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Clean Air & Climate Justice: Legal & Policy Mechanisms for a Sustainable Future

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Abstract

Smoking, diet, and air pollution kill seven million people worldwide. The majority of those deaths occur in low- and middle-income nations that contributed least to fossil fuel usage and industrial emissions. Environmental and climate legislation's moral issue is polluter-polluted gap. Nations, international institutions, and civil society's legal and policy responses and structural deficiencies are examined in this research. Drawing on the World Health Organization Air Quality Guidelines revised in 2021, the Paris Agreement and its nationally determined contribution framework, the OECD Environmental Justice Report, the United States Clean Air Act and environmental justice executive orders, the United Nations General Assembly Resolution 76/300 recognising the human right to a clean, healthy, and sustainable environment, comparative national legislation from the United States, European Union, Colombia, South Korea, Brazil, India, and Chile, and data on global carbon pricing instruments covering approximately 24 to 28 percent of world emissions at an average of only six dollars per tonne against an estimated need of seventy-five dollars per tonne by 2030, the paper identifies five structural reform pillars: a binding global clean air convention modelled on the Montreal Protocol; a universal carbon price floor combined with elimination of the fossil fuel subsidies that reached seven trillion dollars in a recent reference year; adequate and automatically triggered climate finance for loss and damage; statutory environmental justice cumulative impact review embedded in all permit decisions; and a Just Transition Fund linking decarbonisation investment to binding labour and community equity standards. In the report, efficiency-only climate policy cannot sustain human civilization without a legally binding energy transition burden and benefit transfer.

Keywords: clean air law; climate justice; environmental racism; WHO Air Quality Guidelines; Paris Agreement; carbon pricing; polluter pays; Justice40; environmental justice; loss and damage; just transition; cumulative impact; fossil fuel subsidies; human right to clean environment

1. Introduction

In its new Air Quality Guidelines, the WHO states, "Clean air should be a basic human right and a must for societies to be healthy and productive." This exactly reflects the main unfairness of global environmental policy. [1] The word "should" works hard. The WHO does not claim most places guarantee clean air. This is not the case, and this absence causes seven million premature deaths, hundreds of millions of healthy life-years lost, and a five trillion dollar health-related external cost burden on societies.

There is no equitable method to distribute the dead and their costs. Even though they contribute little to air pollution, low- and middle-income nations account for over 90% of premature deaths from outdoor air pollution. [2] Black, Latino, and Indigenous communities in rich countries are exposed to 50–60% more pollution than consumer and manufacturing groups.[3] Climate-related economic issues have cost the 55 most vulnerable countries $525 billion in the previous 20 years. Only 4% of global emissions come from these countries. [4] Given these facts, the global legal framework for clean air and climate justice is woefully inadequate. No global treaty governs air quality. WHO guidelines are essential but not mandatory. Carbon pricing covers only 24%–28% of global greenhouse gas emissions. Economists claim the social cost of carbon and the price needed to reduce carbon emissions are much higher than the average price of six dollars per tonne. [5] In the past year, fossil fuel subsidies—the dirty industry's main legal and financial support—were worth approximately $7 trillion. This represents 7.1% of global GDP. [6] This paper continues. Section 2 examines the fundamental legal systems of clean air and climate justice law. These systems are global, regional, and domestic. Section 3 examines why carbon pricing and "polluter pays" fail. Part 4 compares US

environmental justice to other nations. Section 5 discusses climate funding and legal loss and damage measures. Section 6 discusses new ideas including climate lawsuits and constitutional Clean Environment Rights. Section 7 proposes a five-pillar transformation plan. Section 8 ends.

