

Centering Children Rights and Best Available Science in the Americas States' Human Rights Obligation in the Context of the Climate Emergency*¹

The world will be watching as the Inter-American Court of Human Rights (“Court”) deliberates on an Advisory Opinion² that will clarify States’ obligations to tackle the climate emergency and protect fundamental rights guaranteed by the American Convention on Human Rights (“Convention”), especially for children and future generations.³ Courts around the world have recognized that climate change could “jeopardize the survival of [humans] on Earth”,⁴ is coming dangerously close to “approaching the point of no return”,⁵ and that today “[greenhouse gas emissions] are released into the atmosphere beyond what prudence and respect for human rights require”⁶ risking the “human rights of future generations.”⁷ As the sole regional human rights court currently asked to provide an Advisory Opinion—together with the Court’s respected history of issuing globally influential opinions—the forthcoming Advisory Opinion outlining State’s obligations could profoundly influence the course of humanity.

Understanding the weight the Court’s words will carry, this article provides an overview of a narrowly focused *Amicus* Brief submitted by Our Children’s Trust, the University Network for Human Rights, and Centro Mexicano para la Defensa del Medio Ambiente A.C. The *Amicus* was filed on behalf of twenty-one young people and youth-led organizations with the support of 18 pediatric associations, collectively representing over one million medical professionals from more than 120 countries across the globe. The *Amicus* brief meticulously integrates advanced legal precedents and the latest climate and health sciences to provide the Court with a succinct framework for understanding States’ human rights duties amid the global climate emergency, emphasizing the critical intersection of legal and scientific domains in safeguarding children’s futures. This shorter synthesis aims to provide a succinct version of the brief for the wider legal community.

Convention Rights Encompass the Right to a Life-Sustaining Climate System

Climate change is the all-enveloping crisis that burdens numerous Convention rights with unrivaled severity and scale particularly the rights to life; physical, mental, and moral integrity; private life; health; water; food; housing; participation in cultural life; property; not be forcibly displaced;⁸ non-discrimination;⁹ a healthy environment;¹⁰ and the rights as a child.¹¹ **This is undisputed.** Climate change not only prevents the exercise of fundamental human rights—but also exacerbates the violation of these rights. A **crucial first and foundational step** would be for this Advisory Opinion to build on the Court’s existing jurisprudence—together with the emerging jurisprudence of other Courts¹²—and expressly find that numerous Convention rights *encompass* the right to a life-sustaining climate system.¹³

The Requirement to Use the “Best Available Science” Obligates States to Observe the 350 ppm Limit, Not the 1.5°C Paris Agreement Temperature Target

Courts have borne witness to many moments in legal history when questionable scientific evidence has contaminated legal processes and seriously harmed the innocent. To ensure all rights are justly upheld, the Court’s jurisprudence and international climate agreements require that “**best available science**” be used to determine States’ obligations to address the climate crisis.¹⁴

Best available science has yet to be **defined** by any court¹⁵ and in practice means: (i) the most **up-to-date** science that; (ii) is based on internationally recognized scientific **practices, methodologies, and standards**, where such standards exist; (iii) maximizes the **quality** and **objectivity** of information used, including statistics and assumptions; (iv) **publicly releases** the data used to reach its conclusions, and

publishes its results through the **peer-review** process; (v) clearly **communicates risks** and **uncertainties** in the scientific bases for its conclusions; and (vi) reflects a **consensus** (where consensus exists) or at least rests on multiple peer-reviewed studies from different research groups.¹⁶

In judicial proceedings where climate is at issue, the **non-science based** Paris temperature targets of “[h]olding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels”¹⁷ have too often been improperly presented to courts as the best scientific evidence and the *de facto* legal standard for compliance with international legal principles, obligations, and human rights.¹⁸ **Importantly, the 1.5°C Paris Agreement target is not compatible with best available science nor with States’ human rights obligations**, for two critical reasons. First, **the 1.5°C target is a product of political negotiation, not science.**¹⁹ Second, the best available science from the IPCC and *countless* studies find that **1.5°C of warming is not safe** posing significant risks to Earth’s systems and humanity²⁰ and resulting in widespread and serious human rights violations on a staggering scale²¹ particularly for children,²² the global south,²³ and small island developing states.²⁴

Instead of aiming for a political target, the best available science finds that **to restore Earth’s energy balance**²⁵ and stabilize the climate system States must reduce the annual mean concentration of atmospheric CO₂ from the 2023 level of **421** parts per million (ppm)²⁶ (a level currently resulting in ~1.2°C to 1.3°C of temperature rise above pre-industrial levels)²⁷ to 350 ppm or lower. **This ceiling is known as the 350 ppm limit.** The 350 ppm limit is not in controversy. Scientists continue to identify 350 ppm as the maximum “safe” limit for CO₂ and **no scientific body or journal—including the IPCC—has published any scientific evidence indicating that concentrations above 350 ppm are safe.**²⁸ Moreover, emerging jurisprudence supports the legal finding that States should be obligated to adopt and implement climate action to achieve the 350 ppm limit, and *not* the 1.5°C Paris target, as protective of human rights.²⁹

Another misconception that emerges from the 1.5°C target is that States can still emit CO₂ in line with their “remaining” carbon budgets because the planet is not yet in an overshoot scenario. *This is categorically incorrect.* Earth crossed above the 350 ppm limit in 1988, the year the United Nations established the IPCC.³⁰ Today—at ~70 ppm over the limit³¹—**Earth has been immersed in an overshoot scenario for 35 years.**³² Research concludes that “[i]f the present overshoot of this target CO₂ is not brief, there is a possibility of seeding irreversible catastrophic effects.”³³ The irreversible catastrophic effects that scientists are most concerned about are **climate tipping points**,³⁴ or points of no return.³⁵ If one tipping point is crossed, it increases the likelihood of triggering other tipping points, causing an unstoppable cascade of impacts.³⁶ This would further reinforce global warming, resulting in runaway effects that cannot be controlled, and may make large areas of our planet uninhabitable for humanity.³⁷

Importantly, the IPCC has recognized—with very high confidence—that the **“Risks and projected adverse impacts and related losses and damages from climate change will escalate with every increment of global warming.”**³⁸ Based on this undisputed scientific fact, together with an extensive evidentiary record developed at a full trial on the merits, the District Court of Montana, U.S., legally concluded that, “Every additional ton of GHG [greenhouse gas] emissions exacerbates [youth] Plaintiffs’ injuries and risks locking in irreversible climate injuries[.]”³⁹ and that “[Youth] Plaintiff’s injuries will grow increasing severe and irreversible without science-based actions to address climate change.”⁴⁰ Given the global nature of climate change, these science-based findings of fact and conclusions of law are applicable universally and are poised to be adopted by other courts. **The science is unequivocal: Without science-based action, children everywhere will suffer serious and sometimes grave climate-imposed harms.**

States' Obligation to Use "All the Means at Their Disposal" and Implement Policies that Reflect the "Greatest Possible Ambition" Requires the Phase Out Fossil Fuels by 2035, but No Later than 2050

Recognizing that damage to the climate system may affect all human rights,⁴¹ including children's rights,⁴² the Court has affirmed that: (i) "States are bound to use **all means at their disposal** to avoid activities under their jurisdiction causing significant harm to the environment";⁴³ (ii) have a positive duty to mitigate significant damage that has occurred, including the obligation to "**clean up and restore**" the environment;⁴⁴ and (iii) are obligated to **protect, preserve, and improve** an environment that has already been degraded.⁴⁵ The Inter-American Commission of Human Rights ("Commission") has also called on States to reduce their emissions to ensure a safe climate that enables the exercise of rights⁴⁶ and "adopt and implement policies aimed at reducing greenhouse gas emissions that reflect the **greatest possible ambition** [...]."⁴⁷

In the context of climate change, the necessary **ambition** to mitigate, protect, preserve, and improve the climate system requires States to return the level of atmospheric CO₂ from the 2023 level of 421 ppm to 350 ppm by the end of the century with further reductions thereafter.⁴⁸ To achieve this, States must prioritize two principle **means**: (i) phase out the emission of economy-wide CO₂ and minimize other greenhouse gas emissions; and (ii) maximize the removal of already-existing carbon dioxide pollution from the atmosphere.⁴⁹ Focusing on the phase-out of fossil fuel emissions, hundreds of scientific studies find that **CO₂-emitting fossil fuels are *not* needed to power human energy systems⁵⁰ and roadmaps developed by top energy scientists provide States with pathways to rapidly transition energy infrastructure in all sectors⁵¹ to 100% clean, renewable energy⁵² by as early as 2035, but by no later than 2050, with an 80% transition by 2030.**⁵³ Consequently, not only is this transition feasible, it eliminates carbon dioxide pollution, saves lives, creates jobs, and substantially reduces the risks associated with energy security.⁵⁴ Equally as important, the greatest benefits gained will be in the communities currently suffering the worst environmental injustice.⁵⁵ In short, the transition to a renewable energy system is a win-win for States, human rights, and children.

