouswomenrising.org/defenders-of-mother-earth-treaty/ (stating that the natural laws "have been violated to such an extreme degree that the sacred system of life is now threatened and does not have the capacity for life to continue safely in the way in which it has existed for millions of years" and calling for women to "[n]onviolently rise up with others in [their] communities and around the world to demand immediate changes in the laws that have created the destruction").

cases appear in courts today,[125] climate change cases have been litigated for over thirty years, and thus the central legal issues have evolved over time.[126] In some of the early climate change cases, judges struggled with the quandary of an injury that appeared too distant or hypothetical.[127] But, more recently, plaintiffs have been able to surmount the injury threshold.[128] As a Belgian court recently acknowledged in *Klimaatzaak*

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[125] Jocelyn Timperley, *The Law That Could Make Climate Change Illegal*, BBC (July 7, 2020), https://www.bbc.com/future/article/20200706-the-law-that-could-make-climate-change-illegal; Matthew Green, Valerie Volcovici & Emma Farge, *Climate Battles Are Moving into the Courtroom, and Lawyers Are Getting Creative*, REUTERS (July 2, 2020, 4:15 PM), https://www.reuters.com/article/us-climate-change-lawsuits/climate-battles-are-moving-into-the-courtroom-and-lawyers-are-getting-creative-idUKKBN2433G5?edition-redirect=uk; Holding Redlich, *Climate Change Litigation and the Human Rights Act 2019*, LEXOLOGY (July 1, 2020), https://www.lexology.com/library/detail.aspx?g=9d4ee4ae-68c8-440c-bf02-aa4963b5dcb4. *See also* Ellen M. Gilmer, *Climate Cases Poised for Bigger Fights as Courts Clear Hurdles*, BLOOMBERG L. (June 2, 2020, 3:01 AM), https://news.bloomberglaw.com/environment-and-energy/climate-cases-poised-for-bigger-fights-as-courts-clear-hurdles?context=article-related; Quinn Emanuel Urquhart & Sullivan, LLP, *May 2020: A Critical Period for Climate Change Litigation*, JD SUPRA (June 1, 2020), https://www.jdsupra.com/legalnews/may-2020-a-critical-period-for-climate-65829/.

[126] *See, e.g.*, Found. on Econ. Trends v. Watkins, 731 F. Supp. 530, 530–31, 533 (D.D.C. 1990) (hearing plaintiffs' complaint against the Secretaries of Interior, Agriculture, and Energy for "authorizing, carrying out, approving, funding, or participating in programs that contribute to the 'greenhouse effect'" without evaluating environmental impacts of the actions under the National Environmental Policy Act and denying defendants' motion to dismiss as plaintiffs were not seeking an advisory opinion, claims were ripe, and plaintiffs had standing); Los Angeles v. Nat'l Highway Traffic Safety Admin., 912 F.2d 478, 485, 490 (D.C. Cir. 1990) (finding that cities and state had standing to challenge NHTSA's decision not to prepare environmental impact statements under the National Environmental Policy Act prior to issuing Corporate Average Fuel Economy Standards for automobiles, but deciding the agency's decision was not arbitrary, capricious, or otherwise contrary to law), *overruled by* Fla. Audubon Soc'y v. Bentsen, 94 F.3d 658 (D.C. Cir. 1996) (en banc); Border Power Plant Working Grp. v. Dep't of Energy, 260 F. Supp. 2d 997, 1016, 1023 (S.D. Cal. 2003) (holding that the environmental impact of Mexican power plants had to be considered under the National Environmental Policy Act and agency determination that the operation of the power plants would not have significant impact on ecologically critical area was arbitrary and capricious); Native Vill. of Kivalina v. ExxonMobil Corp., 696 F.3d 849, 853, 858 (9th Cir. 2012) (holding that the Clean Air Act preempted federal common law, thus precluding plaintiff's public nuisance claim); Am. Elec. Power Co. v. Connecticut, 564 U.S. 410, 420, 424 (2011) (an equally divided Court held that plaintiff-states had standing to sue, but a majority held that the Clean Air Act "displace[d] any federal common-law right to seek abatement of . . . emissions from fossil-fuel fired powerplants").

[127] *See, e.g.*, Massachusetts v. EPA, 549 U.S. 497, 541–42 (2007) (Roberts, C.J., dissenting) (noting that "[t]he very concept of global warming seems inconsistent with this particularization requirement" and "accepting a century-long time horizon and a series of compounded estimates [of sea level rise] renders requirements of imminence and immediacy utterly toothless"); Ctr. for Biological Diversity v. U.S. Dep't of Interior, 563 F.3d 466, 478 (D.C. Cir. 2009) ("Petitioners can only aver that any significant adverse effects of climate change 'may' occur at some point in the future. This does not amount to the actual, imminent, or 'certainly impending' injury required to establish standing.").

[128] *See* Juliana v. United States, 947 F.3d 1159, 1168 (9th Cir. 2020) (noting that "'it does not matter how may persons have been injured' if the plaintiffs' injuries are 'concrete and personal'" (quoting *Massachusetts*, 549 U.S. at 517)); *see also* Cath. League for Religious & C.R. v. City &

ASBL v. Belgium, "[i]n the current state of climate science . . . there can no longer be any doubt that there is a real threat of dangerous climate change with a direct negative effect on the daily lives of current and future generations . . . ."[129] Similarly, in *Juliana v. United States*, the Ninth Circuit Court of Appeals recognized that climate change is affecting the plaintiffs "now in concrete ways and will continue to do so unless checked."[130]

The severity of climate change injuries has prompted courts and international bodies to recognize that climate injuries implicate rights fundamental to human existence. In *Klimaatzaak*, the court held that "in pursuing their climate policy, the [government] defendants infringe the fundamental rights of the plaintiffs, and more specifically Articles 2 and 8 of the [European Convention on Human Rights], by failing to take all necessary measures to prevent the effects of climate change on the plaintiffs' life and privacy[.]"[131] In *Neubauer v. Germany*, the German Constitutional Court recognized that "[t]he state's [constitutional] duty of protection . . . also includes the duty to protect life and health against the risks posed by climate change."[132]

In denying the federal government and fossil fuel industry intervenors' motions to dismiss in *Juliana*, Oregon District Court Judge Ann Aiken became the first judge to recognize a climate-specific fundamental right, closely tied to the rights to life and liberty secured by the U.S. Constitution:

> Exercising my "reasoned judgment," I have no doubt that the right to a climate system capable of sustaining human life is fundamental to a free and ordered society. Just as marriage is the "foundation of the family," a stable climate system is quite literally the foundation "of society, without which there would be neither civilization nor progress."
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> . . . .
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> In this opinion, this Court simply holds that where a complaint alleges governmental action is affirmatively and substantially

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Cnty. of San Francisco, 624 F.3d 1043, 1048–53 (9th Cir. 2010); Novak v. United States, 795 F.3d 1012, 1018 (9th Cir. 2015); Jewel v. Nat'l Sec. Agency, 673 F.3d 902, 910 (9th Cir. 2011); Newdow v. Lefevre, 598 F.3d 638, 642 (9th Cir. 2010), *cert. denied*, 562 U.S. 1271 (2011).

[129] ASBL Klimaatzaak v. Belgium, Civ. [Tribunal of First Instance] Brussels (4th ch.), June 17, 2021, p. 61 [hereinafter *Klimaatzaak*], https://prismic-io.s3.amazonaws.com/affaireclimat/18f9910f-cd55-4c3b-bc9b-9e0e393681a8_167-4-2021.pdf.

[130] *Juliana*, 947 F.3d at 1168.

[131] *Klimaatzaak*, *supra* note 129, at 83.

[132] Neubauer v. Germany, BVerfG, 1 BvR 2656/18 et al., March 24, 2021, ¶ 148 [hereinafter *Neubauer*] (internal citations omitted), http://climatecasechart.com/wp-content/uploads/sites/16/non-us-case-documents/2021/20210324_11817_order-1.pdf.

> damaging the climate system in a way that will cause human deaths, shorten human lifespans, result in widespread damage to property, threaten human food sources, and dramatically alter the planet's ecosystem, it states a claim for a due process violation[.] To hold otherwise would be to say that the Constitution affords no protection against a government's knowing decision to poison the air its citizens breathe or the water its citizens drink. Plaintiffs have adequately alleged infringement of a fundamental right.[133]

Although *Juliana* is the only U.S. federal court to date to recognize a climate-specific right,[134] some state courts, such as the Hawai'i Supreme Court, have followed suit and ruled that the state's constitutional right to a clean and healthful environment "subsumes a right to a life-sustaining climate system."[135] In the U.S. state of Montana, Judge Kathy Seeley held that sixteen youth plaintiffs sufficiently alleged that Montana's fossil fuel energy policy implicated their right to a clean and healthy environment secured by the Montana Constitution.[136] Some state supreme court justices in dissenting opinions have followed Judge Aiken's lead in acknowledging the existence of a fundamental climate right. Justices Peter Maassen and Susan Carney, in a youth climate change case before the Alaska Supreme Court, wrote in dissent:

> I disagree with the court's rejection of declaratory relief as serving no useful purpose. In my view, a balanced consideration of prudential doctrines requires that we explicitly recognize a constitutional right to a livable climate – arguably the bare minimum when it comes to the inherent human rights to which the Alaska Constitution is dedicated.[137]

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[133] Juliana v. United States, 217 F. Supp. 3d 1224, 1250 (D. Or. 2016) (internal citations omitted), *rev'd and remanded*, 947 F.3d 1159 (9th Cir. 2020).