2. The Legal Architecture of Clean Air and Climate Governance

The WHO Air Quality Guidelines and the Absence of a Binding Treaty

The WHO updated its Air Quality Guidelines in September 2021, the first major adjustment in 15 years. A much stronger collection of research showed that air pollution causes adverse health consequences at lower concentrations than previously thought and that there is no safe threshold below which exposure is innocuous. [7] New rules cut the yearly PM2.5 limit from 10 micrograms per cubic metre (2005 norm) to five. The WHO estimates that these levels might prevent 80% of PM2.5-related deaths worldwide. [1] Every WHO message emphasizes that the guidelines are not legally obligatory. WHO calls them "an evidence-based instrument for policymakers to drive laws and policies. Individual states decide whether to act, how fast, and how to enforce. [8] Ninety-nine percent of the global population breathes air that exceeds at least one WHO guideline threshold, illustrating the discrepancy between evidence and law.[9] No air quality pact matches the Montreal Protocol, which decreased stratospheric ozone-depleting compounds through legally enforceable phase-out schedules, financial mechanisms, and trade measures. The Montreal Protocol is considered the most successful environmental accord because it coupled scientific urgency with legal responsibility. [10] Lack of a similar device for PM2.5, nitrogen dioxide, ozone, and other pollutants that kill seven million people annually is not a scientific failure. A political and legal issue.

The Paris Agreement: Justice in the Architecture but Not in the Mechanism

The 2015 Paris Agreement, with 196 signatories, is the most ambitious multinational climate governance instrument. The principle of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC) acknowledges that states have contributed differently to the accumulated stock of atmospheric greenhouse gases and must respond in proportion to their capacity. Its preamble explicitly mentions climate justice for the first time in a binding international environmental agreement. [11]

Article 8 of the Agreement emphasises preventing, reducing, and resolving climate-related losses. The Agreement's enforcement architecture falls short of its normative goals. Nationally determined contributions are voluntary because each country chooses its emissions reduction target and there is no penalty for not meeting it. [12] Developed countries frequently missed their $100 billion yearly climate finance target, and climate-vulnerable nations' most urgent need for adaptation funding has been chronically underfunded relative to mitigation finance.

The Human Right to a Clean, Healthy, and Sustainable Environment

UN General Assembly Resolution 76/300 made the right to a clean, healthy, and sustainable environment universal. The 161-state recognition placed environmental protection under international human rights law.Practical implications are contested. Right to polluter pays concept, loss and damage claims, and future generations' rights is emerging jurisprudence, not treaty law. Domestically, environmental rights are more practicable as constitutional rights. Constitutions in Colombia, Brazil, Ecuador, and India impose state environmental responsibilities, according to courts. The Colombian Supreme Court's finding that Amazon deforestation violated present and future generations' constitutional rights pioneered rights-of-nature jurisprudence outside Latin America and into comparative constitutional study.

3. The Polluter Pays Principle: Carbon Pricing, Fossil Fuel Subsidies, and the Justice Deficit

Carbon Pricing Coverage and the Price Gap

Policy tools like carbon pricing are growing. The World Bank tracks 24–28% of worldwide greenhouse gas emissions from 75 carbon pricing mechanisms, including ETSs and carbon levies, up from 7% two decades ago. Sweden's €116 per tonne carbon tax is the highest in the world, while the EU's ETS is $90. Public budgets received $100 billion from global carbon pricing last fiscal year. [14] The policy's insufficiency's price gap must be addressed alongside

these successes. Global carbon prices average $6/ton of CO_2 equivalent. The IMF says the world needs $75 per tonne to be Paris-aligned by 2030. The High-Level Commission on Carbon Prices, led by economists Joseph Stiglitz and Nicholas Stern, suggested $40–$80 per tonne. The policy failure between the average ($6) and the needed range ($40–$80) is significant.