The Continued Emission of CO₂ Discriminates Against Children

Every day, pediatricians worldwide bear witness to the unjust burdens bestowed upon children by the climate crisis. They, more than any other profession, understand how children are distinct from adults and, in turn, are disproportionately harmed by the emission of fossil fuels and resulting air pollution and climate change in ways that differ from older generations. Courts too have begun to reach this conclusion.⁵⁶ In light of these disparities, the forthcoming Advisory Opinion could build on the Court's existing jurisprudence by expressly recognizing that **the ongoing emission of fossil fuels by States constitutes discrimination against children.**

This conclusion is legally logical because the Court and the Commission have already established that children are in a situation of special vulnerability to environmental damage and climate change.⁵⁷ Further, pursuant to the Convention, children are entitled to extra protection⁵⁸ requiring that all laws, regulations, policies, standards, guidelines, plans, and strategies effecting their right be made in light of the **best interests of the child,**⁵⁹ and grounded in the principle of **intergenerational equity** which necessitates that "all children [...] have the right to [...] live on a planet equal to or in better conditions than their ancestors."⁶⁰

Factually, any conclusions reached by the Court finding children are in a situation of special vulnerability to the greenhouse gas pollution and the resulting dangers of climate change and air pollution would be corroborated by *extensive* medical research.⁶¹ The best available medical evidence universally finds that climate change disproportionately harms children for the following primary reasons. First, they are physiologically and psychologically different from adults.⁶² Second, they are dependent on caregivers for their safety and well-being.⁶³ Third, children have more years left to live than adults do and will therefore be exposed to worse climate effects over a larger portion of their lives.⁶⁴ Fourth, children currently bear the greatest burden of impacts of climate change, yet contribute least to the cause of the problem.⁶⁵ Additionally, children have no vote to change the policies that affect their short-term and long-term health, safety, and longevity on the planet. Consequently, explicitly recognizing that climate change disproportionately impacts children constituting discrimination would be a logical and incremental next step in the Court's jurisprudence.

The Continued Emission of CO₂ Violates Children's Rights to Physical and Mental Integrity and Dignity

In cases “involving human health” the Court has held that “the lack of access to conditions that ensure a dignified life may also constitute a violation of the right to personal integrity[.]”⁶⁶ As highlighted above, **medical research concludes**—beyond all doubt—that climate change disproportionately harms child physical and mental health.⁶⁷ **Climate science concludes**—beyond all doubt—that *every tonne* of CO₂ emitted worsens the infringement on rights.⁶⁸ Consequently, the Court could extend its jurisprudence **to explicitly recognize that the continued emission of CO₂ violates childrens' rights to physical and mental integrity and obligate States to phase-out emissions from fossil fuels by 2050 at the latest** to protect childrens' physical and mental integrity for the following reasons.

First, the increased occurrence and intensity of heat, fires, droughts, storms, and flooding resulting from climate change disproportionately impact child **physical health** in ways that are numerous to enumerate here and include death, premature death, physical injuries from extreme weather events, life-long respiratory issues from fires and heat, increased risk of cancer, water-bourne, food-bourne, and vector-bourne diseases, dehydration, malnutrition, cardiovascular challenges, kidney failure, and life-long disabilities.⁶⁹ Second, climate change can also disrupt access to essential health care services either when severe weather cuts off access to medical care or forces facilities to close.⁷⁰ Further, the Court has recognized that “displacements caused by environmental deterioration frequently unleash violent conflicts” and that “Some of these conflicts are massive and thus extremely grave.”⁷¹ When children are displaced by climate change, they become especially vulnerable and far more likely to be victims of various forms of violence and abuse at all stages of their journey, resulting in an array of physical and mental injuries.⁷²

The ongoing emission of greenhouse gas pollution and resulting extreme events are also harmful to child **mental health** for three key reasons. First, when children are exposed to multiple climate stressors during childhood, the effects accumulate and compound over a longer portion of their lives⁷³ resulting in intergenerational inequity. Second, growing up with an awareness of the gravity and urgency of climate change negatively impacts young people's mental health causing emotional distress, a wide range of painful emotions, and adverse impact on their functionality.⁷⁴ Third, children's distress is exacerbated by a sense of betrayal that States continue to act in ways that contribute to climate change, and lack ambition in addressing it.⁷⁵ In essence, the impacts of climate change undermine a child's **“very sense of hope”**.⁷⁶

Courts have already recognized that these physical and mental injuries and harms endured by children are legally cognizable injuries.⁷⁷ This Advisory Opinion is perfectly positioned to strengthen these findings.

Child-Complainants in Climate Cases are Entitled to an *Ipsa Facto* Standard for Harm, Causality, Redress, and Notice

The Commission has established that States have a positive duty to remove any obstacles that prevent or hinder access to justice,⁷⁸ especially for complainants in situations of vulnerability, which certainly includes children.⁷⁹ The Escazú Agreement⁸⁰ and the UN Committee on the Rights of the Child reiterate this legal obligation⁸¹ underscoring a core principle established by the Court: the absence of an effective remedy to violations of the rights recognized by the Convention is itself a violation of the Convention and that the remedy must be “truly effective” in providing redress.⁸²

In turn, the Court would be well within its mandate to find that the Convention requires States’ courts to make special considerations when a child or group of children bring a climate case. Namely, if certain conditions are met, States’ courts must find that the **harm, causation, and redress elements of standing, together with the notice requirement are *ipsa facto* met** by virtue of certain well-established facts. Further, the Advisory Opinion could reinforce the role of national judiciaries and best available science in providing **prompt and effective redress** when fundamental rights are violated.

With respect to **harm**, requiring a showing of particularized harm is inappropriate in the context of climate cases brought by children. It is **established** by climate and medical science that all children alive today were born into a climate system that is already broken, and all of today’s children are harmed disproportionately by this damaged system as compared to adults.⁸³ Concerning causation, **the causal link**—from **each** tonne of CO₂ emissions to climate harms to children—has been **firmly established by science**⁸⁴ and **by courts**⁸⁵ and this causal chain operates identically in every situation involving climate change where a State is continuing to promote a fossil-fuel based energy system rather than striving to transition to 100% renewable and clean energy by 2050, at the latest.⁸⁶ In turn, it is unnecessarily duplicative and obstructive for courts to require children to prove the same causal chain again and again. Regarding **notice**, at **the very latest**, all UN-member States were **definitely** on notice that continuing to emit CO₂ would cause dangerous global warming in **1992** when they established the UN Framework Convention on Climate Change and recognized that “change in the Earth’s climate and its adverse effects are a common concern of humankind”.⁸⁷ Further, almost every year since 1995 negotiators have gathered annually for the Conference of the Parties (“COP”) and **repetitively** and **explicitly** issued countless warnings such as, “[C]limate change represents an urgent and potentially irreversible threat to human societies, future generations and the planet, that continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system and that limiting climate change will require substantial and sustained reductions of greenhouse gas emissions[.]”⁸⁸

Finally, concerning **redress**, **courts not only have the power but also the mandate to remedy wrongs**. The **core role** of judiciaries is to determine whether challenged conduct violates fundamental rights obligations and declare law.⁸⁹ A recent ruling on the role of the judiciary in climate cases invoking fundamental rights concluded, “It is a foundational doctrine that when government conduct catastrophically harms [...] citizens, the judiciary is constitutionally required to perform its independent role and determine whether the challenged conduct, not exclusively committed to any branch by the Constitution, is unconstitutional [...]. The judicial role in cases like this is to apply constitutional law, declare rights, and declare the government’s responsibility.”⁹⁰ And, in the context of the climate emergency, the remedy must be grounding legal redress in the best available science to be effective.

Conclusion

Today, climate is the prism through which all humanity will pass. As the Inter-American Court of Human Rights Court originates a robust body of legal guidance at the intersection of human rights and climate change, the words of Brazil Supreme Court Justice, Edson Fachin, are particularly helpful to underscore the importance of this opinion,

The climate question is the question of our time. It is the question that casts destiny upon us and the answers we formulate will decide the future of humanity—or if there will be any future at all. There is no other agenda, no other problem, no other question. The climate emergency is the antechamber to all others.⁹¹

To answer the climate question, together with the specific questions presented by the Columbia and Chile, *Amici* respectfully suggest that the only practical and effective path States can take to comply with their international human rights obligations is to adhere to the **laws of this Court and the enduring laws of physics and chemistry**. Only then will we have a chance at safeguarding human rights, especially for children.