[134] In Washington state, King County Superior Judge Hollis Hill found, in the context of a climate change case brought by youth plaintiffs, that the "fundamental and inalienable right of the people of the State of Washington to live in a healthful and pleasant environment" codified in statute, WASH. REV. CODE § 43.21A.010 (1970), constitutes a retained right under Article I, Section 30 of the Washington State Constitution. Foster v. Wash. State Dep't of Ecology, No. 14-2-25295-1 SEA (Wash. Super. Ct. Nov. 19, 2015) (internal citations omitted); DEP'T OF ECOLOGY, WASHINGTON GREENHOUSE GAS EMISSION REDUCTION LIMITS (Dec. 2014) ("Climate change is not a far off risk. It is happening now globally and the impacts are worse than previously predicted, and are forecast to worsen. . . . If we delay action by even a few years, the rate of reduction needed to stabilize the global climate would be beyond anything achieved historically and would be more costly.").

[135] *In re* Maui Elec. Co., 506 P.3d 192, 202 n.15 (Haw. 2022).

[136] Held v. Montana, No. CDV-2020-307, at 14 (Mont. First Jud. Dist. Ct. Lewis & Clark Cnty. Aug. 4, 2021), http://climatecasechart.com/climate-change-litigation/wp-content/uploads/sites/16/case-documents/2021/20210804_docket-CDV-2020-307_order.pdf.

[137] Sagoonick v. Alaska, 503 P.3d 777, 805 (Alaska 2022) (Maassen, J., dissenting in part). *See also* Aji P. v. State of Washington, 497 P.3d 350, 353 (Wash. 2021) (Gonzalez, J., dissenting)

Several other decisions from the international circuit, including Belgium, Canada, Colombia, Germany, Norway, Portugal, and Pakistan have opened the door for climate protections based on other fundamental rights, such as the right to life, personal security, or privacy.[138] The Netherlands Supreme Court found that "no other conclusion can be drawn but that the State is required . . . to take measures to counter the genuine threat of dangerous climate change" to protect the rights to life and respect for private and family life secured by Articles 2 and 8 of the European Convention on Human Rights, which "encompass[] the positive obligation to take reasonable and appropriate measures to protect individuals against possible serious damage to their environment."[139] In Canada, Judge Carole J. Brown recognized that youth's climate change claims against the province of Ontario engaged the Canadian Charter of

("[T]he court should not avoid its constitutional obligations that protect not only the rights of these youths but all future generations who will suffer from the consequences of climate change.").

[138] Norway's Supreme Court heard a climate change case over seven days involving Article 112 of its constitution and Arctic oil exploration in Norway's Barents Sea. *See* Alexandru Gociu & Suryapratim Roy, *Norway's Supreme Court Is Set to Rule on Whether the Country Can Keep Searching for New Arctic Oil*, ARCTIC TODAY (Nov. 3, 2020), https://www.arctictoday.com/norways-supreme-court-is-set-to-rule-on-whether-the-country-can-keep-searching-for-new-arctic-oil/ ("The case focuses on Article 112 of the Norwegian Constitution, which focuses on sustainability and protection of the environment. In 2014, [Article 112] was updated to introduce a duty of care on the government to provide a livable environment for current and future generations.").

In September 2020, a group of Portuguese youth activists filed a climate change lawsuit in the European Court of Human Rights. The suit was filed against thirty-three countries and argued that those countries needed to make more ambitious emissions cuts to safeguard their future physical and mental well-being. While the European Court of Human Rights has yet to hear the merits of the case, the court did order the thirty-three governments to respond to the plaintiffs' allegations. The court also asked the governments to explain whether their failure to reduce their emissions violated various articles of the European Convention on Human Rights. Claudio Duarte Agostinho v. Portuga, App. No. 39371/20, at 2–5 (Nov. 30, 2020), https://www.nhri.no/wp-content/uploads/2020/11/DUARTE-AGOSTINHO-and-others-vs-PORTUGAL-and-32-others-unofficial-translation-fr.en_.pdf.

In 2015, a lawsuit was brought by a Pakistani farmer who argued that Pakistan had failed to live up the country's own climate plans, specifically with regard to increasing the country's resilience to climatic change. Noting that the "delay and lethargy" of the state "offend[ed]" fundamental rights, such as the rights to life and human dignity, under the Pakistani Constitution, the judge ordered the Pakistani government to establish a national commission on climate change with a clear remit to ensure steps would be taken to improve climate resiliency. Leghari v. Fed'n of Pak., (2015) W.P. No. 25501 (High Ct. Lahore) (Pak.) 1, 2, 6–7, https://elaw.org/system/files/pk.leghari.090415_0.pdf.

See also Rechtbank Den Haag 24 juni 2015 (Stichting Urgenda/Staat der Nederlanden) (Neth.), ¶ 2.38, http://climatecasechart.com/wp-content/uploads/sites/16/non-us-case-documents/2015/20150624_2015-HAZA-C0900456689_decision-1.pdf; *Sharma ex rel. Sister Marie Brigid Arthur v. Minister for the Env't [No. 2]* (2021) FCA 774 (Austl.), ¶ 58–59, https://equitygenerationlawyers.com/wp/wp-content/uploads/2021/07/Sharma-v-Minister-No-2-2021-FCA-774.pdf.

[139] HR 20 december 2019, RvdW 2020 (De Staat der Nederlanden/Stichting Urgenda) (Neth.), ¶¶ 5.6.2, 5.2.3 [hereinafter *Urgenda* Supreme Court Opinion].

Rights and Freedoms rights to life, liberty, security of the person, and equality, such that they were entitled to a trial to challenge the province's GHG emissions target and plan to reduce GHG emissions.[140]

International bodies, such as the United Nations Human Rights Office of the High Commissioner, acknowledge that the first step toward an effective remedy is a declaration that because climate change threatens the enjoyment of the full suite of human rights, states have an "obligation to prevent the foreseeable adverse effects of climate change and ensure those affected by it, particularly those in vulnerable situations, have access to effective remedies and means of adaptation to enjoy lives of human dignity."[141]

Courts are also coming to grips with the multicausal reality that defines climate change cases and are acknowledging the influential role governments play in setting policies that result in GHG emissions.[142] In recognizing that the youth had proffered sufficient evidence to show that the U.S. government's role in contributing to climate change by purposefully promoting a climate polluting fossil-fuel energy system was a "substantial factor in causing the plaintiffs' injuries," the majority in *Juliana* summarized the U.S. federal government's role as follows:

> [T]he federal government has long understood the risks of fossil fuel use and increasing carbon dioxide emissions. As early as 1965, the Johnson Administration cautioned that fossil fuel emissions threatened significant changes to climate, global temperatures, sea levels, and other stratospheric properties. In 1983, an Environmental Protection Agency ("EPA") report projected an increase of 2 degrees Celsius by 2040, warning that a "wait and see" carbon emissions policy was extremely risky. And, in the 1990s, the EPA implored the government to act before it was too late. Nonetheless, by 2014, U.S. fossil fuel emissions had climbed to 5.4 billion metric tons, up substantially from 1965. This growth shows no signs of abating. From 2008 to 2017, domestic petroleum and natural gas production increased by nearly 60%, and the country is now expanding oil and gas extraction four times faster than any other nation.[143]

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[140] Mathur v. Ontario, [2020] O.N.S.C. 6918, ¶¶ 143–47, 267–68 (Can. Ont. Sup. Ct.) [hereinafter *Mathur*], https://ecojustice.ca/wp-content/uploads/2020/11/Reasons-for-Decision-CJB-FINAL-signed-2020-11-12.pdf.

[141] *OHCHR and Climate Change*, U.N. HUM. RTS. OFF. HIGH COMM'R, https://www.ohchr.org/en/climate-change#:~:text=States (last visited Aug. 7, 2022).

[142] The attribution science is tremendously helpful on the causation issue. *See* Michael Burger, Jessica Wentz & Randley Horton, *The Law and Science of Climate Change Attribution*, 45 COLUM. J. ENV'T L. 57, 112–13 (2020).

[143] Juliana v. United States, 947 F.3d 1159, 1166 (9th Cir. 2020).

The Ninth Circuit went on to reject the argument that "the causal chain is too attenuated because it depends in part on the independent actions of third parties."[144] Other courts have similarly declined to endorse the argument that governments should not be held accountable for their conduct that contributes to climate change simply because the problem may have many contributing factors. For example, according to the Supreme Court of the Netherlands in *Netherlands v. Urgenda Foundation*:

> Partly in view of the serious consequences of dangerous climate change . . . the defence that a state does not have to take responsibility because other countries do not comply with their partial responsibility, cannot be accepted. Nor can the assertion that a country's own share in global greenhouse gas emissions is very small and that reducing emissions from one's own territory makes little difference on a global scale, be accepted as a defence. Indeed, acceptance of these defences would mean that a country could easily evade its partial responsibility by pointing out other countries or its own small share. If, on the other hand, this defence is ruled out, each country can be effectively called to account for its share of emissions and the chance of all countries actually making their contribution will be greatest . . . .[145]

Similarly, in the *Klimaatzaak* case in Belgium, the court found that "[t]he global dimension of the problem of dangerous global warming does not exempt the Belgian public authorities from their pre-described obligation under Articles 2 and 8 of the [European Convention on Human Rights]."[146]

In *Mathur v. Her Majesty the Queen in Right of Ontario*, a case brought by a group of Ontario youth challenging the provincial government's 2030 GHG emission target and climate change plan as insufficiently ambitious and violative of constitutional rights, the court recognized that "the government is acting to cause the harm in question. By lowering the target for Ontario, the government is essentially authorizing, incentivizing, and itself creating the very GHGs that are the cause of the alleged *Charter* violations in the Application."[147] The court acknowledged that "Ontario is actively authorizing and creating the very emissions that are causing harm."[148]

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[144] *Id.* at 1169.