Seven Trillion Dollar Contradiction: State subsidies for fossil fuels demonstrate pollution economic involvement. The IMF estimates that global fossil fuel subsidies, including explicit (retail prices below supply cost) and implicit (prices fail to reflect environmental and health externalities), totalled $7 trillion in a recent reference year, or 7.1% of global GDP. [15] Under global price uncertainty, government energy price assistance generated a $2 trillion increase from projections. This figure is primarily due to the implicit subsidy, which doesn't price carbon, local air pollution, congestion, and accidents. For the 1.5–2°C pathway, hiking fuel prices to economically efficient levels may reduce global fossil fuel CO_2 emissions by 43% below baseline levels by 2030, producing $4.4 trillion in income, or 3.6% of global GDP, according to the IMF. Since 1965, the top 20 fossil fuel companies have emitted 35% of global emissions, but they are not compelled to compensate for climate and public health repercussions.

Carbon pricing and environmental justice: Carbon price threatens justice. When polluters buy credits instead of cutting local emissions, cap-and-trade regimes create a "hot spot" of pollution in low-income and minority regions already under pressure. Some environmental justice specialists prefer facility-level direct emissions standards over cap-and-trade because the trading mechanism allows spatial pollution concentration even when aggregate emissions reduce. Revenue recycling design substantially impacts carbon pricing distribution. Poor towns receive California's cap-and-trade funds. Sweden's revenue-neutral carbon tax scheme partially offsets labor income tax cuts to reduce energy price spikes' regressive effects on low-income households. The IMF notes that with adequate planning, carbon pricing's economic costs can be manageable and in certain countries more than offset by domestic environmental co-benefits like fewer local air pollution deaths, even before the global climate benefit.

4. Environmental Justice at the Domestic Level: Law, Race, and the Geography of Pollution

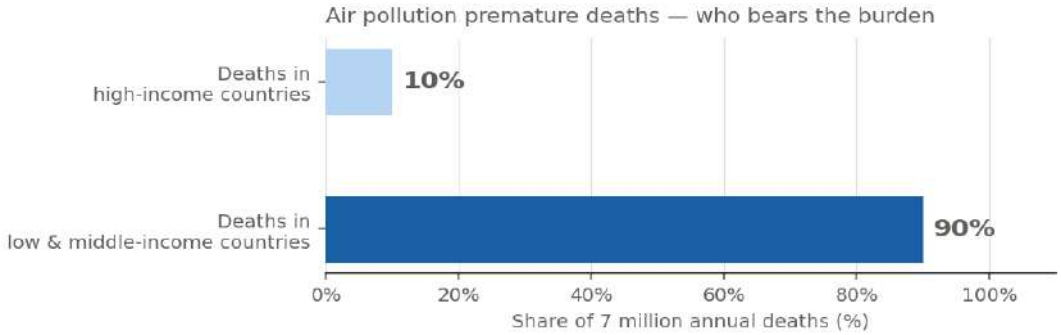
Environmental racism occurs when polluting companies and dangerous infrastructure are concentrated in minority and low-income areas. This trend was caused by historical zoning discrimination, political marginalization, and housing segregation, which lowered land values. A 1983 GAO study indicated that three-quarters of hazardous waste disposal locations in selected south-eastern U.S. states were in Black, Latino, and low-income communities, supporting the claim. Recent research suggests that Black and Latino communities are exposed to more pollution than they consume, while White communities are exposed less. Executive acts, statutes, and constitutions address these disparities. Executive initiatives mandate federal agencies to identify and alleviate unequal environmental impacts, while programs like Justice use spatial burden mapping to target climate and clean energy benefits to disadvantaged regions.

Despite these policies, enforcement is structurally flawed. Federally funded programs cannot discriminate in environmental decision-making under Title VI of the Civil Rights Act. Many environmental discrimination charges go unaddressed for years or decades due to enforcement failure. The Clean Air Act regulates important air contaminants with NAAQS. Their narrow approach is criticized. These criteria analyze pollutants individually rather than the cumulative impact of several environmental risks on vulnerable groups. Thus, areas near highways, industrial sites, and other pollution sources may meet legal limits but incur health consequences. This gap contrasts environmental and regulatory compliance. Global environmental justice approaches vary. The US and South Korea have tackled environmental justice through policy and legislation. Colombia and Brazil protect environmental rights in court. France and Germany incorporate environmental justice into anti-discrimination and

environmental policies without naming it. Chile's recognition of "sacrifice zones," highly polluted areas requiring targeted restoration and community participation, is novel. Regional agreements, such as the Escazú Agreement in Latin America, enhance environmental governance by promoting transparency, public participation, legal remedies, and protection for environmental advocates. Comparative studies reveal how legal and institutional strategies are changing to combat environmental injustice internationally.

