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EDITORIAL

Growth, Emissions, and Climate Targets in the Paris Agreement Era

DR. PETER TSIGARIS, EDITOR-IN-CHIEF
THOMPSON RIVERS UNIVERSITY

Since the 2015 Paris Agreement, governments have adopted ambitious climate targets, frequently committing to substantial emissions reductions by 2030 and net-zero emissions by mid-century. However, numerous international assessments suggest that current global emissions trajectories are insufficient to meet these near-term goals. The question addressed in this special issue is therefore not whether a gap exists, but what produces it. Using comparative national analysis across a diverse set of economies, the contributions examine the structural drivers of emissions change and evaluate whether observed rates of decarbonization are consistent with the timelines embedded in contemporary climate commitments.

Each paper examines emissions dynamics after the 2015 Paris Agreement using the IPAT/Kaya identity, which decomposes environmental impact into the interacting contributions of population, affluence (income per capita), and technology (emissions intensity). The studies were conducted within a coordinated research framework in the Master of Environmental Economics and Management program (Fall 2025), where each author undertook an independent national analysis using a common methodology. Using publicly available World Bank data, the authors constructed country-level datasets, calculated growth rates, and presented an empirical interpretation of the drivers of emissions change. The resulting papers

were written as short scientific commentaries and include disclosures regarding the use of artificial-intelligence research tools.

Collectively, these case studies provide a comparative examination of global decarbonization dynamics. Across diverse economies, industrialized and developing alike, a consistent empirical contrast emerges. In many countries, emissions intensity (emissions per unit of output) declines over time. However, emissions continue to grow, albeit more slowly than economic output. The analyses therefore reveal a recurring distinction in contemporary climate dynamics: relative decoupling is widespread, whereas absolute decoupling remains comparatively rare.

These results suggest that decarbonization is shaped by the development stage and economic structure of a nation. In advanced economies, emissions reductions are primarily associated with technological change and energy system transformation, including coal phase-out, electrification, and efficiency improvements. In middle-income economies, emissions growth often slows but rarely declines rapidly enough because expanding consumption and infrastructure investment offset technological improvement. At earlier stages of development, modernization itself increases energy use and emissions, while in resource- and fossil-fuel-dependent economies emissions trajectories may be shaped by land-use variability or economic volatility. The common feature is therefore not a shared pathway but a shared constraint: the relative speed of economic growth and technological change determines whether emissions fall.

Several papers also demonstrate that emissions trends depend partly on how they are measured. Reported outcomes vary with sector boundaries and the treatment of land-use and forestry emissions. In some countries, including forest carbon fluxes significantly alters the interpretation of national progress because wildfires, harvesting, and ecosystem change affect net emissions. These cases illustrate that apparent decarbonization may reflect ecological conditions and accounting conventions as much as changes in fossil-fuel use. The collection therefore emphasizes an additional requirement of sustainability analysis: careful interpretation of quantitative evidence.

Collectively, the countries examined represent roughly two-thirds of the world’s population and more than four-fifths of global carbon emissions, making the issue a broadly representative snapshot of contemporary decarbonization dynamics. Importantly, the sample includes several of the world’s largest emitting economies, including China, the United States, the European Union, Russia, and Japan. These major economies differ markedly in institutions, energy systems, and development trajectories, and their emissions pathways diverge

accordingly. Some exhibit sustained absolute decoupling, while others continue to experience emissions growth despite improvements in intensity. Yet across these varied trajectories, a common constraint emerges: the pace of structural change remains insufficient to align observed emissions pathways with the reductions implied by near-term targets.

A Comparative Pattern

The individual country studies cluster into recurring empirical patterns summarized in Table 1.

Table 1: *Types of Decarbonization Dynamics Identified*

Regimes	Description	Typical Mechanism	Representative Case Studies
Absolute decoupling economies	Emissions decline while economic output grows	Coal phase-out, electrification, efficiency improvements	United Kingdom; European Union; United States; Japan
Relative-decoupling stabilization economies	Emissions growth slows or stabilizes but sustained decline is not observed	Efficiency gains offset by consumption and infrastructure expansion	Australia; Brazil; South Africa; Mexico; Singapore
Growth-dominated industrializing economies	Emissions continue rising despite improving efficiency	Industrialization, urbanization, expanding electricity demand	China; India; Indonesia; Vietnam
Structural and non-transition changes	Emissions change due to factors other than decarbonization	Land-use carbon flux, economic shocks, development stage, fossil-fuel structure	Canada; Russia; Nepal; Saudi Arabia

This classification highlights a central insight: decarbonization is not a uniform process. Population growth, income growth, and technological change interact, and climate outcomes depend on their relative speeds.

Climate Targets and Realism

One of the most striking collective findings of this special issue is temporal rather than technological. Across nearly all countries examined, observed trajectories appear inconsistent

with meeting the most ambitious 2030 climate targets. Even where progress is visible, declining emissions and intensity, renewable adoption, or efficiency improvements, the pace of change remains insufficient relative to pledged reductions. The regimes summarized in Table 1 imply that the gap arises for different reasons across countries but produces a common outcome: observed emissions pathways remain slower than those required by pledged timelines.

The analyses evaluate trends and growth rates rather than policy intentions. Yet the findings raise an important policy question: what follows when observed trajectories remain inconsistent with Nationally Determined Contributions?

Ambition is necessary in climate governance, but credibility is also a policy instrument. Persistent failure to meet intermediate goals can weaken institutional trust and foster public disengagement. If targets are repeatedly missed, they risk becoming symbolic. The evidence presented in this issue suggests that climate policy may benefit from reassessing timelines while maintaining ambition. Extending comparable targets toward 2040 rather than 2030 would better reflect the time required for energy systems, industrial capital, and consumption patterns to adjust. Such an adjustment would not imply abandoning decarbonization; rather, it would align policy goals with observable transition dynamics. The issue therefore raises a discussion question for policymakers: is a credible path that is slightly longer but achievable preferable to a nearer deadline that is widely missed?

Editorial Role and Acknowledgements

The author's role in this issue was to design the research framework and supervise the analytical process. The country analyses, interpretations, and conclusions belong to the student authors. The publication of this special issue was made possible by the editorial work of Dani Collins, who standardized and copyedited each manuscript, and by Jessica Obando Almache, whose cover design reflects the theme of ambition and transition.

AI, Transparency, and Scholarship

This special issue also reflects a changing research environment. Authors were encouraged to use artificial-intelligence tools as research assistants while remaining responsible for data construction, verification, and interpretation. Each paper includes a disclosure describing how such tools were used. The intention was not to automate scholarship but to

emphasize accountability. The exercise reflects the evolving reality of modern research, in which computational assistance is common, but authorship and responsibility remain human.

In preparing this editorial, the author used ChatGPT (version 5.2) to assist with structural organization and stylistic refinement. The conceptual framework, comparative synthesis, interpretation of findings, and final text were developed through the author's independent analysis of the student manuscripts.