[145] *Urgenda* Supreme Court Opinion, *supra* note 139, ¶ 5.7.7. *See also Neubauer*, *supra* note 132, ¶ 200.

[146] *Klimaatzaak*, *supra* note 129, at 61.

[147] *Mathur*, *supra* note 140, ¶ 194.

[148] *Id.* ¶ 200. The Applications point out that "Ontario established a target that essentially allows GHG emitters to continue to emit GHGs into the atmosphere, thereby causing harm." *Id.* ¶ 218.

In light of the recognition that climate change can implicate individual constitutional and human rights in legally cognizable ways, the question presented to advocates is how to present climate change injury and causation stories to the courts so as to justify not only recognition of the individual's climate change injuries and a challenged entity's role in causing climate change, but to support a finding of liability and imposition of a legal remedy that actually protects the rights from being infringed.[149] In nearly all climate change cases being litigated today, the remedy remains the holy grail. The issuance of a remedy requires judicial bodies to feel secure in deciding the standard by which to gauge a violation of fundamental rights.[150]

B. The Unfortunate Trend of Advocates Adopting the 1.5°C–2°C Paris Target as the Legal Standard Protective of Fundamental Rights

In several recent climate change cases, judicial bodies have begun to equate the Paris Agreement temperature target to the legal standard that gauges a government's compliance with its obligations to protect fundamental rights. For example, the Dutch Supreme Court's well-known and precedent-setting *Urgenda* decision characterizes 1.5°C of heating as "safe" and leaves decision makers assured in their course of conduct pursuing policies that result in such increases in temperature, regardless of what the science says will ensue at such levels of warming.[151] More recently, in *Neubauer*, the court upheld as "constitutionally permissible" the legislature's decision to incorporate the Paris Agreement temperature target into Germany's climate law, finding that the Paris Agreement target:

> [M]ust indeed also be understood as being a specification of the climate action required under constitutional law. This is primarily supported by the fact that the [1.5°C and 2°C] climate target[s] . . . [are] the internationally agreed temperature limit[s] of Art. 2(1)(a) PA, which the legislator has deliberately and explicitly taken as a basis. [Their] constitutional law significance

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[149] *See* David B. Owens, Comment, *Fourth Amendment Remedial Equilibration: A Comment on* Herring v. United States *and* Pearson v. Callahan, 62 STAN. L. REV. 563, 563–65 (2010) (quoting Marbury v. Madison, 5 U.S. (1 Cranch) 137, 163 (1803)) (citing Chief Justice Marshall's "general and indisputable rule" that "where there is a legal right, there is also a legal remedy by suit or action at law, whenever that right is invaded" while noting that "without a remedy there is no right," such that "even if a court says a lot about the value of a right, the manner in which it vindicates that right is really what determines its value").

[150] *Id.* at 565.

[151] *Urgenda* Supreme Court Opinion, *supra* note 139, ¶ 2.1 ("In recent years, new insights have shown that the temperature can only safely rise by no more than 1.5°C, which translates into a greenhouse gas concentration level of no more than 430 ppm in the year 2100.").

> goes beyond the consent given by the German legislator to the Paris Agreement in passing the act of approval.[152]

In Brazil, four political parties filed a case challenging the federal government's failure to adopt administrative measures to implement the statutorily created National Climate Change Fund, which was designed to ensure funding for climate mitigation and adaptation activities.[153] The parties alleged that while the Ministry for the Environment was legally obligated to prepare an annual plan for the Climate Fund, it had been inoperative and unfunded, which violated constitutional obligations to protect and preserve the environment, forests, fauna, and flora; Brazil's commitments under the Paris Agreement; and separation of powers.[154] Calling climate change "one of the defining issues of our time" that "may put at risk the survival of man on Earth,"[155] the Brazilian Supreme Court ruled that there was a constitutional duty to make the Climate Fund operative.[156] While the court made no findings as to what temperature target would protect human rights, the court held that environmental treaties like the Paris Agreement "are a species of the genus human rights treaties," which enjoy "supranational status," and define the contours of the constitutional duty to fund climate mitigation under Brazilian law.[157]

Rather than looking to peer-reviewed scientific evidence to decide the standard of protection for fundamental rights, some courts appear to be defaulting to acceptance of the Paris Agreement target, and whether a government's conduct aligns with its commitments under the Paris Agreement, as the litmus test for fundamental rights protection. As two legal scholars reflected, "the [*Urgenda*] court was relieved of the need to articulate detailed normative implications of the science, given that plaintiffs sought only to hold the . . . government to its own previously stated commitments."[158] But, if judicial bodies are to be "relieved" of the exercise of reviewing the actual scientific evidence in climate change cases, which appears to be the trend,[159] how can advocates ensure that

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[152] *Neubauer*, *supra* note 132, ¶ 209.

[153] PSB v. Brazil, S.T.F. 708, Apelação Cível, Relator: Luís Roberto Barroso, 1.7.2022 (Braz.), http://climatecasechart.com/non-us-case/psb-et-al-v-federal-union/.

[154] *See generally id.*, http://climatecasechart.com/wp-content/uploads/sites/16/non-us-case-documents/2022/20220701_ADPF-708_decision-1.pdf (unofficial translation).

[155] *Id.* ¶¶ 6, 7.

[156] *Id.* ¶ 37.

[157] *Id.* ¶ 17.

[158] R. Henry Weaver & Douglas A. Kysar, *Courting Disaster: Climate Change and the Adjudication of Catastrophe*, 93 NOTRE DAME L. REV. 295, 339, 339 n.312 (2017) (citing the Dutch government's commitments under the 2020 Cancun Agreements).

[159] *E.g.*, *Klimaatzaak*, *supra* note 129, at 64 ("The scientific community agrees on the need to contain the concentration of GHGs to 450 ppm by 2100, whereas currently the concentration of GHGs is already above 400 ppm.").

protection of fundamental rights extends to those most vulnerable to climate harms?

Because of the devastating climate harms associated with 1.5°C–2°C of heating, judicial decisions calibrating the protection of fundamental rights to the Paris Agreement target implicitly endorse the infringement of certain (often minoritized) clients' rights. In these cases, even if there is a "win" for lawyers who seek to enforce compliance with Paris Agreement commitments,[160] there is a net loss for people and other life on our planet. In other words, in these cases, legal climate advocates may "fulfil their legal duty, even if they fail to fulfil their wider duty of care." [161] The science suggests that blind adherence to the Paris Agreement target locks us into disaster *even if* the target is achieved, and thus a different approach is worth exploring when the ultimate goal is the protection of universal fundamental rights.

III. INTRODUCING A SCIENTIFICALLY BASED STANDARD OF PROTECTION IN FUNDAMENTAL RIGHTS BASED CLIMATE CHANGE CASES

The work of defining and protecting fundamental rights falls squarely within the province of judicial bodies, and it is imperative that such bodies have a full understanding of the underlying science when rendering such existential decisions. This section proposes a specific evidence-based and scientifically supported standard for stabilizing the climate system as an alternative to the Paris Agreement target, analyzes whether this standard is justiciable, and argues that advocates should use it instead of the Paris Agreement target to define the legal standard of protection of fundamental rights in climate change cases.

A. The Scientific Prescription to Stabilize the Climate System and Protect Fundamental Rights

Fundamental rights protection requires a climate system standard that is not only safe for humanity, but scientifically supported and measurable

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[160] These decisions are rightfully classified as a "win" in the realm of global climate litigation for a variety of reasons, including, for example, in *Urgenda*, the court's ruling as to the justiciability of climate change claims under the ECHR and the Dutch Constitution and its ultimate holding that the government of the Netherlands is legally obligated to reduce its GHG emissions. *Urgenda* Supreme Court Opinion, *supra* note 139. *See also* Commune de Grande-Synthe v. France [CE] [highest administrative court] July 1, 2021, http://climatecasechart.com/climate-change-litigation/non-us-case/commune-de-grande-synthe-v-france/ (representing the first ruling of its kind in France).

[161] Monbiot, *supra* note 71. *See also* Weaver & Kysar, *supra* note 158, at 354 (citing First Amended Complaint at 5, 36, 87, 93, Juliana v. United States, 339 F. Supp. 3d 1062 (D. Or. 2018) (No. 6:15-cv-01517)) (noting that the *Juliana* plaintiffs, although alleging constitutional violations, "also speak in the register of tort, invoking a 'duty of care' on the part of the trustee governments").

as well. When representing clients before judicial bodies, advocates have a duty of care to seek an evidence-based, peer-reviewed prescription as a fundamental rights standard of protection. The very foundation of judicial systems around the world relies on the use of best evidence to assure fair, impartial, and just remedies. There is no controversy with respect to advocates using scientific evidence to document how climate change is injuring individuals and how government decisions are causing and contributing to those injuries; the science of EEI should similarly be used as evidence to define the legal standard of human rights protection and appropriate remedies.[162]

EEI determines the "temporal evolution of Earth's climate," which scientists have characterized as "[t]he most practical way to monitor climate state, variability and change."[163] Scientists advise that "[t]his simple number, EEI, is the most fundamental metric that the scientific community and public must be aware of as the measure of how well the world is doing in the task of bringing climate change under control."[164] It is vital for judicial bodies to understand the extent of EEI because it "is the most critical number defining the prospects for continued global warming and climate change,"[165] indicating the severity of the human rights infringement.

