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Environmental Governance and Administrative Law: Legal Instruments for Climate Change Mitigation

الحوكمة البيئية والقانون الإداري: الأدوات القانونية للتخفيف من آثار تغير المناخ

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Environmental Governance and Administrative Law: Legal Instruments for Climate Change Mitigation

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Abstract:

Climate change is one of the most significant challenges facing the world today, necessitating well-developed and adaptable governance systems. Increased awareness of climate change has led to the evolution of laws, resulting in various national and international legal instruments designed to tackle this issue. However, these instruments are the focus of considerable debate regarding their effectiveness, particularly concerning implementation on a global scale. This paper analyzes how environmental governance and administrative law can aid in combating climate change. It evaluates the effectiveness of various legal instruments, including treaties, regulations, and policies, at both domestic and international levels. The chosen research methodology for this study is qualitative, beginning with a literature analysis and incorporating several detailed case studies. The study examines jurisdictions that effectively enforce climate-related legal instruments and those that face challenges in enforcement and compliance. The findings indicate that legal instruments are crucial in shaping climate change policies; however, insufficient implementation, political resistance, and resource limitations hinder their effectiveness. Additionally, this paper emphasizes the necessity of developing these frameworks in response to the dynamic challenges posed by climate change. In conclusion, the study demonstrates that effective implementation must be bolstered by a robust enforcement framework, improved international cooperation, and a governance structure capable of adapting to the constantly evolving climate landscape rather than concentrating exclusively on creating and developing legal instruments.

Keywords: Climate Change, Environmental Governance, Administrative Law, Legal Instruments, Enforcement.

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الحوكمة البيئية والقانون الإداري:
الأدوات القانونية للتخفيف من آثار تغير المناخ

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ملخص البحث:

يُعد تغير المناخ أحد أهم التحديات التي تواجه العالم اليوم، مما يستلزم أنظمة حوكمة متطورة وقابلة للتكيف. وقد أدى تزايد الوعي بتغير المناخ إلى تطور القوانين، مما أسفر عن ظهور العديد من الأدوات القانونية الوطنية والدولية المصممة لمعالجة هذه القضية. ومع ذلك، تُعدّ هذه الأدوات محور نقاش واسع حول فعاليتها، لا سيما فيما يتعلق بتطبيقها على نطاق عالمي. تحُلل هذه الورقة البحثية كيف يُمكن للحوكمة البيئية والقانون الإداري أن يُساعدا في مكافحة تغير المناخ. وتُقيّم الورقة فعالية مختلف الأدوات القانونية، بما في ذلك المعاهدات واللوائح والسياسات، على المستويين المحلي والدولي. منهجية البحث المُختارة لهذه الدراسة نوعية، تبدأ بتحليل الأدبيات وتُدمج العديد من دراسات الحالة المُفصلة. وتدرس الدراسة الولايات القضائية التي تُطبّق الأدوات القانونية المتعلقة بالمناخ بفعالية، وتلك التي تواجه تحديات في التطبيق والامتثال. تُشير النتائج إلى أن الأدوات القانونية تُعدّ أساسية في صياغة سياسات تغير المناخ؛ إلا أن ضعف التنفيذ، والمقاومة السياسية، ومحدودية الموارد تُعيق فعاليتها. بالإضافة إلى ذلك، تُشدد هذه الورقة البحثية على ضرورة تطوير هذه الأطر استجابةً للتحديات الديناميكية التي يُشكلها تغير المناخ. وفي الختام، أظهرت الدراسة أن التنفيذ الفعال يجب أن يتعزز من خلال إطار إنفاذ قوي، وتعاون دولي محسن، وبنية حوكمة قادرة على التكيف مع المشهد المناخي المتطور باستمرار بدلاً من التركيز حصريًا على إنشاء وتطوير الأدوات القانونية.

الكلمات المفتاحية: تغير المناخ، الحوكمة البيئية، القانون الإداري، الأدوات القانونية، التنفيذ.

1. INTRODUCTION

Environmental governance constitutes a synthetic mechanism that delineates the relationship between humanity and the physical environment. This encompasses the principles, structures, and procedures adhered to in decision-making processes within the environmental governance framework.[2] In contrast to administrative law, this legislation regulates administrative agencies' operations, including enforcing regulations to protect the environment. The challenges presented by greenhouse gas emissions, deforestation, and various other activities necessitate a coordinated international response. As a result, international treaties, alongside national and local regulations and policies, have been instituted to alleviate the impacts of climate change.[3] These instruments delineate the legal prerequisites for emissions control, sustainable practices, and environmental compliance. According to the prevailing research, legal instruments are imperative for climate change policies, as they establish a legal framework to support such initiatives.

Establish legally enforceable obligations, set and define emission levels, and create compliance systems.[4] These instruments confer legal authority to climate objectives and establish specific legal obligations and repercussions regarding climate actions. Furthermore, they facilitate management and collaboration at both national and international levels concerning climate change mitigation efforts. Without such regulations, the implemented measures would likely manifest as disorganized and less effective in achieving the desired outcomes due to the lack of necessary compulsion.[5] Additionally, legal instruments facilitate the acquisition of financing and resources while establishing funds from which nations, especially those with constrained fiscal capacities, can meet their obligations regarding climate initiatives. Ensures that the climate actions undertaken are coordinated and equitable, enabling them to tackle the intricate issue of climate change effectively.[6]

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[2] Saurav Kaushik, "Environmental Law and Sustainability: Legal Approaches to Addressing Climate Change and Protecting Natural Resources," *Indian Journal of Law* 2, no. 2 (2024): 9–13; Xiaoge Dang et al., "Spatial Pattern of Co2 and Ch4 Emission and Its Influencing Factors from River Confluence Areas," *Chemistry and Ecology* 41, no. 4 (2025): 510–27, https://doi.org/10.1080/02757540.2024.2432875.

[3] Mohammad Fazle Rabbi and Sandor Kovacs, "Quantifying Global Warming Potential Variations from Greenhouse Gas Emission Sources in Forest Ecosystems," *Carbon Research* 3, no. 1 (2024): 70; Flavio R Arroyo M and Luis J Miguel, "The Role of Renewable Energies for the Sustainable Energy Governance and Environmental Policies for the Mitigation of Climate Change in Ecuador," *Energies* 13, no. 15 (2020): 3883.

[4] Arroyo M and Miguel, "The Role of Renewable Energies for the Sustainable Energy Governance and Environmental Policies for the Mitigation of Climate Change in Ecuador"; Lavanya Rajamani et al., "National 'Fair Share' in Reducing Greenhouse Gas Emissions Within the Principled Framework of International Environmental Law," *Climate Policy* 21, no. 8 (2021): 983–1004.

[5] Dang et al., "Spatial Pattern of Co2 and Ch4 Emission and Its Influencing Factors from River Confluence Areas"; Alixandra Underwood et al., "Interstate Air Pollution Governance in the United States: Exploring Clean Air Act Section 126," *Environmental Management*, 2024, 1–13; Rajamani et al., "National 'Fair Share' in Reducing Greenhouse Gas Emissions Within the Principled Framework of International Environmental Law."

[6] Arroyo M and Miguel, "The Role of Renewable Energies for the Sustainable Energy Governance and Environmental Policies for the Mitigation of Climate Change in Ecuador"; Stefan Partelow et al., "Environmental Governance Theories: A Review and Application to Coastal Systems," *Ecology & Society* 25, no. 4 (2020): 1–21, https://doi.org/10.5751/ES-12067-250419.

To effectively address climate change, it is imperative to confront the challenges associated with reducing greenhouse gas emissions. Accordingly, this study seeks to evaluate the degree to which various legal instruments utilized in environmental policies at national and international levels can be regarded as adequate.[7] This assessment necessitates carefully examining the implementation of these laws and regulations concerning the challenges of climate change and their consequent effects on reducing greenhouse gas emissions.[8] The study aims to identify the obstacles hindering the adoption and application of these legal frameworks' instruments. Based on the analysis above, the paper will offer recommendations for enhancing and strengthening existing laws to mitigate climate change effectively.[9]

1.1 Research Scope and Significance

This study is conducted within clearly delineated parameters to ensure a focused and methodologically rigorous inquiry:

1. **Temporal Scope:** The study examines legal instruments from 1992—the year of the United Nations Framework Convention on Climate Change—to 2025, encompassing major milestones such as the Kyoto Protocol, the Paris Agreement, and the European Green Deal. This period reflects a significant evolution in climate law and environmental governance mechanisms.[10]
2. **Spatial Scope:** A comparative methodology has been employed, concentrating on international legal instruments and their implementation within diverse jurisdictions, including the European Union, the United States, Saudi Arabia, and additional nations, to exemplify the differences in capacity, compliance, and legal innovation.
3. **Thematic Scope:** The present research concentrates on the intersection of environmental governance and administrative law, particularly emphasizing implementing and enforcing climate-related legal instruments.

This study investigates how regulatory mechanisms, institutional capacity, and procedural fairness influence climate policy outcomes. This multidimensional scope facilitates a comprehensive analysis of the interactions between legal design and real-world enforcement

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[7] Rajamani et al., "National 'Fair Share' in Reducing Greenhouse Gas Emissions Within the Principled Framework of International Environmental Law"; Turkan Gulce Budak, "Existing Landscape of International Climate Law," in *Beyond Treaties: Rethinking Legal Mechanisms for International Climate Governance*, ed. Turkan Gulce Budak (Cham: Springer Nature Switzerland, 2025), 43–77, https://doi.org/10.1007/978-3-031-86022-5_2.

[8] "The Saudi Board of Grievances, Royal Decree No. M/78" (2007); "The Saudi Civil Transactions Law, Royal Decree No. M/191" (2023).

[9] Agne Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets," *Office of the European Union, Luxembourg*, 2024, https://doi.org/10.2760/7205477; Edwin Woerdman and Josephine Van Zeben, "European Union Emissions Trading System (EU ETS)," in *Oxford Encylopedia of EU Law* (Oxford University Press, 2023).

[10] "The Kenya Climate Change Act, No. 11 of 2016" (2016); D.S. Cohan and M.E. Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future* (Yale University Press, 2022), https://books.google.com.sa/books?id=-dRdEAAAQBAJ; Paul Smoke and Mitchell Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action* (World Bank, 2022).

and governance, evaluating how such dynamics may either promote or hinder progress in climate change mitigation.

1.2 Research Problem and Questions

Notwithstanding the extensive adoption of international treaties, national policies, and sector-specific regulations designed to combat climate change, a persistent and well-documented implementation gap remains between the legal commitments undertaken and the tangible results achieved. This gap is not merely technical or financial but fundamentally institutional and legal. Most notably, the role of administrative law in the enforcement, monitoring, and adaptation of climate obligations has not been sufficiently theorized or utilized. Contemporary scholarship emphasizes normative principles such as equity, sustainability, common but differentiated responsibilities, and ambitious policy frameworks like the European Green Deal. However, there is a significant deficiency in systematic analyses regarding how administrative mechanisms—specifically regulatory rulemaking, enforcement discretion, judicial review of administrative inaction, and procedural safeguards—function as the institutional foundation for effective climate action governance.[11] In various jurisdictions, climate laws often exist solely as theoretical constructs; however, the absence of robust administrative enforcement leads to fragmented implementation, legal ambiguity, and reduced accountability.[12] This disconnection is particularly pronounced as limitations in institutional capacity exacerbate deficiencies in enforcement. Consequently, the principal concerns this study addresses is the inadequate integration between environmental governance objectives and the administrative legal frameworks established to achieve them.[13]

1.2.1 The Primary Research Question

1. How can administrative law enhance the enforceability, accountability, and adaptability of legal instruments governing climate change at the national and international levels?

1.2.2 The Sub-Questions

1. How are international climate obligations translated into enforceable regulations at the national level across various jurisdictions?
2. What barriers impede the implementation of climate-related legislation?
3. Which jurisdictions have incorporated administrative law into climate governance, and what insights may we derive?

1.3 Research Objectives

To address the problem and questions outlined above, this study pursues the following objectives:

1. To evaluate the effectiveness of existing international and national legal instruments—treaties, laws, and administrative policies—in facilitating climate change mitigation.

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[11] Rabbi and Kovacs, "Quantifying Global Warming Potential Variations from Greenhouse Gas Emission Sources in Forest Ecosystems"; Dang et al., "Spatial Pattern of Co2 and Ch4 Emission and Its Influencing Factors from River Confluence Areas."

[12] The Saudi Board of Grievances, Royal Decree No. M/78.

[13] Patrick Bayer and Michael Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices," *Proceedings of the National Academy of Sciences* 117, no. 16 (2020): 8804–12.

2. To examine the role of administrative law mechanisms (rulemaking, enforcement, judicial review, transparency obligations) in ensuring compliance with climate obligations.
3. To identify the institutional, legal, and political challenges that impede the enforcement of environmental legal instruments. Furthermore, to examine case studies from jurisdictions that have successfully implemented administrative and legal frameworks for climate governance.
4. Finally, it is suggested that reforms in legal and institutional frameworks be implemented to enhance the adaptability, legitimacy, and enforceability of climate-related legislation through the incorporation of principles of administrative law.

1.4 Research Methodology

This study on climate change mitigation uses an integrated legal approach, combining doctrinal research, comparative legal analysis, and case-based investigation. This tripartite strategy captures the normative structure, institutional implementation, and jurisprudential evolution of climate-related legal frameworks. It rigorously examines primary and secondary legal sources, including international treaties, national climate laws, regulatory ordinances, administrative decisions, and judicial rulings in various jurisdictions. In reviewing these sources, the study pays particular attention to how legal systems operationalize the principles of equity and the precautionary principle. The principle of equity is central to climate law, especially under the doctrine of Common.[14] Still, Differentiated Responsibilities and Respective Capabilities are reflected in how obligations and burdens are distributed across states, regions, and social groups.[15] This research thus interrogates how laws integrate distributive justice within mitigation strategies, ensuring that both intra-generational and inter-generational equity are preserved.

Furthermore, the precautionary principle, which necessitates legal and policy action despite scientific uncertainty, is subjected to a critical analysis of its legal framework and implications for administrative decision-making. This principle is especially relevant in climate governance, where risks are often systemic, cumulative, and temporally extended. Importantly, the methodology also interrogates whether existing legal frameworks are equipped to address the complexities of establishing causation, attributing liability, and assessing harm in climate-related litigation.[16] For instance, Saudi Arabia, particularly in the Al-Jouf region, exhibits significant agricultural potential, bolstered by a climate that notably contributes to agricultural productivity. Furthermore, this region is distinguished by a remarkably picturesque landscape, accentuated by the presence of olive trees in conjunction

[14] Danielle Celermajer et al., *Institutionalising Multispecies Justice*, Elements in Earth System Governance (Cambridge: Cambridge University Press, 2025), https://doi.org/10.1017/9781009506243.
[15] Alina Averchenkova, Sam Fankhauser, and Jared Finnegan, "The Impact of Strategic Climate Legislation: Evidence from Expert Interviews on the UK Climate Change Act," *Climate Policy* 21, no. 2 (February 7, 2021): 251–63, https://doi.org/10.1080/14693062.2020.1819190.
[16] Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets"; Woerdman and Van Zeben, "European Union Emissions Trading System (EU ETS)."

with various other natural features. [17] The study acknowledges that the adverse effects of climate change often manifest over extended periods, encompassing widely dispersed and cross-border sources and introducing new complexities regarding evidential requirements. Consequently, this research evaluates legal innovations—including presumptions of harm, models of shared responsibility, and advancements in climate attribution science—as viable solutions for addressing the evidentiary challenges that have traditionally impeded accountability in environmental torts and regulatory enforcement. This methodological approach facilitates a multi-layered analysis that delineates legal norms, contrasts jurisdictional applications, and interrogates doctrinal adequacy in addressing the protracted and uncertain nature of climate harm. This research aspires not only to outline existing legal frameworks but also to critique and refine them in light of the evolving demands of climate justice.[18]

1.5 Overview of Literature and Identification of Research Gaps

The scholarly landscape on climate governance is marked by a growing recognition of the law's role in shaping sustainable transitions. However, while there is a robust literature on legal norms, policy frameworks, and equity in international climate law, there remains a critical deficit in the operational analysis of administrative enforcement mechanisms, particularly how administrative law either facilitates or hinders compliance. This study situates itself within and beyond this existing body of knowledge, engaging with the following foundational works.[19]

Lavanya Rajamani et al. (2021) have significantly advanced the legal discourse by articulating a normative framework for assessing national "fair shares" in climate mitigation efforts. Their work is grounded in international legal principles such as Common But Differentiated Responsibilities and distributive equity. It is posited that legal obligations under instruments must account for differentiated capabilities and historical emissions, thus ensuring legitimacy and equity. Nevertheless, their analysis predominantly centers on conceptualizing and rationalizing climate targets rather than the institutional or administrative mechanisms by which such targets are executed, verified, or enforced.

[17] Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*; Rafael Martins Costa Moreira and Gabriel Wedy, "Administrative Tools for Environmental Regulation," in *Brazilian Environmental and Climate Change Law*, ed. Rafael Martins Costa Moreira and Gabriel Wedy (Cham: Springer Nature Switzerland, 2025), 75–112, https://doi.org/10.1007/978-3-031-87998-2_8.

[18] Underwood et al., "Interstate Air Pollution Governance in the United States: Exploring Clean Air Act Section 126"; Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices"; Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets"; Woerdman and Van Zeben, "European Union Emissions Trading System (EU ETS)."

[19] "The Paris Agreement | UNFCCC," accessed December 23, 2024, https://unfccc.int/process-and-meetings/the-paris-agreement; Alexandra Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation," *Environmental Politics* 30, no. 5 (2021): 753–90.

Consequently, while they elucidate the "what" of climate law (equitable targets), they neglect to address the "how" of compliance — an omission that this study seeks to address through administrative and legal analysis.[20]

Alicja Sikora (2021) examines the European Green Deal and the legal-financial architecture necessary to realize its ambitious carbon neutrality goals. Her work highlights the incoherence across legal instruments, the fragmentation of competencies among European Union institutions, and the difficulty in translating overarching environmental objectives into binding national measures. Importantly, Sikora reveals the disconnect between European Union-level law-making and national-level implementation, underscoring how regulatory ambition often outpaces enforceability. However, her study stops short of examining administrative law tools—such as compliance assessments by national authorities, judicial review of administrative inaction, or environmental liability regimes—that could bridge this implementation gap. The research directly engages with these neglected tools.[21]

Partelow et al. (2020) present a thorough theoretical review of environmental governance, emphasizing the significance of participation and adaptive capacity as essential characteristics of effective systems. They introduce a conceptual model highlighting the importance of horizontal and vertical coordination among various actors and institutions.[22] The framework is grounded in governance theory rather than positive law or enforcement mechanisms. Their abstraction omits an analysis of how legal authority is exercised through administrative decisions and how the rule of law operates in practice to compel compliance and remedy violations. Therefore, while their work is essential in theorizing climate governance, it lacks institutional accountability structures, which are fundamental to administrative law analysis.[23]

Kaushik (2024) and Arroyo & Miguel (2020) examine the legal foundations of renewable energy transitions in India and Ecuador. Their research illustrates how legal policies can promote green investments and delineate national energy pathways. Nonetheless, their emphasis is limited to sector-specific legal framework development. It lacks cross-cutting insights into how these sectoral policies are enforced administratively, monitored for compliance, or challenged in courts or tribunals. In other words, while they provide policy depth, they do not engage with procedural enforcement, such as licensing, penalties, or the role of administrative courts in correcting regulatory failures.[24]

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[20] Underwood et al., "Interstate Air Pollution Governance in the United States: Exploring Clean Air Act Section 126."

[21] Alicja Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change," vol. 21, Issue: 4 (Era Forum, Springer, 2021), 681–97, https://doi.org/10.1007/s12027-020-00637-3.

[22] Partelow et al., "Environmental Governance Theories: A Review and Application to Coastal Systems."

[23] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices"; Partelow et al., "Environmental Governance Theories: A Review and Application to Coastal Systems."

[24] "The Paris Agreement | UNFCCC"; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation."

These foundational works illuminate various facets of climate governance—normative equity, legal architecture, theoretical governance, and renewable energy policy—yet converge on a standard limitation: the insufficient examination of administrative enforcement mechanisms as pivotal components in the effectiveness of climate law. This study addresses this gap by reconceptualizing administrative law not as an ancillary governance layer but as a primary vehicle for realizing climate obligations. It examines the functioning of administrative institutions, such as environmental ministries, regulatory agencies, ombudspersons, and administrative courts, as the legal infrastructure through which international and national climate norms are transformed into enforceable measures of action.[25] Using comparative case studies and legal doctrinal analysis, this research elevates enforcement, rulemaking, adjudication, procedural rights, and institutional capacity to the forefront of the climate governance discourse. The objective is to develop further a more cohesive theory of climate law, wherein a resilient and accountable administrative framework legally and procedurally safeguards substantive environmental objectives.[26]

1.6 Research Structure

The research is divided into:

1. Introduction.
2. Legal Foundations And Strategic Instruments In Global Climate Governance.
3. Administrative Law and The Rise Of Climate Governance.
4. Environmental Principles and Governance: Structural Gaps, Enforcement Challenges, and The Role of Environmental Impact Assessment.
5. Legal Pathways To Enforcing Climate Agreements.
6. Conclusion — Administrative Law As A Driving Force For Climate Governance.

[25] Nazih K Shammas, Lawrence K Wang, and Mu-Hao Sung Wang, "Sources, Chemistry and Control of Acid Rain in the Environment," in *Handbook of Environment and Waste Management: Acid Rain and Greenhouse Gas Pollution Control* (World Scientific, 2020), 1–26.

[26] Roberta Regazzoni, "Mediation in Environmental Disputes," in *Interdisciplinary Approaches to Climate Change for Sustainable Growth*, ed. Sara Valaguzza and Mark Alan Hughes (Cham: Springer International Publishing, 2022), 365–73, https://doi.org/10.1007/978-3-030-87564-0_20.

2. LEGAL FOUNDATIONS AND STRATEGIC INSTRUMENTS IN GLOBAL CLIMATE GOVERNANCE

2.1 Foundational Agreements: The United Nations Framework Convention on Climate Change, Kyoto Protocol, and Paris Agreement

The international legal response to climate change is built on three key agreements: the United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement. The United Nations Framework Convention on Climate Change, adopted in 1992 and entered into force in 1994, is the legal backbone of international climate governance.[27] It is a framework treaty that sets general goals and principles for action without specifying exact targets or penalties. Its primary objective is stabilizing greenhouse gas concentrations in the atmosphere to prevent dangerous human interference with the climate system.[28]

The Kyoto Protocol, which was adopted in 1997 and entered into force in 2005, established a more structured and enforceable framework. It represents the first international treaty to impose legally binding emission reduction obligations and targets.[29] The legal framework was established based on the principle of Common but Differentiated Responsibilities and Respective Capabilities, recognizing that developed nations bear a more significant historical responsibility for climate change.[30] The Kyoto Protocol introduced innovative economic instruments, including:

- The Clean Development Mechanism allows countries to earn credits by financing emission reduction projects.[31]
- Joint Implementation facilitated cooperative efforts to achieve their emission reduction targets.[32]

Although groundbreaking, the Kyoto Protocol had limitations. Reduction targets did not bind major emitters like China and India, and the United States never ratified it.[33] Its enforcement mechanisms were weak, and its influence diminished after the first

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[27] "Kyoto Protocol to the United Nations Framework Convention on Climate Change,2303 U.N.T.S. 162" (1997); Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation"; Rajamani et al., "National 'Fair Share' in Reducing Greenhouse Gas Emissions Within the Principled Framework of International Environmental Law"; "The Paris Agreement | UNFCCC"; Partelow et al., "Environmental Governance Theories: A Review and Application to Coastal Systems"; Thomas Hickmann et al., "The United Nations Framework Convention on Climate Change Secretariat as an Orchestrator in Global Climate Policymaking," *International Review of Administrative Sciences* 87, no. 1 (2021): 21–38.

[28] Dang et al., "Spatial Pattern of Co2 and Ch4 Emission and Its Influencing Factors from River Confluence Areas"; Rajamani et al., "National 'Fair Share' in Reducing Greenhouse Gas Emissions Within the Principled Framework of International Environmental Law."

[29] Budak, "Existing Landscape of International Climate Law."

[30] Budak; "Treaty on the Functioning of the European Union, 2016 O.J.C 202/32" (2016); Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change."

[31] Underwood et al., "Interstate Air Pollution Governance in the United States: Exploring Clean Air Act Section 126."

[32] "The Paris Agreement | UNFCCC"; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation."