ENDNOTES

¹ Summarized by Kelly Matheson, Deputy Director, Global Climate Litigation, Our Children’s Trust, kelly@ourchildrenstrust.org

² I/A Court H.R., Request for an Advisory Opinion on Climate Emergency and Human Rights to the Inter-American Court of Human Rights from the Republic of Colombia and the Republic of Chile, January 9, 2023.

³ American Convention on Human Rights, O.A.S. Treaty Series, No. 36 of November 22, 1969, Art. 63.

⁴ Supreme Federal Court, *PSB et al. v. Brazil*, ADPF 708, at 3, para. 7 (Jul. 1, 2022) (unofficial translation) https://climatecasechart.com/wp-content/uploads/non-us-case-documents/2022/20220701_ADPF-708_decision-3.pdf.

⁵ U.S. Ninth Circuit Court of Appeals, *Juliana v. United States*, No. 18-36082, Opinion, at 15 (Jan. 17, 2020) <https://cdn.ca9.uscourts.gov/datastore/opinions/2020/01/17/18-36082.pdf>.

⁶ 2ème Chamber Cour d’Appel Bruxelles, *VZW Klimaatzaak v. Kingdom of Belgium et al.*, Arrêt, 2022/AR/891, para. 266 (Nov. 30, 2023) (unofficial translation) https://prismic-io.s3.amazonaws.com/affaireclimat/4460824d-989f-4c3e-ad14-6dc1e4c9a1d3_SP52019923113012320+en.pdf.

⁷ 2ème Chamber Cour d’Appel Bruxelles, *VZW Klimaatzaak v. Kingdom of Belgium et al.*, Arrêt, 2022/AR/891, para. 266 (Nov. 30, 2023) (unofficial translation) https://prismic-io.s3.amazonaws.com/affaireclimat/4460824d-989f-4c3e-ad14-6dc1e4c9a1d3_SP52019923113012320+en.pdf.

⁸ I/A Court H.R., The Environment and Human Rights, Advisory Opinion OC-23/17, November 15, 2017, Series A No. 23, paras. 47, 64, 66; I/A Court H.R., Case of *Kawas Fernández v. Honduras*, Merits, Reparations and Costs. Judgment of April 3, 2009. Series C No. 196, para. 148.

⁹ I/A Court H.R., The Environment and Human Rights, Advisory Opinion OC-23/17, November 15, 2017, Series A No. 23, paras. 60, 67, 68.

¹⁰ I/A Court H.R., The Environment and Human Rights, Advisory Opinion OC-23/17, November 15, 2017, Series A No. 23.

¹¹ See, e.g., I/A Court H.R., The Environment and Human Rights, Advisory Opinion OC-23/17 of November 15, 2017, Series A No. 23, para. 67; I/A Court H.R., Case of the *Massacres of El Mozote and Surrounding Areas v. El Salvador*, Merits, Reparations and Costs. Judgment of October 25, 2012, Series C No. 252, para. 150 (stating that “[c]ases in which children are victims of human rights violations, are especially serious”); I/A Court H.R., Case of the *“Juvenile Reeducation Institute” v. Paraguay, Preliminary Objections*, Merits, Reparations and Costs. Judgment of September 2, 2004, Series C No. 112, para. 147 (affirming that “[c]hildren [...] have the same rights as all human beings [...] and also special rights derived from their condition, and these are accompanied by specific duties of the family, society, and the State”).

¹² Supreme Court of the State of Hawai‘i, *In the Matter of Hawai‘i Electric Light Company, Inc.*, SCOT-22-0000418, Opinion, 1-20 at 16, 18, 19 (Mar. 13, 2023) (Recognizing that “[w]ith each year, the impacts of climate change amplify and the chances to mitigate dwindle,” the Court unanimously found that the fundamental right to a clean and healthful environment

“encompasses the right to a life sustaining climate system [...]” https://climatecasechart.com/wp-content/uploads/case-documents/2023/20230313_docket-SCOT-22-0000418_opinion.pdf; and United States District Court for the District of Oregon, *Juliana v. United States*, No. 6:15-cv-01517-TC, Opinion and Order, at 32 (Nov. 10, 2016) *rev'd and remanded on other grounds*, 947 F.3d 1159 (9th Cir. 2020) (“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.”) https://climatecasechart.com/wp-content/uploads/case-documents/2016/20161110_docket-615-cv-1517_opinion-and-order-2.pdf.

¹³ I/A Court H.R., *The Environment and Human Rights*, Advisory Opinion OC-23/17 of November 15, 2017, Series A 23, para. 64 (“the full enjoyment of all human rights depends on a suitable environment”).

¹⁴ I/A Court H.R., *The Environment and Human Rights*, Advisory Opinion OC-23/17 of November 15, 2017, Series A No. 23, paras. 142, 172 (the obligation to prevent environmental degradation must be undertaken in accordance with “scientific or technological knowledge” and the obligation to mitigate damage and reverse climate change relying upon the “best available scientific data and technology”.); United Nations Framework Convention on Climate Change, Preamble, Art. 4 §(2)(c)(d) and Preamble (“Recognizing that steps required to understand and address climate change will be environmentally, socially and economically most effective if they are based on relevant scientific, technical and economic considerations and continually re-evaluated in the light of new findings in these areas”) (May 9, 1992); Kyoto Protocol, Art. 9(1) and Art. 13(4)(b); and Glasgow Climate Pact, I §1 (13 Nov. 2021) (“Recognizes the importance of the best available science for effective climate action and policymaking”); and Paris Agreement, Preamble and Art. 4 §1 (12 Dec. 2015); *see e.g.* Supreme Federal Court, *PSB et al. v. Brazil*, ADPF 708, Concurring Opinion at 2 (Jul. 1, 2022) (“[t]his is not about opinion or ideology, but about scientific evidence (unofficial translation) https://climatecasechart.com/wp-content/uploads/non-us-case-documents/2022/20220701_ADPF-708_decision-3.pdf; Supreme Court of the State of Hawai‘i, *In the Matter of Hawai‘i Electric Light Company, Inc.*, SCOT-22-0000418, Concurrence at 10 (Mar. 13, 2023) (“Current scientific consensus, as opposed to political consensus in the Paris Agreement regarding an acceptable increase in global average temperature, suggests that mitigation strategies must be consistent with achieving global atmospheric CO₂ concentrations below 350 parts per million (“ppm”) by 2100.”) (emphasis added the Court) https://climatecasechart.com/wp-content/uploads/case-documents/2023/20230313_docket-SCOT-22-0000418_opinion-2.pdf; and ECHR, *Sutherland v. United Kingdom*, No. 25186/94, Decision, paras. 59-60 (Jul. 1, 1997) (The Commission found in favor of the Applicant reasoning, in part, that the government’s *political* consensus was *contradicted by the weight of scientific evidence.*) <https://hudoc.echr.coe.int/eng#%7B%22itemid%22:%5B%22001-45912%22%7D>};

¹⁵ The Court would be within its mandate to provide of the definition of “best available science” and on occasion, Court has decided to begin Advisory Opinions by drawing up a glossary to define the conceptual scope of words used within. *See e.g.* I/A Court H.R., *Juridical Condition and Rights of Undocumented Migrants*, Advisory Opinion OC-18/03 of September 17, 2003, Series A No. 18, paras. 67, 69 (“The Court is empowered to structure its rulings as it considers best suited to the interests of justice and the purposes of an advisory opinion.”); and I/A Court H.R., *Case of I.V. v. Bolivia*. Judgment of November 30, 2016, Series C No. 329, paras. 147, 166, 176-196 (defining, interpreting the scope of, and articulating three elements of informed consent; then determining the parameters necessary to analyze whether a State’s action is in violation of international human rights standards).

¹⁶ This definition of “best available science” merges: (i) scientific principles and research practices with; (ii) the definition provided in 33 U.S.C. § 1321(a)(27); and (iii) the factors set forth in U.S. Supreme Court, *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 at 579, 592-595 (Jun. 28, 1993) (The five non-exclusive factors judges should consider when determining whether evidence is based on scientifically valid reasoning and been properly applied are: (i) whether the technique or theory can be or has been tested; (ii) whether it has been subjected to peer review and publication; (iii) the known or potential error rate; (iv) the existence and maintenance of standards controlling its operation; and (v) whether it has attracted wide acceptance within a relevant scientific community.) <https://supreme.justia.com/cases/federal/us/509/579/>.

¹⁷ Paris Agreement, Art. 2 §1(a) (Dec. 12, 2015).