The restoration of Earth's energy balance would approximate the Earth's climate system in which human civilization was able to develop and thrive during the last several thousand years, which fluctuated at the naturally slow, glacial pace over the millions of years of Earth's history. Today there are two aspects of human-caused climate change that scientists tell us are dangerous. First, atmospheric CO_2 levels are much higher today than at any time in human civilization.[166] Second, the

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[162] "An intelligent evaluation of facts is often difficult or impossible without the application of some scientific, technical, or other specialized knowledge." FED. R. EVID. 702 advisory committee's note to 1972 proposed rules.

[163] von Schuckmann et al. explain: "All energy entering or leaving the Earth climate system does so in the form of radiation at the top of the atmosphere (TOA). The difference between incoming solar radiation and outgoing radiation, which is the sum of the reflected shortwave radiation and emitted longwave radiation, determines the net radiative flux at TOA. Changes of this global radiation balance at TOA – the so-called Earth energy imbalance (EEI) – determine the temporal evolution of Earth's climate: If the imbalance is positive (i.e., less energy going out than coming in), energy in the form of heat is accumulated in the Earth system, resulting in global warming – or cooling if the EEI is negative. . . . Contemporary estimates of the magnitude of the Earth's energy imbalance range between about 0.4 and 0.9 w/m^{-2} . . . and are directly attributable to increases in carbon dioxide and other greenhouse gases in the atmosphere from human activities." von Schuckmann et al., *supra* note 4, at 2014–15 (internal citation omitted).

[164] *Id.* at 2014.

[165] *Id.*

[166] *See, e.g.*, Henry Fountain, *Carbon Dioxide Levels Are Highest in Human History*, N.Y. TIMES (June 3, 2022), https://www.nytimes.com/2022/06/03/climate/carbon-dioxide-record.html.

increase in the amount of greenhouse gases (such as methane and CO_2) in our atmosphere, and thus the rate of climatic change, is largely unprecedented in the Earth's history, according to the scientific record.[167] According to recent calculations, the United States alone is emitting carbon into the atmosphere at a rate that is at least the same order of magnitude, or more than double the rate, that resulted in the end-Permian extinction 251.9 million years ago that resulted in the disappearance of 95% of marine species.[168]

Dr. James Hansen, one of the most prominent scientists that has studied EEI, in an expert report submitted for *Juliana v. United States*, has explained that "in light of approaching points of no return," the current state of EEI justifies an initial target of returning to less than 350 ppm of CO_2 by 2100. A global mitigation trajectory that is consistent with achieving global atmospheric CO_2 concentrations of below 350 ppm would result in a mid-century peak of approximately 1.3°C before temperatures begin to cool again, with global surface temperatures stabilizing at ~1°C above pre-industrial temperatures by 2100 and reducing even further in the twenty-second century as the EEI corrects. In the *Juliana* litigation, Dr. Hansen testified:

> The enormity of the potential consequences of . . . [the] loss of coastal cities and extermination of countless species, demanded reassessment of what constituted "dangerous human-made interference with the climate system," which the global community sought to avoid by ratifying the United Nations Framework Convention on Climate Change in 1992. That reassessment led me and others to conclude in 2008 that the political guardrail of 2°C of warming (corresponding approximately to an atmospheric CO_2 concentration of ~450 ppm) is highly dangerous, and that an initial target of < 350 ppm CO_2 is justified by the relevant science.
>
> Particularly in light of approaching points of no return, it is, in my expert opinion, essential to commence serious and sustained action to return atmospheric CO_2 to < 350 ppm without further delay; essential, that is, to preserve coastal cities from rising seas

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[167] *See* Tik Root, *Earth Is Now Trapping an 'Unprecedented' Amount of Heat, NASA Says*, WASH. POST (June 16, 2021, 4:00 PM), https://www.washingtonpost.com/climate-environment/2021/06/16/earth-heat-imbalance-warming/.

[168] *See* S.D. Burgess, J.D. Muirhead & S.A. Bowring, *Initial Pulse of Siberian Trap Sills as the Trigger of the End-Permian Mass Extinction,* 8 NATURE COMMC'NS 1, 2 (2017); Gavin L. Foster, Pincelli Hull, Daniel J. Lunt & James, *Placing Our Current 'Hyperthermal' in the Context of Rapid Climate Change in Our Geological Past*, 376 PHIL. TRANSACTIONS ROYAL SOC'Y, Aug. 7, 2018, at 3–4; Justin L. Penn & Curtis Deutsch, *Avoiding Ocean Mass Extinction from Climate Warming*, 376 SCI. 524, 525–26 (2022); *see also* Personal Conversation with Anders Carlson, Climate Analyst, Our Children's Trust (May 17, 2022) (on file with authors).

> and floods (caused in part by melting of Antarctic and Greenland ice) and superstorms, and otherwise to restore a viable climate system on which the life, liberty, and property prospects of Plaintiffs, young citizens of America, and future generations so thoroughly depend.[169]

The 350 ppm standard is becoming more significant given the increasing EEI trend.[170] A positive EEI manifests as "symptoms" of climate change harms, such as global temperature rise, increased ocean warming, ocean acidification, and sea level rise.[171] For example, in 2020 one study showed that "[t]he world's oceans absorbed 20 sextillion joules of heat due to climate change and warmed to record levels."[172] The quantity of warming—20,000,000,000,000,000,000,000 joules—is equal to the energy of ten Hiroshima atomic bombs being detonated every second of the year, or the amount required to take 1.3 trillion trips to the moon.[173] According to a scientific paper by Dr. Hansen, co-author Karina von Schuckmann, and dozens of respected scientists across the world:

> Stabilization of climate, the goal of the universally agreed UNFCCC and the Paris Agreement, requires that EEI be reduced to approximately zero to achieve Earth's system quasi-equilibrium. The change of heat radiation to space for a given greenhouse gas change can be computed accurately. The amount of CO_2 in the atmosphere would need to be reduced from 410 to 353 ppm (i.e., a required reduction of -57+/- 8 ppm) to increase

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[169] *Juliana*, Hansen Expert Report, *supra* note 11, at 4–5. *See also* von Schuckmann et al., *supra* note 4, at 2014.

[170] *See* von Schuckmann et al., *supra* note 4, at 2015 (citing Karina von Schuckmann, et al., *An Imperative to Monitor Earth's Energy Imbalance*, 6 NAT. CLIMATE CHANGE 138 (2016)); Ryan J. Kramer et al., *Observational Evidence of Increasing Global Radiative Forcing*, 48 GEOPHYSICAL RSCH. LETTERS 1, 1 (2021) (finding radiative forcing has increased 0.53 +/- 0.11 W/m^2 from 2003 to 2018 and confirming "that rising greenhouse gas concentrations account for most of the increases in the radiative forcing, along with reductions in reflective aerosols. This serves as direct evidence that anthropogenic activity has affected Earth's energy budget in the recent past"); Norman G. Loeb et al., *Satellite and Ocean Data Reveal Marked Increase in Earth's Heating Rate*, 48 GEOPHYSICAL RS. LETTERS 1, 1 (2021) ("Satellite and in situ observations independently show an approximate doubling of Earth's Energy Imbalance (EEI) from mid-2005 to mid-2019."); *see Juliana*, Hansen Expert Report, *supra* note 11, at 7 ("Because EEI is such a fundamental property of the climate system, the implications of an increasing EEI trend are far reaching.").

[171] Loeb et al., *supra* note 170, at 7 (internal citation omitted) ("A positive EEI is manifested as 'symptoms' such as global temperature rise, increased ocean warming, sea level rise, and intensification of the hydrological cycle.").

[172] Ben Deacon, *Climate Change Pushed Ocean Temperatures to Record High in 2020, Study Finds*, ABC NEWS (Jan. 17, 2021, 12:15 PM), https://www.abc.net.au/news/2021-01-18/ocean-temperatures-reached-record-high-in-2020-study-finds/13062628.

[173] *Id.*; *The World Continued to Warm in 2020*, CAMBRIDGE NETWORK (Jan. 18, 2021), https://www.cambridgenetwork.co.uk/news/world-continued-warm-2020; Personal Conversation with Anders Carlson, Climate Analyst, Our Children's Trust (on file with authors).

> heat radiation to space by 0.87 W/m^{-2}, bringing Earth back towards energy balance . . . .[174]

Other scientific experts have similarly expressed the necessity of the 350 ppm standard, given the importance of restoring Earth's energy balance. Dr. Ove Hoegh-Guldberg, one of Australia's preeminent experts on coral reefs, testified in *Juliana* about the risks of acidification:

> [P]resent levels of atmospheric CO_2, as with any level above 350 parts per million (ppm), presents serious and ongoing threat through dangerous acidification of the world's oceans.
>
> . . . In fact, even achieving the goals of the Paris Climate Agreement . . . and restraining warming to "well below" 2°C (equivalent to approximately 450 ppm of CO_2) will still result in the loss of 90% of today's corals.
>
> At today's level of ~410 ppm, most reefs worldwide are committed to a considerable irreversible decline. The rate, extent, and nature of this decline will become increasingly severe if atmospheric CO_2 concentrations continue to increase above current levels. Returning the atmosphere to a safe level of CO_2 for coral reefs requires atmospheric CO_2 concentrations below 350 ppm and achieving long-term targets of a maximum temperature peak of 1.3°C above the Pre-Industrial Period with a gradual cooling below those levels through the end of this century and beyond.[175]

Dr. Eric Rignot, an expert on ice sheets, has testified that "[a]s an interim step to returning to preindustrial CO_2 concentrations, we should at minimum aim to return to no more than 350 ppm by 2100" to preserve ice sheets in Antarctica and Greenland.[176]

It is thus vital for advocates to present judicial bodies with primary scientific evidence of how to stabilize the climate system and protect these vital planetary systems, as opposed to solely what levels of heating have been deemed to be politically palatable by governments under the Paris Agreement. If advocates do not at least present judicial bodies this critical scientific information and urge that it be used to define the legal standard of protection in the fundamental rights context, there is a formidable risk that the rights of the most climate vulnerable populations on the planet get erased. There are also strategic legal reasons for presenting judicial bodies with the best available scientific information

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[174] von Schuckmann et al., *supra* note 4, at 2029 (internal citations omitted).