[33] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

commitment period. In 2015, the Paris Agreement supplanted the Kyoto Protocol as the focal point of global climate action. In contrast to its predecessor, the Paris Agreement introduces the concept of Nationally Determined Contributions. Each nation establishes its emission reduction objectives within this framework and submits progress reports every five years. Although this approach fosters inclusivity and flexibility, it lacks legal enforcement, underscoring the necessity of political will for nations' success.[34]

2.2 Sector-Specific International Instruments and Institutional Bodies

Beyond broad framework treaties, several specialized international organizations and sectoral agreements play vital roles in global emissions regulation.[35] An important example is the Montreal Protocol on Substances that Deplete the Ozone Layer, which was enacted in 1987. While its primary objective was to phase out substances that deplete the ozone layer, it has inadvertently aided in mitigating climate change by restricting hydrofluorocarbons, potent greenhouse gases.[36] The Kigali Amendment, enacted in 2016, formally included hydrofluorocarbons in the list of substances to be phased out, thereby enhancing the efficacy of the Montreal Protocol in addressing climate change.[37]

Two major sectoral regulators have developed legally binding emissions rules:

- The International Maritime Organization regulates emissions from global shipping.
- The International Civil Aviation Organization governs carbon emissions from international flights through mechanisms like the Carbon Offsetting and Reduction Scheme for International Aviation.[38]

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[34] Feyisayo Ajayi, Adejumo Azeez Adewale, and Osho Moses Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health," *Security Challenges* 1, no. 10 (2024): 2; Akbar Yuda Pratama et al., "China's Policy Developments in The Implementation of The Paris Agreement: Strategies and Challenges in Addressing The 2020-2024 Carbon Emission Problem," *Proirofonic* 1, no. 1 (2025): 197–205.

[35] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices."

[36] Shiming Yang, "Growing Apart: China and India at the Kigali Amendment to the Montreal Protocol," *Global Environmental Politics* 23, no. 2 (May 1, 2023): 74–101, https://doi.org/10.1162/glep_a_00698.

[37] Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment"; H. Mahfoodh et al., "Reflections on the Kigali Amendment Implementation in the GCC," in *2021 Third International Sustainability and Resilience Conference: Climate Change*, 2021, 48–52, https://doi.org/10.1109/IEEECONF53624.2021.9668082.

[38] Abdulaziz Alharbi and Mohamed Ghonimy, "Environmental Benefits of Olive By-Products in Energy, Soil, and Sustainable Management," *Sustainability* 17, no. 10 (2025), https://doi.org/10.3390/su17104722; "Saudi 'Green Financing Framework' (National Debt Management Center/Ministry of Finance)," 2024, https://www.pif.gov.sa/en/investors/green-finance-framework/; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart," The Global Economy, 2023, https://www.theglobaleconomy.com/Saudi-Arabia/Carbon_dioxide_emissions_per_capita/; Jonathan Pinckney, Charles Butcher, and Jessica Maves Braithwaite, "Organizations, Resistance, and Democracy: How Civil Society Organizations Impact Democratization," *International Studies Quarterly* 66, no. 1 (March 2022): sqab 094 (1-14), https://doi.org/10.1093/isq/sqab094; David Tier, "American Civil-Military Relations and the Political Economy of National Security" (2021), https://hdl.handle.net/10161/24358; "Council of the European Union (2011) High-Level SSA Civil-Military Use Requirements. European External Action Service, Brussels," n.d.; "Civil

These institutions ensure that international transportation, one of the hardest sectors to regulate at the national level, is subject to global emissions control. Their actions demonstrate how climate governance has moved beyond traditional treaty-making to include highly technical, sector-specific institutions capable of enforcing compliance through industry rules and standards.[39]

2.3 National Climate Law Approaches: Comparative Perspectives

Countries vary widely in how they implement their climate commitments. This section explores several prominent national legal frameworks that have shaped the global response to climate change.

2.3.1 European Union: The Emissions Trading System

Established in 2005, the European Union Emissions Trading System is the world's largest and most developed carbon market.[40] It operates on a cap-and-trade principle:

- The European Union establishes a comprehensive limit on the Greenhouse Gas emissions permitted from power plants, factories, and other relevant sources, including airlines.[41]
- Companies are issued emissions allowances, which they can trade among themselves.
- The cap is reduced over time to lower total emissions.[42]

Initially, the system encountered challenges such as the overallocation of permits and inadequate carbon prices.[43] Nevertheless, implementing the Market Stability Reserve and more stringent emissions caps has enhanced its efficiency. By 2020, emissions in the sectors encompassed by the European Union Emissions Trading System had decreased by approximately 35% compared to 2005.[44]

Aviation Law (Royal Decree No. M/44 of 12/10/1426H)" (n.d.), https://www.gaca.gov.sa/-/media/Files/PDF/LawsAndRegulation/Civil-Aviation-Law/Law-of-Civil-Aviation-Tariff-EN.pdf?as=0&hash=E5FE6FD53B5A41DA66CFBCC950921BD8.

[39] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[40] "Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 Amending Directive 2003/87/EC as Regards the EU ETS and Decision (EU) 2015/1814 Concerning the Market Stability Reserve [2023] OJ L130/134" (2023).

[41] Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets"; Woerdman and Van Zeben, "European Union Emissions Trading System (EU ETS)."

[42] Woerdman and Van Zeben, "European Union Emissions Trading System (EU ETS)."

[43] "The Paris Agreement | UNFCCC"; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation"; Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices"; Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets"; Woerdman and Van Zeben, "European Union Emissions Trading System (EU ETS)."

[44] Samuel Asumadu Sarkodie, Samuel Adams, and Thomas Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?," *Journal of Cleaner Production* 263 (2020): 121262; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Rajamani et al., "National 'Fair Share' in Reducing Greenhouse Gas Emissions Within the Principled Framework of International Environmental Law"; Rajamani et al.; Rabbi and Kovacs, "Quantifying Global Warming Potential Variations from Greenhouse Gas Emission Sources in Forest

2.3.2 Germany: Renewable Energy Sources Act

Germany's Renewable Energy Sources Act, first enacted in 2000, created a legal obligation for utilities to purchase renewable energy at guaranteed prices. This law has dramatically increased solar and wind energy use and made Germany a global leader in clean energy technology.[45]

2.3.3 United Kingdom: Climate Change Act

The United Kingdom Climate Change Act was the first legislation in the world to make long-term climate targets legally binding. It requires the government to:

- Set five-year carbon budgets.[46]
- Reduce emissions to net zero by 2050.[47]
- Report annually to Parliament on progress.

This legal framework established accountability and serves as a model for similar laws in other countries.

2.3.4 United States: Clean Air Act and the Inflation Reduction Act

The Clean Air Act, administered by the Environmental Protection Agency, serves as the legal foundation for regulating Greenhouse Gas emissions within the United States.[48] This regulation is implemented explicitly through vehicle emissions standards and power plant regulations. Furthermore, the Inflation Reduction Act of 2022 has recently been recognized as the most significant climate legislation in the United States. It encompasses:

- Tax credits for clean energy development.[49]
- Incentives for electric vehicles.

Ecosystems"; Hewu Kuang, Zeeshan Akmal, and Feifei Li, "Measuring the Effects of Green Technology Innovations and Renewable Energy Investment for Reducing Carbon Emissions in China," *Renewable Energy* 197 (2022): 1–10; "Saudi 'Green Financing Framework' (National Debt Management Center/Ministry of Finance)"; Ling Zhu and Xinwei Li, "Identifying Key Polluters: The Feasibility of Applying the Polluter Pays Principle to Marine Greenhouse Gas Emissions," *Transnational Environmental Law*, 2025, 1–27, https://doi.org/10.1017/S2047102524000372.

[45] Underwood et al., "Interstate Air Pollution Governance in the United States: Exploring Clean Air Act Section 126"; Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets."

[46] Kuang, Akmal, and Li, "Measuring the Effects of Green Technology Innovations and Renewable Energy Investment for Reducing Carbon Emissions in China"; Pratama et al., "China's Policy Developments in The Implementation of The Paris Agreement: Strategies and Challenges in Addressing The 2020-2024 Carbon Emission Problem"; Rabbi and Kovacs, "Quantifying Global Warming Potential Variations from Greenhouse Gas Emission Sources in Forest Ecosystems"; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart."

[47] Averchenkova, Fankhauser, and Finnegan, "The Impact of Strategic Climate Legislation: Evidence from Expert Interviews on the UK Climate Change Act."

[48] Underwood et al., "Interstate Air Pollution Governance in the United States: Exploring Clean Air Act Section 126."

[49] Kuang, Akmal, and Li, "Measuring the Effects of Green Technology Innovations and Renewable Energy Investment for Reducing Carbon Emissions in China"; Pratama et al., "China's Policy Developments in The Implementation of The Paris Agreement: Strategies and Challenges in Addressing The 2020-2024 Carbon Emission Problem"; Rabbi and Kovacs, "Quantifying Global Warming Potential Variations from Greenhouse Gas Emission Sources in Forest Ecosystems"; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart."

- Funding for carbon capture and low-emission manufacturing.[50]

Despite being subjected to a budget process (reconciliation), its legal ramifications are significant. It encompasses billions in clean energy investments and aspires to diminish the United States' Greenhouse Gas Emissions by 50–52% by 2030 compared to previous levels in 2005.[51]

2.3.5 Saudi Arabia: National Environmental Law and Vision 2030

The Environmental Law of Saudi Arabia constitutes a notable achievement in the Kingdom's transition towards sustainable development.[52] This legislation was enacted as a crucial component of Vision 2030, which aims to promote the expansion of green spaces within the environment through its provisions:

- Regulates air, water, and land pollution.
- Establishes strict licensing systems for industrial emissions.
- Provides penalties for environmental violations.[53]

The law supports a national commitment to achieve net-zero emissions by 2060 in conjunction with the Saudi Green Initiative.[54] It highlights a growing legal recognition of environmental risks and aligns with global governance standards.[55]

2.4 Implementation Hurdles: Adherence, Technology, and Political Commitment Weaknesses of the Paris Agreement

Despite the growth in legal instruments and national climate laws, implementation remains a global challenge.[56] Several obstacles persist:

- **Voluntary Commitments:** Most international climate agreements, including the Paris Agreement, rely on countries' self-defined targets and lack enforcement mechanisms.
- Technology and Capacity Gaps: the lack of technical capacity or infrastructure to implement sophisticated emissions tracking, clean energy systems, or sustainable land use practices.[57]

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[50] Underwood et al., "Interstate Air Pollution Governance in the United States: Exploring Clean Air Act Section 126"; Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*; Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets."

[51] "Us Sets Target to Reduce Emissions by 50-52% Below 2005 Levels in 2030," *SDG Knowledge Hub* (blog), https://sdg.iisd.org/news/us-sets-target-to-reduce-emissions-by-50-52-below-2005-levels-in-2030/.

[52] Kaushik, "Environmental Law and Sustainability: Legal Approaches to Addressing Climate Change and Protecting Natural Resources"; The Saudi Civil Transactions Law, Royal Decree No. M/191; "The Saudi Environmental Law, Royal Decree No. M/165" (2020).

[53] The Saudi Environmental Law, Royal Decree No. M/165; The Saudi Civil Transactions Law, Royal Decree No. M/191.

[54] H. Mahfoodh et al., "Reflections on the Kigali Amendment Implementation in the GCC."

[55] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[56] Pratama et al., "China's Policy Developments in The Implementation of The Paris Agreement: Strategies and Challenges in Addressing The 2020-2024 Carbon Emission Problem"; Rainer Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies," in *Reducing the Effects of Climate Change Using Building-Integrated and Building-Applied Photovoltaics in the Power Supply*, ed. Ali Sayigh (Cham: Springer Nature Switzerland, 2024), 149–61, https://doi.org/10.1007/978-3-031-42584-4_7.

[57] "The Paris Agreement | UNFCCC"; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

- **Finance and Delay:** Instruments such as the Green Climate Fund have been established to assist countries in their adaptation and mitigation efforts; however, the financial commitments from nations have been sluggish and inconsistent. This undermines trust and delays project execution.[58]
- **Domestic Barriers:** Even within advanced economies, climate legislation may encounter political resistance, regulatory fragmentation, or legal challenges within the judiciary[59] Although legal frameworks are indispensable, they must be bolstered by stable institutions, adequate funding, and a long-term political vision.

Despite the extensive commendation the Paris Agreement has received for its comprehensive scope and political momentum, it encounters several significant weaknesses that constrain its efficacy as a legal instrument:

- **Non-Binding Nature:** The Agreement stipulates that countries are to submit and periodically update their climate plans, known as Nationally Determined Contributions; however, it does not require them to fulfill those objectives. Furthermore, no legal penalties are associated with failing to meet these goals due to underperformance.[60]
- **Lack of Enforcement:** Unlike the Kyoto Protocol, which included some compliance mechanisms for developed countries, the Paris Agreement relies entirely on transparency and peer pressure, not legal enforcement.[61]
- **Uneven Commitment:** Some countries have taken bold action, while others continue to increase emissions. There is no legal tool to compel consistency across nations.
- **Insufficient Support:** Financial commitments under the Green Climate Fund have failed to meet expectations, presenting challenges in accessing funds or technology transfers and a disparity between legal expectations and actual capabilities.[62]
- **Data Reliability and Transparency Issues:** The Agreement encompasses a reporting system, making it challenging to evaluate genuine progress.[63]

In 2023, the global average of CO_2 emissions per capita was approximately 4.76 metric tons; however, this average obscures significant disparities among nations: the United States

[58] W. P Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?," *Climate Policy* 22, no. 9–10 (November 26, 2022): 1241–51, https://doi.org/10.1080/14693062.2022.2114985.
[59] Kuang, Akmal, and Li, "Measuring the Effects of Green Technology Innovations and Renewable Energy Investment for Reducing Carbon Emissions in China"; Raul Pacheco-Vega, "Environmental Regulation, Governance, and Policy Instruments, 20 Years After the Stick, Carrot, and Sermon Typology," *Journal of Environmental Policy & Planning* 22, no. 5 (2020): 620–35.
[60] Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."
[61] Pratama et al., "China's Policy Developments in The Implementation of The Paris Agreement: Strategies and Challenges in Addressing The 2020-2024 Carbon Emission Problem."
[62] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.
[63] Kyoto Protocol to the United Nations Framework Convention on Climate Change,2303 U.N.T.S. 162.

reported an average of 14.21 metric tons, the European Union approximately 5.63 metric tons, and Saudi Arabia exhibited a notably higher figure of about 18.73 metric tons per individual.[64] These statistics transcend environmental data and serve as legal indicators highlighting the pressing necessity for enforceable, institutionally grounded climate governance.[65] In this framework, administrative law signifies the most strategically crucial and operationally effective legal structure, far exceeding civil or criminal law concerning scope and application.[66] While civil liability may provide retrospective compensation and criminal law can impose sanctions for egregious misconduct, neither offers the preventive, adaptive, and procedural infrastructure for steering climate-related decisions across varying scales.[67] Administrative law, by contrast, equips governments with tools to act before harm occurs, incorporating scientific evidence, setting regulatory limits, and enforcing compliance through licenses, inspections, and administrative remedies. In the European Union, directives such as the Industrial Emissions Directive and the Governance Regulation require member states to integrate climate obligations directly into their administrative planning and permitting structures.[68]

For example, since 2014, China's overseas energy investment strategy has evolved to reflect a deeper alignment with global environmental standards and legal norms, particularly in clean energy financing. This strategic transition—marked by the cessation of fossil fuel investments in 2017—represents more than a shift in energy priorities; it reflects China's attempt to position itself as a legally compliant actor within a global framework shaped by the Paris Agreement and international environmental law.[69] A central example is Nigeria's $5.8 billion Mambila Hydropower Project, awarded to Chinese state-owned enterprises following high-level diplomatic engagement. While the project aligns with principles of sustainable development and equitable use under customary international water law, it also underscores the urgent need for strong, active administrative law systems in host countries.[70]

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[64] Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets"; Woerdman and Van Zeben, "European Union Emissions Trading System (EU ETS)"; Dang et al., "Spatial Pattern of Co2 and Ch4 Emission and Its Influencing Factors from River Confluence Areas"; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; The Saudi Environmental Law, Royal Decree No. M/165; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"

[65] Pacheco-Vega, "Environmental Regulation, Governance, and Policy Instruments, 20 Years After the Stick, Carrot, and Sermon Typology."

[66] The Saudi Board of Grievances, Royal Decree No. M/78.

[67] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[68] Di Wang, Lijing Chen, and Liang Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives," *Journal of Cleaner Production* 467 (August 15, 2024): 142972, https://doi.org/10.1016/j.jclepro.2024.142972; Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets."

[69] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives."

[70] Wang, Chen, and Dong; Pratama et al., "China's Policy Developments in The Implementation of The Paris Agreement: Strategies and Challenges in Addressing The 2020-2024 Carbon Emission

Nigeria's Environmental Impact Assessment Act provides a legal basis for project scrutiny. Still, the effectiveness of such laws depends on their enforceability through administrative procedures—licensing, monitoring, public consultation, and independent review.[71]

In this context, administrative law should not function passively or merely as a procedural mechanism; instead, it must serve as a robust regulatory force that ensures transparency, accountability, and adherence to legal standards throughout the investment lifecycle. This necessitates the requirement for timely environmental assessments, the imposition of penalties for non-compliance, and the establishment of accessible avenues for grievance redress and judicial review.[72]

Ineffective administrative enforcement in numerous African nations restricts the management of intricate energy projects with international partners, particularly in renewable sectors such as solar and wind, where grid integration and environmental risks necessitate flexible regulatory oversight.[73] Additionally, China's shift from sovereign lending to Foreign Direct Investment—partially attributed to more stringent regulations imposed by the China Banking and Insurance Regulatory Commission—amplifies the responsibility of host countries to create comprehensive administrative frameworks. These frameworks should encompass enforceable legal standards for investor conduct, binding mechanisms for public involvement, and penalties for administrative impropriety or environmental violations.[74] Projects will likely encounter legal uncertainty, environmental degradation, and public opposition without proactive administrative law as a foundation for energy governance. Therefore, effective climate-aligned investment requires financial capital and administrative regimes that are legally empowered, transparent, and accountable at every implementation stage.[75]

Problem"; Yang, "Growing Apart: China and India at the Kigali Amendment to the Montreal Protocol."

[71] Taitiya Kenneth Yuguda et al., "Hydropower Development, Policy and Partnership in the 21st Century: A China-Nigeria Outlook," *Energy & Environment* 34, no. 4 (June 1, 2023): 1170–1204, https://doi.org/10.1177/0958305X221079423.

[72] Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*; Martins Costa Moreira and Wedy, "Administrative Tools for Environmental Regulation."

[73] Martins Costa Moreira and Wedy, "Administrative Tools for Environmental Regulation"; Yuguda et al., "Hydropower Development, Policy and Partnership in the 21st Century: A China-Nigeria Outlook"; Pacheco-Vega, "Environmental Regulation, Governance, and Policy Instruments, 20 Years After the Stick, Carrot, and Sermon Typology."

[74] Yuguda et al., "Hydropower Development, Policy and Partnership in the 21st Century: A China-Nigeria Outlook"; Martins Costa Moreira and Wedy, "Administrative Tools for Environmental Regulation."

[75] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Yuguda et al., "Hydropower Development, Policy and Partnership in the 21st Century: A China-Nigeria Outlook"; Pratama et al., "China's Policy Developments in The Implementation of The Paris Agreement: Strategies and Challenges in Addressing The 2020-2024 Carbon Emission Problem"; Yang, "Growing Apart: China and India at the Kigali Amendment to the Montreal Protocol"; Johanna Coenen et al., "Environmental Governance of China's Belt and Road Initiative," *Environmental Policy and Governance* 31, no. 1 (2021): 3–17.

The United States follows a similar model through the Clean Air Act, which empowers the Environmental Protection Agency to issue emissions standards, conduct rulemaking, and adapt regulations as scientific understanding evolves. Saudi Arabia—guided by its Vision 2030 and the Environmental Law (2020)—has positioned administrative law at the heart of its environmental strategy by empowering the National Center for Environmental Compliance to issue permits, inspect activities, and digitize ecological enforcement.[76] However, this model is not confined to the national level; it is being regionalized and localized, particularly in environmentally sensitive areas such as Al-Jouf, a region in northern Saudi Arabia.[77] In this setting, administrative law becomes the mechanism by which national climate goals are translated into real, local action: requiring climate impact assessments for new agricultural expansion, ensuring sustainable groundwater use, and adapting licensing standards to ecological limits.[78] These localized administrative practices are not symbolic—they are the legal instruments that protect ecosystems and communities at the front lines of climate stress.

Nevertheless, the strength of administrative law lies not only in its enforcement mechanisms but in its ability to embed equity into procedure. Public participation, access to environmental data, and transparent decision-making are core principles of administrative law that enable affected populations to shape regulatory outcomes. This is critical as climate harm is unequally distributed across countries, sectors, and generations. Administrative law is the only framework operationalizing climate equity while maintaining legal accountability and policy flexibility.[79]

As climate risks worsen, the global legal system quietly evolves—not towards increased litigation or enforcement, but towards a form of regulatory governance grounded in administrative frameworks.[80] The future focuses not on broadening criminal laws or compensatory torts but on establishing strong, transparent, independent administrative bodies capable of managing complexity, responding to scientific insights, and taking timely action.[81]

Saudi Arabia serves as an excellent example of progress under Vision 2030. The global trend is shifting towards performance-based regulation, intergenerational environmental planning, and adaptive governance models—each achievable only through administrative

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[76] H. Mahfoodh et al., "Reflections on the Kigali Amendment Implementation in the GCC."

[77] "The Paris Agreement | UNFCCC"; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation."

[78] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[79] Celermajer et al., *Institutionalising Multispecies Justice*.

[80] Dang et al., "Spatial Pattern of Co2 and Ch4 Emission and Its Influencing Factors from River Confluence Areas."

[81] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*. Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets"; Woerdman and Van Zeben, "European Union Emissions Trading System (EU ETS)."

law's comprehensive scope and adaptability.[82] In places like Washington Riyadh, and regions like Al-Jouf, administrative law is not just one legal tool among many; it is the cornerstone for legitimate climate action and provides a fair framework for equitable outcomes.[83] A significant challenge within international environmental law is managing common interest issues such as climate change, biodiversity loss, and ocean acidification—a reality that nations cannot address independently.[84] These challenges have notably reshaped the fundamental principles of international law. The system is gradually transitioning from an adversarial dispute resolution model to cooperative, non-punitive compliance mechanisms. Such initiatives aim to re-engage states within the established legal framework without assigning blame. This indicates a conceptual focus on accountability.[85]

Global environmental law now functions more like an administrative regime than a traditional treaty-based system. Decision-making is procedural, iterative, and embedded in scientific, technical, and socio-economic assessments. Institutions operate through monitoring, reporting, review, and adaptive planning mechanisms mirroring domestic administrative agencies.[86] However, unlike domestic systems, there is a structural imbalance: global institutions are rarely subject to enforceable checks and balances, and their decisions often reflect geopolitical hierarchies.

The pressing demand for a robust global system highlights considerable gaps in capability and accountability in climate management. Consequently, international environmental law operates as a legal mechanism addressing global environmental challenges.[87] Administrative law should play a primary role in climate matters.

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[82] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"; Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*; Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change"; Pinckney, Butcher, and Braithwaite, "Organizations, Resistance, and Democracy"; The Saudi Civil Transactions Law, Royal Decree No. M/191; Civil Aviation Law (Royal Decree No. M/44 of 12/10/1426H).

[83] The Saudi Environmental Law, Royal Decree No. M/165; Budak, "Existing Landscape of International Climate Law."

[84] "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; Pacheco-Vega, "Environmental Regulation, Governance, and Policy Instruments, 20 Years After the Stick, Carrot, and Sermon Typology"; The Saudi Environmental Law, Royal Decree No. M/165.

[85] Raid Alrowais et al., "Groundwater Quality Assessment for Drinking and Irrigation Purposes at Al-Jouf Area in KSA Using Artificial Neural Network, GIS, and Multivariate Statistical Techniques," *Water* 15, no. 16 (2023), https://doi.org/10.3390/w15162982; Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*; Martins Costa Moreira and Wedy, "Administrative Tools for Environmental Regulation."

[86] H. Mahfoodh et al., "Reflections on the Kigali Amendment Implementation in the GCC"; Pratama et al., "China's Policy Developments in The Implementation of The Paris Agreement: Strategies and Challenges in Addressing The 2020-2024 Carbon Emission Problem"; Alrowais et al., "Groundwater Quality Assessment for Drinking and Irrigation Purposes at Al-Jouf Area in KSA Using Artificial Neural Network, GIS, and Multivariate Statistical Techniques."

[87] Martins Costa Moreira and Wedy, "Administrative Tools for Environmental Regulation."

