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FROM ZERO TO NET-ZERO: RETHINKING LEGAL PATHWAYS FOR DECARBONIZATION

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1. Introduction

Net-zero refers to a state in which the volume of greenhouse gases emitted into the atmosphere is balanced by the amount removed through natural or technological processes. Achieving this equilibrium requires both deep emissions reductions and credible carbon removal strategies, implemented through sustained and systemic decarbonization efforts.

Since the Industrial Revolution, global average surface temperatures have increased by approximately 1.2°C. According to the Intergovernmental Panel on Climate Change, limiting global warming to 1.5°C is critical to reducing the likelihood of severe and irreversible climate impacts. However, current projections from the United Nations indicate that the world is likely to exceed this threshold under existing policy trajectories.¹

In response, an increasing number of states, corporations, and international institutions have adopted net-zero commitments. Despite this momentum, most actors remain significantly behind their 2030 targets.² This disconnect suggests that the challenge is not merely one of ambition, but of governance. Existing legal and institutional frameworks are insufficiently equipped to ensure that net-zero commitments translate into structural transformation.

This paper argues that contemporary net-zero governance is fragmented and often counterproductive. It enables the coexistence of emissions reductions, fossil fuel expansion, and offset-based compliance without establishing a clear hierarchy or transition pathway. To address this, international energy law must evolve toward a framework that prioritizes clean energy as a non-negotiable foundation, while redefining net-zero as a time-bound and enforceable transitional mechanism.

¹ <https://www.un.org/en/climatechange/net-zero-coalition>

² Press Information Bureau, Govt. of India, India's Achievements at COP26 (June 2, 2023), <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1945472>; Climate Action Tracker, India: Net Zero Target, <https://climateactiontracker.org/countries/india/net-zero-targets/>.

2. Corporate Net-Zero Standards and Their Limits

At the corporate level, the emergence of standardized frameworks has sought to bring credibility and consistency to net-zero commitments. The Corporate Net-Zero Standard provides a science-based framework designed to align business strategies with climate goals.

Its key strengths include:

- **Completeness:** Targets encompass all material sources of emissions across value chains.
- **Early Action:** Near-term targets ensure immediate emissions reductions.
- **Ambition:** Targets are aligned with 1.5°C climate scenarios.
- **Timeframe:** Companies are required to achieve net-zero by 2050 at the latest.
- **Accountability:** Independent verification mechanisms enhance credibility.³

While these standards represent an important step forward, they remain limited in their ability to drive systemic change. Their voluntary nature and reliance on corporate self-regulation often result in uneven implementation and insufficient accountability.

3. Global Commitments and Uneven Transitions

More than 150 countries have now committed to achieving net-zero emissions within specified timeframes, albeit at varying paces. Developed economies generally target 2050, while China has announced a 2060 goal and India has set a 2070 target, reflecting developmental priorities and differing capacities.⁴

This divergence highlights a fundamental tension between climate ambition and economic development. For developing countries, rapid decarbonization must be balanced against the need for energy access, poverty alleviation, and industrial growth. As a result, net-zero pathways are inherently uneven, raising questions of fairness, equity, and differentiated responsibility.

³ <https://sciencebasedtargets.org/net-zero>

⁴ Press Information Bureau, Govt. of India, India's Achievements at COP26 (June 2, 2023), <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1945472> ; Climate Action Tracker, India: Net Zero Target, <https://climateactiontracker.org/countries/india/net-zero-targets/>.

4. Fragmentation in Climate and Energy Governance

The accelerating climate crisis has intensified scrutiny of legal and governance frameworks. However, the dominant framing of decarbonization as a trade-off between clean energy and net-zero commitments obscures a deeper structural issue: the absence of a coherent and integrated legal framework.

Current regimes operate in silos:

- Climate law emphasizes flexibility and voluntary participation.
- Investment law prioritizes stability and investor expectations.
- Energy governance remains grounded in sovereignty and security concerns.

This fragmentation enables formal compliance without substantive transformation. Net-zero commitments frequently coexist with continued fossil fuel expansion, excessive reliance on carbon offsets, and the normalization of transitional fuels without clearly defined exit strategies.

5. Comparative Legal Approaches

Comparative experience illustrates both the potential and limitations of existing models.

The European Union has adopted a “clean-energy-first” approach, characterized by binding commitments and enforceable timelines. While effective in driving decarbonization, this model has generated distributive tensions among member states.

In contrast, the United States has pursued an incentive-driven strategy, emphasizing political feasibility and market-based solutions. However, this approach risks perpetuating technological uncertainty and delaying structural change.