[175] Expert Report of Ove Hoegh-Guldberg, Ph.D. at 8, Juliana v. United States, 339 F. Supp. 3d 1062 (D. Or. 2018) (No. 15-cv-01517) (internal citations omitted).

[176] Expert Report of Eric Rignot, Ph.D. at 2, Juliana v. United States, 339 F. Supp. 3d 1062 (D. Or. 2018) (No. 15-cv-01517) (internal citation omitted).

as opposed to a politically negotiated target, including the need to overcome justiciability arguments currently impeding many climate change cases from going to trial.

Some may say it is too late, or impossible, to limit global average temperature rise to below 1.5°C, and that the Paris Agreement target is the best we can achieve. Surely, global temperature has already surpassed 1°C. However, many experts have opined that, while challenging, achieving a science-based prescription to restore Earth's energy balance is still feasible.[177] Such feasibility, however, becomes more precarious the longer that emissions continue to rise without an appropriate judicial check consistent with a scientifically backed standard. It would be a tragedy to advocate for a standard of global heating that does not reflect the current state of climate science and knowingly exacerbates existing climate injuries. The physical principles at play in EEI, and the resulting climate change, will not accommodate the political compromises captured in the Paris Agreement. Human laws should be consistent with the laws of physics, as should advocates' presentation of evidence before judicial bodies.

B. Scientific Evidence Can Be Judicially Manageable

Many governments in climate change cases take the position that there are no judicially manageable standards to decide the question of whether conduct that causes climate change infringes fundamental rights.[178] In essence, the argument is that there are no standards by which to judge when a government's contribution to climate change, or its failure to reduce GHG emissions, crosses the fundamental rights threshold. The argument is attractive because its endorsement essentially gives the political branches of government full, unreviewable discretion to continue their conduct that contributes to climate change despite the known danger, viable alternatives, and their own legal commitments to

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[177] *See, e.g.*, James Hansen et al., *Assessing "Dangerous Climate Change": Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature*, 8 PLOS ONE 1, 2 (2013); BEN HALEY ET AL., 350 PPM PATHWAYS FOR THE UNITED STATES 6 (2019), https://irp-cdn.multiscreensite.com/be6d1d56/files/uploaded/350PPMPathwaysfortheUnitedStates.pdf; Mark Jacobson, et al., *100% Clean and Renewable Wind, Water, and Sunlight All-Sector Energy Roadmaps for 139 Countries of the World*, 1 JOULE 108, 108 (2017); Expert Report of James H. Williams, Ph.D. at 11, Juliana v. United States, 339 F. Supp. 3d 1062 (D. Or. 2018) (No. 15-cv-01517); Expert Report of G. Philip Robertson at 3, Juliana v. United States, 339 F. Supp. 3d 1062 (D. Or. 2018) (No. 15-cv-01517).

[178] *See, e.g.*, Defendants State of Florida, the Florida Department of Agriculture and Consumer Services, Commissioner Nikkie Fried, and the Florida Public Service Commission's Motion to Dismiss the First Amended Complaint at 8–10, Reynolds v. Florida, No. 84521673 (App. Ct. Fla. 2019); La Rose v. Her Majesty the Queen, [2020] F.C. 1008 (Can. Ont.); *Mathur*, *supra* note 140, ¶ 123.

reduce GHG emissions. It is also alluring to raise during the initial stages of litigation, such as in the context of a motion to dismiss, as it is an easier argument to make in the abstract, without the benefit of a fully developed factual record that can be reviewed for whether the standard, as presented and applied, was in fact manageable.

Courts routinely adopt and apply a panoply of legal standards when deciding claims of infringement of fundamental rights in a variety of different factual contexts.[179] For example, courts in the United States have been hearing and deciding Fifth Amendment substantive due process and equal protection claims, the type of constitutional legal claims raised in *Juliana v. United States*, for decades. In 1882, the U.S. Supreme Court acknowledged that the substantive due process clause is "of that character which it is intended the courts shall enforce when cases involving their operation and effect are brought before them."[180] In such cases, government "policies that classify on suspect bases or infringe on fundamental rights are strongly presumptively unconstitutional; they can be upheld only if necessary to serve a compelling governmental interest."[181] The U.S. Supreme Court has stated that the fundamental standard of culpability for state-created danger in a substantive due process claim, one of the claims in the *Juliana* litigation, is deliberately indifferent behavior that "shocks the conscience."[182] Only "conduct intended to injure in some way unjustifiable by any government interest" would rise to a conscience-shocking level for purposes of due process.[183]

In many (but not all) countries, it is the courts, not political bodies, who are ultimately charged with upholding individual fundamental rights

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[179] *See* Richard H. Fallon, Jr., *Implementing the Constitution*, 111 HARV. L. REV. 54, 67 (1997) (identifying "eight relatively common kinds of tests, all employed by the Court (either alone or in combination) in some areas of constitutional law to help define constitutional limits on governmental powers").

[180] United States v. Lee, 106 U.S. 196, 218, 220 (1882) ("Courts of justice are established, not only to decide upon the controverted rights of the citizens as against each other, but also upon rights in controversy between them and the government, and the docket of this court is crowded with controversies of the latter class.").

[181] Fallon, Jr., *supra* note 179, at 88. *See also* Washington v. Glucksberg, 521 U.S. 702, 720 (1997) ("The [Due Process] Clause also provides heightened protection against government interference with certain fundamental rights and liberty interests.").

[182] Cnty. of Sacramento v. Lewis, 523 U.S. 833, 846 (1998). The Court recognized that "[r]ules of due process are not . . . subject to mechanical application in unfamiliar territory," and "preserving the constitutional proportions of substantive due process demands an exact analysis of circumstances before any abuse of power is condemned as conscience shocking." *Id.* at 850. *See also* Farmer v. Brennan, 511 U.S. 825, 832–34 (1994) (deliberate indifference to violence from other prisoners); Wilson v. Seiter, 501 U.S. 294, 302–04 (1991) (deliberate indifference to conditions of confinement); Estelle v. Gamble, 429 U.S. 97, 104–05 (1976) (deliberate indifference to serious medical needs of prisoners).

[183] *Lewis*, 523 U.S. at 849.

against claims of compelling state interest. As U.S. Supreme Court Justice Elena Kagan noted during a recent oral argument, courts are the arbiters of rights: "[I]sn't the point of a right that you don't have to ask Congress? Isn't the point of a right that it doesn't really matter what Congress thinks or what the majority of the American people think as to that right?"[184] In fact, "[t]he Court retains an independent constitutional duty to review factual findings when constitutional rights are at stake. . . . Uncritical deference to Congress' factual findings in these [constitutional] cases is inappropriate."[185]

The U.S. Supreme Court has explained: "In determining what lines are unconstitutionally discriminatory, we have never been confined to historic notions of equality, any more than we have restricted due process to a fixed catalogue of what was at a given time deemed to be the limits of fundamental rights."[186] Familiar legal standards that both define fundamental rights and set the standards of infringement are applied by courts in a wide variety of factual scenarios, even some that are politically contentious such as the death penalty, abortion, and guns. Even when the legal standard is informed by constitutional "text-and-history" as opposed to science, as relevant in the Second Amendment context under U.S. law, the Supreme Court has acknowledged that these are legal standards capable of being applied by courts.[187] That some injuries are caused by climate change, a complex scientific issue with "political implications,"[188] should not automatically exempt the issue of climate change from a court's application of familiar legal standards in the fundamental rights context; nor should it excuse the parties from

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[184] Transcript of Oral Argument at 75, Whole Woman's Health v. Jackson, 142 S. Ct. 522 (2021) (No. 21-463).

[185] Gonzales v. Carhart, 550 U.S. 124, 165–66 (2007).

[186] Harper v. Va. State Bd. of Elections, 383 U.S. 663, 669 (1966).

[187] N.Y. State Rifle & Pistol Ass'n, Inc. v. Bruen, 142 S. Ct. 2111, 2130 n.6 (2022) (finding that petitioners have a constitutional right to bear arms in public for self-defense based on a plain text reading of the Second Amendment and on a historical review of the American tradition of firearm regulation).

[188] Courts in many jurisdictions reject the notion that cases are nonjusticiable merely "because the issues have political implications . . . ." INS v. Chadha, 462 U.S. 919, 943 (1983). Under Canadian law, claims that the government has interfered with a plaintiffs' rights have never been held to be non-justiciable simply because they raise complex social, political, and economic issues. *See, e.g.*, Carter v. Canada, [2015] 1 S.C.R. 331 (Can.); Canada v. Bedford, [2013] 3 S.C.R. 1101 (Can.); Canada v. PHS Cmty. Serv. Soc'y, [2011] 3 S.C.R. 134 (Can.); Chaoulli v. Quebec, [2005] 1 S.C.R. 791 (Can.); Victoria v. Adams, [2009] B.C.C.A. 563 (Can.). The Netherlands Supreme Court also recognized that while the government and parliament "have a large degree of discretion to make the political considerations that are necessary," "[i]t is up to the courts to decide whether, in availing themselves of this discretion, the government and parliament have remained within the limits of the law by which they are bound." *Urgenda* Supreme Court Opinion, *supra* note 139, ¶ 8.3.2.

withholding from the court the best available scientific evidence needed to decide the case.