3. ADMINISTRATIVE LAW AND THE RISE OF CLIMATE GOVERNANCE

Government climate pertains to how a state organizes its legal, institutional, and policy frameworks to manage, mitigate, and adapt to climate change. It encompasses the political will, regulatory architecture, institutional accountability, and public administrative culture associated with environmental governance. Administrative law is increasingly acknowledged as a pivotal legal mechanism in the global response to climate change.[88] Its role extends beyond traditional public management, encompassing environmental obligations' design, implementation, and enforcement.[89] As climate challenges evolve in complexity and urgency, administrative law provides a structured yet flexible framework for operationalizing scientific imperatives, ensuring regulatory compliance, and embedding climate accountability within public institutions. Administrative law translates high-level climate commitments into enforceable state duties through specialized agencies, delegated regulatory powers, and binding procedural mechanisms.[90] Its institutional versatility has enabled rapid adaptation across legal systems, from civil law jurisdictions to hybrid and standard law models, making it an indispensable component of contemporary environmental governance.[91]

3.1 Institutional Capacity and Cross-Sectoral Coordination

A key strength of administrative law lies in its ability to coordinate complex policy objectives across multiple sectors and levels of government. In the European Union, climate action is implemented through interlinked administrative institutions guided by binding regulations and directives. National regulatory agencies must align transport, agriculture, and energy planning with Union-wide decarbonization goals, with compliance monitored through legally structured reporting mechanisms.[92] In China, the administration allowed the central environmental authority to oversee air, water, and land regulations under a cohesive framework, enhancing inter-agency coherence and expediting enforcement capabilities.[93] Likewise, in Saudi Arabia, institutional national frameworks have improved regulatory clarity and empowered centralized authorities to monitor environmental compliance, permitting, and enforcement.[94] These models illustrate how administrative law enables legal

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[88] Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*; Smoke and Cook; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies."

[89] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives."

[90] Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[91] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[92] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

[93] Coenen et al., "Environmental Governance of China's Belt and Road Initiative"; Yuguda et al., "Hydropower Development, Policy and Partnership in the 21st Century: A China-Nigeria Outlook."

[94] Martins Costa Moreira and Wedy, "Administrative Tools for Environmental Regulation"; Coenen et al., "Environmental Governance of China's Belt and Road Initiative"; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart."

systems to move beyond siloed policy development toward integrated, cross-sectoral governance architectures capable of sustaining long-term climate objectives.[95]

3.2 Digital Transformation and Legal Innovation

The digitization of administrative procedures has fundamentally improved climate governance's efficiency, transparency, and enforceability. Across various jurisdictions, administrative authorities are employing real-time monitoring technologies, geospatial data systems, and algorithmic enforcement tools to oversee environmental compliance.[96] In the United States, agencies utilize open-access databases, digital emissions inventories, and automated permitting systems to enhance responsiveness and regulatory effectiveness. In the European Union, digital tools are embedded within compliance monitoring and climate planning cycles, enabling dynamic adjustment of national targets based on performance data.[97] China's administrative regulators employ predictive analytics and remote sensing to detect violations and impose immediate penalties, reducing enforcement lags.[98] Saudi Arabia's environmental agencies are advancing digital licensing, inspections, and reporting platforms, aligning administrative processes with the broader goals of innovative governance and sustainable development.[99] These technological innovations reinforce legal principles such as transparency, due process, and accountability while expanding the institutional reach of administrative law in managing complex ecological systems.[100]

3.3 Participatory Governance and Public Legitimacy

Participation in climate governance is one of the most legally structured and practically impactful expressions in the Environmental Impact Assessment process. As a procedural mechanism embedded within administrative law, Environmental Impact Assessment requires public authorities to assess proposed activities' potential environmental consequences before approval. Crucially, this process is not merely technocratic; it is deeply participatory.[101] In modern regulatory systems, Environmental Impact Assessment procedures include public notification, comment periods, access to draft documents, stakeholder hearings, and the obligation to revise plans in response to public concerns in

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[95] Averchenkova, Fankhauser, and Finnegan, "The Impact of Strategic Climate Legislation: Evidence from Expert Interviews on the UK Climate Change Act."

[96] The Saudi Environmental Law, Royal Decree No. M/165; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives."

[97] Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets."

[98] Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*.

[99] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[100] Kuang, Akmal, and Li, "Measuring the Effects of Green Technology Innovations and Renewable Energy Investment for Reducing Carbon Emissions in China"; Pacheco-Vega, "Environmental Regulation, Governance, and Policy Instruments, 20 Years After the Stick, Carrot, and Sermon Typology."

[101] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

some jurisdictions.[102] This procedural transparency facilitates the involvement of affected communities, civil society organizations, indigenous groups, and technical experts in articulating concerns, proposing alternatives, and influencing project design to align with ecological and social priorities. Within the European Union, the Environmental Impact Assessment is regulated by Directive 2011/92/EU, as amended by Directive 2014/52/EU, which stipulates public participation as an essential element of the environmental assessment process.[103] Member States must ensure that the public is informed early in the procedure, that they are granted adequate time to study and respond to project proposals, and that their contributions are considered before making any final decision.[104] This institutionalizes public influence as a legal right rather than a discretionary administrative practice. The Environmental Impact Assessment framework has empowered communities to contest high-risk infrastructure projects, reshape land use plans, and ensure that environmental concerns are integrated into administrative approvals at every level of governance.[105]

In the United States, the National Environmental Policy Act requires federal agencies to prepare Environmental Assessments or more detailed Environmental Impact Statements before undertaking actions that may significantly affect the environment. These documents must be made publicly available, and public input must be solicited through comment periods and public hearings. Courts have consistently emphasized that meaningful participation is not a formalistic checkbox but an essential element of informed and democratic decision-making. Through this process, administrative law becomes a vehicle for legal compliance, civic empowerment, and environmental justice.[106]

The institutionalization of Environmental Impact Assessment as a participatory instrument is experiencing significant growth. In South Africa, the National Environmental Management Act mandates the involvement of the public in the Environmental Impact Assessment process, requiring stakeholders' consultation from the scoping phase to the final decision-making stage.[107] This framework has enabled communities residing in resource-rich yet ecologically sensitive areas to engage actively in administrative processes that might

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[102] Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*; Budak, "Existing Landscape of International Climate Law."

[103] "The European Union's Environmental Impact Assessment (EIA) Is Governed by Directive 2011/92/EU, Which Has Been Amended by Directive 2014/52/EU." (2011).

[104] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives."

[105] "The Paris Agreement | UNFCCC"; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation."

[106] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; The European Union's Environmental Impact Assessment (EIA) is governed by Directive 2011/92/EU, which has been amended by Directive 2014/52/EU.; Pacheco-Vega, "Environmental Regulation, Governance, and Policy Instruments, 20 Years After the Stick, Carrot, and Sermon Typology."

[107] The European Union's Environmental Impact Assessment (EIA) is governed by Directive 2011/92/EU, which has been amended by Directive 2014/52/EU.; Coenen et al., "Environmental Governance of China's Belt and Road Initiative."

otherwise favor extractive or industrial interests.[108] In India, the Environmental Impact Assessment Notification framework enables public hearings for large-scale industrial projects, allowing affected populations to articulate objections and advocate for modifications. Despite existing challenges—particularly related to access, literacy, and enforcement—the participatory role of Environmental Impact Assessment is increasingly regarded as essential to rights-based and inclusive environmental governance.[109]

In Saudi Arabia, environmental assessment plays a key role in decision-making. Under the Law of the Environment, regulatory authorities can now require environmental evaluations for major project permits. The General Authority for Meteorology and Environmental Protection and the National Center for Environmental Compliance have initiated protocols that promote early public communication, dissemination of reports, and engagement in project planning.[110] These developments mark a significant shift toward embedding the Environmental Impact Assessment as a participatory and preventive tool, aligning environmental policy with sustainability, transparency, and strategic public involvement.[111] Through Environmental Impact Assessments and Strategic Environmental Assessments, administrative law establishes a structured and legally enforceable mechanism to ensure the protection of environmental governance concerning emissions protection.[112]

3.3.1 Regulatory Insight and the Proactive Role of Administrative Climate Legislation

Climate change governance increasingly demands remedial legal tools and anticipatory regulatory frameworks to prevent foreseeable harm before it materializes.[113] Administrative law, by design, is uniquely equipped to serve this preventive function through its procedural flexibility, delegated enforcement authority, and forward-looking policy mechanisms.[114] In contrast to reactive legal regimes, where litigation typically follows environmental harm, administrative systems can intervene ex-ante through licensing, planning, monitoring, and regulation.[115]

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[108] Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*.

[109] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Yang, "Growing Apart: China and India at the Kigali Amendment to the Montreal Protocol."

[110] "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[111] Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets"; Woerdman and Van Zeben, "European Union Emissions Trading System (EU ETS)."

[112] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[113] Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*. Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets"; Woerdman and Van Zeben, "European Union Emissions Trading System (EU ETS)."

[114] Partelow et al., "Environmental Governance Theories: A Review and Application to Coastal Systems."

[115] Kuang, Akmal, and Li, "Measuring the Effects of Green Technology Innovations and Renewable Energy Investment for Reducing Carbon Emissions in China"; Pacheco-Vega,

The legal foundation for administrative prevention rests on a set of well-established principles. Chief among these is the precautionary principle, which authorizes administrative bodies to act in the face of scientific uncertainty where the stakes involve irreversible or severe environmental harm. This principle is enshrined in numerous international legal instruments, such as Article 191(2) of the Treaty on the Functioning of the European Union. It is reflected in national environmental laws from Germany to South Africa. Under this standard, administrative agencies must not wait for conclusive proof of harm before regulating; instead, they must preempt risk based on the best available evidence. [116]

Furthermore, Article 191(2) of the Treaty on the Functioning of the European Union establishes fundamental principles for European Union environmental policy, encompassing the precautionary principle, preventive action, rectification of ecological damage at the source, and the polluter pays principle. These principles necessitate that environmental governance be proactive rather than reactive, enabling public authorities to act before the conclusive demonstration of environmental harm.[117] The article stipulates that the level of ecological protection throughout the Union must be upheld at a high standard while acknowledging regional diversity. These principles are binding legal standards that steer regulatory agencies' decision-making processes within administrative law.[118] For example, the precautionary principle mandates that administrative bodies—such as environmental ministries, licensing authorities, and planning commissions—incorporate scientific uncertainty into their approval and oversight functions. This frequently culminates in more stringent permitting procedures, obligatory Environmental Impact Assessments, and a legal foundation for withdrawing or denying authorizations should serious harm be implicated.[119] Consequently, Article 191(2) profoundly transforms environmental protection from a policy preference into an enforceable administrative obligation, influencing the operational dynamics of environmental governance across European Union institutions and member states, including Germany, and impacting global administrative models, such as those in South Africa.[120]

The shift from damage control to risk anticipation represents a paradigmatic evolution in administrative environmental law.[121] In practice, preventive administrative law is operationalized through procedural tools. Strategic Environmental Assessment is among the

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"Environmental Regulation, Governance, and Policy Instruments, 20 Years After the Stick, Carrot, and Sermon Typology."

[116] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[117] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[118] Budak, "Existing Landscape of International Climate Law."

[119] Partelow et al., "Environmental Governance Theories: A Review and Application to Coastal Systems."

[120] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32; Kaushik, "Environmental Law and Sustainability: Legal Approaches to Addressing Climate Change and Protecting Natural Resources."

[121] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

most potent.[122] Unlike project-level Environmental Impact Assessments, which allow administrative authorities to incorporate climate and ecological considerations into broader policy, plan, and program development, often before specific projects are even proposed. In jurisdictions like the European Union, New Zealand, and Norway, Strategic Environmental Assessment has been used to evaluate national energy strategies, land-use planning schemes, and coastal zone management in light of future climate projections. This upstream legal integration ensures that administrative decisions are not siloed or reactive but structured around long-term environmental sustainability.[123]

The preventive function is also incorporated within permitting and licensing frameworks, which empower regulators to impose conditional approvals on activities characterized by high emissions or significant land use. Under the Clean Air Act, administrative authorities in the United States enforce forward-looking emission limits, adaptive management clauses, and continuous monitoring requirements as integral components of regulatory permits.[124] In China, the framework for environmental permitting requires mandatory climate risk assessments for infrastructure projects in areas vulnerable to drought, rising sea levels, or biodiversity loss. These mechanisms create a legal structure that ensures regulatory decisions follow existing standards and remains resilient to future challenges and conditions.[125]

Climate adaptation planning further strengthens the preventive mandate of administrative law. States increasingly legislate obligations for subnational governments and regulatory agencies to draft and regularly update climate resilience strategies. In France, the Energy and Climate Law (2019) mandates regional climate risk assessments as part of administrative development approvals.[126] The Climate Change Act (2016) requires national and county governments to mainstream adaptation measures into all administrative planning instruments in Kenya.[127] Such legal mandates extend administrative duties beyond sector-specific

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[122] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[123] Partelow et al., "Environmental Governance Theories: A Review and Application to Coastal Systems."

[124] "The Clean Air Act, 42 U.S.C. § 7401 et Seq" (1970).

[125] Kuang, Akmal, and Li, "Measuring the Effects of Green Technology Innovations and Renewable Energy Investment for Reducing Carbon Emissions in China"; Pacheco-Vega, "Environmental Regulation, Governance, and Policy Instruments, 20 Years After the Stick, Carrot, and Sermon Typology."

[126] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices"; Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets"; A Melet et al., "Sea Level Rise in Europe: Observations and Projections," ed. Bart van den Hurk Nadia Pinardi, Thorsten Kiefer, Kate Larkin, Petra Manderscheid and Kristin Richter, *Sea Level Rise in Europe: 1st Assessment Report of the Knowledge Hub on Sea Level Rise (SLRE1)* 3-slre1 (2024): 4, https://doi.org/10.5194/sp-3-slre1-4-2024; Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change."

[127] The Kenya Climate Change Act, No. 11 of 2016; Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*; Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*.

regulation to encompass cross-sectoral systemic risk management, making climate foresight a binding public function.[128]

As delineated by the Law of the Environment, the Saudi legal framework empowers the National Center for Environmental Compliance to require ex-ante environmental assessments and impose mitigation plans before initiating projects.[129] Administrative instruments, encompassing ecological zoning, digital early warning systems, and adaptive regulatory licensing, are increasingly being adopted to ensure that infrastructure, industrial growth, and urban development align with climate resilience objectives.[130] Moreover, incorporating climate risk into strategic national planning, as part of Vision 2030, establishes the normative and operational foundation essential for a forward-thinking administrative governance model. [131]

However, despite these positive developments, institutionalizing regulatory foresight faces structural challenges. Administrative cycles can exhibit variance in risk modeling capabilities among various agencies, particularly within the global context of the South.[132] Legal uncertainty surrounding long-term environmental projections, such as sea level rise over 50-year periods, creates ambiguity in how administrative decisions should be structured today.[133] To address this issue, certain jurisdictions have commenced the process of codifying requirements for the integration of climate science, imposing a mandate on agencies to utilize authoritative scenarios from the Intergovernmental Panel on Climate Change or National Climate Centers when devising regulations.[134] The normative strength of preventive administrative law lies in its ability to shift the burden of justification. When applied rigorously, the precautionary principle and foresight-based mandates require developers, extractive industries, and public authorities to demonstrate the safety and sustainability of their actions, not the other way around.[135] This reverses the traditional presumption in administrative review, embedding a presumption of ecological caution within the law. It protects ecosystems, communities, and the legal system itself, insulating it

[128] Averchenkova, Fankhauser, and Finnegan, "The Impact of Strategic Climate Legislation: Evidence from Expert Interviews on the UK Climate Change Act."
[129] The Saudi Environmental Law, Royal Decree No. M/165; The Clean Air Act, 42 U.S.C. § 7401 et seq.
[130] Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*; Martins Costa Moreira and Wedy, "Administrative Tools for Environmental Regulation."
[131] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.
[132] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."
[133] Melet et al., "Sea Level Rise in Europe: Observations and Projections."
[134] Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets"; Woerdman and Van Zeben, "European Union Emissions Trading System (EU ETS)."
[135] Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change"; The Kenya Climate Change Act, No. 11 of 2016; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies."

against claims of regulatory negligence, institutional blindness, or failure to act in the face of scientifically foreseeable threats.[136]

3.4 Mediation and Arbitration in Environmental Governance: The Role of Administrative Law in Strengthening Environmental Impact Assessment Procedures

Environmental conflicts today are increasingly complex, involving diverse stakeholders, cross-border ecological impacts, and highly technical disputes.[137] Traditional litigation often proves inadequate in such contexts due to its high cost and protracted timelines. Therefore, there is growing recognition of the potential for mediation and arbitration to play a transformative role in environmental governance, particularly within the framework of Environmental Impact Assessment procedures.[138] This section analyzes the ways in which administrative law can integrate and govern mediation and arbitration within the framework of environmental regulatory processes. Furthermore, it investigates how these mechanisms contribute to the realization of fundamental environmental principles, including participation, precaution, proportionality, and intergenerational equity, while simultaneously enhancing the legitimacy and effectiveness of Environmental Impact Assessments.[139]

3.4.1 Administrative Law and Alternative Dispute Resolution: Conceptual Foundations

Administrative law is traditionally concerned with ensuring that public authorities act within the limits of legality, fairness, and transparency. However, as environmental governance evolves, administrative systems must also embrace alternative forms of dispute resolution, namely:

- Mediation facilitates structured dialogue and consensus-building among affected stakeholders (e.g., developers, regulators, civil society, and impacted communities).
- Arbitration allows for expert-based, binding adjudication of specific legal or technical disputes, such as those involving compliance with environmental permits or environmental damage compensation.[140]

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[136] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health." Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets"; Woerdman and Van Zeben, "European Union Emissions Trading System (EU ETS)."

[137] Regazzoni, "Mediation in Environmental Disputes"; Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*; Martins Costa Moreira and Wedy, "Administrative Tools for Environmental Regulation"; "The REACH Regulation (EC) No 1907/2006, Initially Adopted on December 18, 2006, Has Undergone Several Amendments and Consolidations. A Consolidated Version, Incorporating Various Amendments, Was Published on March 1, 2022. The Regulation Is Administered by the European Chemicals Agency (ECHA)." (2022).

[138] Regazzoni, "Mediation in Environmental Disputes."

[139] Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*; Martins Costa Moreira and Wedy, "Administrative Tools for Environmental Regulation."

[140] Regazzoni, "Mediation in Environmental Disputes"; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public

Unlike civil or commercial law, administrative law imposes public interest obligations, requiring any alternative dispute resolution to be legally accountable, inclusive, and compatible with environmental standards.[141] Yet, mediation and arbitration are increasingly considered valuable tools for resolving regulatory and impact-related disputes, especially in projects requiring Environmental Impact Assessment.

3.4.2 Entry Points for Mediation and Arbitration in the Environmental Impact Assessment Process

Environmental Impact Assessment procedures typically involve multiple phases—from project screening and scoping to final approval and post-implementation monitoring. Potential conflicts may arise between developers, regulators, and the public at each stage.[142] The following table illustrates where mediation and arbitration can be constructively employed:

Environmental Impact Assessment Phase	**Applicable Dispute Resolution Mechanism**
Scoping	Mediation to clarify stakeholder concerns and define environmental scope
Public Consultation	Mediated dialogue to address objections or reconcile conflicting interests
Impact Evaluation	Arbitration between experts on technical or scientific uncertainties[143]
Mitigation Conditions	Negotiated settlements on compensatory measures or environmental offsets
Monitoring and Enforcement	Arbitration in cases of non-compliance with permit conditions[144]

Health"; Alharbi and Ghonimy, "Environmental Benefits of Olive By-Products in Energy, Soil, and Sustainable Management."

[141] Regazzoni, "Mediation in Environmental Disputes"; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; "Saudi 'Green Financing Framework' (National Debt Management Center/Ministry of Finance)"; The Saudi Civil Transactions Law, Royal Decree No. M/191; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; The Saudi Environmental Law, Royal Decree No. M/165; "The Saudi Arabian Government Tenders and Procurement Law, Royal Decree No. (M/128" (2019).

[142] Regazzoni, "Mediation in Environmental Disputes"; Alharbi and Ghonimy, "Environmental Benefits of Olive By-Products in Energy, Soil, and Sustainable Management"; Coenen et al., "Environmental Governance of China's Belt and Road Initiative"; Pacheco-Vega, "Environmental Regulation, Governance, and Policy Instruments, 20 Years After the Stick, Carrot, and Sermon Typology"; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[143] The Kenya Climate Change Act, No. 11 of 2016; Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*; Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*.

By integrating these mechanisms within Environmental Impact Assessment procedures, administrative agencies can preempt legal disputes, enhance procedural justice, and increase public confidence in environmental decisions.[145]

3.4.3 Do Environmental Principles Support the Use of Mediation and Arbitration?

Indeed. Numerous fundamental environmental principles are in close alignment with the implementation of structured dispute resolution mechanisms within administrative contexts:

Principle	Role of Mediation and Arbitration
Public Participation	Mediation encourages active and inclusive engagement in environmental decisions
Precautionary Principle	Dispute resolution helps identify and mitigate uncertain environmental risks early
Proportionality	Mediation enables flexible, balanced solutions that avoid disproportionate outcomes
Intergenerational Equity	Agreements can include long-term sustainability safeguards to protect future interests

Administrative law can thus serve as a legal vehicle to institutionalize these principles through practical and participatory mechanisms.

3.4.4 Legal and Procedural Challenges

Despite its potential, the use of mediation and arbitration in environmental governance raises important legal and procedural concerns:

- **Public Interest Protection:** Any resolution must be consistent with environmental legislation and the broader public interest.
- **Transparency and Accountability:** Agreements resulting from dispute resolution should be publicly accessible and subject to review.[146]

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[144] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[145] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health." Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets"; Woerdman and Van Zeben, "European Union Emissions Trading System (EU ETS)."

[146] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

- Legal Certainty: Outcomes of mediation or arbitration must not bypass formal environmental requirements or statutory mandates.[147]
- **Expertise and Legitimacy:** The parties facilitating or arbitrating disputes must possess environmental, legal, and administrative expertise.

Therefore, administrative legal frameworks must establish clear rules governing when, how, and under what conditions mediation or arbitration may occur within Environmental Impact Assessment or broader environmental decision-making processes. [148]

3.4.5 Comparative Practices and Global Developments

Several legal systems are beginning to adopt structured mechanisms for mediation and arbitration within environmental governance:

- In New Zealand, environmental mediation is widely used in land-use planning and indigenous consultations under the Resource Management Act.[149]
- Canada employs facilitated negotiation during environmental reviews, especially when indigenous rights and ecological protection are at stake.
- The European Union, through the Aarhus Convention, encourages the use of non-judicial mechanisms to resolve environmental disputes.[150]
- In Saudi Arabia, environmental law allows for administrative dispute resolution by integrating mediation or arbitration within Environmental Impact Assessment procedures.
- Although litigation remains dominant in the United States, the National Environmental Policy Act includes provisions for early conflict resolution during environmental assessments.[151]

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[147] The REACH Regulation (EC) No 1907/2006, initially adopted on December 18, 2006, has undergone several amendments and consolidations. A consolidated version, incorporating various amendments, was published on March 1, 2022. The regulation is administered by the European Chemicals Agency (ECHA).; "Climate and Resilience Law No. 2021-1104 of August 22,2021 on Combating Climate Change and Increasing Resilience. Official Journal of the French Republic, August 24, 2021." (2021), https://www.legifrance.gouv.fr.; The Kenya Climate Change Act, No. 11 of 2016; Kuang, Akmal, and Li, "Measuring the Effects of Green Technology Innovations and Renewable Energy Investment for Reducing Carbon Emissions in China"; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation."

[148] Romain Weikmans, Harro van Asselt, and J Timmons Roberts, "Transparency Requirements Under the Paris Agreement and Their (UN) Likely Impact on Strengthening the Ambition of Nationally Determined Contributions (NDCS)," in *Making Climate Action More Effective* (Routledge, 2021), 107–22; "Saudi 'Green Financing Framework' (National Debt Management Center/Ministry of Finance)."

[149] Weikmans, van Asselt, and Roberts, "Transparency Requirements Under the Paris Agreement and Their (UN) Likely Impact on Strengthening the Ambition of Nationally Determined Contributions (NDCS)"; Regazzoni, "Mediation in Environmental Disputes"; Rachel Hale et al., "Environmental Implications of Future Offshore Renewable Energy Development in Aotearoa New Zealand," *Journal of the Royal Society of New Zealand* 55, no. 4 (2024): 912–45, https://doi.org/10.1080/03036758.2024.2406829.

[150] Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*; Martins Costa Moreira and Wedy, "Administrative Tools for Environmental Regulation."

[151] "Saudi 'Green Financing Framework' (National Debt Management Center/Ministry of Finance)"; Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC as regards the EU ETS and Decision (EU) 2015/1814 concerning the Market Stability Reserve [2023] OJ L130/134; Climate and Resilience Law No.

These examples illustrate growing recognition that mediation and arbitration can serve as constructive complements to formal administrative review, enhancing the responsiveness and adaptability of environmental governance systems.

3.4.6 Establishing a Hybrid Administrative Framework for Environmental Dispute Resolution

As environmental disputes become more multifaceted and urgent, administrative law must evolve to offer procedural fairness and flexibility.[152] Mediation and arbitration—when properly integrated into the Environmental Impact Assessment process—can:

- Reduce conflict and court congestion.
- Foster inclusive stakeholder dialogue.[153]
- Help resolve scientific and technical disputes quickly.
- Ensure faster, fairer, and more adaptable environmental decisions.[154]

To make this vision a reality, governments should codify clear rules for using mediation and arbitration in environmental procedures. These rules should be grounded in administrative law and ensure alignment with environmental principles, transparency, and public accountability.[155] A hybrid administrative model that integrates legally mandated procedures with structured dispute resolution presents an opportunity for improved effectiveness and equity. The principles of climate should significantly influence enforcement, as administrative law holds paramount importance.