An alternative model is emerging in India, where a developmental approach to net-zero is shaped by constitutional environmental jurisprudence. This model does not mandate an immediate exit from fossil fuels, nor does it permit indefinite delay. Instead, it reflects a framework of **conditional permissibility**, balancing environmental protection, economic development, and intergenerational equity through legal oversight rather than rigid mandates.

6. The Indian Constitutional Perspective

Indian constitutional law provides important normative insights for global climate governance. Under Article 21, the right to life has been interpreted to include the right to a healthy environment. In *M.C. Mehta v. Union of India*, the Supreme Court affirmed the state's obligation to safeguard environmental resources for future generations, embedding the principle of intergenerational equity within domestic law.⁵

Precautionary principle and polluter-pays principle, which is known in *Vellore Citizens Welfare Forum v. Union of India*⁶, support conditional tolerance as opposed to unconditional permission. Although, transitional emissions can be permitted, they must be accompanied with mitigation, accountability, and transition to structural change which must be proved.

This approach does not treat environmental protection as an absolute constraint. Instead, it allows for development subject to principles of precaution, mitigation, and sustainability. Such a framework is particularly relevant for developing countries, where strict decarbonization mandates may conflict with pressing socio-economic needs.⁷

At the same time, Indian jurisprudence cautions against unregulated flexibility. Development cannot be pursued at the expense of long-term ecological stability, nor can net-zero commitments serve as a justification for indefinite delay.

7. Toward a Coherent Legal Framework

To address these challenges, international energy law must move beyond the false dichotomy between clean energy and net-zero. Instead, it should integrate both within a structured and enforceable framework.

Three key reforms are necessary:

1. Clean Energy as a Non-Negotiable Baseline

Decarbonization efforts must prioritize the rapid deployment of clean energy technologies as a foundational requirement.

2. Net-Zero as a Transitional Mechanism

⁵ *M.C. Mehta v. Union of India*, (1997) 2 S.C.C. 353 (India).

⁶ *Vellore Citizens' Welfare Forum v. Union of India*, (1996) 5 S.C.C. 647 (India).

⁷ *Narmada Bachao Andolan v. Union of India*, (2000) 10 S.C.C. 664 (India).

Net-zero should be reconceptualized as a time-bound pathway with clearly defined milestones, rather than an open-ended objective.

3. Limits on Offsets and Transitional Fuels

The reliance on carbon offsets and transitional fuels must be progressively reduced, with explicit timelines for phase-out.

Without such recalibration, net-zero risks devolving into an accounting exercise rather than a transformative strategy.

Key Pillars of the Net Zero Transition

Achieving net zero requires transformation across several sectors:

1. Energy Transition

Moving from fossil fuels to renewable energy sources like solar, wind, and hydropower is essential. Electrification of transport and industry also plays a key role.

2. Energy Efficiency

Reducing energy consumption through better design, technology, and behavior can significantly cut emissions without compromising quality of life.

3. Sustainable Transportation

Electric vehicles, improved public transport, and alternative fuels are reshaping how people and goods move.

4. Nature-Based Solutions

Forests, wetlands, and oceans act as natural carbon sinks. Protecting and restoring these ecosystems is crucial for offsetting emissions.

5. Carbon Capture and Storage (CCS)

Emerging technologies that capture carbon emissions from industrial processes and store them underground can help address hard-to-abate sectors.

Challenges on the Path

The road to net zero is not without obstacles:

- **Economic Costs:** Transitioning infrastructure and energy systems requires significant investment.
- **Technological Gaps:** Some industries, such as aviation and heavy manufacturing, lack mature low-carbon alternatives.

- **Equity Issues:** Developing countries face unique challenges, balancing economic growth with sustainability.
- **Behavioral Change:** Shifting public habits and consumption patterns is often slow and complex.

Addressing these challenges requires collaboration, innovation, and long-term commitment.

8. Conclusion

Decarbonization is not merely a technical or economic challenge; it is fundamentally a normative one. It raises critical questions of equity, responsibility, and justice across both borders and generations.

A credible pathway to net-zero requires more than ambitious targets. It demands a reconfiguration of legal frameworks to ensure that flexibility serves as a tool for transition rather than a substitute for it. International energy law must therefore evolve to support structural transformation, balancing pragmatic transition strategies with principled commitments to sustainability and equity.

Absent such reform, net-zero will remain an aspirational concept—capable of legitimizing delay rather than driving meaningful change.

The journey from zero to net zero is both a necessity and an opportunity. It requires a collective effort from governments, businesses, and individuals to rethink how we live, work, and interact with the planet. While the path is challenging, the cost of inaction is far greater.

Achieving net zero is not just about reducing emissions—it is about building a sustainable future for generations to come.