The inquiry relevant to this Article is how legal standards can be manageably applied with respect to claims based on injuries related to climate change. Climate change is a scientific phenomenon that is objectively measurable in terms of GHG emissions and the extent to which GHG emissions are contributing to EEI. Ultimately, in order to avert the worst impacts of climate change and thus prevent further injury, Earth must be brought back toward energy balance.[189] A legal standard measuring the challenged conduct against its impact on the ability to restore Earth's energy balance, i.e., reducing atmospheric CO_2 concentrations to below 350 ppm by 2100, can be established as a matter of scientific evidence.[190] Once that is established as the legal standard needed to preserve fundamental rights, it becomes an exercise of applying the facts to the law to ascertain whether the challenged conduct exceeds this standard, a familiar judicial task that courts should begin to undertake.

The argument that some claims are "beyond the competence of courts" is not unique; as "[s]ome make the same point as regards the problem of equal protection in cases involving racial segregation,"[191] as in other areas. How can a court decide when the government is violating one's right to life, liberty, or property. one's right to private family life; one's right to be free from cruel and unusual punishment; one's right to privacy; or one's right to bear arms? On the flip side, how do courts determine whether a state's interest outweighs an individual's rights, such as a state's interest in "potential life" weighed against the rights of a woman to her privacy and bodily autonomy? For better or worse, making those calls is the proper role of the courts when interpreting constitutions or other laws that secure fundamental rights, and science in many cases can and should inform where courts ought to draw the line in the sand. As U.S. Supreme Court Justice Clarence Thomas recently acknowledged in the case of *New York State Rifle & Pistol Ass'n v. Bruen*, these kinds of constitutional inquiries are not made in the abstract because courts decide cases based upon the record compiled by the parties, and that often includes scientific evidence.[192]

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[189] *See* von Schuckmann et al., *supra* note 4, at 2029.

[190] *See, e.g.*, *Juliana*, Hansen Expert Report, *supra* note 11, at 25.

[191] Baker v. Carr, 369 U.S. 186, 245 (1962) (Douglas, J., concurring) ("Adjudication is often perplexing and complicated.")

[192] N.Y. State Rifle & Pistol Ass'n, Inc. v. Bruen, 142 S. Ct. 2111, 2130 n.6 (2022); *see also* Roper v. Simmons, 543 U.S. 551, 569 (2005) (referencing the "scientific and sociological studies" in the record that differentiated juveniles and adults to justify holding that imposing the death penalty on juvenile offenders violates the Eighth Amendment of the U.S. Constitution).

The complexity or novelty of the issue, whether it be climate change, racial segregation, gun rights, or discrimination on the basis of sex or gender, is no basis for courts to shrink from their role to hear and decide constitutional cases. As Judge Staton noted in her dissenting opinion in *Juliana*: "There is no justiciability exception for cases of great complexity and magnitude."[193] The Canadian Supreme Court has similarly ruled: "The fact that the matter is complex, contentious or laden with social values does not mean that the courts can abdicate the responsibility vested in them by our Constitution . . . when citizens challenge it."[194] If courts decide not to draw the line simply because the issue is complex, novel, or politically charged, the fundamental rights at stake technically become meaningless.[195]

Justice Carol J. Brown in Ontario, Canada, recently recognized the manageability of constitutional climate change claims based upon scientific evidence in the *Mathur* case: "[T]his Application is capable of scientific proof and the Applicants have already included many facts based on scientific and social science findings."[196] Justice Brown said that she was "satisfied that appropriate levels of global GHG emissions can be established through scientific evidence, based on the past and projected emission levels" and that "the Applicants cite various facts that are capable of scientific proof and about which courts are capable of making determinations, based on expert evidence . . . ."[197] Judge Staton, in her dissenting opinion in *Juliana*, agreed: "Here, the right at issue is fundamentally one of a discernable standard: the amount of fossil-fuel emissions that will irreparably devastate our Nation. That amount can be established by scientific evidence like that proffered by the plaintiffs."[198] She pointed out that "[n]either the government nor the majority has articulated why the courts could not weigh scientific and prudential

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[193] Juliana v. United States, 947 F.3d 1159, 1185 (9th Cir. 2020) (Staton, J., dissenting).

[194] Chaoulli v. Quebec, [2005] 1 S.C.R. 791, 844 (Can.).

[195] ERWIN CHEMERINSKY, CLOSING THE COURTHOUSE DOOR: HOW YOUR CONSTITUTIONAL RIGHTS BECAME UNENFORCEABLE 206 (2017) ("But enforcement of the Constitution should never be left to the political process. The Constitution exists to limit the government, those limits have meaning only if they are enforceable, and to think that the political process will address such issues is usually to indulge a fiction.").

[196] *Mathur*, *supra* note 140, ¶ 171. *See also id.* ¶ 94 (internal citation omitted) ("Lastly, the Applicants cite decisions in other countries to demonstrate that their claim is capable of scientific proof. For example, in *Urgenda* . . . the Supreme Court of the Netherlands affirmed that reduction in emissions was necessary for the Dutch government to protect human rights. The court recognized that 'each additional molecule of GHG in the atmosphere causes a demonstrable increase in the harm, with a single molecule of carbon dioxide causing a warming effect.'").

[197] *Id.* ¶ 96.

[198] *Juliana*, 947 F.3d at 1187 (Staton, J., dissenting).

considerations—as we often do—to put the government on a path to constitutional compliance."[199] Furthermore:

> In sum, resolution of this action requires answers only to scientific questions, not political ones. . . .
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> . . . .
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> . . . Nothing about climate change, however, is *inherently* political. The majority is correct that redressing climate change will require consideration of scientific, economic, energy, and other policy factors. But that endeavor does not implicate the way we elect representatives, assign governmental powers, or otherwise structure our polity.[200]

Judicial bodies are often well-equipped to hear and decide cases involving a wide range of scientific evidence.[201] For example, the U.S. Supreme Court has developed a well-established litmus test for the admission of expert scientific testimony. In *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, Justice Blackmun ruled that judges in their evidentiary "gatekeeping" role "must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable."[202] As to reliability:

> [I]n order to qualify as "scientific knowledge," an inference or assertion must be derived by the scientific method. Proposed testimony must be supported by appropriate validation—*i.e.*, "good grounds," based on what is known. In short, the

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[199] *Id.* at 1189.

[200] *Id.* at 1189–90 (emphasis added).

[201] *See, e.g.*, FED. R. EVID. 702 ("A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if: (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue; (b) the testimony is based on sufficient facts or data; (c) the testimony is the product of reliable principles and methods; and (d) the expert has reliably applied the principles and methods to the facts of the case."). *See also* Jeff Tollefson, *Inside the US Supreme Court's War on Science*, 609 NATURE 460 (2022) (discussing recent U.S. Supreme Court decisions that, in contrast to earlier cases, dismiss rather than defer to science), https://www.nature.com/articles/d41586-022-02920-4.

[202] Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 589, 597 (1993). Further, despite Chief Justice Rehnquist's fear that the *Daubert* standard turns judges into "amateur scientists," the rules of evidence do not require it. *Id.* at 600–01 (Rehnquist, C.J., concurring in part and dissenting in part). Brian Leiter, *The Epistemology of Admissibility: Why Even Good Philosophy of Science Would Not Make for Good Philosophy of Evidence*, 1997 BYU L. REV. 803, 816 ("[T]he discovery of truth is only *one* of the aims of adjudication under the Federal Rules. The rules of evidence serve distinctly nonepistemic purposes as well: the promotion of various policy objectives (like encouraging the repair of dangerous conditions) and the efficient and timely resolution of disputes."). Both nonepistemic purposes apply directly to any evidence presented on the dangerous urgency of the climate crisis.

> requirement that an expert's testimony pertain to "scientific knowledge" establishes a standard of evidentiary reliability.[203]

Many factors are considered as to whether the proffered scientific testimony is admissible, including whether the scientific theory or technique can be or has been tested, whether it has been subject to peer review, "the known or potential rate of error," and its "general acceptance" in the relevant scientific community.[204] A criterion notably absent from this list is whether the scientific evidence has been accepted through international political consensus. In fact, in *Rucho v. Common Cause*,[205] the U.S. Supreme Court explicitly cautioned that a judicially manageable standard must be "clear, manageable, and *politically neutral*."[206] Advocates asking judicial bodies to interpret and protect fundamental rights in climate change cases can and should present genuine climate science, not overlook it, substitute for it, or avoid it altogether.

Other courts outside the U.S. have been able to at least partially navigate the divide between justiciable and political issues in climate change cases. In *Klimatzaak*, the Belgian court declared that Belgium's climate policy infringed the fundamental rights of the plaintiffs but declined to issue an injunction requiring Belgium to reduce its GHG emissions by certain percentages requested by the plaintiffs. The court found that "while it is within the remit of the tribunal to note a failure on the part of the federal state and the three regions [defendants], this does not authorise it, by virtue of the principle of separation of powers, to itself set targets for reducing Belgium's GHG emissions."[207] The court thus felt comfortable making a determination that Belgium crossed the standard of protection, but was unwilling to announce where that line was. In *Urgenda*, on the other hand, the Netherlands court not only found a violation of fundamental rights but ordered a reduction in emissions. Although these reductions were in line with the government's earlier political commitments and not based on genuinely supported scientific prescriptions, one wonders whether the outcome would have been

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[203] *Daubert*, 509 U.S. at 590.