2021-1104 of August 22,2021 on Combating Climate Change and Increasing Resilience. Official Journal of the French Republic, August 24, 2021.; The Kenya Climate Change Act, No. 11 of 2016; The European Union's Environmental Impact Assessment (EIA) is governed by Directive 2011/92/EU, which has been amended by Directive 2014/52/EU.

[152] The Kenya Climate Change Act, No. 11 of 2016; Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*; Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*.

[153] Weikmans, van Asselt, and Roberts, "Transparency Requirements Under the Paris Agreement and Their (UN) Likely Impact on Strengthening the Ambition of Nationally Determined Contributions (NDCS)."

[154] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[155] Weikmans, van Asselt, and Roberts, "Transparency Requirements Under the Paris Agreement and Their (UN) Likely Impact on Strengthening the Ambition of Nationally Determined Contributions (NDCS)"; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Alharbi and Ghonimy, "Environmental Benefits of Olive By-Products in Energy, Soil, and Sustainable Management."

4. Environmental Principles and Governance: Structural Gaps, Enforcement Challenges, and the Role of Environmental Impact Assessment

The legal foundations of environmental protection are established upon a framework of fundamental principles that guide policy formulation, regulatory development, and administrative enforcement. These principles encompass the Precautionary Principle, Environmental Equity, Polluter Pays Principle, Preventive Principle, Public Participation, Intergenerational Justice, and Sustainability.[156] Although these principles are enshrined in a range of international declarations and national legislation, their practical enforcement continues to be characterized by fragmentation and inconsistency. This section critically examines these principles, concentrating on the reasons for the failures in enforcement, the manner in which administrative structures contribute to the gaps, and the function of Environmental Impact Assessment as a mechanism for the realization of effective environmental governance.[157]

4.1 Foundational Principles in Environmental Law and Policy

4.1.1 The Precautionary Principle

Definition: Requires action to prevent environmental harm despite lacking scientific certainty.[158]

Governance Gap: The principle is often sidelined in favor of short-term economic gains. Public authorities may delay action due to lobbying pressure, regulatory inertia, or a lack of scientific consensus, despite administrative law frameworks that would permit anticipatory regulation.

Case Insight: In several infrastructure projects across the Gulf region, including desalination plant expansions, permits were issued before robust scientific studies were completed, undermining long-term ecosystem resilience.

Link to Environmental Impact Assessment: Environmental Impact Assessment should operationalize the precautionary principle by mandating risk assessments under uncertainty. However, many are conducted post hoc, limiting their preventative value.[159]

4.1.2 Environmental Equity- (Environmental Justice)

Definition: Ensures fair distribution of environmental benefits and burdens across all social groups.

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[156] Majambere Rodrigue, "The Precautionary Principle in Environmental Law," *Open Journal of Social Sciences* 11, no. 12 (December 1, 2023): 548–67, https://doi.org/10.4236/jss.2023.1112037.

[157] Arroyo M and Miguel, "The Role of Renewable Energies for the Sustainable Energy Governance and Environmental Policies for the Mitigation of Climate Change in Ecuador"; Brian F. O'Neill, Matthew Jerome Schneider, and Alejandro Garcia Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity," *Environmental Justice* 18, no. 2 (April 1, 2025): 90–99, https://doi.org/10.1089/env.2023.0067; Coenen et al., "Environmental Governance of China's Belt and Road Initiative."

[158] Rodrigue, "The Precautionary Principle in Environmental Law"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity"; Pacheco-Vega, "Environmental Regulation, Governance, and Policy Instruments, 20 Years After the Stick, Carrot, and Sermon Typology."

[159] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Rodrigue, "The Precautionary Principle in Environmental Law."

Governance Gap: Regulatory decisions disproportionately affect vulnerable communities due to a lack of participatory mechanisms in administrative procedures. In many jurisdictions, permitting processes fail to include environmental justice assessments.[160]

Case Insight: In industrial areas like Jubail or Rabigh in Saudi Arabia, emissions can disproportionately impact local populations. The government could enforce penalties or hold environmental hearings regarding the environmental situation.[161]

Link to Environmental Impact Assessment: Equity considerations are infrequently incorporated into Environmental Impact Assessments.[162] Additionally, even when public consultations are conducted, they tend to be symbolic or inaccessible to the affected populations due to barriers related to education or legal constraints.[163]

4.1.3 Polluter Pays Principle

Definition: Imposes the cost of environmental damage on the entity responsible.

Governance Gap: Enforcement mechanisms, existing legal loopholes, and administrative discretion significantly undermine accountability.[164] Certain polluters are able to negotiate exemptions or obtain advantages from transparent settlements.[165]

Case Insight: Oil leaks or industrial waste discharges in coastal areas may have led to minimal financial penalties compared to the ecological damage caused, indicating enforcement imbalances.[166]

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[160] Zhu and Li, "Identifying Key Polluters: The Feasibility of Applying the Polluter Pays Principle to Marine Greenhouse Gas Emissions."

[161] O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity"; Celermajer et al., *Institutionalising Multispecies Justice*; Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices"; Arroyo M and Miguel, "The Role of Renewable Energies for the Sustainable Energy Governance and Environmental Policies for the Mitigation of Climate Change in Ecuador"; Zhu and Li, "Identifying Key Polluters: The Feasibility of Applying the Polluter Pays Principle to Marine Greenhouse Gas Emissions."

[162] The Kenya Climate Change Act, No. 11 of 2016; Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*; Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*.

[163] Rodrigue, "The Precautionary Principle in Environmental Law"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity."

[164] Zhu and Li, "Identifying Key Polluters: The Feasibility of Applying the Polluter Pays Principle to Marine Greenhouse Gas Emissions."

[165] O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity."

[166] Xue Liu and Zhanyang Yu, "Examining Marine Pollution Governance from the Perspective of International Investment Law: Theoretical Connection, Development Trends, and China's Experience," *Frontiers in Marine Science* Volume 12 (2025), https://www.frontiersin.org/journals/marine-science/articles/10.3389/fmars.2025.1617277; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Alrowais et al., "Groundwater Quality Assessment for Drinking and Irrigation Purposes at Al-Jouf Area in KSA Using Artificial Neural Network, GIS, and Multivariate Statistical Techniques."

Link to Environmental Impact Assessment: While Environmental Impact Assessment frameworks can theoretically enforce cost internalization, they often lack post-approval monitoring, making it challenging to track compliance or penalize violations.[167]

4.1.4 Preventive Principle

Definition: Promotes proactive measures to prevent environmental degradation before it occurs, rather than addressing the consequences post-factum.[168]

Governance Gap: Environmental governance frameworks frequently operate reactively instead of proactively. Authorities responsible for granting permits may neglect long-term effects owing to institutional silos or constraints related to resources.[169]

Case Insight: Strategic development initiatives in arid regions advanced without comprehensive ecological assessments, subsequently necessitating expensive remediation due to the degradation of the water table.[170]

Link to Environmental Impact Assessment: Strategic Environmental Assessments, when implemented, bolster preventative reasoning; however, in numerous frameworks, they remain optional, insufficiently funded, or lack integration with planning processes.

4.1.5 Public Participation

Definition: Ensures that stakeholders, especially affected populations, have access to information and decision-making processes.

Governance Gap: The lack of transparency and procedural fairness often hinders meaningful engagement. Administrative agencies may interpret public hearings as having authoritative implications. A commendable illustration is provided by Saudi Arabia, which exemplifies full transparency, equity, procedural fairness, and clarity in governance, as outlined by its legal framework.[171]

Case Insight: In renewable energy project approvals, local communities are often consulted only after major decisions are finalized, reducing trust and increasing resistance.

Link to Environmental Impact Assessment: While public consultation is formally part of it, it is often superficial. Moreover, Environmental Impact Assessment reports are frequently inaccessible or too technical for lay audiences, undermining informed engagement.

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[167] Zhu and Li, "Identifying Key Polluters: The Feasibility of Applying the Polluter Pays Principle to Marine Greenhouse Gas Emissions."

[168] Liu and Yu, "Examining Marine Pollution Governance from the Perspective of International Investment Law: Theoretical Connection, Development Trends, and China's Experience."

[169] Liu and Yu; Nina Lakhani, "'Worthless': Chevron's Carbon Offsets Are Mostly Junk and Some May Harm, Research Says," *The Guardian*, May 24, 2023, sec. Environment, https://www.theguardian.com/environment/2023/may/24/chevron-carbon-offset-climate-crisis.

[170] Liu and Yu, "Examining Marine Pollution Governance from the Perspective of International Investment Law: Theoretical Connection, Development Trends, and China's Experience"; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation."

[171] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021). (2021); Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change."

4.1.6 Intergenerational Equity

Definition: This principle mandates that current generations take responsibility for safeguarding environmental resources for the benefit of future generations.

Governance Gap: Short-term policy cycles predominantly govern administrative decision-making, with governments frequently prioritizing immediate political or economic returns at the expense of long-term sustainability.[172]

Case Insight: Excessive groundwater extraction for agricultural purposes in arid regions neglects the importance of long-term aquifer stability, compromising future generations' environmental rights.[173]

Link to Environmental Impact Assessment: Most Environmental Impact Assessments do not incorporate a comprehensive long-term risk modeling component, concentrating on specific projects' durations rather than the timeframes relevant to ecosystems.

- **Sustainability Principle**

Definition: The definition pertains to balancing environmental, economic, and social dimensions during decision-making.

Governance Gap: Sustainability persists primarily as a rhetorical objective rather than a legally enforceable obligation. Administrative bodies frequently exhibit insufficient capacity or authority to evaluate sustainability holistically.

Case Insight: Due to inadequate interdisciplinary review during the licensing phase, urban mega-projects may present themselves as "sustainable" despite consuming substantial energy and displacing natural habitats.[174]

Link to Environmental Impact Assessment: Environmental Impact Assessments are ideally positioned to evaluate sustainability trade-offs; however, the fragmentation of sectoral authorities results in a compartmentalized analysis that lacks systemic coherence.[175]

- **Synthesis: Why Enforcement Fails – Institutional and Legal Diagnoses**

Across all principles, enforcement gaps arise from a combination of:

- Administrative Discretion Misuse: Agencies may interpret principles loosely, prioritize political goals, or bypass technical advice.[176]

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[172] Kaushik, "Environmental Law and Sustainability: Legal Approaches to Addressing Climate Change and Protecting Natural Resources."

[173] Melet et al., "Sea Level Rise in Europe: Observations and Projections."

[174] Kaushik, "Environmental Law and Sustainability: Legal Approaches to Addressing Climate Change and Protecting Natural Resources"; Melet et al., "Sea Level Rise in Europe: Observations and Projections"; Liu and Yu, "Examining Marine Pollution Governance from the Perspective of International Investment Law: Theoretical Connection, Development Trends, and China's Experience"; Rodrigue, "The Precautionary Principle in Environmental Law"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment"; Budak, "Existing Landscape of International Climate Law."

[175] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[176] Melet et al., "Sea Level Rise in Europe: Observations and Projections"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity"; Rodrigue, "The

- Capacity Limitations: Environmental authorities often suffer from underfunding, insufficient expertise, and limited data access.
- Regulatory Capture: Powerful industries may influence regulatory frameworks, weakening substantive obligations and procedural safeguards.
- Judicial Gaps: Limited access to environmental courts or appellate bodies restricts legal accountability and public oversight.

▪ **Strengthening Governance Through Environmental Impact Assessment Integration**

Challenge	Legal-Governance Response	Environmental Impact Assessments Role
Discretionary overreach	Codify binding thresholds for risk and participation	Make Environmental Impact Assessments legally enforceable with appeal mechanisms
Weak enforcement	Establish independent environmental compliance bodies	Require post-project monitoring & audits
Marginalized participation	Institutionalize early, inclusive consultations.	Mandate plain-language summaries and public comment response requirements
Short-termism	Introduce intergenerational impact assessments	Integrate scenario modeling and resilience benchmarks[177]

Environmental principles serve as the normative pillars of climate and ecological governance; however, in the absence of active, well-resourced, and transparent administrative systems, there is a risk that these principles may remain aspirational. Integrating these principles into the design, implementation, and monitoring of Environmental Impact Assessments and Strategic Environmental Assessments, bolstered by accountable public institutions, is essential to fulfilling their potential. Environmental governance can only transition from formal compliance to transformative stewardship through these measures.[178]

Precautionary Principle in Environmental Law"; Coenen et al., "Environmental Governance of China's Belt and Road Initiative"; Pacheco-Vega, "Environmental Regulation, Governance, and Policy Instruments, 20 Years After the Stick, Carrot, and Sermon Typology."

[177] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[178] The REACH Regulation (EC) No 1907/2006, initially adopted on December 18, 2006, has undergone several amendments and consolidations. A consolidated version, incorporating various amendments, was published on March 1, 2022. The regulation is administered by the European Chemicals Agency (ECHA).; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation"; Kuang, Akmal, and Li, "Measuring the

4.2 THE PRINCIPLE OF EQUITY IN MITIGATING CLIMATE CHANGE

Mitigating climate change is dependent on a complex array of legal instruments at both the national and international levels. These frameworks are crucial for fostering international cooperation, establishing timelines and specific emissions targets, and monitoring and overseeing the performance of nations and corporations. The governance of climate change is primarily guided by international treaties and conventions, which provide a collaborative framework on a global scale.[179] The United Nations Framework Convention on Climate Change, which was adopted in 1992, functions as the principal legal mechanism for addressing climate change.[180] As a result, it laid the groundwork for future agreements focused on defining various goals and obligations. The United Nations Framework Convention on Climate Change also acknowledges the principle of 'equity,' which supports the idea that all parties are responsible for climate change while recognizing that this responsibility should align with their economic status and CO2 emissions levels.[181] The principle of equity represents a fundamental tenet of the international legal framework responding to climate change.[182] This concept transcends mere moral perspective; it embodies a legally recognized standard to foster fairness, justice, and diverse responsibilities among nations. This principle directs the allocation of climate responsibilities by considering historical emissions, economic capacities, and developmental needs. The cornerstone of equity in climate law is encapsulated in the principle of "Common But Differentiated Responsibilities and Respective Capabilities."[183] This doctrine indicates that while all nations must take action to combat climate change, their respective levels of responsibility and capacity may vary significantly.[184] This concept is articulated in Article 3(1) of the United Nations Framework Convention on Climate Change and Article 2(2) of the Paris

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Effects of Green Technology Innovations and Renewable Energy Investment for Reducing Carbon Emissions in China"; Climate and Resilience Law No. 2021-1104 of August 22,2021 on Combating Climate Change and Increasing Resilience. Official Journal of the French Republic, August 24, 2021.

[179] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

[180] Wu Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation," *Science of the Total Environment* 717 (2020): 137265; Kyoto Protocol to the United Nations Framework Convention on Climate Change,2303 U.N.T.S. 162.

[181] Melet et al., "Sea Level Rise in Europe: Observations and Projections"; Coenen et al., "Environmental Governance of China's Belt and Road Initiative"; Dang et al., "Spatial Pattern of Co2 and Ch4 Emission and Its Influencing Factors from River Confluence Areas."

[182] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[183] Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives."

[184] Pratama et al., "China's Policy Developments in The Implementation of The Paris Agreement: Strategies and Challenges in Addressing The 2020-2024 Carbon Emission Problem"; Kaushik, "Environmental Law and Sustainability: Legal Approaches to Addressing Climate Change and Protecting Natural Resources."

Agreement.[185] This principle accepts that countries with greater historical greenhouse gas emissions and more financial or technological resources should do more to mitigate climate change.[186] This shifts the concept of equal obligations to a framework of substantive justice, adapting obligations to each nation's context. Under the Paris Agreement, countries present their Nationally Determined Contributions, outlining their climate action strategies. Each plan should demonstrate advancement and embody the country's utmost ambition, considering equity.[187] A country's commitments must be increasingly ambitious based on its capability or responsibility. The judiciary has started viewing equity as a mandatory legal criterion rather than a political goal.[188]

In the case of Neubauer v. Germany (2021), the German Constitutional Court concluded that the German Climate Protection Act infringed on the rights of youth by postponing crucial emissions reductions until 2030.[189] The court invoked Article 20a of the German Constitution, which obligates the state to protect the natural environment for future generations. This case established intergenerational equity as a constitutional requirement, defined as fairness between present and future generations. Likewise, in Commune de Grande-Synthe v. France (2020), France's highest administrative court held the government accountable for its failure to meet climate targets.[190] The court underscored that fairness and responsibility—fundamental equity components—necessitate prompt and tangible actions from governments. These rulings demonstrate that courts possess the capacity to enforce equity in both administrative and environmental matters.

Equity profoundly influences administrative law—the body of legal rules that govern the decisions made by government agencies. Administrative bodies must ensure that climate-related decisions are procedurally fair through transparent and inclusive processes and substantively equitable distribution of burdens and benefits. This encompasses:

- Distributive justice: ensuring that climate policies do not unfairly impact communities.
- Procedural fairness entails the involvement of stakeholders affected by decisions in the decision-making process, such as through public consultations. This concept aligns with the notion of "custom," which denotes a long-established practice or behavior deemed to possess

[185] Dang et al., "Spatial Pattern of Co2 and Ch4 Emission and Its Influencing Factors from River Confluence Areas."
[186] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."
[187] Dang et al., "Spatial Pattern of Co2 and Ch4 Emission and Its Influencing Factors from River Confluence Areas"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment"; Rajamani et al., "National 'Fair Share' in Reducing Greenhouse Gas Emissions Within the Principled Framework of International Environmental Law"; Budak, "Existing Landscape of International Climate Law."
[188] Melet et al., "Sea Level Rise in Europe: Observations and Projections"; Budak, "Existing Landscape of International Climate Law"; Celermajer et al., *Institutionalising Multispecies Justice*.
[189] Neubauer, et al. v. Germany, Order of Mar. 24, 2021, 1 BvR 2656/18 (Fed. Const. Ct.) (2021).
[190] French Conseil D'etat, Commune De Grande-Synthe and others V. France, Case No. 427301, Admissibility (2020).

the force of law, notwithstanding its unwritten status.[191] A custom attains legally binding status when it is adhered to consistently over time and acknowledged by society or the courts as obligatory.[192]

- Long-term justice: considering the needs of future generations.[193]

For instance, when regulatory permits for industrial emissions are granted, assessing the environmental impact and determining whether the decision aligns with the principle of equity is essential. Legislation such as the Aarhus Convention (1998) in Europe guarantees the public's right to access environmental information, participate in decision-making processes, and contest violations in court.[194] These rights enhance the procedural aspect of equity by improving transparency and facilitating public involvement.[195]

Sharia law plays a significant role in shaping administrative governance in Saudi Arabia. The country's Environmental Law includes rules on sustainability, impact assessment, and environmental protection—principles aligned with equity.[196] Sharia incorporates several concepts that match modern climate equity:

- Public interest: Legal decisions should promote the welfare of society, including environmental health.
- Harm: Preventing harm is a core legal obligation, supporting the idea that climate actions must not harm current or future populations.[197]

Saudi administrative entities, such as the National Center for Environmental Compliance, must consider these principles when authorizing industrial activities. This approach

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[191] The REACH Regulation (EC) No 1907/2006, initially adopted on December 18, 2006, has undergone several amendments and consolidations. A consolidated version, incorporating various amendments, was published on March 1, 2022. The regulation is administered by the European Chemicals Agency (ECHA).; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation"; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation"; Rodrigue, "The Precautionary Principle in Environmental Law."

[192] The Saudi Civil Transactions Law, Royal Decree No. M/191.

[193] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[194] Maria Lee, "The Aarhus Convention 1998 and the Environment Act 2021: Eroding Public Participation," *The Modern Law Review* 86, no. 3 (May 1, 2023): 756–84, https://doi.org/10.1111/1468-2230.12789; The REACH Regulation (EC) No 1907/2006, initially adopted on December 18, 2006, has undergone several amendments and consolidations. A consolidated version, incorporating various amendments, was published on March 1, 2022. The regulation is administered by the European Chemicals Agency (ECHA).; Climate and Resilience Law No. 2021-1104 of August 22,2021 on Combating Climate Change and Increasing Resilience. Official Journal of the French Republic, August 24, 2021.

[195] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices"; Rajamani et al., "National 'Fair Share' in Reducing Greenhouse Gas Emissions Within the Principled Framework of International Environmental Law"; Budak, "Existing Landscape of International Climate Law."

[196] "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation"; The Saudi Environmental Law, Royal Decree No. M/165.

[197] The Saudi Civil Transactions Law, Royal Decree No. M/191; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation"; The Saudi Environmental Law, Royal Decree No. M/165.

embodies a form of sanctioned environmental equity, thereby ensuring that policies are equitable and ethical.[198]

4.3 Equity and the Precautionary Principle: Legal Symbiosis

Equity further reinforces the precautionary principle, which posits that actions should be undertaken before achieving scientific certainty in the presence of a risk of serious or irreversible harm. This principle is enshrined in European Union law, specifically in Principle 15 of the 1992 Rio Declaration. For example, in the case of Monsanto (Case C-236/01), the Court of Justice of the European Union established that environmental risks warrant preventive measures.[199] This exemplifies temporal equity in practice: safeguarding future generations by averting harm in the present, even without complete evidence.[200] Administrative agencies must, therefore, integrate principles of equity and precaution in their climate-related decision-making processes, particularly in the context of uncertainty. This integration guarantees that no individual is subjected to an inequitable share of climate-related risks and that the well-being of future generations is not jeopardized for immediate gains or interests.[201] Equity has evolved from a vague moral concept to a legally enforceable standard that governs the actions of nations, judicial bodies, and regulatory agencies in addressing climate change. It shapes the distribution of international obligations, guides how courts assess government policies and requires that administrative actions are fair, inclusive, and focused on the future.[202] For instance, nations such as Saudi Arabia, recognized for their profound ethical traditions and evolving legal frameworks, possess significant potential, as evidenced by their prior advancements in legislation addressing equity principles in climate governance systems.[203]

The principle of equity transmutes climate law into an instrumental mechanism for global and intergenerational justice. [204] Intergenerational equity emphasizes the obligation of the current generation to maintain the planet's ecological equilibrium for future generations. This concept is progressing from aspirational rhetoric to enforceable public policy principles.[205] It suggests that administrative authorities are not merely managing resources but holding these resources in trust. This environmental trusteeship obligates public officials to refrain from authorizing actions that could inflict irreversible harm upon ecological systems.[206]

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[198] Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change"; The Saudi Civil Transactions Law, Royal Decree No. M/191; Budak, "Existing Landscape of International Climate Law."

[199] Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change."

[200] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[201] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health." Navroz K Dubash, "Varieties of Climate Governance: The Emergence and Functioning of Climate Institutions," *Environmental Politics* 30, no. sup1 (2021): 1–25.

[202] Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"

[203] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[204] Budak, "Existing Landscape of International Climate Law."

[205] The Saudi Environmental Law, Royal Decree No. M/165.

[206] Rajamani et al., "National 'Fair Share' in Reducing Greenhouse Gas Emissions Within the Principled Framework of International Environmental Law."

In administrative law, this doctrine can be operationalized through mandatory long-term environmental assessments, sustainability scoring of significant projects, and integrating future impact scenarios in climate policy planning. Saudi Arabia is poised to take on a leadership role in environmental stewardship via its regulatory framework. This initiative has the potential to effectively integrate energy diversification, resource utilization, and desert rehabilitation programs with climate priorities, as the Saudi legal system is characterized by equity-led.[207]

4.3.1 Differentiated Responsibilities and Fair Burden Allocation

Equity constitutes a fundamental pillar of international climate collaboration. The differentiated responsibilities principle acknowledges that not all nations have contributed equally to climate change or possess equivalent capacities to mitigate its effects. This principle plays a critical role in formulating equitable climate financing, facilitating mechanisms for technology transfer, and establishing obligations related to capacity building. Legal frameworks based on administrative law—including national climate strategies, emissions budgeting, and sustainability audits—must incorporate this differentiation approach.[208]

As a rapidly modernizing economy of significant global energy relevance, Saudi Arabia is strategically positioned to implement this principle domestically via targeted decarbonization initiatives in high-emission sectors while concurrently offering support to climate diplomacy and regional efforts collaboration. Incorporating differentiation into domestic legislation promotes global fairness and facilitates the design of tailored and efficient climate policies. Procedural equity ensures that environmental governance processes are transparent, participatory, and inclusive. It emphasizes that climate policy decisions should not be conducted behind closed doors or monopolized by a limited group of stakeholders. Legal systems must establish procedural guarantees, including access to environmental information, public consultation rights, and administrative review mechanisms.[209]

This objective can be accomplished within administrative law by employing frameworks that require stakeholder engagement in climate action strategies, conducting early-stage consultations for significant environmental permits, and utilizing digital platforms to facilitate citizen feedback.[210] Procedural equity is achieved through institutionalizing participation in climate initiatives, particularly for local communities affected by adaptation infrastructure, the utilization of water resources, or the expansion of renewable energy. Ensuring that all perspectives are considered in climate governance enhances social legitimacy, reduces legal risks, and increases the efficacy of policy implementation.[211]

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[207] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32; Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*.