¹⁸ Andrea Rodgers et al., *The injustice of 1.5°C–2°C: The need for a scientifically based standard of fundamental rights protection in constitutional climate change cases*, Va. Env’t L. J., 40:102-151 at 102 and 105 (2022) http://www.velj.org/uploads/1/2/7/0/12706894/40.2_va_envt_lj_rodgers_sancken_marlow_102_151.pdf; *See e.g.* ECHR, *KlimaSeniorinnen v. Switzerland*, No. 53600/20, Observations on the facts, admissibility, and the merits (Dec. 2, 2022) (In 2016, over 2,000 older women asserted that Switzerland failed to take sufficient climate action exposing them to climate-induced heatwaves. To remedy the resulting violations, Applicants asked the court to order Switzerland to meet the 1.5°C Paris target. In 2016, the Earth’s average surface temperature was ~1.07°C above pre-industrial levels. The Applicants erred in asking the Court to sanction a target that is *higher* than the temperature at the time the violations occurred.), *see e.g.* p. II para. 3, pp. 10-13 §2 at 1.10 paras. 33-36, and p. 69 §3 para. (3)(2)(a-d), https://en.klimaseniorinnen.ch/wp-content/uploads/2022/12/221202_53600_20_Observations_GC_KlimaSeniorinnen_and_others_v_Switzerland.pdf; *Duarte Agostinho and Others v. Portugal and 32 Others*, No. 39371/20, Observations of the Applicants on Admissibility and the Merits (Feb. 9, 2022) (Assertions similar to those in *KlimaSeniorinnen* were made by child applicants from Portugal against 33 States.

Applicants also presented the 1.5°C target as the remedy on 559 pages of their 868-page submission even though the average global temperature was *lower* at the time the violations occurred.) *see e.g.* paras. 2, 5(a)(i), 5(e), and 5(f) (accessible via <https://youth4climatejustice.org/case-documents/>, last accessed Feb. 6, 2024); and ITLOS, *Request for an Advisory Opinion on Climate Change and International Law*, Case No. 31, Written statement of the commission of small island states on climate change (Jun. 16, 2023) (The Commission of Small Island States (COSIS) underscores “up-to-date scientific data is a critical yardstick against which States’ environmental due diligence obligations must be measured” and highlights the “devastating effects” Small Island States will suffer even if global warming remains under 1.5°C. Yet, the COSIS concludes that a 1.5°C target would be an acceptable legal standard.) *see e.g.* para 3 and 122 https://www.itlos.org/fileadmin/itlos/documents/cases/31/written_statements/2/C31-WS-2-4-COSIS.pdf, *see also* ITLOS, Case No. 31, *Amicus Curiae* Submission, Our Children’s Trust and Oxfam International (Jun. 16, 2023) https://www.itlos.org/fileadmin/itlos/documents/cases/31/written_statements/4/C31-WS-4-8-Our_Children_s_Trust_Oxfam.pdf).

¹⁹ Andrea Rodgers et al., *The injustice of 1.5°C–2°C: The need for a scientifically based standard of fundamental rights protection in constitutional climate change cases*, Va. Env’t L. J., 40:102-151 at 102 and 105 (2022) (“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.”) http://www.velj.org/uploads/1/2/7/0/12706894/40.2_va_envt_lj_rodders_sancken_marlow_102_151.pdf; Béatrice Cointe et al., *A history of the 1.5°C target*, WIREs Clim. Change, e824:1-11 (2023) (Referring to 1.5°C as “originated with a political impetus”, a “politically driven target”; “politically approved”; with its origin “clearly on the diplomatic side”; with an “overtly political history”; and “the result of intense and difficult negotiations”) <https://doi.org/10.1002/wcc.824>; and Juan Auz et al., *The neocolonial violence of 1.5°C*, Open Global Rights, Center for Human Rights and Global Justice and the Future of Rights Program at New York University School of Law (Oct. 6, 2023) <https://www.openglobalrights.org/neocolonial-violence-1-5C-threshold/>.

²⁰ IPCC *Global warming of 1.5°C: An IPCC special report on the impacts of global warming of 1.5°C*, at 44 (2019) (“Warming of 1.5°C is not considered “safe” [...] and poses significant risks to natural and human systems as compared to the current warming of 1°C [...]. 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 [...]. Some of the worst impacts on sustainable development are expected to be felt among [...] children [...].”) https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SR15_Full_Report_LR.pdf.

²¹ IPCC, *Global warming of 1.5°C: An IPCC special report on the impacts of global warming of 1.5°C*, (2019) https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SR15_Full_Report_LR.pdf; IPCC, 2023: *Summary for Policymakers*. In: Climate change 2023: Synthesis report (2023) https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf; and IPCC, 2023: *Longer Report*, In: Climate change 2023: Synthesis report (2023) https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf.

²² *See e.g.* United Nations Children’s Fund (UNICEF), *The climate crisis is a child rights crisis: Introducing the children’s climate risk index*, 1-26 at 11 (2021) (“Almost every child on Earth is exposed to at least 1 [...] major climate and environmental hazards, shocks and stresses.”) <https://www.unicef.org/media/105376/file/UNICEF-climate-crisis-child-rights-crisis.pdf>.

²³ *See e.g.* Matthew W. Jones et al., *Global and regional trends and drivers of fire under climate change*, Rev. Geophys., 60(e2020RG000726):1-76 at 12 (2022) (At current levels of warming (1990-2019 average), South America has experienced the second highest increase in length of the fire season and has experienced the greatest increase in conditions conducive to fire ignition and spread anywhere in the globe. This is expected to worsen relative to the 1990-2019 average by 21% for fire season length and 55.6% for extreme fire weather under the 1.5°C scenario.) <https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/2020RG000726>.

²⁴ *See e.g.* Michalis I. Voutsoukas et al., *Small island developing states under threat by rising seas even in a 1.5°C warming world*, Nat. Sustain., 1-13 at 3 (2023) <https://doi.org/10.1038/s41893-023-01230-5> (Small island developing states already suffer high losses and damage from extreme events. For instance, in 2019, tropical cyclone Dorian resulted in over US \$3 billion in damages and losses linked to flooding only in the Bahamas, with 30,000 people impacted, 67 fatalities, and 282 missing. Losses and damages will increase as the world approaches 1.5°C); Adele M. Dixon et al., *Future loss of local-scale thermal refugia in coral reef ecosystems*, PLoS Climate, 1(2):1-20 at 4 (2022) (From 1986-2019, ~84% of areas within coral reefs served as a refuge for coral protecting coral from rising sea temperatures. At 1.5°C the area of refuge drops drastically to 0.2%) <https://journals.plos.org/climate/article?id=10.1371/journal.pclm.0000004>.

²⁵ The Global Climate Observing System, *Where does the heat go?* (“Earth Energy Imbalance is the difference between the amount of energy from the sun arriving at the Earth and the amount returning to space. It serves as a fundamental metric to allow the scientific community and the public to assess how well the world responds to the task of bringing climate change under control.”) <https://gcos.wmo.int/en/news/where-does-heat->

[go#:~:text=The%20Earth%20Energy%20Imbalance%20\(EEI,bringing%20climate%20change%20under%20control.](#) (last visited Dec. 6, 2023).

²⁶ “Annual mean concentration of atmospheric CO₂” is the amount of carbon dioxide in the atmosphere. It is measured in parts per million (ppm). Ppm is the number of CO₂ molecules per million molecules of the air that sits 8-12 kilometres above the Earth’s surface. Just as one percent means one out of a hundred, one ppm means one out of a million. While each ppm denotes a *very* small numerical value, the geologically unprecedented large and rapid change in ppm of CO₂ in our atmosphere over the last century are devastating for the planet and human rights, such that *every ppm matters*. See <https://climate.nasa.gov/vital-signs/carbon-dioxide/> (last accessed Feb. 6, 2024). The 2022 annual mean concentration of atmospheric CO₂ was ~419 ppm. This level was referenced in the *Amicus* brief as the 2023 average had not yet been calculated since the brief was submitted before the end of year. The 2023 level is now in and is ~421 ppm and is available at National Oceanic and Atmospheric Administration at https://gml.noaa.gov/webdata/ccgg/trends/co2/co2_annmean_mlo.txt. See e.g. James Hansen et al., *Target atmospheric CO₂: Where should humanity aim?*, *Open Atmospheric Sci. J.*, 2:217-231 at 217, 229 (2008) (“If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO₂ will need to be reduced from its current 385 ppm to at most 350 ppm, but likely less than that.”) <https://openatmosphericssciencejournal.com/contents/volumes/V2/TOASCJ-2-217/TOASCJ-2-217.pdf>; Johan Rockström et al., *A safe operating space for humanity*, *Nature* 461:472-475 at 473 (2009) (“[H]uman changes to atmospheric CO₂ concentrations should not exceed 350 parts per million by volume [...] above pre-industrial levels.”) <https://www.nature.com/articles/461472a>; Will Steffen et al., *Planetary boundaries: Guiding human development on a changing planet*, *Science*, 347:736-746 at 739 (2015) <https://www.science.org/doi/10.1126/science.1259855> (“We retain the control variables and boundaries originally proposed—i.e., an atmospheric CO₂ concentration of 350 parts per million (ppm) [...].); Katherine Richardson et al., *Earth beyond six of nine planetary boundaries*, *Sci. Adv.*, 9:1-16 at 2 (2023) <https://www.science.org/doi/10.1126/sciadv.adh2458> (Precaution places the planetary boundary at the start of increasing risk (350 ppm ≈ 1°C)); Benjamin W. Abbott et al., *Accelerating the renewable energy revolution to get back to the Holocene*, *Earth’s Future*, 11:1-14 at 1 (2023) (“Despite convincing evidence that 1.5°C of warming would cause immense disruption to Earth systems, especially human civilization, many policymakers and researchers continue to treat this target as acceptable [...].”) <https://doi.org/10.1029/2023EF003639>.