[204] *Id.* at 593–94.

[205] *Rucho* is the primary case relied upon by two of three judges in *Juliana v. United States* to justify dismissal of the youth's constitutional climate change case on redressability grounds, even though the majority explicitly stated it did not find the claims to raise a political question. *Compare* Juliana v. United States, 947 F.3d 1159, 1173–74, 1174 n.9 (9th Cir. 2020) *with id.* at 1189–90 (Staton, J., dissenting) (identifying the flaws in the majority's reliance on *Rucho*).

[206] Rucho v. Common Cause, 139 S. Ct. 2484, 2498 (2019) (quoting Vieth v. Jubelirer, 541 U.S. 267, 307–08 (2004) (plurality opinion)).

[207] *Klimaatzaak*, *supra* note 129, at 82.

different had the court been presented with the science of EEI.[208] *Urgenda*'s win can equally be considered a loss if the goal was to protect the fundamental rights of the Netherlands' most climate vulnerable, including the youth and future generations who face devastating climate harms at 1.5°C–2°C of warming.

The unfortunate default "action" by many judicial bodies (particularly in the United States) deciding climate cases has been judicial restraint—dismissing these cases before hearing the evidence on the merits.[209]

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[208] *Urgenda* Supreme Court Opinion, *supra* note 139, ¶¶ 8.3.4, 8.3.5.

[209] *See* Am. Elec. Power Co. v. Connecticut, 564 U.S. 410, 420, 424 (2011) (holding that while some plaintiffs had standing to sue defendant fossil-fuel power plants to seek abatement of their contribution to global warming, the Clean Air Act displaced any federal common law right plaintiffs had to pursue their claim); Lujan v. Defs. of Wildlife, 504 U.S. 555, 564, 568 (1992) (holding that plaintiffs did not assert a sufficiently imminent injury to have Article III standing and that plaintiffs' claimed injury was not redressable); City of New York v. Chevron Corp., 993 F.3d 81, 95 (2d Cir. 2021) (holding that plaintiff's state-law nuisance action against defendant multinational oil companies implicated federal common law rather than New York state law, and federal common law, in turn, was displaced by the Clean Air Act); Juliana v. United States, 947 F.3d 1159, 1170–71, 1174 (9th Cir. 2020) (holding that plaintiffs' suit, which called for declaratory and injunctive relief against the United States to stop the continued federal permitting, authorization and subsidization of fossil fuel extraction, as well as development, consumption and exportation of the same, presented a nonjusticiable political question and that plaintiffs' failed to show redressability); Wash. Env't Council v. Bellon, 732 F.3d 1131, 1147 (9th Cir. 2013) (holding that plaintiffs lacked Article III standing to assert their claim that the state of Washington was required, under the Clean Air Act, to regulate greenhouse gas emissions released by the state's five oil refineries); Clean Air Council v. United States, 362 F. Supp. 3d 237, 249 (E.D. Penn. 2019) (dismissing plaintiffs' claim that their rights were violated by the Executive branch's "rolling back" of environmental laws and regulations on the ground plaintiffs failed to state an injury redressable by court action); Amigos Bravos v. Bureau of Land Mgmt., 816 F. Supp. 2d 1118, 1138–39 (D.N.M. 2011) (dismissing suit by six environmental groups, who alleged that the BLM failed to fully consider the issue of climate change when the agency approved several oil and gas lease sales, on the ground the plaintiffs failed to demonstrate both an injury-in-fact and a particularized interest in the land at issue and that plaintiffs failed to establish causation); City of New York v. BP P.L.C., 325 F. Supp. 3d 466, 471–72, 475 (S.D.N.Y. 2018) (holding that New York City's federal common law nuisance suit, which sought to recover for injuries the City suffered due to rising sea levels that the City alleged were caused by emissions of greenhouse gases sold by the defendants, was displaced by the Clean Air Act and that the City's claims were otherwise barred by the presumption against extraterritoriality); WildEarth Guardians v. Salazar, 880 F. Supp. 2d 77, 86 (D.C. Cir. 2012) (holding that plaintiffs, who challenged the decision by several federal agencies to authorize the lease of public lands for coal mining, lacked standing to challenge the lease decision based on climate change impacts to plaintiffs' recreational, aesthetic and economic interests); Animal Legal Def. Fund v. United States, 404 F. Supp. 3d 1294, 1300–01 (D. Or. 2019) (holding that plaintiffs, who claimed that the government's failure to protect them from the effects of climate change on federally owned and managed lands violated their constitutional right to a safe and sustainable environment, lacked constitutional standing and that their suit was not a justiciable case or controversy); Comer v. Murphy Oil USA, Inc., 839 F. Supp. 2d 849, 862, 865, 868 (S.D. Miss. 2012) (holding that suit by plaintiffs, property owners who asserted public and private nuisance claims alleging that defendant oil companies release of emissions increased global warming that caused damage to plaintiffs' properties, was barred by res judicata, collateral estoppel, the lack of standing, preemption by the Clean Air Act, and the implication of non-justiciable political questions).

Scholars, and some dissenting state supreme court justices, have referred to such judicial restraint as resulting in a judicial "nihilism," whereby courts assert supreme power by their inaction.[210] Reasons for such nihilism point more to ideology largely perpetuated by fossil fuel producers—that climate change is a special policy preference exempt from judicial review—than to a lack of judicially manageable standards or an inability to grapple with scientific evidence.[211] Nevertheless, some judges are beginning to reject the notion that courts should sit on the sidelines of the climate crisis. As expressed by the Washington Supreme Court's Chief Justice Steven C. Gonzaléz and Justice G. Helen Whitener in their dissent in *Aji P. v. Washington*:

> We recite that we believe the children are our future, but we continue actions that could leave them a world with an environment on the brink of ruin and no mechanism to assert their rights or the rights of the natural world. This is our legacy to them described in the self-congratulatory words of judicial restraint. . . .
>
> . . . .
>
> The court should not avoid its constitutional obligations that protect not only the rights of these youths but all future generations who will suffer from the consequences of climate change.[212]

This sentiment reflects an important evolution in the history of climate change cases. If judicial bodies are becoming open to hearing and deciding these cases, as is happening in Montana state court in the *Held*

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[210] Weaver & Kysar, *supra* note 158, *passim*. *Cf.* Hollis Hill, Opinion, *Let Youth Have Day in Court Over Climate Change*, SEATTLE TIMES (Oct. 1, 2021, 1:53 PM), https://www.seattletimes.com/opinion/let-youth-have-day-in-court-over-climate-change/ ("Washingtonians must face the hard truth: Climate change is happening, and if we do not change course, it will only get worse. As a former judge, I know it is critical that all three branches of government use every tool at their disposal to turn the tide."). *Cf.* Alfred T. Goodwin, *A Wake-Up Call for Judges*, BULLETIN (June 14, 2015), http://www.bendbulletin.com/opinion/3222160-151/a-wake-up-call-for-judges ("Whether grounded in Article III or state constitutional provisions, the third branch must now recognize its obligation to provide a check on government exercise of power over the public trust. The third branch can, and should, take another long and careful look at the barriers to litigation created by modern doctrines of subject-matter jurisdiction and deference to the legislative and administrative branches of government.").

[211] *See, e.g.*, Weaver & Kysar, *supra* note 158, at 320–22 (providing some explanations for "nihilistic reading[s] of catastrophe" in tort climate change cases, including "societal consequences" and "popular backlash").

[212] Aji P. v. Washington, No. 99564-8, at 2, 5 (Wash. Oct. 6, 2021) (González, C.J., dissenting). *See also* Held v. Montana, No. CDV-2020-307, at 24 (Mont. First Jud. Dist. Ct. Lewis & Clark Cnty. Aug. 4, 2021) (denying state's motion to dismiss constitutional climate change claims and allowing the case to proceed to trial).

case and in the *Mathur* case in Ontario, they should be presented with the best evidence to protect fundamental rights.

C. Litigators Should Present a Scientific Target Rather than the Paris Agreement Target to Define Fundamental Rights

There are several reasons, both legal and practical, for climate advocates to present judicial bodies with peer-reviewed science to define a constitutional standard of protection for fundamental rights. First, advocates that characterize the Paris Agreement target as the threshold for fundamental rights protection run the risk of enforcing an unfortunate trend; judicial bodies endorsing the Paris Agreement target as science based, safe, or protective of fundamental rights now and into the future when in fact it is catastrophic. Judicial endorsement has had the effect of legalizing and perpetuating the ongoing infringement of rights. As Justice Jackson foretold in his dissenting opinion in the tragic case of *Korematsu v. United States*:

> [A] judicial construction of the due process clause that will sustain this [internment of Japanese citizens during World War II] order is a far more subtle blow to liberty than the promulgation of the order itself. . . . [O]nce a judicial opinion rationalizes such an order to show that it conforms to the Constitution, or rather rationalizes the Constitution to show that the Constitution sanctions such an order, the Court for all time has validated the principle of racial discrimination . . . . The principle then lies about like a loaded weapon ready for the hand of any authority that can bring forward a plausible claim of an urgent need.[213]

Second, once a constitutional standard is embedded in law, history shows that policies that flow from that constitutional standard will inevitably allow full maximization of pollution levels that lead to the brink of that standard. For example, in the climate change context, very few governments achieve even the inadequate GHG emission targets (from a perspective of restoring Earth's energy balance) they commit to achieving under domestic or international law, and even fewer governments are able to increase ambition of existing commitments as the years of failure mount.[214]

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[213] Korematsu v. United States, 323 U.S. 214, 245–46 (1944) (Jackson, J., dissenting).