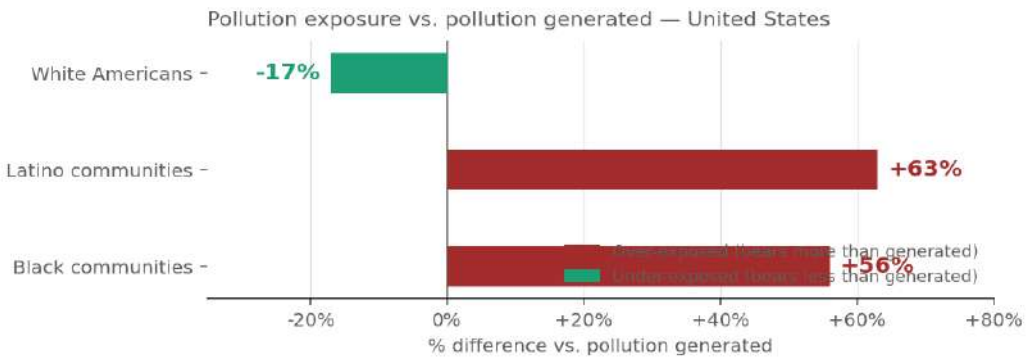
5. Climate Finance, Loss and Damage, and the Justice Imperative

Climate financing affects global economy, law, and morality. Wealthy nations must raise $100 billion annually to help developing nations battle climate change under Article 9 of the Paris Agreement. This goal, first announced in 2009 at Copenhagen, is rarely realized, indicating a large gap between commitments and fulfillment. The pledged adaptation finance is 10–18 times less than developing nations' needs. Inequality hurts vulnerable nations most. Over the past two decades, climate-related disasters, environmental degradation, and slow-onset impacts like sea-level rise and desertification have cost the Vulnerable Group of Twenty (V20), 55 nations with 1.74 billion people and 4% of global emissions, one-fifth of At COP27, the Loss and Damage Fund accepted that some climate impacts cannot be minimized or adapted to and require compensation, advancing climate justice. Major operational issues exist despite this understanding. Poor nations were apprehensive about the World Bank's interim host because they believed its governance structure favored wealthy states. Fund early financial commitments were low, and developed countries aren't required to participate. Aid-seeking nations must wait for long applications without automatic disbursement. To ensure emissions-related costs benefit affected individuals, experts advocate a fossil fuel surtax on major global polluters. With the NCQG on climate financing, Paris Agreement climate justice principles must be implemented. Developing nations and climate justice advocates want $1 trillion annually for mitigation, adaptation, and loss and damage. European Carbon Border Adjustment Mechanism import taxes from low-emission countries are funding options. This tactic has worried poor countries about its economic repercussions and legitimizing unilateral climate-related trade measures. NCQG negotiations will decide global climate expenditure viability and fairness.



Source: WHO Air Quality Guidelines 2021; WHO Global Air Quality Database. 7 million deaths annually; ~90% in low- and middle-income countries.