[208] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[209] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[210] "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart."

[211] The Saudi Board of Grievances, Royal Decree No. M/78.

4.3.2 Equity in Climate Finance and Technology Access

One of the most critical domains for applying equity is the distribution of climate finance and clean technology. The lack of sufficient funding and technological capabilities hinders the implementation of ambitious climate mitigation and adaptation measures. Equity necessitates that international and national institutions facilitate equitable access to these resources.[212] Legally, climate finance mechanisms must follow principles of accountability, transparency, and accessibility. Regulatory agencies should design funding channels prioritizing need, vulnerability, and impact. The concept of equity is advanced by directing sovereign wealth climate initiatives toward underserved regions, addressing vulnerability, and demonstrating impact. Investment leadership may incorporate equity by steering sovereign wealth climate initiatives toward underserved regions or by endorsing joint ventures that facilitate technology transfer provisions.[213] This operationalizes equity through enforceable financing agreements, procurement rules, and grant conditionality frameworks.[214]

Integrating equity into climate governance necessitates the implementation of proactive institutional design. This entails progressing beyond reactive or compensatory models of justice towards frameworks that anticipate risks and incorporate fairness within administrative structures.[215] Equity should be incorporated in regulatory impact assessments, policy evaluation frameworks, and institutional mandates.[216] This forward-thinking approach enables legal systems to regard equity not merely as a constraint but as a catalyst for developing more resilient, inclusive, and legitimate climate action.[217] Countries like Saudi Arabia, positioned at the intersection of tradition and innovation, can build hybrid governance systems that merge ethical traditions of fairness with global best practices in legal and administrative regulation. By doing so, equity is preserved and transformed into a strategic legal asset in global climate leadership.[218]

4.3.3 Legal Enforceability of Equity in Climate Agreements and Institutional Commitments

Equity must move from aspirational rhetoric to an enforceable norm within international and domestic legal systems. While equity is often a guiding principle in climate agreements,

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[212] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

[213] The Saudi Board of Grievances, Royal Decree No. M/78.

[214] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; French Conseil D'etat, Commune De Grande-Synthe and others V. France, Case No. 427301, Admissibility.

[215] Rajamani et al., "National 'Fair Share' in Reducing Greenhouse Gas Emissions Within the Principled Framework of International Environmental Law."

[216] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[217] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[218] Budak, "Existing Landscape of International Climate Law"; Rajamani et al., "National 'Fair Share' in Reducing Greenhouse Gas Emissions Within the Principled Framework of International Environmental Law"; Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices."

its implementation hinges on the legal structures that translate commitments into binding duties.[219] The enforceability of international treaties is contingent not solely upon their wording but also on the incorporation of equity within contractual clauses, bilateral agreements, national legislation, and institutional oversight mechanisms.[220]

One critical method of legalizing equity is through conditional compliance mechanisms. These are increasingly used in international climate finance instruments and bilateral agreements. For instance, financial disbursements from multilateral climate funds, such as the Green Climate Fund or Adaptation Fund, can be made conditional upon demonstrable progress toward equitable outcomes, such as gender-responsive adaptation or inclusion of marginalized communities in planning processes. Embedding equity conditions in grant agreements or financing contracts allows legal remedies for non-compliance, shifting equity from a principle to an operational rule. [221]

In addition, equity audit mechanisms are becoming essential tools of accountability. These mechanisms assess whether climate finance and technology projects comply with distributive and procedural equity standards, including access, inclusiveness, and proportional benefit-sharing. Equity audits may be institutionalized within regulatory oversight bodies or autonomous administrative tribunals, particularly in jurisdictions that recognize justiciable socio-environmental rights. For instance, Saudi Arabia has established a green finance framework that supports its objective of achieving net-zero emissions by the year 2060 and a reduction of CO_2 emissions by 278 million tons annually, based on the 2019 baseline, by the year 2030. Green finance—mobilizing capital for projects that promote environmental sustainability—contributes to equity by ensuring equitable access to resources and bolsters administrative law through transparent and regulated processes that align public funding with climate-related objectives.[222] Investments in climate initiatives and the establishment of grievance redress systems pertaining to equity indicators.[223] Equity in legal capacity building represents a crucial dimension. Entities confront legal asymmetries that disadvantage them in climate negotiations, contract drafting, or dispute resolution. Legal empowerment—achieved through training, access to legal counsel, and involvement in norm-setting—should be viewed as a matter of justice. Therefore, international legal frameworks should integrate capacity-building obligations for donor countries and institutions, converting support into a legal obligation rather than a discretionary act gesture.[224]

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[219] Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change"; Coenen et al., "Environmental Governance of China's Belt and Road Initiative."

[220] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

[221] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[222] "Saudi 'Green Financing Framework' (National Debt Management Center/Ministry of Finance)."

[223] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32; Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[224] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices."

Equity must be codified within institutional charters, regulatory statutes, and administrative procedures. This includes mandating that climate-related decisions, such as licensing clean energy projects or allocating emission rights, undergo equity-based Regulatory Impact Assessments.[225] These assessments evaluate how proposed policies affect social groups and whether they perpetuate or correct structural injustices. A rule-based equity framework allows legal systems to correct path dependencies and institutional biases, enabling more consistent and transparent governance.[226]

Therefore, equity is made enforceable through judicial systems, institutional mandates, compliance mechanisms, and innovations in administrative law.[227] Nations with robust legal frameworks and political commitment, such as Saudi Arabia, exemplify "equity constitutionalism" within the sphere of climate governance. In this context, fairness moves beyond being a mere ancillary value; it acts as a fundamental legal obligation intricately woven into each climate-related instrument and policy framework, thereby affirming this perspective.[228]

4.3.4 Environmental Equity Through Accountability: Integrating the Polluter Pays Principle into Administrative Justice

The Polluter Pays Principle has evolved from a compensatory doctrine into a legally enforceable standard that reinforces the principle of equity within administrative and environmental governance. At its core, the Polluter Pays Principle ensures that those who profit from or contribute to environmental degradation are legally and financially responsible for rectifying the harm they cause. This obligation aligns directly with distributive and procedural equity, foundational components of administrative justice.

4.3.5 The Polluter Pays Principle as a Mechanism of Environmental Equity

Environmental degradation disproportionately impacts vulnerable populations and future generations. The failure to hold polluters accountable effectively transfers ecological burdens to the public, contradicting the principle of equity that necessitates fairness in allocating environmental risks and the regulations that govern them. By requiring that polluters internalize the costs of their actions, the Polluter Pays Principle reinstates equilibrium in the administrative framework. It reaffirms the state's obligation to act with impartiality and protective intent on behalf of society at large. Enshrined in Article 191(2) of the Treaty on the Functioning of the European Union, the Polluter Pays Principle is

[225] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[226] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Averchenkova, Fankhauser, and Finnegan, "The Impact of Strategic Climate Legislation: Evidence from Expert Interviews on the UK Climate Change Act."

[227] Kuang, Akmal, and Li, "Measuring the Effects of Green Technology Innovations and Renewable Energy Investment for Reducing Carbon Emissions in China"; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation"; The Kenya Climate Change Act, No. 11 of 2016; Regazzoni, "Mediation in Environmental Disputes"; Lee, "The Aarhus Convention 1998 and the Environment Act 2021: Eroding Public Participation."

[228] The Saudi Civil Transactions Law, Royal Decree No. M/191.

intrinsically linked to equity-oriented norms: "Environmental damage should as a priority be rectified at source, and the polluter should pay." [229]

This provision aligns with the precautionary and preventive principles, ensuring that environmental risks are not externalized to disadvantaged populations or deferred to future administrations. Thus, the Polluter Pays Principle is a legal safeguard for intergenerational equity, mandating administrative interventions prioritizing fairness. [230]

- **Administrative Integration of the Polluter Pays Principle: Comparative Jurisdictions**

The Industrial Emissions Directive (2010/75/EU) translates the Polluter Pays Principle into binding administrative obligations. Permits are issued only after environmental liabilities are assessed, and agencies can impose conditions ensuring that polluters assume responsibility for long-term restoration. This guarantees environmental protection and procedural equity, where affected communities have a legal basis to demand fair administrative oversight.

In the United States, the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 enforces the Polluter Pays Principle through administrative orders issued by the Environmental Protection Agency. Polluters are held strictly liable for contamination, and the administrative process allows for swift, equitable remediation without lengthy court delays. This administrative pathway advances corrective equity by compelling cleanup and restitution regardless of a polluter's intent or financial power.

Saudi Arabia's Environmental Authority embeds the Polluter Pays Principle within its administrative authority:

- Article 15: Obligates polluters to undertake restoration at their own expense.
- Article 18: Empowers the National Center for Environmental Compliance to issue administrative penalties or revoke licenses.[231]
- Article 26: Provides for full compensation and remediation financed by the polluter.

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[229] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[230] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices."

[231] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Liu and Yu, "Examining Marine Pollution Governance from the Perspective of International Investment Law: Theoretical Connection, Development Trends, and China's Experience"; Rodrigue, "The Precautionary Principle in Environmental Law"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment"; Budak, "Existing Landscape of International Climate Law"; Climate and Resilience Law No. 2021-1104 of August 22,2021 on Combating Climate Change and Increasing Resilience. Official Journal of the French Republic, August 24, 2021.; The Saudi Environmental Law, Royal Decree No. M/165; Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

These provisions reflect a rising commitment to environmental equity by ensuring that governmental bodies do not favor economic actors over ecological and public interests. Moreover, administrative authorities increasingly incorporate the Polluter Pays Principle into Environmental Impact Assessments and project approval procedures, ensuring that environmental burdens are not unfairly shifted onto communities or ecosystems.[232]

- **Equity, Accountability, and Future Generations**

The Polluter Pays Principle reinforces intergenerational fairness by holding current polluters accountable for future harm. This principle is central to equity, as affirmed in the Neubauer v. Germany ruling, where the German Constitutional Court held that inadequate climate measures violated the rights of future generations under Article 20a of the German Basic Law.[233] Similarly, in Commune de Grande-Synthe v. France, administrative inaction was deemed unjust and inequitable toward citizens affected by climate impacts.[234]

By embedding the Polluter Pays Principle in administrative procedures, governments ensure:

- Responsibility is allocated fairly and not diluted across the population.
- Environmental justice becomes part of administrative legality.
- Abstract or delayed regulatory mechanisms do not leave vulnerable groups and ecosystems unprotected.

- **The Polluter Pays Principle as an Instrument of Administrative Equity**

The Polluter Pays Principle operationalizes equity within administrative law by aligning costs, responsibilities, and accountability. It ensures that administrative decisions do not disproportionately favor the powerful over the environment or the public, and that justice is delivered not solely within courtrooms but also through permits, fines, and enforcement actions. Across various jurisdictions—from the European Union to Saudi Arabia—the integration of the Polluter Pays Principle signifies a growing recognition of equity as both a legal and ethical imperative. Through the administrative law framework, the Polluter Pays Principle transitions from a theoretical construct to an actionable mandate, effectively translating the promise of fairness into a regulatory reality.[235]

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[232] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

[233] Neubauer, et al. v. Germany, Order of Mar. 24, 2021, 1 BvR 2656/18 (Fed. Const. Ct.).

[234] Climate and Resilience Law No. 2021-1104 of August 22,2021 on Combating Climate Change and Increasing Resilience. Official Journal of the French Republic, August 24, 2021.; Treaty on the Functioning of the European Union, 2016 O.J.C 202/32; Liu and Yu, "Examining Marine Pollution Governance from the Perspective of International Investment Law: Theoretical Connection, Development Trends, and China's Experience"; Rodrigue, "The Precautionary Principle in Environmental Law"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment"; French Conseil D'etat, Commune De Grande-Synthe and others V. France, Case No. 427301, Admissibility.

[235] Climate and Resilience Law No. 2021-1104 of August 22,2021 on Combating Climate Change and Increasing Resilience. Official Journal of the French Republic, August 24, 2021.; The Saudi Environmental Law, Royal Decree No. M/165; Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

- **Summary Table: Administrative Implementation of the Polluter Pays Principle**

Jurisdiction	Legal Basis	Administrative Authority	Mechanism of Enforcement	Equity Outcome
European Union	Treaty on the Functioning of the European Union Art. 191(2); Directive 2010/75/EU[236]	National Environmental Agencies	Licensing conditions, financial guarantees, revocation powers	Procedural and intergenerational fairness[237]
United States	The Comprehensive Environmental Response, Compensation, and Liability Act, a U.S. federal law (1980), 42 U.S.C. §9601 et seq.	Environmental Protection Agency	Administrative orders, strict liability, remediation enforcement	Corrective and distributive equity[238]
Saudi Arabia	Environmental Law (Royal Decree M/165, 2020)	National Center for Environmental Compliance; Environmental Ministries and Authorities	Permit suspension, Environmental Impact Assessment, full cost recovery via administrative law[239]	Regulatory equity and restoration justice

[236] "The Treaty on the Functioning of the European Union (TFEU) and Directive 2010/75/Eu Are Key Pieces of Eu Legislation Related to Environmental Protection and Industrial Emissions." (2010); Dubash, "Varieties of Climate Governance: The Emergence and Functioning of Climate Institutions"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"; Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change"; Hickmann et al., "The United Nations Framework Convention on Climate Change Secretariat as an Orchestrator in Global Climate Policymaking."

[237] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021).; Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change."

[238] Neubauer, et al. v. Germany, Order of Mar. 24, 2021, 1 BvR 2656/18 (Fed. Const. Ct.).

[239] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

- **Analysis of Equity in the Administrative Enforcement of the Polluter Pays Principle**

The integration of the Polluter Pays Principle into the architecture of administrative law represents a profound recalibration of how modern states conceptualize justice, responsibility, and environmental stewardship.[240] No longer confined to a post-disaster cost recovery tool, the Polluter Pays Principle now functions as an instrument of preventive, corrective, and distributive equity, enforced not only through judicial decisions but also through the everyday workings of administrative agencies and regulatory institutions.[241]

At its heart, the Polluter Pays Principle corrects the structural imbalance inherent in traditional regulatory systems, where the costs of pollution were externalized to the public, ecosystems, and future generations.[242] By integrating the Polluter Pays Principle within the framework of administrative law—through instruments such as licensing regimes, environmental assessments, penalties, and performance bonds—governments reallocate accountability to its appropriate origin: the polluter. This transformation is not merely functional; it embodies moral, legal, and institutional dimensions, signifying that environmental integrity and social equity are inherently interconnected.[243]

The comparative evidence from the European Union, the United States, and Saudi Arabia illustrates that the administrative enforcement of the Polluter Pays Principle enhances legal clarity, institutional responsiveness, and procedural fairness.[244] The European Union anchors a legally binding framework for climate and pollution governance; in the United States, it

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[240] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity"; Rodrigue, "The Precautionary Principle in Environmental Law"; Coenen et al., "Environmental Governance of China's Belt and Road Initiative"; Pacheco-Vega, "Environmental Regulation, Governance, and Policy Instruments, 20 Years After the Stick, Carrot, and Sermon Typology"; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[241] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices."

[242] Budak, "Existing Landscape of International Climate Law."

[243] The Saudi Environmental Law, Royal Decree No. M/165; Climate and Resilience Law No. 2021-1104 of August 22,2021 on Combating Climate Change and Increasing Resilience. Official Journal of the French Republic, August 24, 2021.; Liu and Yu, "Examining Marine Pollution Governance from the Perspective of International Investment Law: Theoretical Connection, Development Trends, and China's Experience"; Rodrigue, "The Precautionary Principle in Environmental Law"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[244] S. Abhayawansa, C. A. Adams, and C. Neesham, "Accountability and Governance in Pursuit of Sustainable Development Goals: Conceptualising How Governments Create Value," *Accounting Auditing and Accountability* 34, no. 4 (2021): 923–45, https://doi.org/10.1108/aaaj-07-2020-4667; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

empowers agencies to impose swift remedial action through administrative authority; and in Saudi Arabia, it reflects a strategic evolution in regulatory design aligned with sustainable development under Vision 2030.[245]

Notably, the Polluter Pays Principle also underpins the emergence of intergenerational equity as a core administrative value. By forcing polluters to bear the long-term ecological and societal costs of their actions, administrative bodies assume a guardianship role not only over present populations but also over future generations and ecological systems. This is especially crucial in climate governance, where delayed action translates into irreversible harm.[246]

Moreover, the Polluter Pays Principle strengthens transparency, accountability, and public trust in governance. When administrative agencies are equipped with the legal mandate to enforce environmental responsibility, and when their actions are open to public scrutiny and judicial review, the administrative process itself becomes a forum for democratic environmental justice. Citizens are no longer passive recipients of harm—they are participants in regulatory fairness.[247]

Thus, the Polluter Pays Principle, when embedded in administrative law, is more than a financial doctrine—it is a legal paradigm that aligns state power with environmental ethics and equitable governance. It offers a forward-looking model where justice is no longer confined to compensating victims but is embedded in the design and operation of state authority. This evolution transforms the administrative state into a protector of the environment, an enforcer of responsibility, and a guarantor of equity across time, space, and society.[248]

4.4 Preventive Justice in Public Administration: The Role of the Precautionary Principle in Advancing Environmental Equity

The Precautionary Principle represents one of the most legally significant extensions of the principle of equity in administrative environmental law. As environmental challenges grow

[245] The Saudi Environmental Law, Royal Decree No. M/165; Climate and Resilience Law No. 2021-1104 of August 22,2021 on Combating Climate Change and Increasing Resilience. Official Journal of the French Republic, August 24, 2021.; The Saudi Arabian Government Tenders and Procurement Law, Royal Decree No. (M/128; Civil Aviation Law (Royal Decree No. M/44 of 12/10/1426H); Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC as regards the EU ETS and Decision (EU) 2015/1814 concerning the Market Stability Reserve [2023] OJ L130/134.

[246] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Yuguda et al., "Hydropower Development, Policy and Partnership in the 21st Century: A China-Nigeria Outlook"; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; The Saudi Civil Transactions Law, Royal Decree No. M/191.

[247] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Rajamani et al., "National 'Fair Share' in Reducing Greenhouse Gas Emissions Within the Principled Framework of International Environmental Law."

[248] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity"; Rodrigue, "The Precautionary Principle in Environmental Law."

more complex and uncertain—particularly those related to climate change, biodiversity loss, and hazardous substances—the ability of public administrations to act before harm occurs becomes a question not only of scientific capacity but of legal and moral fairness. The core logic of the precautionary principle is equity: no person, community, or future generation should bear the cost of preventable harm simply because the science was not yet "conclusive."

4.4.1 Legal Foundations: From Scientific Uncertainty to Administrative Duty

The legal expression of the precautionary principle emerged prominently in international law through instruments such as the Rio Declaration on Environment and Development (1992), Principle 15, which states:

"Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."[249]

This principle is now codified in binding law, notably in Article 191(2) of the Treaty on the Functioning of the European Union. Within the European Union framework, administrative agencies are authorized and required to act preemptively when there is a risk of harm, even without definitive scientific proof. The principle thus transforms uncertainty from a reason for inaction into a trigger for legal responsibility.[250]

4.4.2 Administrative Implementation as a Tool of Equity

From an administrative perspective, the precautionary principle strengthens the preventive function of environmental governance.[251]. It requires that regulators:

- Demand proof of safety before granting permits. [252]
- Conduct cumulative environmental impact assessments, and
- Apply adaptive monitoring systems that evolve as new information emerges.

These tools enable agencies to distribute environmental risks more equitably, ensuring that marginalized or future populations are not forced to absorb the costs of industrial or governmental uncertainty.[253] Procedural equity is embedded in precautionary administration

[249] Climate and Resilience Law No. 2021-1104 of August 22,2021 on Combating Climate Change and Increasing Resilience. Official Journal of the French Republic, August 24, 2021.; Treaty on the Functioning of the European Union, 2016 O.J.C 202/32; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"

[250] Climate and Resilience Law No. 2021-1104 of August 22,2021 on Combating Climate Change and Increasing Resilience. Official Journal of the French Republic, August 24, 2021.; Treaty on the Functioning of the European Union, 2016 O.J.C 202/32; The European Union's Environmental Impact Assessment (EIA) is governed by Directive 2011/92/EU, which has been amended by Directive 2014/52/EU.; The Kenya Climate Change Act, No. 11 of 2016; "The Climate Change Act of the United Kingdom" (2008); Kyoto Protocol to the United Nations Framework Convention on Climate Change,2303 U.N.T.S. 162.

[251] Melet et al., "Sea Level Rise in Europe: Observations and Projections"; The Treaty on the Functioning of the European Union (TFEU) and Directive 2010/75/Eu Are Key Pieces of Eu Legislation Related to Environmental Protection and Industrial Emissions.

[252] Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021).

[253] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public

by involving local communities in early-stage consultations, publishing risk data, and allowing judicial review of precaution-based decisions. [254]

4.4.3 Comparative Perspective: Saudi Arabia, European Union, and the United States

Saudi Arabia has begun formalizing the precautionary principle within its Environmental Regulations. Article 13 grants administrative authorities the power to suspend or prohibit activities suspected of posing environmental or health risks, even without definitive scientific proof. This represents a move toward risk-averse governance that aligns with Islamic environmental ethics and Vision 2030's sustainability goals. Administrative bodies such as the National Center for Environmental Compliance have increasing authority to act in the interest of ecological prevention and social equity.[255]

Within the European Union, precaution constitutes a binding administrative standard. Through regulatory frameworks such as the REACH Regulation and the Water Framework Directive, public authorities are required to assess chemicals, industrial activities, and land uses based on potential risks rather than proven risks. This shift transforms administrative law into a protection-oriented model, wherein failure to act constitutes a breach of public duty and equity in the face of danger. [256] The United States lacks a cohesive legal codification of the precautionary principle, which restricts its explicit administrative implementation.[257] Nevertheless, certain agencies, including the Environmental Protection Agency, are progressively adopting precautionary approaches under the Clean Air Act and the Safe Drinking Water Act, particularly for the regulation of persistent pollutants and climate-related risks. Nonetheless, the United States tends to prefer a cost-benefit model,

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Participation"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity."

[254] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Yuguda et al., "Hydropower Development, Policy and Partnership in the 21st Century: A China-Nigeria Outlook"; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; The Saudi Civil Transactions Law, Royal Decree No. M/191.

[255] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

[256] Abhayawansa, Adams, and Neesham, "Accountability and Governance in Pursuit of Sustainable Development Goals"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[257] The REACH Regulation (EC) No 1907/2006, initially adopted on December 18, 2006, has undergone several amendments and consolidations. A consolidated version, incorporating various amendments, was published on March 1, 2022. The regulation is administered by the European Chemicals Agency (ECHA).; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity"; Rodrigue, "The Precautionary Principle in Environmental Law"; Hale et al., "Environmental Implications of Future Offshore Renewable Energy Development in Aotearoa New Zealand"; Alharbi and Ghonimy, "Environmental Benefits of Olive By-Products in Energy, Soil, and Sustainable Management"; Regazzoni, "Mediation in Environmental Disputes"; Coenen et al., "Environmental Governance of China's Belt and Road Initiative."

which may impede the timely execution of preventive measures, raising concerns regarding distributive inequity, especially among vulnerable or underrepresented populations.

- **Intergenerational Equity and Preventive Justice**

The precautionary principle is fundamental to achieving intergenerational equity, a moral and legal obligation to safeguard future generations from identifiable harm. Administrative law serves as the operative mechanism through which this promise is actualized. Significantly, the Neubauer v. Germany (2021) ruling by the Federal Constitutional Court of Germany reiterated that inaction concerning climate threats constitutes a violation of constitutional responsibilities toward future citizens. This directly corresponds with the precautionary paradigm: governments are compelled to prioritize safety over profitability or political expediency. [258]

- **Precaution as a Pillar of Equitable Administration**

The precautionary principle is not merely a scientific doctrine, but a legal obligation grounded in fairness. It empowers administrative agencies to act ethically under uncertainty and mandates that states prioritize human and ecological safety over industrial risk-taking. When embedded into administrative decision-making, the precautionary principle delivers justice before harm, advancing a model of governance that is just, inclusive, and forward-looking. It is through such anticipatory legal mechanisms that the promise of environmental equity becomes a reality—not only for today's communities, but for those yet to come.[259]

- **The Intersection of Environmental and Administrative Law: Legal Mechanisms, Equity Principles, and Climate Governance Challenges**

The contestation against climate change and ecological degradation increasingly hinges not only on environmental law as a normative framework but also on administrative law as the mechanism of implementation. While environmental law delineates the "what"—targets, standards, and rights—administrative law regulates the "how"—procedures, institutions, and enforcement.[260] This interaction is influenced by fundamental legal values: proportionality, legality, procedural due process, discretionary power, and the safeguarding of the public interest. Nevertheless, in light of the climate emergency and systemic ecological threats, these foundational principles are undergoing scrutiny, and deficiencies are surfacing that necessitate legal adaptation.[261]

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[258] Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021).; Alharbi and Ghonimy, "Environmental Benefits of Olive By-Products in Energy, Soil, and Sustainable Management."