[214] For example, Canada has failed to meet its GHG emission reduction targets it set beginning in 1988. Statement of Claim to the Defendants ¶ 5, at 4, La Rose v. Her Majesty the Queen (Oct. 25, 2019), No. T-1750-19 (Can. Fed. Ct.), http://climatecasechart.com/climate-change-litigation/wp-content/uploads/sites/16/non-us-case-documents/2019/20191025_T-1750-19_complaint.pdf. *See also* WASH. STATE DEP'T OF ECOLOGY, WASHINGTON STATE GREENHOUSE GAS EMISSION REDUCTION LIMITS: REPORT PREPARED UNDER RCW 70.235.040, at 16 (Dec. 2019) ("In terms of progress towards the greenhouse gas emission limits currently in

Third, a standard that characterizes 1.5°C or 2°C of heating as protective of fundamental rights undercuts plaintiffs' abilities to provide judicial bodies with present-day injury stories. The Paris Agreement on its face, without underlying scientific explanation, implies that the climate system, and the people within it, can withstand additional heating above and beyond what has occurred to date. Although such an assumption is untrue, it is a dangerous one to present to judicial bodies charged with protecting human rights, as exhibited in August 2022 when severe rains and flooding in Pakistan affected at least 33 million people, killing at least 1,033 people, including hundreds of children.[215] Relatedly, advocates' use of the Paris Agreement target as the legal standard of fundamental rights protection may make it even more difficult to establish a breach, since Earth has not yet reached such levels of warming. Scientists have confirmed that we are already in the danger zone at about 1°C of heating.[216] Although scientists agree that existing climate impacts will likely worsen as the heating increases,[217] the evidence provided to a judicial body should realistically portray the current catastrophe facing humanity, particularly those most vulnerable whose fundamental rights are most imminently at stake. According to John Holdren, who served as Science Advisor to President Barack Obama:

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statute, as of 2017, Washington is 7.0 MMTCO2e or 7.7% higher than the 2020 target."); Joeri Rogelj et al., *Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development*, *in* GLOBAL WARMING OF 1.5°C, *supra* note 7, at 95, https://www.ipcc.ch/site/assets/uploads/sites/2/2019/02/SR15_Chapter2_Low_Res.pdf ("Under emissions in line with current pledges under the Paris Agreement (known as Nationally Determined Contributions, or NDCs), global warming is expected to surpass 1.5°C above pre-industrial levels, even if these pledges are supplemented with very challenging increases in the scale and ambition of mitigation after 2030 . . . ."); *see also* Armstrong McKay et al., *supra* note 5, 1171 ("Currently the world is heading toward ~2 to 3°C of global warming; at best, if all net-zero pledges and nationally determined contributions are implemented it could reach just below 2°C. This would lower tipping point risks somewhat but would still be dangerous as it could trigger multiple climate tipping points.").

[215] Michelle Velez & Teele Rebane, *Hundreds of Children Among 1,000 People Killed by Pakistan Monsoon Rains and Floods*, CNN (Aug. 28, 2022), https://www.cnn.com/2022/08/28/asia/pakistan-flooding-intl/index.html.

[216] U.S. DEP'T OF STATE & U.S. EXECUTIVE OFFICE OF THE PRESIDENT, THE LONG-TERM STRATEGY OF THE UNITED STATES: PATHWAYS TO NET ZERO GREENHOUSE GAS EMISSIONS BY 2050, at 10 (2021) ("Climate change already inflicts serious damage on the United States and the world, particularly the most vulnerable that are least equipped to adapt—and the science is clear that, without faster global action, these impacts will become much more frequent and severe."); Joyashree Roy et al., *Sustainable Development, Poverty Eradication and Reducing Inequalities*, *in* GLOBAL WARMING OF 1.5°C, *supra* note 7, at 447, https://www.ipcc.ch/sr15/chapter/chapter-5/ ("Warming of 1.5ºC is not considered 'safe' for most nations, communities, ecosystems, and sectors and poses significant risks to natural and human systems as compared to current warming of 1°C . . . .").

[217] SUMMARY FOR POLICYMAKERS, *supra* note 92, at 9–10.

> At a mere 1°C or so above the average temperature of 120 years ago, the world is experiencing increases in the frequency and intensity of deadly heat waves in many regions; increases in torrential downpours and flooding in many others; large expansions in the annual area burned in regions prone to wildfires (and expansion of wildfires into regions not previously prone to them); an increase in the power of the strongest tropical storms; expanded impacts of pests and pathogens across large parts of the globe; disruptive changes in monsoons; other alterations in atmospheric and oceanic circulation patterns that, together with other impacts, are affecting agriculture and ocean fisheries; an accelerating pace of global sea-level rise; and ocean acidification arising from absorption of some of the excess carbon dioxide in the atmosphere.[218]

Plaintiffs' present-day injury stories based on current impacts are often of critical import, spurring an increasing number of judicial bodies to step up, recognize a fundamental rights violation, and order a remedy.

Fourth, the use of politically negotiated as opposed to science-based standards increases the risk that judicial bodies will find climate change cases nonjusticiable. In the United States, federal courts have held in a limited number of cases that the political question doctrine bars judicial review of claims based on the political branches' involvement in foreign affairs.[219] Asking courts to define a government's obligation to protect individual fundamental rights based upon its international political commitments, or the commitments of other nations (provided they have not been enshrined into domestic law), presents a risk of the claim being found non-justiciable.[220] Judicial bodies could find that if countries are working on climate change through international negotiations, there is no need to hold countries accountable on the domestic level.

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[218] Larson et al., *supra* note 85, at 4.

[219] *See, e.g.*, El-Shifa Pharm. Indus. Co. v. United States, 607 F.3d 836, 837–38, 845 (D.C. Cir. 2010) (dismissing for posing political questions the plaintiffs' declaratory and injunctive claims that the United States mistakenly destroyed a pharmaceutical plant via drone strike in Sudan as part of efforts to dismantle a terrorist network); Bancoult v. McNamara, 445 F.3d 427, 429, 436 (D.C. Cir. 2006) (dismissing for posing political questions the claims for injunctive relief raised by residents of the island of Chagos who alleged that they were systematically tortured and displaced to make way for a United States naval base).

[220] *See, e.g.*, Baker v. Carr, 369 U.S. 186, 211 (1962) ("There are sweeping statements to the effect that all questions touching foreign relations are political questions."); Thompson v. Oklahoma, 487 U.S. 815, 868 n.4 (1988) (Scalia, J., dissenting) (stating that "where there is not first a settled consensus among our own people, the views of other nations, however enlightened the Justices of this Court may think them to be, cannot be imposed upon Americans through the Constitution"). Courts in other nations appear to be more amenable to defining constitutional standards based upon international political commitments, *see, e.g.*, *Urgenda* Supreme Court Decision, *supra* note 139, ¶¶ 2.1, 8.3.4, but this case raises the other problems associated with constitutional standards of protection that may not align with best available science.

Finally, a clear body of peer-reviewed science exists that contradicts the use of the Paris Agreement temperature target as a standard of "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system"[221] and protect fundamental rights. It is impossible to forecast the precise role judicial bodies will play in resolving the climate crisis. But, if judges are only being asked to enforce the Paris Agreement, that will be the extent of what they do. If, on the other hand, advocates ensure judges are presented with the most current climate science and what scientists prescribe needs to be done to protect our vital planetary systems and people whose most fundamental rights depend upon the health of such systems, there is a greater chance that governments will address climate change in a way that respects and protects fundamental rights for all.

CONCLUSION

Although the Paris Agreement target began as a heuristic to serve as a guiding objective for policymakers seeking international consensus, it has since evolved into an oft-articulated legal standard for the protection of fundamental rights in constitutional climate change cases. The IPCC has never scientifically affirmed the Paris Agreement target as being "safe" or not dangerous, and, indeed, more current peer-reviewed science says otherwise.[222] Yet, it is becoming increasingly frequent for advocates, and judicial bodies to whom these arguments are presented, to characterize the 1.5°C–2°C target as somehow reflecting a scientific consensus as to what is needed to preserve fundamental rights in climate change cases.[223] Judicial bodies' universal adoption of the Paris Agreement target as a proxy for fundamental rights protections will have catastrophic consequences. Such an approach confines humanity to a world of political majoritarianism, where, absent legal remedies, constitutional redress for global heating becomes geophysically

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[221] U.N. Framework, *supra* note 38, at art. 2.

[222] *See, e.g.*, Yun Gao, Xiang Gao & Xiaohua Zhang, *The 2°C Global Temperature Target and the Evolution of the Long-Term Goal of Addressing Climate Change—From The United Nations Framework Convention on Climate Change to the Paris Agreement*, 3 ENGINEERING 272, 272–73 (2017). *See also* Armstrong McKay et al., *supra* note 5.

[223] *See, e.g.*, *Urgenda* Supreme Court Opinion, *supra* note 139, ¶ 2.1 ("There has long been a consensus in climate science—the science that studies climate and climate change—and in the international community that the average temperature on earth may not rise by more than 2°C compared to the average temperature in the pre-industrial era."); *id.* ¶ 4.3 ("Climate science long ago reached a high degree of consensus that the warming of the earth must be limited to no more than 2°C and that this means that the concentration of greenhouse gases in the atmosphere must remain limited to a maximum of 450 ppm.").

impossible. If advocates do not present courts with scientifically based standards of fundamental rights protections in constitutional climate cases, then where does the law leave us? The emergent jurisprudence of climate catastrophe, after all, is one that should expand, not contract, the norms of justice.[224]

[224] *See* Weaver & Kysar, *supra* note 158, at 298, 301.