²⁷ The indeterminacy of global average temperature rise is one of the reasons temperatures make a poor metric for evaluating the extent of global warming. For purposes of the submission filed on Dec. 13, 2023, *Amici* the average global temperature rise above pre-industrial levels through 2022 was ~1.1°C–1.3°C. This has been re-calculated here to include 2023. The difference in the temperature records—and in turn the temperature rise about preindustrial levels from NOAA, NASA, Hadley, Copernicus and Berkeley Earth—make it difficult to determine whether and when global temperature targets may have been breached and are one of the reasons why measurements of atmospheric CO₂ are much more precise. The IPCC indicates a “likely range of total human caused global surface temperature increase” of 0.8°C to 1.3°C however this ranges is outdated.

²⁸ Our Children’s Trust, *Bibliography: Important Scientific Studies on the Limit of Atmospheric CO₂ Required to Protect Human Rights*, <https://static1.squarespace.com/static/571d109b04426270152febe0/t/656f36b262f6bf76c68df46b/1701787314558/Important+Science+Studies+Curated+Biblio+Atmospheric+Boundary.pdf>.

²⁹ Supreme Court of the State of Hawai‘i, *In the Matter of Hawai‘i Electric Light Company, Inc.*, SCOT-22-0000418, Concurrence at pp. 9-11 (Mar. 13, 2023) (“Governments cannot use the 1.5°C Paris Agreement target as a mechanism to delay reducing emissions until that threshold has been met. [...] The target for emission reductions must instead be based on the level of atmospheric CO₂ that ensures a life-sustaining climate system. [...] Current scientific consensus, as opposed to political consensus in the Paris Agreement regarding an acceptable increase in global average temperature, suggests that mitigation strategies must be consistent with achieving global atmospheric CO₂ concentrations below 350 parts per million (“ppm”) by 2100. [...] Limiting atmospheric CO₂ levels to below 350 ppm is essential to [...] ‘restore a viable climate system on which the life, liberty, and property’ of all people depend.”) and Montana First Judicial District Court, *Held et al. v. State of Montana*, CDV-2020-307, Findings of Fact at paras. 67-92 (Aug. 14, 2023) bit.ly/HeldFindingsConclusionsOrder.

³⁰ *Trends in atmospheric Carbon Dioxide*, NOAA Earth System Research Lab., https://gml.noaa.gov/webdata/ccgg/trends/co2/co2_annmean_mlo.txt (last accessed Feb. 6, 2024).

³¹ *Trends in atmospheric Carbon Dioxide*, NOAA Earth System Research Lab., https://gml.noaa.gov/webdata/ccgg/trends/co2/co2_annmean_mlo.txt (last accessed Feb. 6, 2024).

³² For comparison with the unsafe target of 1.5°C: to achieve a 50% chance of keeping warming to—not below—1.5°C, as of January 2023 States could only emit a total of another 250 gigatons of CO₂, which is around six years of current CO₂ emissions. Robin D. Lamboll, *Assessing the size and uncertainty of remaining carbon budgets*, *Nat. Clim. Change*, 13:1360-1367 (2023) <https://doi.org/10.1038/s41558-023-01848-5>.

- ³³ James Hansen, *Target atmospheric CO₂: Where should humanity aim?*, *Open Atmospheric Sci. J.*, 2:217-230 at 217 (2008) (emphasis added) <https://openatmosphericjournal.com/contents/volumes/V2/TOASCJ-2-217/TOASCJ-2-217.pdf>; and Johan Rockström et al., *A safe operating space for humanity*, *Nature* 461:472-475 at 473 (2009) (“Transgressing these boundaries will increase the risk of irreversible climate change [...]”) <https://www.nature.com/articles/461472a>.
- ³⁴ David I. Armstrong McKay et al., *Exceeding 1.5°C global warming could trigger multiple climate tipping points*, *Sci.* 377:1-10 at 1, 10 (2022) (“[E]ven 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. Crossing these [climate tipping points] can generate positive feedbacks that increase the likelihood of crossing other [climate tipping points]” and “The Earth may have left a safe climate state beyond 1°C global warming.”) <https://doi.org/10.1126/science.abn7950>.
- ³⁵ See Alexandria Herr et al., *The 7 climate tipping points that could change the world forever*, *Grist* (Dec. 3, 2019), <https://grist.org/climate-tipping-points-amazon-greenland-boreal-forest/> (last accessed Feb. 6, 2024).
- ³⁶ David I. Armstrong McKay et al., *Exceeding 1.5°C global warming could trigger multiple climate tipping points*, *Sci.* 377:1-10 at 1, 7 (2022) <https://doi.org/10.1126/science.abn7950>.
- ³⁷ See Will Steffen et al., *Trajectories of the Earth system in the Anthropocene*, *PNAS*, 115:8252-8259 at 8256 (2018) <https://www.pnas.org/doi/epdf/10.1073/pnas.1810141115>; and see generally David Wallace-Wells, *The uninhabitable Earth: Life after warming* (2019), <https://www.crisrieder.org/thejourney/wp-content/uploads/2019/05/The-Uninhabitable-Earth-David-Wallace-Wells.pdf>.
- ³⁸ IPCC, *2023: Summary for policymakers*, In: *Climate change 2023: Synthesis report*, para. B.2.2, see also paras. B.1, B.1.3, Figure SPM.2, B.2, Figure SPM.4, C.1.1, and Figure SPM.6 (2023) (emphasis added) https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf.
- ³⁹ Montana First Judicial District Court, *Held et al. v. State of Montana*, CDV-2020-307, Conclusions of Law at p. 87, para. 6 (Aug. 14, 2023); see also Findings of Fact at p. 24, para. 92 (“Every ton of fossil fuel emissions contributes to global warming and impacts to the climate and thus increases the exposure of Youth Plaintiffs to harms now and additional harms in the future.”) bit.ly/HeldFindingsConclusionsOrder.
- ⁴⁰ Montana First Judicial District Court, *Held et al. v. State of Montana*, CDV-2020-307, Conclusions of Law at p. 87, para. 7 (Aug. 14, 2023) bit.ly/HeldFindingsConclusionsOrder.
- ⁴¹ I/A Court H.R., *The Environment and Human Rights*, Advisory Opinion OC-23/17 of November 15, 2017, Series A 23, para. 64.
- ⁴² I/A Court H.R., *The Environment and Human Rights*, Advisory Opinion OC-23/17 of November 15, 2017, Series A No. 23, para. 67; UN Committee on the Rights of the Child, *General comment No. 26 (2023) on children’s rights and the environment, with a special focus on climate change* (Aug. 22, 2023) (Finding that climate change is an “urgent and systemic threat to children’s rights globally” and describing the threats and harms environmental degradation and climate change presents to children’s right to non-discrimination; life; survival; development; to be heard; to enjoy freedom of expression, association, and peaceful assembly; to access to information; to be free from all forms of violence; to the highest attainable standard of health; to social security and an adequate standard of living; to education; to belong to Indigenous and minority groups; to rest, play, leisure and recreation; and the right to clean, healthy and sustainable environment.)
- ⁴³ I/A Court H.R., *The Environment and Human Rights*, Advisory Opinion OC-23/17 of November 15, 2017, Series A No. 23, para. 142 (emphasis added); see also para. 180 (“States must act with due caution to prevent possible damage. [...] Therefore, even in the absence of scientific certainty, they must take ‘effective’ measures to prevent severe or irreversible damage.”).
- ⁴⁴ I/A Court H.R., *The Environment and Human Rights*, Advisory Opinion OC-23/17 of November 15, 2017, Series A No. 23, para. 172 (emphasis added); See e.g., I/A Court H.R., *Juridical Condition and Rights of Undocumented Migrants*, Advisory Opinion OC-18/03 of September 17, 2003, Series A No. 18, para. 81 and para. 1 of the final Opinion (States “should take affirmative action, avoid taking measures that restrict or infringe a fundamental right, and eliminate measures and practices that restrict or violate a fundamental right.”); and Montana First Judicial District Court, *Held et al. v. State of Montana*, CDV-2020-307, Conclusions of Law at p. 96, paras. 43-45 (Aug. 14, 2023) (Concluding that Montana’s language regarding the right to a clean and healthy environment is “forward looking and preventative” and “clearly indicate that Montanans have a right not only to reactive measures after a constitutionally-proscribed environmental harm has occurred, but to be free of its occurrence in the first place” and that the right to a clean and healthy environment requires “enhancement” and is “complemented by an affirmative duty upon governments to take active steps to realize this right.”) bit.ly/HeldFindingsConclusionsOrder.
- ⁴⁵ Additional Protocol to the American Convention on Human Rights in the Area of Economic, Social and Cultural Rights (“Protocol of San Salvador”) November 16, 1999, Art. 11.
- ⁴⁶ I/A Comm’n H.R., Resolution No. 3/2021 *Climate Emergency: Scope of Inter-American Human Rights Obligations of December 31, 2021*, para. 11 (“States have an obligation to cooperate in good faith in order to prevent pollution of the planet, which entails reducing their emissions to ensure a safe climate that enables the exercise of rights.”).