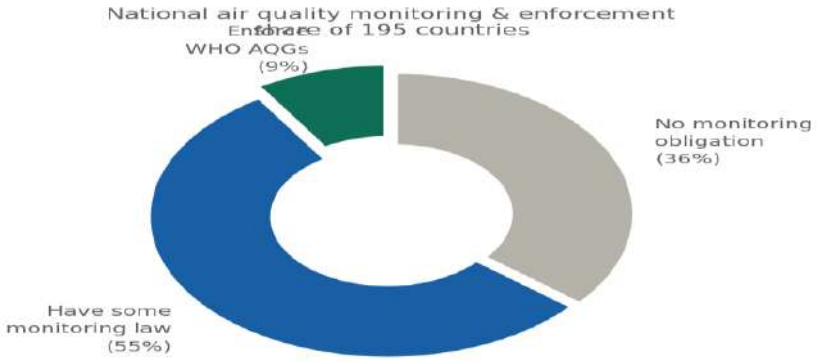
Figure 1: Air Pollution Premature Deaths — Who Bears the Burden



Source: Center for Sustainable Systems, University of Michigan, Environmental Justice

Factsheet. Positive values = community bears more pollution than it generates; negative = bears less.

Figure 2: Pollution Exposure vs. Pollution Generated — United States (% Difference)



Source: WHO Global Air Quality Database; OECD Environmental Justice Report. Only 9% of countries enforce WHO Air Quality Guideline standards in national law.

Figure 3: National Air Quality Monitoring & Enforcement — Share of 195 Countries

6. New approaches: legal climate litigation, constitutional rights, and just transition

Governments and companies can be held liable for climate change and failures to protect vulnerable communities through climate litigation. Urgenda v. Netherlands and Germany's constitutional finding on intergenerational climate rights are among the groundbreaking cases brought in over forty nations. US youth-led lawsuits like Juliana v. US affect legal discussion. The Sabin Center tracks these incidents to support congressional action. While environmental justice groups have sued discriminatory permitting processes and pollutant exposure, their impact has been restricted by Title VI's lack of a private right of action. A "just transition" ensures that the transition away from fossil fuels does not create additional disparities for workers and communities relying on them. It has evolved into formal policy frameworks as the ILO Just Transition Guidelines, EU Just Transition Fund, and US Inflation Reduction Act provisions. Still, disparities remain, especially in benefit equity. Climate policy's underlying disparities include low-income households receiving less clean energy subsidies. Advocates want a place-based, inclusive approach that helps disadvantaged areas economically and socially rather than just financial transfer.

7. A Five-Pillar Reform Agenda

INTEGRATED REFORM ARCHITECTURE: CLEAN AIR & CLIMATE JUSTICE				
▼ Layer 1: International Legal Foundations ▼				
Paris Agreement NDCs · CBDR-RC Loss & Damage	WHO AQGs 2021 (Non-binding) PM2.5 / O_3 / NO_2	Rio Declaration Polluter Pays Precaution · Participation	SDGs 3.9 / 7.1.2 Clean Air & Clean Cooking	UNGA Res. 76/300 Right to Clean Environment
⚠ No binding clean air treaty · WHO AQGs unenforceable · Carbon pricing covers only ~24–28% of global emissions ⚠				
▼ Layer 2: National & Regional Mechanisms ▼				
USA Clean Air Act Justice40 · EJScreen	EU EU ETS · CBAM Social Climate Fund	Carbon Taxes Sweden €116/t avg $6/t (need $75)	Judicial EJ Colombia · Brazil India · Chile	EJ Legislation S. Korea · Maine Maryland
▼ Layer 3: Community & Grassroots Justice ▼				
Defender Protection Aarhus · Escazú	Community Benefit Agreements	EJScreen / CEJST Pollution Mapping	Just Transition Worker Retraining Clean Jobs	Participation Rights Right to Know

▼ Proposed Reform Pillars ▼

I Binding Clean Air Convention	II Universal Carbon Price Floor	III Automatic Climate Finance (Loss & Damage)	IV Statutory EJ Cumulative Impact Review	V Just Transition Fund with Equity Standards

Source: Author's compilation based on WHO AQG 2021, Paris Agreement, OECD EJ Report, US Clean Air Act, Escazú Agreement, EU ETS, and IMF Fossil Fuel Subsidies analysis.