[259] French Conseil D'etat, Commune De Grande-Synthe and others V. France, Case No. 427301, Admissibility; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Alharbi and Ghonimy, "Environmental Benefits of Olive By-Products in Energy, Soil, and Sustainable Management."

[260] Budak, "Existing Landscape of International Climate Law."

[261] Kyoto Protocol to the United Nations Framework Convention on Climate Change,2303 U.N.T.S. 162; The Climate Change Act of the United Kingdom; "The Basic Law of Governance of Saudi Arabia, Royal Order No. A/90" (1992); Mei Yuan et al., "Meeting U.S. Greenhouse Gas Emissions Goals with the International Air Pollution Provision of the Clean Air Act," *Environmental Research Letters* 17, no. 5 (2022): 054019; Yang, "Growing Apart: China and India at the Kigali Amendment to the Montreal Protocol"; Ajayi, Adewale, and Ademola, "Integrating

- **Legal Foundations: Balancing Administrative Values and Environmental Necessity**

The values that underpin administrative decision-making are essential in ensuring that state action remains legitimate, rational, and equitable. In environmental contexts, these values are both enabling and constraining:

Administrative Law Principle	Environmental Law Implication	Challenge in Climate Governance	Legal Adjustment
Proportionality	Ensures that environmental restrictions are not excessive relative to their objectives	Delays in applying urgent climate limits	Calibrate proportionality to long-term planetary boundaries
Procedural Due Process	Requires transparency, participation, and fair hearings	Insufficient public consultation in Environmental Impact Assessments.	Mandate early, digital, and multi-stage consultations
Discretionary Authority	Allows tailoring decisions to context	Risks of arbitrariness or abuse (regulatory capture)	Create binding administrative criteria; allow judicial appeal
Public Interest	Authorizes state action for health, safety, and environment	Conflict with short-term economic development	Codify "climate interest" as part of the public interest test
Legality	Requires that decisions be made under legal authority[262]	Environmental mandates often vague or fragmented	Codify climate-specific duties; strengthen the precision of authorizing statutes

Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

[262] The Treaty on the Functioning of the European Union (TFEU) and Directive 2010/75/Eu Are Key Pieces of Eu Legislation Related to Environmental Protection and Industrial Emissions.

The Administrative Pathway: From Permitting to Enforcement

The climate relevance of administrative law becomes most visible in the permit-based governance chain, which spans from regulatory approval to enforcement.[263] A modern, climate-sensitive administrative framework proceeds as follows:

Step 1: Permit Application

Applicants for industrial, energy, or infrastructure projects must submit detailed environmental and operational documentation. This includes:

- Resource use estimates (water, land, energy). [264]
- Project lifecycle emissions projections.
- Climate risk adaptation plans. [265]

Challenge: Weak scrutiny of submissions due to capacity gaps or political influence.

Step 2: Environmental Impact Assessment

Environmental Impact Assessment is the key mechanism through which administrative agencies evaluate whether the project is environmentally acceptable. [266] It must:

- Assess direct and cumulative impacts (e.g., Greenhouse Gas emissions, biodiversity loss),
- Consider alternatives, including non-implementation.[267]
- Include public participation and expert review.

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[263] Weikmans, van Asselt, and Roberts, "Transparency Requirements Under the Paris Agreement and Their (UN) Likely Impact on Strengthening the Ambition of Nationally Determined Contributions (NDCS)"; Mohammed Alhajji et al., "A National Nudge Study of Differently Framed Messages to Increase COVID-19 Vaccine Uptake in Saudi Arabia: A Randomized Controlled Trial," *Saudi Pharmaceutical Journal* 31, no. 9 (September 1, 2023): 101748, https://doi.org/10.1016/j.jsps.2023.101748; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; The Saudi Civil Transactions Law, Royal Decree No. M/191; The Saudi Environmental Law, Royal Decree No. M/165; The Saudi Arabian Government Tenders and Procurement Law, Royal Decree No. (M/128.

[264] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[265] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Yuguda et al., "Hydropower Development, Policy and Partnership in the 21st Century: A China-Nigeria Outlook"; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; The Saudi Civil Transactions Law, Royal Decree No. M/191.

[266] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Yuguda et al., "Hydropower Development, Policy and Partnership in the 21st Century: A China-Nigeria Outlook"; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; The Saudi Civil Transactions Law, Royal Decree No. M/191.

[267] Kyoto Protocol to the United Nations Framework Convention on Climate Change,2303 U.N.T.S. 162; The Climate Change Act of the United Kingdom; The Saudi Board of Grievances, Royal Decree No. M/78; The Basic Law of Governance of Saudi Arabia, Royal Order No. A/90; The Clean Air Act, 42 U.S.C. § 7401 et seq; Yuan et al., "Meeting U.S. Greenhouse Gas Emissions Goals with the International Air Pollution Provision of the Clean Air Act"; Yang, "Growing Apart: China and India at the Kigali Amendment to the Montreal Protocol."

Weaknesses: ***A considerable number of Environmental Impact Assessments inadequately quantify or address climate impacts in a superficial manner. Some assessments diminish participation to merely formality.***[268]

Solution: ***It is crucial to require the inclusion of climate-specific metrics, such as projected CO_2 emissions, in Environmental Impact Assessments, and to make approval contingent upon proving alignment with climate goals.***[269]

Step 3: Setting Emission Limits

After Environmental Impact Assessment approval, agencies must define legally binding emissions thresholds in the permit:

- Annual Greenhouse Gas emission caps.[270]
- Pollutant discharge limits.[271]
- Adaptation and mitigation obligations (e.g., use of clean technologies).

Problem: Emission limits are often outdated, generalized, or based on non-binding guidelines.

Fix: Make limits dynamic, science-based, and enforceable through administrative orders—reference international benchmarks (e.g., Intergovernmental Panel on Climate Change, Nationally Determined Contributions).

Step 4: Appeals and Public Challenges

Administrative law offers a critical remedy through mechanisms for appeals. Stakeholders, which include civil society, local residents, or competing applicants, have the opportunity to challenge:

- Environmental Impact Assessment quality.
- Lack of due process.[272]
- Unlawful permit issuance.

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[268] French Conseil D'etat, Commune De Grande-Synthe and others V. France, Case No. 427301, Admissibility; Weikmans, van Asselt, and Roberts, "Transparency Requirements Under the Paris Agreement and Their (UN) Likely Impact on Strengthening the Ambition of Nationally Determined Contributions (NDCS)"; Pratama et al., "China's Policy Developments in The Implementation of The Paris Agreement: Strategies and Challenges in Addressing The 2020-2024 Carbon Emission Problem"; "The Paris Agreement | UNFCCC."

[269] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[270] Kyoto Protocol to the United Nations Framework Convention on Climate Change,2303 U.N.T.S. 162; Yuan et al., "Meeting U.S. Greenhouse Gas Emissions Goals with the International Air Pollution Provision of the Clean Air Act"; Yang, "Growing Apart: China and India at the Kigali Amendment to the Montreal Protocol."

[271] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[272] Liu and Yu, "Examining Marine Pollution Governance from the Perspective of International Investment Law: Theoretical Connection, Development Trends, and China's Experience"; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation."

Threat: Access to justice is often restricted by standing rules or a lack of transparency.

Solution: Guarantee standing in environmental cases; require agencies to publish full decisions and supporting data.

Step 5: Monitoring, Enforcement, and Penalties

Once a permit is operational:

- Agencies must monitor compliance (e.g., emissions reporting).[273]
- Conduct inspections.
- Impose administrative penalties for breaches.

Gap: Agencies often lack sufficient staff, tools, or independence.[274]

Solution: Digitize monitoring systems (e.g., real-time pollution tracking); allow independent auditors; ensure penalties are proportional and restorative.

- **Substantive vs. Procedural Legality: When Adhering to the Rules Is Insufficient**

One of the greatest risks in climate governance is formal compliance without substantive environmental protection. A permit may be legally issued, all procedural boxes checked, yet still result in environmental harm because:

- The Environmental Impact Assessment was superficial.
- Emissions were underestimated.[275]
- Alternatives were not seriously considered.

Thus, administrative law must evolve toward substantive environmental legality—a regime where following the rules is not enough unless the outcome also aligns with ecological integrity and climate targets.[276]

Example: In many jurisdictions, Environmental Impact Assessments do not require a "climate compatibility test," allowing carbon-intensive projects to proceed despite national or international emissions reduction goals.[277]

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[273] Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*; Budak, "Existing Landscape of International Climate Law."

[274] The Saudi Environmental Law, Royal Decree No. M/165; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Alharbi and Ghonimy, "Environmental Benefits of Olive By-Products in Energy, Soil, and Sustainable Management."

[275] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

[276] The REACH Regulation (EC) No 1907/2006, initially adopted on December 18, 2006, has undergone several amendments and consolidations. A consolidated version, incorporating various amendments, was published on March 1, 2022. The regulation is administered by the European Chemicals Agency (ECHA).; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Alharbi and Ghonimy, "Environmental Benefits of Olive By-Products in Energy, Soil, and Sustainable Management."

[277] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity"; Rodrigue, "The Precautionary Principle in Environmental Law."

Reform: Introduce a "climate impact compliance clause" in all administrative authorizations, making them revocable if future data reveals unacceptable consequences for Greenhouse Gas.

- **Challenges: Regulatory Capture and Institutional Capacity**

Two structural threats undermine the entire architecture:

- **Regulatory Capture**

Occurs when administrative bodies favor polluting industries due to political pressure or lobbying.[278]

Solution: Enhance transparency obligations and enable third-party oversight in significant climate-related permits.

- **Institutional Weakness**

Agencies may lack data, staffing, legal tools, or scientific knowledge to implement complex environmental duties.[279]

Solution: Create specialized climate units within administrative agencies; integrate AI-powered environmental data systems; build inter-ministerial coordination platforms.

- **Toward a Coherent, Dynamic, and Just Administrative Framework for Climate Governance**

The administrative state is at the center of the climate challenge. It is where laws become action, and where environmental legality and public legitimacy are tested in real time. [280] The interaction between administrative and environmental law must therefore evolve to meet three simultaneous demands:

- **Substantive effectiveness:** Ensure decisions actually reduce harm, not just comply procedurally.
- **Procedural fairness:** Guarantee meaningful participation, access to data, and equitable remedies.
- **Dynamic legality:** Allow adaptive, evidence-based regulation as science and climate conditions evolve. [281]

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[278] The REACH Regulation (EC) No 1907/2006, initially adopted on December 18, 2006, has undergone several amendments and consolidations. A consolidated version, incorporating various amendments, was published on March 1, 2022. The regulation is administered by the European Chemicals Agency (ECHA).; Patrick Bayer and Michaël Aklin, "The European Union Emissions Trading System Reduced CO2 Emissions despite Low Prices," *Proceedings of the National Academy of Sciences* 117, no. 16 (2020): 8804–12.

[279] The Basic Law of Governance of Saudi Arabia, Royal Order No. A/90; The Clean Air Act, 42 U.S.C. § 7401 et seq; Yuan et al., "Meeting U.S. Greenhouse Gas Emissions Goals with the International Air Pollution Provision of the Clean Air Act"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives."

[280] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices."

[281] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity"; Rodrigue, "The Precautionary Principle in Environmental Law."

Administrative law should not simply grant authority; it must also delineate authority in the pursuit of intergenerational equity, climate resilience, and democratic environmental governance. Through the redesign of permitting processes, enhancement of Environmental Impact Assessments, reinforcement of emission controls, and establishment of legitimate appeal mechanisms, the administrative system evolves from merely a bureaucratic conduit into a legal instrument of climate justice.[282]

- **The Structural Failure of the Paris Agreement: Causation, Environmental Principles, and the Absence of Administrative Law**

Despite its global endorsement, the Paris Agreement suffers from critical limitations in legal enforceability and institutional application.[283] While it marked a breakthrough in international climate consensus, it lacks the operational legal architecture to enforce obligations, protect victims of climate harm, or translate environmental principles into domestic regulatory action.[284]

- **Three Core Legal And Institutional Challenges Define Its Failure:**

1. **Causation gaps:** Difficulty linking emissions to specific damages
2. **Legally unaddressed harm:** Environmental damage with no liability or remedy
3. **Institutional weakness:** Lack of administrative structures to enforce climate commitments

- **Causation: The Untraceable Chain of Responsibility**

In law, causation is essential to establish liability—one must prove a direct link between an action and a specific harm. In climate change, however, emissions:

- Accumulate over decades (cumulative).[285]
- Cross national borders (transboundary).
- Involve many sources (collective).[286]

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[282] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[283] French Conseil D'etat, Commune De Grande-Synthe and others V. France, Case No. 427301, Admissibility; Weikmans, van Asselt, and Roberts, "Transparency Requirements Under the Paris Agreement and Their (UN) Likely Impact on Strengthening the Ambition of Nationally Determined Contributions (NDCS)"; Pratama et al., "China's Policy Developments in The Implementation of The Paris Agreement: Strategies and Challenges in Addressing The 2020-2024 Carbon Emission Problem"; "The Paris Agreement | UNFCCC"; Lee, "The Aarhus Convention 1998 and the Environment Act 2021: Eroding Public Participation"; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity."

[284] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Yuguda et al., "Hydropower Development, Policy and Partnership in the 21st Century: A China-Nigeria Outlook"; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; The Saudi Civil Transactions Law, Royal Decree No. M/191.

[285] Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*; Budak, "Existing Landscape of International Climate Law."

[286] Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021).

Thus, no single country or company can be easily held responsible for particular damages like floods, crop loss, or wildfires. This causal ambiguity shields major emitters from legal claims.[287]

Paris Agreement Gap: No legal liability framework exists. The agreement does not include tools to establish or enforce causation, undermining accountability.

- **Environmental Harm Without Legal Remedy**

The effects of climate change—rising sea levels, biodiversity collapse, extreme weather—are scientifically proven. But under the Paris Agreement, no legal mechanism exists to assign responsibility or require remediation. The "Loss and Damage" mechanism is advisory, unfunded, and non-compulsory.[288]

This violates the Precautionary Principle, which calls for proactive action even under uncertainty, and fails the Environmental Justice principle by offering no legal path for vulnerable communities to seek redress.[289]

- **Systemic Institutional Gaps: Law Without Administration**

The Paris Agreement utilizes a "pledge and review" model, wherein nations voluntarily detail their Nationally Determined Contributions. However, there are:

- No penalties for failure.
- There is no climate court or tribunal.[290]
- Monitoring is periodic and non-binding.
- National agencies have broad discretion to interpret or delay action.

This soft framework violates basic tenets of administrative law, including legality, proportionality, and accountability. Administrative authorities are not legally required to incorporate climate targets into permits, licenses, or planning decisions.[291]

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[287] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices."

[288] Budak, "Existing Landscape of International Climate Law."

[289] Abhayawansa, Adams, and Neesham, "Accountability and Governance in Pursuit of Sustainable Development Goals"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[290] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

[291] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Yuguda et al., "Hydropower Development, Policy and Partnership in the 21st Century: A China-Nigeria Outlook"; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; The Saudi Civil Transactions Law, Royal Decree No. M/191.

- **Are Environmental Principles Applied in the Paris Agreement?**

Principle	Definition	Paris Agreement Application	Legal Status
Precautionary Principle	Act early despite scientific uncertainty	Referenced, but not binding	Not enforceable
Polluter Pays	Polluters should bear the cost of the damage they cause	No liability or cost mechanism	Absent
Environmental Justice	Fair distribution of environmental burdens and access to remedy	Acknowledged, but no procedural rights	Symbolic only
Intergenerational Equity	Protect rights of future generations[292]	Weak long-term targets, no enforcement	Partially

The Paris Agreement symbolically refers to these principles but does not operationalize them through enforceable obligations or procedures.

- **Environmental Impact Assessment: A Disconnected Tool**

Environmental Impact Assessment is the procedural backbone of environmental law. Ideally, it should assess whether public or private projects align with national and international environmental objectives. However:

- Most Environmental Impact Assessment laws do not determine climate compatibility (e.g., whether a new project aligns with Nationally Determined Contributions or net-zero goals). [293]
- Environmental Impact Assessments are often narrow in scope, focusing on local impacts, not global emissions
- Strategic Environmental Assessment—designed for broader climate planning—is optional or underused. [294]

In the absence of obligatory climate criteria, Environmental Impact Assessments are reduced to mere formalities that are disconnected from the objectives set forth in the Paris

[292] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021).; Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change."

[293] Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021).

[294] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Yuguda et al., "Hydropower Development, Policy and Partnership in the 21st Century: A China-Nigeria Outlook"; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; The Saudi Civil Transactions Law, Royal Decree No. M/191.

Agreement. This situation undermines environmental governance and renders administrative oversight ineffective. [295]

- **Administrative Law: The Missing Bridge Between Goals and Action**

Administrative law ensures that government agencies act:

- Lawfully (within their powers). [296]
- Proportionally (balancing public and private interests). [297]
- Accountably (subject to review). [298]

For the Paris Agreement to work, national agencies must translate climate goals into enforceable administrative decisions. This means:

- Linking Nationally Determined Contributions targets to licensing, permitting, and land-use planning. [299]
- Making climate compliance mandatory in Environmental Impact and Strategic Environmental Assessments processes.
- Facilitating the ability of courts and civil society to contest inaction or inadequate enforcement.

Nevertheless, most countries, including those with high emissions, have not legally integrated these responsibilities into their administrative frameworks.

- **Comparative Insight: Saudi Arabia and the United States**

Both systems exemplify rigorous administrative law and, for comparison, the enforcement of climate commitments, notwithstanding existing legal frameworks.

Saudi Arabia:

- Climate action is part of Vision 2030 and the Saudi Green Initiative. [300]
- Environmental law facilitates proactive regulation; however, Environmental Impact Assessments frequently overlook considerations related to carbon impact or long-term climate risk. Furthermore, there exists a binding correlation between Nationally Determined

[295] Partelow et al., "Environmental Governance Theories: A Review and Application to Coastal Systems."

[296] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity"; Rodrigue, "The Precautionary Principle in Environmental Law."

[297] Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*; Budak, "Existing Landscape of International Climate Law."

[298] The Saudi Environmental Law, Royal Decree No. M/165; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Alharbi and Ghonimy, "Environmental Benefits of Olive By-Products in Energy, Soil, and Sustainable Management."

[299] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity"; Rodrigue, "The Precautionary Principle in Environmental Law."

[300] The Saudi Environmental Law, Royal Decree No. M/165.

Contributions and project-level permitting. Additionally, administrative discretion remains consistent. [301]

United States:

- Statutes like the Clean Air Act shape environmental governance. [302]
- The Supreme Court's 2022 decision (West Virginia v. Environmental Protection Agency) narrowed the federal agency's ability to regulate emissions, weakening administrative enforcement.

▪ **Brief Overview of West Virginia v. Environmental Protection Agency: Where Is the Administrative Law?**

The United States Supreme Court determined that the Environmental Protection Agency exceeded its statutory authority under the Clean Air Act in its attempts to enforce the Clean Power Plan, a regulation intended to transition electricity generation from coal to more sustainable energy sources. The Court held that the Agency's interpretation involved a "major question" of national significance and required explicit congressional authorization.[303]

▪ **Administrative Law Application West Virginia V. The Environmental Protection Agency:**

1. **Major Questions Doctrine:**

- The Court applied the major questions doctrine, which holds that administrative agencies must have clear congressional authorization when making decisions of vast economic and political significance.[304]
- This limited the Environmental Protection Agency's discretion to broadly interpret ambiguous statutes in a way that allows it to restructure national energy policy.[305]

2. **Chevron Deference Limited:**

- The case marked a shift away from the Chevron doctrine, which traditionally allowed agencies to interpret ambiguous statutory language if their interpretation was reasonable.

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[301] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices."

[302] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

[303] Ajayi, Adewale, and Ademola; Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021).; Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change."

[304] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[305] West Virginia v. Environmental Protection Agency, 597 U.S. 697 (2022); Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Alharbi and Ghonimy, "Environmental Benefits of Olive By-Products in Energy, Soil, and Sustainable Management."

- The Court demanded a stricter standard for agency rulemaking when major economic or political issues are involved. [306]

3. Violation of Separation of Powers:

- The Court emphasized the constitutional principle of separation of powers, asserting that Congress—not agencies—must make major policy decisions.

▪ **Administrative Law Gaps Highlighted In West Virginia V. The Environmental Protection Agency:**

- **Lack of Clear Legislative Guidance:** The Clean Air Act does not contain explicit language authorizing the Environmental Protection Agency to enforce generation-shifting policies, thereby exposing a disparity between environmental objectives and statutory mandates.
- **Unclear Boundaries of Agency Power:** The ruling exposed how agencies may overreach when filling regulatory gaps, especially in climate governance, where technology and policy are rapidly evolving.
- **Weakness in Adaptive Governance:** The decision slows down administrative innovation in response to urgent issues like climate change, revealing that traditional administrative frameworks may be too rigid for modern environmental challenges. Courts can mandate action (e.g., Massachusetts v. Environmental Protection Agency, 2007), but climate goals still depend on political will and inconsistent agency discretion.[307]

The case of West Virginia v. Environmental Protection Agency represents a significant development in administrative law, reshaping the boundaries of agency discretion pursuant to the major questions doctrine.[308] It underscores the necessity for explicit legislative authorization in the formulation of agency policy, while also illuminating systemic deficiencies arising from antiquated legal frameworks and insufficient dynamic legislative backing that impede effective environmental governance. [309]

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[306] Budak, "Existing Landscape of International Climate Law."

[307] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity"; Rodrigue, "The Precautionary Principle in Environmental Law."

[308] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[309] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

- **Summary Table: Structural Gaps in the Paris Agreement**

Issue	Gap Description	Impact on Enforcement
Causation	No method to assign liability	Polluters escape responsibility
Harm	No compensation or redress mechanism	Victims lack remedy
Principles	Symbolic references, not binding	No legal obligation to act
Integration of Environmental Impact Assessments	Weak or missing climate criteria in project review	Projects may undermine national targets[310]
Administrative Law Linkage	Climate goals not integrated into licensing & permitting[311]	Agencies not accountable

- **From Aspiration to Mandated Governance**

The Paris Agreement's effectiveness depends not only on global consensus but on the administrative and legal mechanisms that enforce its vision. Without causation frameworks, enforceable principles, and administrative procedures linked to emissions targets, the Agreement remains a statement of intent rather than a tool of justice.

- **To Address This Gap:**

- Codify environmental principles into binding administrative law.
- Link Environmental Impact and Strategic Environmental Assessments to national and international climate goals.[312]
- Ensure judicial oversight of administrative climate inaction. [313]

[310] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[311] Liu and Yu, "Examining Marine Pollution Governance from the Perspective of International Investment Law: Theoretical Connection, Development Trends, and China's Experience"; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation."

[312] The Treaty on the Functioning of the European Union (TFEU) and Directive 2010/75/Eu Are Key Pieces of Eu Legislation Related to Environmental Protection and Industrial Emissions.

[313] The Saudi Environmental Law, Royal Decree No. M/165; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Alharbi and Ghonimy, "Environmental Benefits of Olive By-Products in Energy, Soil, and Sustainable Management."

- Create legal pathways for victims to seek remedy and accountability. [314]

It is only through this process that environmental principles may transition from theoretical frameworks to practical applications, and that climate commitments can evolve from mere promises into tangible protections. [315]

4.3 Mechanisms of Legal Responsibility in Environmental and Climate Law

The legal architecture of environmental and climate responsibility transforms traditional doctrines of harm, liability, and enforcement, struggling to respond to climate change's diffuse and long-term nature. [316] Responsibility is increasingly addressed through three intersecting legal frameworks—civil liability, criminal accountability, and administrative sanctioning—each offering unique mechanisms for enforcing climate obligations and attributing legal fault.[317]

4.3.1 Civil Liability: Attribution and Compensation

Civil liability remains the most developed avenue for seeking redress for climate-related harm. Under tort law principles such as negligence, nuisance, and strict liability, claimants seek compensation for environmental damage caused by excessive Greenhouse Gas emissions.[318] In the pivotal case of Milieudefensie v. Royal Dutch Shell, the court determined that Shell is obligated to fulfill its duty of care following Dutch civil law and international human rights standards, necessitating a reduction in its carbon emissions by 45% by the year 2030. This ruling represents a substantial doctrinal shift, recognizing corporate responsibilities consistent with the Paris Agreement, notwithstanding the lack of explicit statutory provisions or requirements.[319]

National statutes also provide for civil environmental responsibility.[320] For example, the German Environmental Liability Act implements the European Union Environmental Liability Directive (2004/35/EC), allowing private parties to compensate polluters whose

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[314] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Yuguda et al., "Hydropower Development, Policy and Partnership in the 21st Century: A China-Nigeria Outlook"; "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart"; The Saudi Civil Transactions Law, Royal Decree No. M/191.

[315] Abhayawansa, Adams, and Neesham, "Accountability and Governance in Pursuit of Sustainable Development Goals"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[316] Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity"; Rodrigue, "The Precautionary Principle in Environmental Law."

[317] Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change."

[318] Yuan et al., "Meeting U.S. Greenhouse Gas Emissions Goals with the International Air Pollution Provision of the Clean Air Act."