⁴⁷ I/A Comm'n H.R., Resolution No. 3/2021 *Climate emergency: Scope of Inter-American Human Rights obligations* of December 31, 2021, para. 1 (emphasis added).

⁴⁸ James Hansen et al., *Target atmospheric CO₂: Where should humanity aim?*, *Open Atmospheric Sci. J.*, 2:217-231 at 217, 229 (2008) (“If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO₂ will need to be reduced from its current 385 ppm to at most 350 ppm, but likely less than that.”)

<https://openatmosphericssciencejournal.com/contents/volumes/V2/TOASCJ-2-217/TOASCJ-2-217.pdf>; Johan Rockström et al., *A safe operating space for humanity*, *Nature* 461:472-475 at 473 (2009) (“[H]uman changes to atmospheric CO₂ concentrations should not exceed 350 parts per million by volume [...] above pre-industrial levels.”)

<https://www.nature.com/articles/461472a>; Will Steffen et al., *Planetary boundaries: Guiding human development on a changing planet*, *Science*, 347:736-746 at 739 (2015) <https://www.science.org/doi/10.1126/science.1259855> (“We retain the control variables and boundaries originally proposed—i.e., an atmospheric CO₂ concentration of 350 parts per million (ppm) [...]”); Katherine Richardson et al., *Earth beyond six of nine planetary boundaries*, *Sci. Adv.*, 9:1-16 at 2 (2023)

<https://www.science.org/doi/10.1126/sciadv.adh2458> (Precaution places the planetary boundary at the start of increasing risk (350 ppm ≈ 1°C)); Benjamin W. Abbott et al., *Accelerating the renewable energy revolution to get back to the Holocene*, *Earth’s Future*, 11:1-14 at 1 (2023) (“Despite convincing evidence that 1.5°C of warming would cause immense disruption to Earth systems, especially human civilization, many policymakers and researchers continue to treat this target as acceptable [...]”)

<https://doi.org/10.1029/2023EF003639>.
⁴⁹ James Hansen, et al., *Young people’s burden: Requirement of negative CO₂ emissions*, *Earth Sys. Dyn.*, 8: 577-616 at 595 (2017) (Because “the world has already overshoot appropriate targets for [greenhouse gas] amount, [...] we thus infer an urgent need for (1) rapid phasedown of fossil fuel emissions, (2) actions that drawdown atmospheric CO₂ [...]”; and also at 593 (There is “no persuasive scientific reason to a priori reject as implausible a rapid phasedown of fossil fuel emissions.”)

<https://esd.copernicus.org/articles/8/577/2017/>.
⁵⁰ IPCC, 2023: *Summary for policymakers*. In: *Climate change 2023: Synthesis report*, pp. 1-34 at A.4.2 (“[M]itigation options [...] are technically viable, are becoming increasingly cost effective and are generally supported by the public.”)

https://bit.ly/IPCC_ar6; and Christian Breyer et al., *On the history and future of 100% renewable energy systems research*, *IEEE Access*, 10:78176-78218 at 78176, 78202 (2022) (“The main conclusion of most of these studies is that 100% renewables is feasible worldwide at low cost.”) <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9837910>.

⁵¹ In this summary, “all sectors” is defined as: electricity, transportation, buildings, industry, agriculture / forestry / fishing, and the military.

⁵² In this summary, 100% clean, renewable energy encompasses wind, water, and solar.

⁵³ Mark Z. Jacobson et al., *Low-cost solutions to global warming, air pollution, and energy insecurity for 145 countries*. *Energy Environ. Sci.*, 15:3343–3359 (2022) <https://web.stanford.edu/group/efmh/jacobson/Articles/I/145Country/22-145Countries.pdf>; and Montana First Judicial District Court, *Held et al. v. State of Montana*, CDV-2020-307, Trial Transcript, Testimony of Mark Z. Jacobson, p. 1057 (Jun 16, 2023) (underscoring that the roadmaps set forth only one of many scenarios to reach 100% renewables providing States with a starting point to tailor their climate actions) (available upon request).

⁵⁴ Mark Z. Jacobson et al., *No miracles needed: How today’s technology can save our climate and clean our air*, Cambridge University Press (2023) <https://www.cambridge.org/core/books/no-miracles-needed/8D183E65462B8DC43397C19D7B6518E3> (restricted access, available upon request).

⁵⁵ Benjamin W. Abbott et al., *Accelerating the renewable energy revolution to get back to the Holocene*, *Earth’s Future*, 11:1-14 at 6 (2023) <https://doi.org/10.1029/2023EF003639>.

⁵⁶ Montana First Judicial District Court, *Held et al. v. State of Montana*, CDV-2020-307, Conclusions of Law at p. 87, para. 8 (Aug. 14, 2023) (“[Youth] Plaintiffs have proven that as children and youth they are disproportionately harmed by fossil fuel pollution and climate impacts.”); see also Findings of Fact “III. Climate Change Harms Children and Specifically Youth Plaintiffs” pp. 26-34 paras. 100-139 and “V. Climate Change is Already Harming Plaintiffs” pp. 46-64 paras. 194 -208 bit.ly/HeldFindingsConclusionsOrder.

⁵⁷ I/A Court H.R., *The Environment and Human Rights*, Advisory Opinion OC-23/17 of November 15, 2017, Series A No. 23, para. 67 (“Various human rights bodies have recognized that [...] children [...] are groups that are especially vulnerable to environmental damage [...]”); and I/A Comm’n H.R., Resolution No. 3/2021 *Climate emergency: Scope of Inter-American Human Rights obligations*, at 6 (Dec. 31, 2021).

⁵⁸ American Convention on Human Rights, O.A.S. Treaty Series, No. 36 of November 22, 1969, Art. 19; and I/A Court H.R., *Case of the Massacres of El Mozote and surrounding areas v. El Salvador*. Merits, Reparations and Costs. Judgment of October 25, 2012, Series C No. 252, para. 150 (“The Court reiterates that cases in which children are victims of human rights violations are especially serious”. Children “also possess the special measures of protection [...] which must be defined according to the particular circumstances [...]. The adoption of special measures [...] include the measures relating to non-discrimination [...]”)(emphasis added).

⁵⁹ I/A Court H.R., Differentiated approaches with respect to certain groups of persons in detention, Advisory Opinion OC-29/22 of May 30, 2022, Series A No. 29, para. 172 (“The Court has already emphasized that, in protecting the rights of children and in adopting measures to achieve that protection, the following four guiding principles of the Convention on the Rights of the Child should transversally inspire, and be implemented throughout, the entire system of comprehensive protection: the principle of non-discrimination; the principle of the best interests of the child; the principle of respect for the right to life, survival and development, and the principle of respect for the opinion of children in all procedures affecting them in a manner that ensures their participation.”); and UN Committee on the Rights of the Child, *General comment No. 26 (2023) on children’s rights and the environment, with a special focus on climate change*, paras. 16-19 (Aug. 22, 2023)(“[T]he best interests of the child shall be a primary consideration in the adoption and implementation of environmental decisions, including laws, regulations, policies, standards, guidelines, plans, strategies, budgets, international agreements and the provision of development assistance.”).

⁶⁰ I/A Comm’n H.R., Resolution No. 3/2021 *Climate emergency: Scope of Inter-American Human Rights obligations*, para. 21 (Dec. 31, 2021); and UN Committee on the Rights of the Child, *General comment No. 26 (2023) on children’s rights and the environment, with a special focus on climate change*, para. 11 (Aug. 22, 2023). In the context of climate change, intergenerational justice requires that atmospheric CO₂ be restored to ~280-350 ppm: the pre-industrial level to which humanity is adapted. *See e.g.* James Hansen et al., *Target atmospheric CO₂: Where should humanity aim?*, *Open Atmospheric Sci. J.*, 2:217-231(2008) <https://openatmosphericssciencejournal.com/contents/volumes/V2/TOASCJ-2-217/TOASCJ-2-217.pdf>.