Figure 4: Integrated Reform Architecture — Clean Air & Climate Justice

Pillar I: A Binding Global Clean Air Convention

A binding global clean air convention with legally enforceable standards for PM2.5, NO_2, ozone, SO_2, and carbon monoxide, a phase-down schedule for polluting combustion technologies, financial support for low-income countries, independent monitoring, and implementation would be the most significant reform. A convention would turn the WHO AQGs from expert guidance into international law, with all the compliance-inducing ramifications of treaty ratification.

Pillar II: Universal Carbon Price Floor and Fossil Fuel Subsidy Reform

Some WTO and IMF modelling suggests a universal minimum carbon price of $50 to $75 per tonne, with differentiated rates for low-, middle-, and high-income countries, to align incentives with the Paris Agreement target and generate revenue to fund unmet climate finance commitments. Multiple G20 communiqués have promised to eliminate explicit fossil fuel subsidies, but they have been delayed. It is legal and fiscally possible to reverse the seven trillion dollar subsidy figure, which prioritizes fossil fuel consumption over public health and climate stability.

Pillar III: Adequate and Automatically Triggered Climate Finance

A revenue base, binding contribution mechanism, and pre-agreed triggers for speedy payment in the case of qualifying climatic disasters are needed for the Loss and Damage Fund. A fossil fuel windfall surtax on the world's largest producers, adjusted to annual output volume and enforced domestically as a condition of export market access, might offer a stable, justice-consistent revenue source. The NCQG should have a binding yearly floor of $1 trillion and use EU CBAM earnings for developing-country climate funding to mitigate its trade consequences.

Pillar IV: Statutory Environmental Justice Cumulative Impact Review

The most essential domestic change is the statutory adoption of a cumulative impact requirement in environmental permitting, especially in the US, whose legal choices have worldwide market and normative influence. The Environmental Justice for All Act would amend the Clean Air Act and Clean Water Act to require permit decisions to consider a community's aggregate pollution burden, moving from single-pollutant, single-source assessment to whole-community burden analysis. Justice40 should be enshrined in law to prevent executive order reversal. Refundable, tax-free clean energy tax credits should address the renter-equity divide.

Pillar V: A Just Transition Fund with Binding Community Equity Standards

International climate funding should require clean energy investments to provide local jobs, community benefit agreements for key infrastructure projects, and genuine Indigenous and frontline community participation in transition governance. The Escazú Agreement's concept of legally enforceable participation rights and defender safeguards should be implemented globally, drawing on the Aarhus Convention principles and the UN Special Rapporteur's framework for a clean, healthy, and sustainable environment.

8. Conclusion

The Paris Agreement, UNGA recognition of the right to a healthy environment, proliferation of national environmental justice frameworks, carbon pricing expansion, and Loss and Damage Fund are real achievements in clean air and climate justice law and policy. Each symbolizes hard-won normative development. This research shows that each is insufficient for the scope and urgency of the situation it addresses.

An competent legal system cannot prevent seven million air pollution-related deaths each year, 90% of which occur in countries that emit significantly less per capita. A global fossil fuel subsidy bill of $7 trillion and a Loss and Damage Fund funded at a fraction of assessed needs are not consistent applications of the polluter pays principle. A carbon price of six dollars per tonne against a scientifically calculated need of seventy-five dollars per tonne is not a serious attempt to align economic incentives with Paris Agreement commitments. It's not enough to tweak current systems, as this paper suggests. From voluntary to binding air quality obligations; from subsidised fossil fuel consumption to mandatory internalisation of environmental and health costs; from underfunded pledges to automatic, justice-consistent climate finance; from cumulative burden as an afterthought to cumulative burden as the organising principle of environmental permitting; and from transition as an economic process to transition as a justice project, designed with Efficiency alone cannot support a habitable world. The right to breathe clean air, the right not to pay for others' emissions, and the right to meaningfully participate in environmental decisions are not aspirations, according to environmental justice, which has driven this movement since the 1982 Warren County protests. They're rights. Any serious legal system enforces rights.

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