[319] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021).; Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change."

[320] Budak, "Existing Landscape of International Climate Law."

emissions cause measurable environmental harm.[321] Saudi Arabia's Environmental Law also includes civil liability provisions, holding polluters accountable for restoration costs and compensation for environmental damage, particularly where harm results from negligence or violating licensing conditions.[322]

4.3.2 Criminal Liability: Punishment for Environmental Harm

Criminal accountability in the domain of climate-related issues continues to exist; however, it is progressing at an accelerated pace. Environmental offenses, which encompass unlawful emissions, the falsification of carbon offset data, and significant pollution, are increasingly being subjected to criminalization under national legislation.[323] In France, the 2021 Climate and Resilience Law established new environmental criminal offenses, including the term "ecocide," which is defined as intentional actions resulting in severe and enduring ecological harm.[324]

At the international level, significant momentum is accruing towards the recognition of ecocide as a fifth core crime under the Rome Statute of the International Criminal Court. The draft definitions proposed by the Independent Expert Panel in 2021 would render unlawful or wanton acts committed with knowledge of severe environmental degradation, including those from climate-related activities criminal offenses.[325] Although these definitions are not yet legally binding, they indicate a notable shift towards holding individuals, including Chief Executive Officers and government ministers, criminally accountable for actions related to climate change destruction.[326]

4.4 Administrative Responsibility: Enforcement Through Governance Mechanisms

Administrative law is the primary mechanism for climate enforcement, predominantly via licensing, Environmental Impact Assessments, and sanctions. Regulatory authorities possess

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[321] Budak.

[322] "Us Sets Target to Reduce Emissions by 50-52% Below 2005 Levels in 2030"; "Saudi 'Green Financing Framework' (National Debt Management Center/Ministry of Finance)"; Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change"; Melet et al., "Sea Level Rise in Europe: Observations and Projections"; Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices"; Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets"; Sofia Rampazzo, "An Evaluation of the European Union Emissions Trading System: The Importance of Including Methane Emissions Along the Supply Chain of Natural Gas and Crude Oil," 2024; Woerdman and Van Zeben, "European Union Emissions Trading System (EU ETS)."

[323] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[324] Neubauer, et al. v. Germany, Order of Mar. 24, 2021, 1 BvR 2656/18 (Fed. Const. Ct.).

[325] Celermajer et al., *Institutionalising Multispecies Justice*.

[326] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices"; "Climate and Resilience Law No. 2021-1104 of August 22, 2021, on Combating Climate Change and Increasing Resilience. Official Journal of the French Republic, August 24, 2021. Https://Www.Legifrance.Gouv.Fr." (2021).

the authority to impose fines, revoke permits, or mandate compliance in cases of climate violations. For instance, according to the European Union's Industrial Emissions Directive (2010/75/EU), significant facility operators must adhere to the Best Available Techniques for emissions reduction. Administrative courts across the European Union have upheld permit conditions as binding legal obligations.[327]

The National Center for Environmental Compliance exercises administrative authority in Saudi Arabia to inspect, license, and sanction projects violating emissions thresholds. Its decisions are subject to review by the Board of Grievances, which serves as the competent administrative court.[328]

4.4.1 Identifying the Responsible Party and the Legal Forum

The scope of legal responsibility now extends beyond direct polluters to include states, multinational corporations, financial institutions, and even public regulators.[329] Following the United Nations Framework Convention on Climate Change, states are assigned differentiated responsibilities, with developed countries obligated to assume the lead in mitigation efforts. Failing to fulfill Nationally Determined Contributions may invoke state responsibility under customary international law, especially when harm transgresses national borders.[330]

The adjudication of international justice regarding climate issues can take place. In the case of Greenpeace Nordic v. Norway, the Norwegian Supreme Court scrutinized whether oil exploration infringed upon constitutional rights to a healthy environment.[331] The European Court of Human Rights, in *Verein KlimaSeniorinnen Schweiz v. Switzerland*,[332] held in 2024 that inadequate climate action contravened Article 8 of the European Convention, thereby establishing a duty for states to safeguard life and health against the implications of climate change. [333]

4.4.2 Legal forums vary by jurisdiction and claim type

There are many different types of jurisdictions that individuals can utilize as follows:

- Civil courts handle tort-based and constitutional damages claims.

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[327] Smoke and Cook, *Administrative Decentralization and Climate Change: Concepts, Experience, and Action*; Budak, "Existing Landscape of International Climate Law."

[328] Yuan et al., "Meeting U.S. Greenhouse Gas Emissions Goals with the International Air Pollution Provision of the Clean Air Act."

[329] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[330] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[331] Cohan and Webber; Greenpeace Nordic and Others v. Norway, Application no. 34068/21, communicated on 16 December 2021, at the European Court of Human Rights (2021).

[332] Verein KlimaSeniorinnen Schweiz and Others v. Switzerland, 53600/20, European Court of Human Rights, Application No. 53600/20, April 9, 2024. (2024).

[333] See generally, Neubauer, et al. v. Germany, Order of Mar. 24, 2021, 1 BvR 2656/18 (Fed. Const. Ct.); Coenen et al., "Environmental Governance of China's Belt and Road Initiative"; Rampazzo, "An Evaluation of the European Union Emissions Trading System: The Importance of Including Methane Emissions Along the Supply Chain of Natural Gas and Crude Oil"; Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change"; Melet et al., "Sea Level Rise in Europe: Observations and Projections"; Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices"; Woerdman and Van Zeben, "European Union Emissions Trading System (EU ETS)."

•Administrative courts review licensing and enforcement decisions.[334]

•International tribunals (e.g., The International Criminal Court, The International Court of Justice, The International Tribunal for the Law of the Sea) are increasingly invoked for transboundary linked climate harm.[335]

4.4.4 Temporal Dimensions of Climate Harm

A significant challenge in addressing climate responsibility pertains to the temporal characteristics of climate-related harm.[336] In contrast to immediate pollution incidents, the impacts of climate change typically manifest over extended periods, encompassing cumulative emissions and deferred repercussions, such as rising sea levels, desertification, or the collapse of ecosystems.[337] Legal frameworks are evolving by integrating intertemporal principles, thus ensuring that states and stakeholders are held accountable for future damages resulting from current inaction.[338]

In Neubauer v. Germany, the Court determined that delaying emission reductions related to climate targets unfairly imposes a heavier burden on future generations, infringing on their fundamental rights. This decision established the principle of "climate justice over time," which requires legislative and administrative strategies to consider intergenerational equity.[339]

4.4.5 How Can Causation and Responsibility for Climate Harm Be Proven Through Administrative Law?

Proving legal responsibility for climate-related harm is challenging because such harm typically results from the cumulative actions of multiple actors across borders and over decades—traditional legal models based on direct causation struggle to handle this complexity. Administrative law provides a flexible and proactive framework that allows regulators to establish responsibility even when causation is shared or indirect.[340] A landmark case in this area is Milieudefensie v. Shell, where the court found that Royal Dutch Shell had a duty to reduce its greenhouse gas emissions.[341] Shell was not solely responsible for global climate change, but the court recognized that its significant contribution created a legal obligation.[342] This case marked a shift toward acknowledging cumulative

[334] The Saudi Board of Grievances, Royal Decree No. M/78.
[335] Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021).
[336] Budak, "Existing Landscape of International Climate Law."
[337] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."
[338] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices."
[339] Neubauer, et al. v. Germany, Order of Mar. 24, 2021, 1 BvR 2656/18 (Fed. Const. Ct.).
[340] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."
[341] Greenpeace Nordic and Others v. Norway, Application no. 34068/21, communicated on 16 December 2021, at the European Court of Human Rights; Neubauer, et al. v. Germany, Order of Mar. 24, 2021, 1 BvR 2656/18 (Fed. Const. Ct.).
[342] Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021).

responsibility and using administrative principles, like the duty of care, risk management, and policy oversight, are, risk management, and policy oversight to impose enforceable obligations on major emitters.[343]

In a comparative analysis, Saudi Arabia has embraced a progressive approach by implementing the Environmental Law, which authorizes the National Center for Environmental Compliance to enforce administrative mechanisms, including ex-ante environmental impact assessments, adaptive licensing systems, and digital monitoring. These instruments empower Saudi regulators to monitor potential ecological damages, identify accountable parties, and require mitigation plans before the commencement of projects.[344] While Saudi Arabia is not equivalent to Milieudefensie, it is essential to note that its administrative institutions are designed to proactively manage environmental risks in alignment with Vision 2030 and global climate objectives.[345]

The key strength of administrative law lies in its preventive and coordinated nature. Unlike civil litigation, which often reacts after damage occurs, administrative law embeds responsibility into decision-making. It also allows for shared responsibility across multiple domestic or international actors by using cumulative emissions, risk contribution, and compliance behavior as grounds for regulatory action.[346]

Thus, by relying on administrative law, states can reasonably ascertain the individuals or entities responsible for contributing to climate harm and mandate corrective measures, even without traditional causation. [347] This approach establishes a just, evidence-based pathway for climate accountability without compromising development or cooperation with international objectives.[348]

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[343] Abdulmehsen Mohammad AlNemer, "Examining the Kingdom of Saudi Arabia's Tourism Sector and Assessing Its Potential Contributions in Achieving the Kingdom's Vision 2030," 2024, https://www.proquest.com/dissertations-theses/examining-kingdom-saudi-arabias-tourism-sector/docview/3067154526/se-2; The Saudi Environmental Law, Royal Decree No. M/165; The Saudi Civil Transactions Law, Royal Decree No. M/191; "The Law of the Board of Grievances in Saudi Arabia, Royal Decree No. M/78" (2007); The Basic Law of Governance of Saudi Arabia, Royal Order No. A/90.

[344] "National Center for Environmental Compliance (NCEC), Established by Cabinet Resolution in March 2019, Based in Riyadh," 2019; The Saudi Environmental Law, Royal Decree No. M/165; The Saudi Civil Transactions Law, Royal Decree No. M/191; The Saudi Board of Grievances, Royal Decree No. M/78; The Basic Law of Governance of Saudi Arabia, Royal Order No. A/90.

[345] "National Center for Environmental Compliance (NCEC), Established by Cabinet Resolution in March 2019, Based in Riyadh,."

[346] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

[347] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[348] AlNemer, "Examining the Kingdom of Saudi Arabia's Tourism Sector and Assessing Its Potential Contributions in Achieving the Kingdom's Vision 2030"; The Saudi Civil Transactions Law, Royal Decree No. M/191; The Saudi Environmental Law, Royal Decree No. M/165; The Law of the Board of Grievances in Saudi Arabia, Royal Decree No. M/78.

5. LEGAL PATHWAYS TO ENFORCING CLIMATE AGREEMENTS

5.1 From Voluntary Pledges to Legally Binding Domestic Obligations

The Paris Agreement and related climate frameworks mark a turning point in international environmental law: global cooperation is no longer defined by top-down binding quotas but by Nationally Determined Contributions that reflect domestic conditions and sovereignty.[349] While this shift encourages participation, it also raises questions of enforceability.[350] The legal transformation of climate pledges into enforceable obligations begins when states incorporate international climate commitments into their national legal frameworks.[351] Domestic incorporation requires that climate goals be codified through legislation, executive regulation, or constitutional recognition. [352] Countries like France, Kenya, and the United Kingdom have adopted national climate laws, translating their Nationally Determined Contributions into binding targets.[353] These domestic instruments empower administrative bodies to act and create a legal basis for oversight.[354] This way, enforcement becomes a national legal function that bridges international goals with concrete administrative and institutional action.[355]

5.2 Defining Legal Duties for Ministries and Agencies: Sectoral Enforcement as Legal Obligation

Effective climate enforcement depends on clarifying which state actors are responsible for which emissions. The design of legal frameworks must move beyond broad commitments and assign specific, measurable obligations to public authorities. A promising model is the sectoral allocation of emissions ceilings or performance indicators. Ministries of energy, housing, transport, and water can each be given binding mitigation and adaptation responsibilities under national law.[356] The legal obligations may be incorporated into annual

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[349] Nishchay Mehrotra and Emmanuel Olatunbosun Benjamin, "Evaluating the Enhancement of the Nationally Determined Contributions (NDCS) of Developing Countries: An International Support Programme Perspective," *Climate Policy* 22, no. 6 (2022): 728–42.

[350] Liu and Yu, "Examining Marine Pollution Governance from the Perspective of International Investment Law: Theoretical Connection, Development Trends, and China's Experience"; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation."

[351] Dang et al., "Spatial Pattern of Co2 and Ch4 Emission and Its Influencing Factors from River Confluence Areas."

[352] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[353] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[354] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[355] Neubauer, et al. v. Germany, Order of Mar. 24, 2021, 1 BvR 2656/18 (Fed. Const. Ct.).

[356] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health." Onur Cagdas Artantas, "Green Electricity Promotion in Germany," in *Promotion of Green Electricity in Germany and Turkey: A Comparison with Reference to the WTO and EU Law* (Springer, 2023), 139–67; Joana Setzer and Catherine Higham, "Global Trends in Climate Change Litigation: 2023 Snapshot," 2023.

performance reports, budgetary processes, or integrated planning tools. This approach aligns effectively with the established performance-driven governance structures in nations with administrative frameworks, as exemplified by advanced initiatives such as Saudi Arabia's Vision 2030 environmental transformation.[357] Enforcement arises from administrative discipline and compliance with legal mandates akin to fiscal or procurement regulations. Oversight bodies, judicial entities, or auditing organizations must scrutinize these responsibilities. This framework elevates emissions reduction from a mere policy objective to a legally binding public commitment obligation.

5.3 Climate Oversight Bodies and Institutional Enforcement Mechanisms

To monitor compliance and drive enforcement, legal systems benefit from independent climate oversight bodies. These institutions—whether established by law or decree—act as watchdogs and performance evaluators.[358] They may track government progress on climate targets, evaluate policy impacts, and publish public reports. Some, like the UK's Climate Change Committee or South Korea's Presidential Commission on Carbon Neutrality, have advisory roles, while others have quasi-regulatory powers. Legal frameworks should empower these bodies to request data from ministries, issue binding recommendations in case of policy failures, and refer cases for judicial review if government agencies neglect their duties.[359] In the Arab region, countries could adapt this model to existing institutional ecosystems by establishing a National Climate Oversight Authority, combining legal, scientific, and economic expertise. This authority would help translate technical climate science into actionable legal advice.[360] By institutionalizing oversight, states ensure that enforcement is not reactive but proactive, ongoing, and supported by a public record of accountability.[361]

5.4 Legalizing Climate Impact Assessment: A Discussion and Analysis of Public Participation and Cooperation in Recent Judicial Applications

Modern administrative law increasingly recognizes that decisions must be based on legality and scientific and environmental rationality. As climate risks grow more systemic, states are beginning to adopt Climate Impact Assessment procedures beyond traditional Environmental Impact Assessments. These legal instruments require public bodies to assess the long-term climate consequences of any major infrastructure, energy, or urban planning

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[357] AlNemer, "Examining the Kingdom of Saudi Arabia's Tourism Sector and Assessing Its Potential Contributions in Achieving the Kingdom's Vision 2030"; The Saudi Environmental Law, Royal Decree No. M/165; The Saudi Civil Transactions Law, Royal Decree No. M/191; The Law of the Board of Grievances in Saudi Arabia, Royal Decree No. M/78; The Basic Law of Governance of Saudi Arabia, Royal Order No. A/90.

[358] Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[359] Dang et al., "Spatial Pattern of Co2 and Ch4 Emission and Its Influencing Factors from River Confluence Areas"; Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021).

[360] Yuan et al., "Meeting U.S. Greenhouse Gas Emissions Goals with the International Air Pollution Provision of the Clean Air Act."

[361] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

decision. For instance, public investment in new highways or power generation must include an analysis of how that project contributes to or undermines national climate targets. These assessments can be made legally binding conditions of administrative approval.[362] Furthermore, administrative courts may be empowered to annul decisions that lack adequate climate reasoning.[363] This trend is emerging in courts in Europe and Latin America and could be adapted across legal systems that already respect procedural fairness and proportionality. Legalizing climate assessment ensures that enforcement is not just about penalties but about ensuring rationality, foresight, and integrity in governance. Enforcement also depends on the availability of legal remedies. Citizens, private entities, and impacted communities should possess the capacity to contest administrative inaction or unauthorized emissions approvals. Legal standing regulations should be modified to facilitate public interest litigation concerning climate matters.[364] National courts, including administrative and constitutional jurisdictions, can play an essential role by requiring governments to meet their climate targets or strike down decisions inconsistent with environmental law.[365] International cooperation mechanisms may offer external support momenta, such as the Global Stocktake, the Transparency Framework under the Paris Agreement, and various regional legal cooperation platforms support momenta, such as the Global Stocktake, the Transparency Framework under the Paris Agreement, and various regional legal cooperation platforms.[366] These mechanisms may not impose stiff sanctions but increase visibility, comparability, and mutual accountability, encouraging states to stay on course. Enforcement thus becomes a shared responsibility—anchored in domestic law, supported by regional norms, and coordinated through global instruments.[367]

The enforcement of climate agreements is not about coercion or penalties but about designing legal systems that support governments in fulfilling their responsibilities. Contemporary discourse has demonstrated that the enforcement of climate regulations necessitates legal clarity, a well-defined institutional framework, and public legitimacy. The process encompasses translating global targets into domestic legislation, assigning sector-specific legal responsibilities, and establishing institutional oversight accompanied by judicial remedies. Consequently, states are equipped with diverse tools to fulfill their climate commitments.[368]

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[362] Ajayi, Adewale, and Ademola.

[363] Abhayawansa, Adams, and Neesham, "Accountability and Governance in Pursuit of Sustainable Development Goals"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[364] Kyoto Protocol to the United Nations Framework Convention on Climate Change,2303 U.N.T.S. 162.

[365] Cagdas Artantas, "Green Electricity Promotion in Germany"; Setzer and Higham, "Global Trends in Climate Change Litigation: 2023 Snapshot."

[366] Neubauer, et al. v. Germany, Order of Mar. 24, 2021, 1 BvR 2656/18 (Fed. Const. Ct.).

[367] Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?" Mehrotra and Benjamin, "Evaluating the Enhancement of the Nationally Determined Contributions (NDCS) of Developing Countries: An International Support Programme Perspective."

[368] Liu and Yu, "Examining Marine Pollution Governance from the Perspective of International Investment Law: Theoretical Connection, Development Trends, and China's Experience";

Importantly, these approaches are flexible: they allow each country to choose the legal instruments most consistent with its political system and legal tradition. Whether through legislation, regulation, soft law, or administrative reform, climate enforcement can be built in ways that reinforce national development goals, strengthen governance, and support international cooperation. It is a process of mutual learning, not criticism, where countries share solutions and advance a common objective: a safe, stable, and sustainable climate future for all.[369]

The significant case studies can clarify this point and address the primary issues that demonstrate the successes in climate litigation. This area of jurisprudence has experienced a rapid evolution over the past decade, reflecting a burgeoning trend of courts affirming their role in enforcing environmental obligations by administrative, constitutional, and international law.[370] Courts have evolved from passive arbiters of environmental disputes to proactively influencing climate governance by holding individuals and entities accountable for inaction or regulation failures.[371]

Among the most influential rulings worldwide is the Urgenda Foundation v. State of the Netherlands (2019), wherein the Dutch Supreme Court determined that inadequate governmental efforts to address climate change contravened Articles 2 and 8 of the European Convention on Human Rights.[372] The ruling confirmed that administrative discretion must occur within the confines of human rights obligations, establishing a transformative precedent for other jurisdictions.[373] It underscored the enforceability of climate targets as legal obligations rather than mere policy aspirations or goals. In recent years, courts worldwide have increasingly emerged as crucial actors in addressing the failures of the executive and legislative branches to meet environmental obligations, particularly in the realm of climate change.[374]

In the United States, the regulation of administrative climate matters is governed by federal statutes such as the National Environmental Policy Act, which mandates the implementation of environmental impact assessments. Nevertheless, as evidenced in the case of Seven County Infrastructure Coalition v. Eagle County, the decision rendered by the United States

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Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation."

[369] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices."

[370] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health." Cagdas Artantas, "Green Electricity Promotion in Germany"; Setzer and Higham, "Global Trends in Climate Change Litigation: 2023 Snapshot."

[371] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices."

[372] Maiko Meguro, "State of the Netherlands v. Urgenda Foundation," *American Journal of International Law* 114, no. 4 (2020): 729–35, https://doi.org/10.1017/ajil.2020.52.

[373] Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change"; Toleikyte et al., "Clean Energy Technology Observatory: Heat Pumps in the European Union-2024 Status Report on Technology Development, Trends, Value Chains and Markets."

[374] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

Supreme Court in May 2025 has limited the extent of obligations imposed on federal agencies, favoring a restrictive interpretation of environmental responsibilities.[375] The judicial review of administrative discretion is restricted under the Chevron doctrine, and cases related to climate issues frequently face challenges due to procedural barriers, including standing and political question doctrines.[376] Consequently, the United States model experiences fragmented accountability and an absence of a binding constitutional environmental framework duty.[377]

In New Zealand, the judiciary, confronted with administrative inertia, has permitted tort-based climate claims against significant emitters, as exemplified in the case of Smith v. Fonterra, particularly in instances where indigenous rights are at stake.[378] Despite the absence of a constitutional environmental right, the administrative obligations arise from the Resource Management Act, which facilitates the achievement of sustainable development objectives.[379] The judiciary has exhibited a readiness to counterbalance ineffective enforcement of administrative actions. [380] Liability is not yet personal, but the possibility is growing under negligence-based claims, particularly if administrative omission causes foreseeable harm.[381]

In the Global South, judicial intervention has taken on a notably more structural role, as demonstrated in the case of Leghari v. Federation of Pakistan (2015). In this case, the Lahore High Court determined that climate change violates constitutional rights. It mandated the implementation of institutional reforms, including establishing a dedicated Climate Change Commission.[382] This ruling illustrates how courts within developing legal systems can effectively address procedural and substantive environmental governance gaps through innovative judicial measures and remedies.[383]

In Colombia, the Supreme Court's ruling in Future Generations v. Ministry of the Environment (2018) recognized the Amazon rainforest as a legal entity. It invoked the constitutional rights of future generations to demand state action against deforestation. In India, high courts have repeatedly invoked Article 21 of the Constitution (Right to Life) to

[375] Seven County Infrastructure Coalition V. Eagle County, 82 F. 4th 1152 (2025).
[376] Lakhani, "'Worthless'"; Lee, "The Aarhus Convention 1998 and the Environment Act 2021: Eroding Public Participation"; Lihua et al., "Improvement of Regional Environmental Quality: Government Environmental Governance and Public Participation"; O'Neill, Schneider, and Lozano, "Toward a Critical Environmental Justice Approach to Ocean Equity"; Rodrigue, "The Precautionary Principle in Environmental Law."
[377] Neubauer, et al. v. Germany, Order of Mar. 24, 2021, 1 BvR 2656/18 (Fed. Const. Ct.); Seven County Infrastructure Coalition V. Eagle County, 82 F. 4th 1152.
[378] Smith v. Fonterra, NZHC 419: High Court judgment, NZCA 552: Court of Appeal judgment, NZSC 35: Supreme Court judgment, NZSC 5: Supreme Court judgment, and NZHC 940: Subsequent High Court proceedings. (2022).
[379] Abhayawansa, Adams, and Neesham, "Accountability and Governance in Pursuit of Sustainable Development Goals"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."
[380] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.
[381] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives."
[382] Leghari v. Federation of Pakistan, W.P. No. 25501/201 (2015).
[383] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

protect ecological resources, ranging from rivers and wetlands to air quality. These decisions reflect a pattern where courts interpret the law and actively shape institutional responses to environmental degradation.[384]

Saudi Arabia is participating in this global judicial shift. Traditionally, environmental governance in Saudi Arabia was primarily enforced through executive agencies and administrative procedures; however, recent judicial developments indicate a significant transition towards enhanced legal accountability.[385] Additionally, Article 32 of the Basic Law of Governance establishes safeguarding natural resources as a constitutional principle. This judicial action illustrates a renewed commitment within the Saudi legal system to scrutinize and potentially invalidate administrative decisions that neglect environmental protections.[386]

Saudi Arabia is increasingly exploring how Islamic legal maxims can support this evolution. Principles such as "do not cause harm and do not reciprocate harm" serve as ethical normsand interpretive tools that align with administrative due process and the precautionary principle in environmental law. This hybridization of administrative legality and Islamic ethics may offer a distinctive jurisprudential model reconciling developmental policy with ecological integrity.[387] In this context, Saudi Arabia's emerging environmental jurisprudence can be seen as both a reflection of global legal convergence and a culturally grounded innovation.[388] These judicial movements across different jurisdictions demonstrate a common theme: climate change is no longer insulated from judicial review. Whether grounded in constitutional rights, administrative legality, or ethical-religious doctrines, courts are reinterpreting the judiciary's role in ensuring that climate obligations are not aspirational but enforceable. The convergence of procedural oversight, intergenerational justice, and institutional reform forms the backbone of a growing transnational legal doctrine that places climate governance firmly within the realm of law.[389]

By participating in this global jurisprudential evolution, Saudi Arabia advances its Vision 2030 environmental objectives and offers a culturally rooted model of climate justice. This model draws from Sharia, statutory law, and emerging judicial practices, contributing to a

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[384] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

[385] Setzer and Higham, "Global Trends in Climate Change Litigation: 2023 Snapshot"; AlNemer, "Examining the Kingdom of Saudi Arabia's Tourism Sector and Assessing Its Potential Contributions in Achieving the Kingdom's Vision 2030"; The Saudi Civil Transactions Law, Royal Decree No. M/191; The Saudi Environmental Law, Royal Decree No. M/165; The Saudi Board of Grievances, Royal Decree No. M/78; The Basic Law of Governance of Saudi Arabia, Royal Order No. A/90.