⁶¹ I/A Court H.R., Request for an Advisory Opinion on the Climate Emergency and Human Rights *Amicus Curiae* Submission from Our Children’s Trust et al., Annex C: Scientific findings on the effects of climate change on child health of December 13, 2023, <https://static1.squarespace.com/static/655a2d016eb74e41dc292ed5/t/657a0182e1880b5417feb13f/1702494611469/2023.12.11+IACtHR+Amicus+Brief.pdf>.

⁶² *See e.g.* Zhiwei Xu et al., *Climate change and children’s health—A call for research on what works to protect children*, *Int. J. Environ. Res. Public Health*, 9:3298-3316 at 3299 (2012) (“Climate change poses a significant threat to children’s health because children have unique metabolism, behavior, physiology and development characteristics.”)

<https://doi.org/10.3390/ijerph9093298>; Samantha Ahdoon et al., *Global climate change and children’s health*, *Pediatrics*, 136(5):e1468-1484 at e1470 (2015) (Children’s “immature physiology and metabolism; incomplete development; higher exposure to air, food, and water per unit body weight; unique behavior patterns; and dependence on caregivers place children at much higher risk of climate-related health burdens than adults.”) <https://doi.org/10.1542/peds.2015-3233>; and Frederica Perera et al., *Climate change, fossil-fuel pollution, and children’s health*, *New Eng. J. Med.*, 386:2303- 2314 at 2304, Figure 2 (2022) (“The fetus, infant, and child are uniquely vulnerable to climate-related environmental impacts and air pollution owing to a host of biologic and behavioral factors.”) <https://www.nejm.org/doi/full/10.1056/NEJMra2117706>.

⁶³ *See e.g.* Samantha Ahdoon et al., *Global climate change and children’s health*, *Pediatrics*, 136(5):e1468-e1484 at e1470 (2015) <https://doi.org/10.1542/peds.2015-3233>; and Kristie L. Ebi, *Climate Change and Children*, *Pediatr. Clin. North Am.*, 54(2):213-226 at 213, 218 (2007) (“Children are particularly vulnerable in extreme events because of their dependence on adults to ensure their safety and well-being.”) <https://doi.org/10.1016/j.pcl.2007.01.004> (restricted access, available upon request).

⁶⁴ *See e.g.* Perry E. Sheffield et al., *Global climate change and children’s health: Threats and strategies for prevention*, *Environ. Health Perspect.*, 119(3):291-298 at 292 (2011) <https://doi.org/10.1289/ehp.1002233>; and Francis Vergunst et al., *Climate change and children’s mental health: A developmental perspective*, *Clin. Psychol. Sci.*, 10(4):767–785 at 769-775, Figures 1 and 2 (2022) <https://doi.org/10.1177/21677026211040787>.

⁶⁵ *See e.g.* United Nations Children’s Fund (UNICEF), *The climate crisis is a child rights crisis: Introducing the children’s climate risk index*, 1-26 at 20 (2021) <https://www.unicef.org/media/105376/file/UNICEF-climate-crisis-child-rights-crisis.pdf>.

⁶⁶ I/A Court H.R., *The Environment and Human Rights*, Advisory Opinion OC-23/17 of November 15, 2017, Series A No. 23, para. 114.

⁶⁷ I/A Court H.R., Request for an Advisory Opinion on the Climate Emergency and Human Rights *Amicus Curiae* Submission from Our Children’s Trust et al., Annex C: Scientific findings on the effects of climate change on child health of December 13, 2023, <https://static1.squarespace.com/static/655a2d016eb74e41dc292ed5/t/657a0182e1880b5417feb13f/1702494611469/2023.12.11+IACtHR+Amicus+Brief.pdf>.

⁶⁸ IPCC, *Summary for policymakers*, In: *Climate change 2021: The physical science basis* at 15:B.2.2 (2021) (“With every additional increment of global warming, changes in extremes continue to become larger [...]. There will be an increasing occurrence of some extreme events unprecedented in the observational record with additional global warming”)

https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf;

IPCC, *Summary for policymakers*. In: *Climate change 2023: Synthesis report*, pp. 1-34, *see e.g.* p. 12, B.1 (“Every increment of global warming will intensify multiple and concurrent hazards (*high confidence*)”); *see also* B.1.3, Figure SPM.2, B.2, B.2.2, Figure SPM.4, C.1.1, and Figure SPM.6, https://bit.ly/IPCC_ar6; *see also*, Montana First Judicial District Court, *Held et al. v. State of Montana*, CDV-2020-307, Conclusions of Law at p. 87, para. 6 (Aug. 14, 2023)(“Every additional ton of GHG

[greenhouse gas] emissions exacerbates [youth] Plaintiffs' injuries and risks locking in irreversible climate injuries." Findings of Fact at p. 24, para. 92 ("Every ton of fossil fuel emissions contributes to global warming and impacts to the climate and thus increases the exposure of Youth Plaintiffs to harms now and additional harms in the future."); and Conclusions of Law at p. 87, para. 7 ("[Youth] Plaintiffs' injuries will grow increasing severe and irreversible without science-based actions to address climate change.") bit.ly/HeldFindingsConclusionsOrder.

⁶⁹ See generally, United Nations Children's Fund (UNICEF), *The climate crisis is a child rights crisis: Introducing the children's climate risk index*, 1-26 (2021) <https://www.unicef.org/media/105376/file/UNICEF-climate-crisis-child-rights-crisis.pdf>.

⁷⁰ See e.g. Carolyn Kousky, *Impacts of natural disasters on children*, *Future Child.*, 26(1):73-92 at 73 (2016) <https://files.eric.ed.gov/fulltext/EJ1101425.pdf>; Chaamala Klinger et al., *Power outages, extreme events and health: A systematic review of the literature from 2011-2012*, *PLoS Curr.*, 2(6) (2014) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3879211/>; and World Health Organization, *Climate Change*, Figure (2023) <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health> (last accessed Feb. 6, 2024).

⁷¹ I/A Court H.R., *The Environment and Human Rights*, Advisory Opinion OC-23/17 of November 15, 2017, Series A No. 23, para. 66.

⁷² See e.g. UN Office of the Special Representative of the Secretary-General on Violence Against Children, *The climate crisis and violence against children*, (2022) <https://violenceagainstchildren.un.org/sites/violenceagainstchildren.un.org/files/the-climate-crisis-and-violence-against-children.pdf>; and Jorge Cuartas et al., *Climate change is a threat multiplier for violence against children*, *Child Abuse Negl.*, 1-24 (2023) <https://doi.org/10.1016/j.chiabu.2023.106430> (restricted access, available upon request).

⁷³ See e.g. Perry E. Sheffield et al., *Global climate change and children's health: Threats and strategies for prevention*, *Environ. Health Perspect.*, 119(3):291-298 at 292 (2011) <https://doi.org/10.1289/ehp.1002233>; and Francis Vergunst et al., *Climate change and children's mental health: A developmental perspective*, *Clin. Psychol. Sci.*, 10(4):767-785, Figures 1 and 2 (2022) <https://doi.org/10.1177/21677026211040787>; and Susie E. L. Burke et al., *The psychological effects of climate change on children*, *Curr. Psychiatry Rep.*, 20(35):1-8 at 3 (2018) ("[T]he cumulative stress brought on by slower onset but chronic climate related changes like severe drought or sea-level rise led to more serious mental health problems including depression and suicidality.") <https://doi.org/10.1007/s11920-018-0896-9> (restricted access, available upon request).

⁷⁴ Caroline Hickman et al., *Climate anxiety in children & young people and their beliefs about government responses to climate change: A global survey*, *Lancet*, 5(12):e863-e873 at e870 (2021) (This global survey of 10,000 children found that, "A large proportion of children and young people around the world report emotional distress and a wide range of painful, complex emotions (sad, afraid, angry, powerless, helpless, guilty, ashamed, despair, hurt, grief, and depressed). Similarly, large numbers report experiencing some functional impact and have pessimistic beliefs about the future (people have failed to care for the planet; the future is frightening; humanity is doomed; they won't have access to the same opportunities their parents had; things they value will be destroyed; security is threatened; and they are hesitant to have children).") [https://doi.org/10.1016/S2542-5196\(21\)00278-3](https://doi.org/10.1016/S2542-5196(21)00278-3).

⁷⁵ Caroline Hickman et al., *Climate anxiety in children & young people and their beliefs about government and responses to climate change: A global survey*, *Lancet*, 5(12):e863-e873 at e863, e864, e870-e871 (2021) [https://doi.org/10.1016/S2542-5196\(21\)00278-3](https://doi.org/10.1016/S2542-5196(21)00278-3).

⁷⁶ United Nations, *Young people reconsidering parenthood due to climate change, UNICEF poll reveals* (2022) <https://news.un.org/en/story/2022/11/1130377> (last accessed Feb. 6, 2024).

⁷⁷ See e.g. Montana First Judicial District Court, *Held et al. v. State of Montana*, CDV-2020-307, Conclusions of Law at p. 87, para. 5 (Aug. 14, 2023) ("[Youth] Plaintiff's mental health injuries stemming from the effects of climate change [...], feelings like loss, despair, and anxiety, are cognizable injuries.") bit.ly/HeldFindingsConclusionsOrder. U.S. Ninth Circuit Court of Appeals, *Juliana v. United States*, No. 18-36082, Opinion, at 18-19 (Jan. 17, 2020) ("These injuries are not simply 'conjectural' or 'hypothetical,' at least some of the plaintiffs have presented evidence that climate change is affecting them now and in concrete ways and will continue to do so unless checked.") <https://cdn.ca9.uscourts.gov/datastore/opinions/2020/01/17/18-36082.pdf>.

⁷⁸ IACHR, *Access to Justice as a Guarantee of Economic, Social, and Cultural Rights. A Review of the Standards Adopted by the Inter-American System of Human Rights*, para. 1 (2007) <https://www.refworld.org/docid/477e3d062.html>.

⁷⁹ See e.g., IACHR, *Access to Justice as a Guarantee of Economic, Social, and Cultural Rights. A Review of the Standards Adopted by the Inter-American System of Human Rights* (2007); and IACHR Special Rapporteurship on the Rights of Women, *Access to Justice for Women Victims of Violence in the Americas* (2007).

⁸⁰ Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean (Escazú Agreement), Preamble, Arts. 1, 8 (Sep. 27, 2018) reaffirming Rio Declaration on Environment and Development, Principle 10 (Aug. 12, 1992) (The Escazú Agreement obligates States to provide "effective access to judicial and administrative proceedings, including redress and remedy" *specifically* with respect to environmental issues.) (emphasis added).

⁸¹ UN Committee on the Rights of the Child, *General comment No. 26 (2023) on children's rights & the environment, with a special focus on climate change*, paras. 86, 83, 87, 84-85 (Aug. 22, 2023) (Calling on States to make it easier for children to bring climate

cases and be heard in proceeding affecting them by “adjusting the rules of standing,” “shifting the onerous burden of proof from child plaintiffs to establish causation,” and making “[m]echanisms [...] available for claims of imminent or foreseeable harms and past or current violations of children’s rights.”)

⁸² I/A Court H.R., Case of the “*Street Children*” (*Villagrán Morales et al.*) v. *Guatemala*. Judgment of November 19, 1999, Series C No. 63, para. 235, citing I/A Court H.R., Case of *Cesti Hurtado*. Judgment of September 29, 1999, Series C No. 56, paras. 121, 125; I/A Court H.R. Case of *Castillo Petruzzi et al.* Judgment of May 30, 1999, Series C No. 52, para. 185; I/A Court H.R., Judicial Guarantees in States of Emergency, Advisory Opinion OC-9/87 of October 6, 1987, Series A No. 9, para. 24.

⁸³ See multiple citations within.

⁸⁴ See e.g. IPCC, *Summary for policymakers*. In: Climate change 2023: Synthesis report, pp. 1-34 (At A.1 “Human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming [...]” At A.2 “Human-caused climate change is already affecting many weather and climate extremes in every region across the globe. This has led to widespread adverse impacts and related losses and damages to nature and people (*high confidence*). Vulnerable communities who have historically contributed the least to current climate change are disproportionately affected (*high confidence*).” At A.2.2 “Approximately 3.3 to 3.6 billion people live in contexts that are highly vulnerable to climate change.” At A.2.4. “Climate change has reduced food security and affected water security [...]” At A.2.5. “In all regions increases in extreme heat events have resulted in human mortality and morbidity [...]” At A.2.7 “[O]bserved climate change has caused adverse impacts on human health, livelihoods and key infrastructure.” At Figure SPM(c) “The extent to which current and future generations will experience a hotter and different world depends on choices now and in the near term.” At B.1 “Every increment of global warming will intensify multiple and concurrent hazards [...]” https://bit.ly/IPCC_ar6.

⁸⁵ Montana First Judicial District Court, *Held et al. v. State of Montana*, CDV-2020-307, Findings of Fact, Conclusions of Law, and Order (Aug. 14, 2023) See e.g. the following Findings of Fact: At p. 19, para. 67 “There is overwhelming scientific consensus that Earth is warming as a direct result of human [greenhouse gas] emissions, primarily from the burning of fossil fuels.” At p. 23 para. 86 “The scientific consensus is that CO₂ from fossil fuel pollution is the primary driver of Earth’s energy imbalance.” At p. 23 para. 87 “The buildup of CO₂ and the current Earth energy imbalance is due to anthropogenic changes in the environment, not natural variability.” At p. 24 para. 89 “Until atmospheric [greenhouse gas] concentrations are reduced, extreme weather events and other climactic events such as droughts and heatwaves will occur more frequently and in greater magnitude, and Plaintiffs will be unable to live clean and healthy lives [...]” At p. 24, para. 92 “Every ton of fossil fuel emissions contributes to global warming and impacts to the climate and thus increases the exposure of Youth Plaintiffs to harms now and additional harms in the future.” At Conclusions of Law p. 87, para. 6 “Every additional ton of GHG [greenhouse gas] emissions exacerbates [youth] Plaintiffs’ injuries and risks locking in irreversible climate injuries.”) bit.ly/HeldFindingsConclusionsOrder.

⁸⁶ See e.g. Sam Meadows, *Vaca Muerta was the future: Argentina goes all in on fracking*, Guardian (Oct. 18, 2023) <https://www.theguardian.com/global-development/2023/oct/18/vaca-muerta-oil-shale-argentina-goes-all-in-on-fracking>; Oliver Milman et al., *Biden approves controversial Willow oil drilling project in Alaska*, Guardian (Mar. 13, 2023) <https://www.theguardian.com/us-news/2023/mar/13/alaska-willow-project-approved-oil-gas-biden>; Justin Rowlett, *UAE planned to use COP28 climate talks to make oil deals*, BBC (Nov. 26, 2023) <https://www.bbc.com/news/science-environment-67508331> (all last accessed on Feb. 6, 2024).

⁸⁷ United Nations Framework Convention on Climate Change, Preamble (May 9, 1992); see also, United Nations Climate Change, *History of the Convention* (documenting that State Parties have known since well before the 1992 Earth Summit in Rio de Janeiro when the UNFCCC was opened for signature that to avert a climate crisis, time was of the essence.) <https://unfccc.int/process/the-convention/history-of-the-convention> (last accessed Feb. 6, 2024); and UCAR Center for Science Education, *History of Climate Science*, <https://scied.ucar.edu/learning-zone/how-climate-works/history-climate-science-research> (last accessed Feb. 6, 2024).

⁸⁷ United Nations Framework Convention on Climate Change, Preamble (May 9, 1992).

⁸⁸ UN Framework Convention of Climate Change, *Report of the Conference of the Parties on its nineteenth session, held in Warsaw from 11 to 23 November 2013*, FCCC/CP/2013/10/Add.1, Preamble (Jan. 31, 2014)

<https://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf>; cited by 2^{ème} Chamber Cour d’Appel Bruxelles, *VZW Klimaatzaak v. Kingdom of Belgium et al.*, Arrêt, 2022/AR/891, para. 34 (Nov. 30, 2023) https://prismic-io.s3.amazonaws.com/affaireclimat/4460824d-989f-4c3e-ad14-6dc1e4c9a1d3_SP52019923113012320+en.pdf.

⁸⁹ See e.g. American Convention on Human Rights, O.A.S. Treaty Series, No. 36 of November 22, 1969, Art. 63.

⁹⁰ United States District Court for the District of Oregon, *Juliana v. United States*, Civ. No. 6:15-cv-01517-AA, Opinion and Order, at 18 (Jun. 1, 2023) (emphasis added) https://climatecasechart.com/wp-content/uploads/case-documents/2023/20230601_docket-615-cv-01517_opinion-and-order-1.pdf.

⁹¹ Supreme Federal Court, *PSB et al. v. Brazil*, ADPF 708, Concurring Opinion at 3 (Jul. 1, 2022) (unofficial translation) https://climatecasechart.com/wp-content/uploads/non-us-case-documents/2022/20220701_ADPF-708_decision-3.pdf.