[386] The Basic Law of Governance of Saudi Arabia, Royal Order No. A/90.

[387] Yang, "Growing Apart: China and India at the Kigali Amendment to the Montreal Protocol"; Dang et al., "Spatial Pattern of Co2 and Ch4 Emission and Its Influencing Factors from River Confluence Areas."

[388] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices"; Martins Costa Moreira and Wedy, "Administrative Tools for Environmental Regulation."

[389] Neubauer, et al. v. Germany, Order of Mar. 24, 2021, 1 BvR 2656/18 (Fed. Const. Ct.).

pluralistic and localized interpretation of global climate governance norms.[390] Climate litigation worldwide increasingly relies on administrative law to hold governments and private actors accountable for inadequate climate action.[391] However, the legal frameworks, judicial openness, transparency, punishment, and liability mechanisms vary significantly across jurisdictions. Saudi Arabia presents that administrative law operates within a Sharia-compliant legal order and central executive authority yet is increasingly adapting to global environmental governance trends. Administrative law in Saudi Arabia is increasingly being used to enforce climate-related obligations. Under Article 6 of the Environmental Law, government bodies must assess environmental impacts and adopt preventive and precautionary measures—echoing international norms. However, judicial oversight is still limited due to the lack of a constitutional ecological right and the hierarchical structure of administrative decision-making.[392] The Board of Grievances in Saudi Arabia, serving as the administrative judicial framework, can evaluate regulatory shortcomings. Recent reforms have enabled enhanced legal recourse for addressing environmental damages. Significantly, Sharia law provides ethical guidelines consistent with climate governance, particularly through the prohibitions against excessive risk and corruption, coupled with the obligation to uphold the public interest.[393] These principles resonate with the precautionary principle, which posits that actions should not be deferred solely due to a lack of scientific certainty. In administrative contexts, Saudi agencies are mandated to implement proactive policies in response to environmental threats, even in the absence of comprehensive information data.[394]

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[390] "Saudi Arabia Carbon Dioxide (CO2) Emissions Per Capita - Data, Chart."

[391] AlNemer, "Examining the Kingdom of Saudi Arabia's Tourism Sector and Assessing Its Potential Contributions in Achieving the Kingdom's Vision 2030"; The Saudi Civil Transactions Law, Royal Decree No. M/191; The Saudi Environmental Law, Royal Decree No. M/165; The Saudi Arabian Government Tenders and Procurement Law, Royal Decree No. (M/128; The Law of the Board of Grievances in Saudi Arabia, Royal Decree No. M/78.

[392] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health." Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[393] Abhayawansa, Adams, and Neesham, "Accountability and Governance in Pursuit of Sustainable Development Goals"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[394] Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021).; Lakhani, "'Worthless'"; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Alharbi and Ghonimy, "Environmental Benefits of Olive By-Products in Energy, Soil, and Sustainable Management."

6. CONCLUSION — ADMINISTRATIVE LAW AS A DRIVING FORCE FOR CLIMATE GOVERNANCE

While the architecture of climate governance—anchored by the United Nations Framework Convention on Climate Change, the Paris Agreement, and national frameworks—has matured, its operational effectiveness remains constrained by institutional and procedural gaps. The core challenge is no longer merely legal recognition of climate duties but the mechanisms of their enforceability.[395] At the national level, administrative law serves as the engine that translates international environmental norms into binding, accountable, and adaptable legal obligations.[396] Nevertheless, administrative failures—from regulatory inertia and fragmented bureaucracies to politically motivated deregulation—undermine this transformation. Many states suffer from insufficient regulatory infrastructure, inadequate fiscal and technical capacity, and underdeveloped administrative review mechanisms.[397] Climate objectives are often aspirational, with weak implementation due to vague enabling statutes, lack of enforceable procedures, and limited institutional independence.[398]

Moreover, compliance with climate commitments suffers where administrative law is absent or underutilized. Climate measures lack enforceability without transparent licensing procedures, public participation, binding regulatory impact assessments, or judicial review of agency action.[399] This is particularly visible in the fragmented application of Nationally Determined Contributions, where inconsistencies in administrative oversight and legal mandates have led to unequal enforcement, delayed action, and, in some cases, legal impunity.[400] In short, environmental law without administrative enforceability is insufficient. Realizing climate goals requires substantive environmental norms and robust administrative structures that govern how those norms are applied, challenged, and enforced.[401]

6.1 Summary of Key Findings

This study presents the following four key findings, reflecting both doctrinal analysis and jurisdictional comparisons:

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[395] Cagdas Artantas, "Green Electricity Promotion in Germany"; Setzer and Higham, "Global Trends in Climate Change Litigation: 2023 Snapshot."

[396] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health."

[397] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[398] Rampazzo, "An Evaluation of the European Union Emissions Trading System: The Importance of Including Methane Emissions Along the Supply Chain of Natural Gas and Crude Oil."

[399] Neubauer, et al. v. Germany, Order of Mar. 24, 2021, 1 BvR 2656/18 (Fed. Const. Ct.).

[400] Bayer and Aklin, "The European Union Emissions Trading System Reduced Co2 Emissions Despite Low Prices."

[401] Yang, "Growing Apart: China and India at the Kigali Amendment to the Montreal Protocol"; Setzer and Higham, "Global Trends in Climate Change Litigation: 2023 Snapshot."

1. Climate Governance Has Become Procedurally Hollow—A Regime of Aspirations Without Administrative Muscle

Despite decades of environmental treaty-making, the international climate regime—symbolized by the Paris Agreement—functions as a regime of declaratory ambition without procedural enforcement. Climate obligations remain detached from the operational machinery of the state, specifically from administrative decision-making systems responsible for permitting, licensing, urban planning, and infrastructure approvals. Environmental principles such as the precautionary principle, intergenerational equity, and the polluter pays principle are recognized in international declarations and national policies but have not been structurally embedded into administrative law. As a result:

- Permits are issued for projects that are fundamentally incompatible with national decarbonization goals.
- Environmental Impact Assessments fail to account for carbon intensity or ecological tipping points.[402]
- Courts are often powerless because administrative discretion is unchecked, unstandardized, and politically shielded.[403]

Climate governance today is procedurally empty. Administrative law—the nervous system of the regulatory state—has not been reprogrammed for the climate era. This is not a legal gap; it is a legal void.[404]

2. Environmental Impact Assessment Has Become the Achilles' Heel of Climate Law

Environmental Impact Assessment, designed initially as a protective filter for ecological decision-making, now functions as a box-ticking ritual. Its structural failure lies not only in its technical limits (e.g., scope, thresholds, methodologies) but in its jurisdictional confinement and inability to enforce alignment with international climate obligations.

Key problems include:

- Static project-level assessments that ignore cumulative or long-term emissions trajectories.[405]
- Absence of legal obligations to ensure compatibility with Nationally Determined Contributions.
- Marginalization of public voices in the procedural logic of Environmental Impact Assessment.
- Lack of post-approval enforcement, rendering "mitigation plans" performative.

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[402] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[403] Lakhani, "'Worthless.'"

[404] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health." Cagdas Artantas, "Green Electricity Promotion in Germany"; Setzer and Higham, "Global Trends in Climate Change Litigation: 2023 Snapshot."

[405] Lakhani, "'Worthless'"; Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Alharbi and Ghonimy, "Environmental Benefits of Olive By-Products in Energy, Soil, and Sustainable Management."

In short, Environmental Impact Assessment has become a performative, not protective, tool. Without binding climate anchors and legal consequences, it legitimizes rather than restrains ecological harm.

3. **Administrative law is fundamental to enforceability.** It provides legal instruments—such as rulemaking, licensing, inspections, and sanctions—that transform climate commitments into obligations. Jurisdictions that possess codified administrative procedures demonstrate enhanced climate compliance.

4. **Accountability mechanisms remain underdeveloped:** Many environmental agencies operate without formal accountability frameworks. In the absence of administrative courts or ombuds institutions, regulatory discretion can be misused, undermining public trust.

5. **Climate obligations require adaptive administration:** Environmental risks evolve, requiring regulatory tools that can dynamically respond, such as periodic review mandates, emergency rulemaking powers, and delegated legislative authority with clear limits and oversight.

6. **Weak administrative institutions and legal fragmentation structurally hinder enforcement.** When treaties are ratified, the absence of effective operational administrative law undermines their domestic legal authority.

These findings emphasize that administrative law is not peripheral to climate change mitigation—it is foundational.

6.2 Tackling Research Objectives: A Legal-Administrative Integrating

This study addresses its core objectives through a rigorous analysis of how administrative law serves as the procedural engine of climate governance. The insights below demonstrate how legal instruments become effective only when supported by structured, transparent, and enforceable administrative systems.[406]

6.2.1 Evaluating the Effectiveness of Climate Legal Instruments through Administrative Design

Climate change treaties and domestic environmental laws offer essential legal commitments, but their enforceability fundamentally depends on the administrative systems that give them life. Instruments like the Paris Agreement or United Nations Framework Convention on Climate Change are legally significant only when transposed into domestic law via rulemaking, institutional mandates, and regulatory procedures—tasks governed by administrative law.[407] For instance, the United Kingdom Climate Change Act 2008 is not merely a substantive statute but a procedural regime that binds ministers to carbon budgeting

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[406] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*. Beatriz Garcia, Anita Foerster, and Jolene Lin, "Net Zero for the International Shipping Sector? An Analysis of the Implementation and Regulatory Challenges of the IMO Strategy on Reduction of GHG Emissions," *Journal of Environmental Law* 33, no. 1 (2021): 85–112. Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[407] Hickmann et al., "The United Nations Framework Convention on Climate Change Secretariat as an Orchestrator in Global Climate Policymaking"; Budak, "Existing Landscape of International Climate Law"; Pratama et al., "China's Policy Developments in The Implementation of The Paris Agreement: Strategies and Challenges in Addressing The 2020-2024 Carbon Emission Problem"; "The Paris Agreement | UNFCCC."

cycles, judicially reviewable obligations, and independent oversight via the Climate Change Committee. Similarly, the European Climate Law operationalizes long-term neutrality goals through delegated powers that allow the European Commission to update emissions targets and enforce planning timelines.[408]

These examples illustrate that legal instruments do not function in isolation. Their effectiveness emerges through administrative mechanisms such as:

- Statutory rulemaking procedures that ensure lawful implementation.
- Institutional mandates for enforcement, auditing, and data collection.
- Appealing licensing frameworks for industries under emissions regulation.

Thus, administrative law provides the spine upon which environmental law stands. Without it, climate instruments remain aspirational, lacking precision, enforceability, and adaptability.

6.2.2 Identifying Administrative Mechanisms That Strengthen Accountability and Compliance

Administrative law provides essential procedural safeguards that substantiate climate commitments. These safeguards uphold the rule of law, prevent discretionary abuse, and ensure that environmental governance is legitimate and legally durable. Such mechanisms can be identified as key components in this context:

- Public consultation frameworks that require climate policies to undergo stakeholder review before adoption.
- Transparency regulations (e.g., access to environmental impact data, publication of emissions registries) that allow civil society to monitor compliance.
- Judicial review provisions allow courts to assess whether climate decisions comply with legal duties, procedural fairness, and proportionality principles.[409]
- Regulatory agencies issue administrative sanctions and corrective orders for non-compliance with environmental permits or mitigation requirements.[410]

Administrative law facilitates responsive regulation by allowing laws to evolve per emerging climate data, technological advancements, and changing socioeconomic conditions. Administrative systems maintain flexibility through dynamic licensing, regulatory feedback mechanisms, and emergency rulemaking authority, all while ensuring compliance with legal standards.[411] The case studies, specifically the Seven County Infrastructure Coalition v. Eagle County case, in conjunction with other legal precedents and pertinent legislation, illustrate that integrating these procedures within climate legislation enhances legitimacy, cultivates institutional trust, and encourages compliance. This

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[408] Arroyo M and Miguel, "The Role of Renewable Energies for the Sustainable Energy Governance and Environmental Policies for the Mitigation of Climate Change in Ecuador."

[409] Celermajer et al., *Institutionalising Multispecies Justice*.

[410] Abhayawansa, Adams, and Neesham, "Accountability and Governance in Pursuit of Sustainable Development Goals"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[411] Abhayawansa, Adams, and Neesham, "Accountability and Governance in Pursuit of Sustainable Development Goals"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

ultimately amplifies the practical efficacy of environmental policies, as evidenced by the decision rendered by the United States Supreme Court in May 2025.[412]

6.2.3 Recognizing Contemporary Obstacles in Climate Law Enforcement and the Role of Administrative Structure

The challenge in the current legal and geopolitical climate is not a lack of climate commitments but the complexity of enforcing them in diverse institutional environments.[413] Jurisdictions face real-time implementation challenges that require nuanced legal responses rather than judgment or critique. This study identifies four interrelated contemporary obstacles framed constructively:

1. *Legal Fragmentation*

Regulatory responsibilities are often spread across ministries, agencies, or local units in systems with multi-level governance or pluralistic legal traditions.[414] This results in inconsistent standards, delayed coordination, or jurisdictional confusion, especially in climate-sensitive sectors like land use, energy, and water management.[415]

2. *Cross-Sectoral Integration Deficits*

Climate change intersects with economic planning, agriculture, health, and transport. However, administrative mandates are often sector-specific.[416] Climate actions may conflict or be diluted without a legal mechanism for cross-ministerial rulemaking or interagency harmonization.[417]

3. *Resource and Capacity Gaps*

Entities encounter challenges in acquiring environmental data, retaining regulatory experts, or implementing digital tools for emissions monitoring. These deficiencies do not indicate legal shortcomings but rather structural realities necessitating resolution through legal cooperation, institutional innovation, and international support.[418]

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[412] Rajamani et al., "National 'Fair Share' in Reducing Greenhouse Gas Emissions Within the Principled Framework of International Environmental Law."

[413] Cagdas Artantas, "Green Electricity Promotion in Germany"; Setzer and Higham, "Global Trends in Climate Change Litigation: 2023 Snapshot." Rampazzo, "An Evaluation of the European Union Emissions Trading System: The Importance of Including Methane Emissions Along the Supply Chain of Natural Gas and Crude Oil."

[414] Mehrotra and Benjamin, "Evaluating the Enhancement of the Nationally Determined Contributions (NDCS) of Developing Countries: An International Support Programme Perspective."

[415] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[416] Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[417] Liu and Yu, "Examining Marine Pollution Governance from the Perspective of International Investment Law: Theoretical Connection, Development Trends, and China's Experience"; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation."

[418] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021).; Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change."

4. Need for Adaptive Governance Tools

In a volatile climate era, static regulations can quickly become obsolete.[419] Administrative law must enable climate-responsive governance—using instruments such as rolling climate audits, interim permitting schemes, and risk-based regulation to maintain legality while adapting to rapid change.[420] These challenges are best addressed not through external pressure but by strengthening internal administrative institutions through procedural reform, legal harmonization, and public engagement.[421]

6.2.4 Advancing a Reform-Oriented Administrative Model for Climate Governance

To address future climate governance needs, this study advocates for an administrative law framework that is based on four interdependent reform pillars:

a. Legal Clarity and Mandate Specificity

Laws must define who is responsible, their obligations, and how they will be executed. Clear mandates prevent overlap, ensure ministerial accountability, and empower agencies to act within the bounds of legality.[422]

b. Institutional Independence and Oversight

Independent climate bodies, including commissions, ombudspersons, and review panels, should have legal status, operational budgets, and the authority to conduct implementation audits, propose sanctions, and release binding reports. Institutional autonomy guarantees that climate enforcement surpasses political consideration cycles.

c. Procedural Transparency and Public Legitimacy

Administrative procedures should guarantee access to information, consultation rights, and reasons for decisions. This strengthens procedural justice and invites public co-production of policy, which enhances legitimacy and reduces resistance. [423]

d. **Enforceable Remedies and Judicial Access**

Legal systems must provide accessible avenues for contesting administrative inaction, mishandling, or climate-related harms.[424] Administrative courts and tribunals should be

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[419] Abhayawansa, Adams, and Neesham, "Accountability and Governance in Pursuit of Sustainable Development Goals"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[420] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[421] Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?" Mehrotra and Benjamin, "Evaluating the Enhancement of the Nationally Determined Contributions (NDCS) of Developing Countries: An International Support Programme Perspective."

[422] The Saudi Environmental Law, Royal Decree No. M/165; Pacheco-Vega, "Environmental Regulation, Governance, and Policy Instruments, 20 Years After the Stick, Carrot, and Sermon Typology"; Shammas, Wang, and Wang, "Sources, Chemistry and Control of Acid Rain in the Environment."

[423] Treaty on the Functioning of the European Union, 2016 O.J.C 202/32.

[424] Cagdas Artantas, "Green Electricity Promotion in Germany"; Setzer and Higham, "Global Trends in Climate Change Litigation: 2023 Snapshot."

authorized to issue binding remedies, enforce climate impact assessments, and compel adherence. This reform model advocates for a legally coherent, procedurally sound, and institutionally robust framework to implement international and domestic climate obligations. It contextualizes climate governance not merely within environmental ethics but within the realm of procedural and administrative legality.[425]

6.3 Strategic Legal Recommendations

To enhance the administrative enforceability of climate obligations, the following four strategic recommendations are hereby proposed:

1. **Legally Reconstruct Administrative Law as a Climate Sovereignty Mechanism**

A climate-resilient future requires more than international consensus—it requires a complete reengineering of the legal anatomy of the state. This involves transforming administrative law into the primary interface between environmental principles and enforceable action. That means:

- Legislating environmental principles as enforceable constraints on agency discretion, not interpretive suggestions.
- Making Nationally Determined Contributions alignment a precondition for project approval, enforced through licensing law.[426]
- Imposing a constitutional duty on public authorities to justify how each major decision serves climate resilience, public ecological security, and future generational rights;
- Codifying "climate incompatibility" as a ground for automatic permit rejection.

This is not regulatory reform—it is administrative constitutionalism. It shifts the legal burden from "why we should act" to "why we failed to prevent harm."

2. Design a Multi-Layered Procedural Ecosystem—From Impact Prediction to Enforcement

Instead of viewing Environmental Impact Assessment as a one-time procedural formality, the state should build a layered procedural ecosystem, embedding climate foresight, dispute resilience, and enforceable accountability. Such a system would include:

1. Climate Screening – Every administrative proposal undergoes triage for emissions intensity, ecological risk, and climate compatibility.
2. Carbon-Conscious Impact Assessment—Environmental Impact Assessments must quantify lifetime emissions, assess mitigation durability, and model disruption under multiple climate scenarios.
3. Mandatory Rebuttable Presumption – Projects exceeding climate thresholds are presumed unlawful unless agencies provide clear scientific justification.
4. Embedded Participatory Windows – Communities, scientists, and civil society engage early—not post-hoc—with standing rights and legal weight.

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[425] Abhayawansa, Adams, and Neesham, "Accountability and Governance in Pursuit of Sustainable Development Goals."

[426] Ajayi, Adewale, and Ademola, "Integrating Engineering Innovations to Enhance Environmental Resilience: Evaluating the Impact of Greenhouse Gas Emissions, Ozone Depletion, And Aquatic Ecosystem Degradation on Public Health"; Milieudefensie et al. v. Royal Dutch Shell PLC, ECLI:NL:RBDHA:2021:5339 (Hague District Court, May 26, 2021).; Sikora, "European Green Deal–Legal and Financial Challenges of the Climate Change."

5. Mediation and Arbitration as Mechanisms for Climate Compliance: Legally recognized mediation and climate arbitration panels are empowered to issue binding climate compliance orders, grounded in established environmental principles.

6. Post-Approval Enforcement Mandate: Agencies must report annually on real-world emissions compared to projected emissions; discrepancies trigger automatic reviews or sanctions.

The outcome is a dynamic procedural system, rather than a mere procedural theatre. It effectively implements justice, precaution, participation, and legality throughout the entire policy lifecycle. What is required is not superficial procedural enhancements, but instead a comprehensive procedural transformation. Climate justice must be built not on symbolic declarations, but on the spine of administrative enforceability. That requires transforming Environmental Impact Assessment into a constitutional procedure of accountability, and administrative law into the engine of ecological sovereignty. Only then will environmental principles cease to be moral rhetoric and become a juridical force.

3. Establish a Treaty-Based International Framework for Climate Administrative Law

Launch negotiations for an International Framework Agreement on Climate Administrative Justice under the Paris Agreement or the United Nations Framework Convention on Climate Change.[427] This new legal instrument would obligate states to adopt and enforce core administrative principles—such as access to environmental information, due process in climate licensing, public participation, and timely remedies—as legally binding procedural rights. This would move procedural climate obligations from soft principles to treaty-backed, enforceable standards harmonized across jurisdictions.[428]

4. Create a Global Climate Administrative Tribunal (GCAT)

Establish a permanent transnational tribunal to adjudicate procedural failures related to climate governance. The Global Climate Administrative Tribunal (GCAT) would provide a venue for individuals, civil society organizations, and even states to challenge:

- Denials of public consultation in climate projects.[429]
- Failures to disclose climate risks.
- Inadequate administrative remedies for climate harms.

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[427] Liu and Yu, "Examining Marine Pollution Governance from the Perspective of International Investment Law: Theoretical Connection, Development Trends, and China's Experience"; Lesnikowski et al., "Policy Implementation Styles and Local Governments: The Case of Climate Change Adaptation."

[428] Kaushik, "Environmental Law and Sustainability: Legal Approaches to Addressing Climate Change and Protecting Natural Resources."

[429] Regazzoni, "Mediation in Environmental Disputes"; Wang, Chen, and Dong, "A Critical Review of Climate Change Mitigation Policies in the EU ——Based on Vertical, Horizontal and Policy Instrument Perspectives"; Pauw et al., "Post-2025 Climate Finance Target: How Much More and How Much Better?"; Hinrichs-Rahlwes, "Massive Growth of PV Capacity as a Major Cornerstone of Germany's Energy Security and Climate Policies"; Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

The tribunal's jurisdiction would be based on a newly negotiated treaty, and its rulings would be binding upon ratifying parties, thereby introducing a global mechanism for procedural enforcement.[430]

5. *Integrate Climate Administrative Standards into Trade, Investment, and Aid Agreements*

Transform international economic instruments into vehicles for procedural climate enforcement.[431] Trade agreements, Bilateral Investment Treaties, and development aid conditionalities should incorporate minimum administrative climate standards, such as:

- Transparent permitting processes for carbon-intensive industries.
- Climate impact disclosure obligations.[432]
- Fair hearing mechanisms for affected communities.

Failure to comply would trigger sanctions, funding suspensions, or investor-state claims, creating real consequences for administrative failure in climate governance.[433]

6. *Establish an International Climate Governance Capacity Fund*

Create a dedicated International Fund for Administrative Climate Capacity to strengthen administrative enforcement systems. The Fund would support:

- Establishment of specialized climate administrative courts,
- Development of digital permitting and compliance systems,
- Training for climate regulators and administrative judges.

Unlike existing climate finance mechanisms, this Fund would exclusively focus on procedural justice and enforcement capacity, financed through a blend of international carbon pricing revenues, green bonds, and climate litigation settlement payments.

6.4 Closing Reflection

Administrative law serves as the foundational structure of environmental governance. It provides the procedural guarantees necessary to convert climate aspirations into enforceable legal obligations. In the absence of administrative integrity—characterized by explicit mandates, enforceable procedures, and institutional checks—climate governance risks collapsing into mere declaratory policy. The future of climate action transcends mere scientific or political considerations; it is fundamentally rooted in legal and administrative frameworks. The integration of administrative law at every stage of climate policy formulation, execution, monitoring, and enforcement constitutes the pathway toward a more accountable, legitimate, and effective global response to the climate crisis.

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[430] Abhayawansa, Adams, and Neesham, "Accountability and Governance in Pursuit of Sustainable Development Goals"; Martins Costa Moreira and Wedy, "Administrative Tools for Environmental Regulation."

[431] Cohan and Webber, *Confronting Climate Gridlock: How Diplomacy, Technology, and Policy Can Unlock a Clean Energy Future*.

[432] Sarkodie, Adams, and Leirvik, "Foreign Direct Investment and Renewable Energy in Climate Change Mitigation: Does Governance Matter?"

[433] Cagdas Artantas, "Green Electricity Promotion in Germany"; Setzer and Higham, "Global Trends in Climate Change Litigation: 2023 Snapshot."

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