Future Earth
A Student Journal on Sustainability and Environment

AMBITION VS. ACTION
Growth, Emissions, and Climate Targets in the Paris Agreement Era

Online ISSN: 2819-7046 SPECIAL ISSUE: AMBITION VS. ACTIONS 2026

COMMENTARY

Mexico's Greenhouse Gas Emissions in the Paris Era: Stabilization Without Sustained Decline

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The global effort to combat climate change centers on reducing greenhouse gas (GHG) emissions while maintaining economic growth. This balance, known as "absolute decoupling," is central to the Paris Agreement's goal of limiting global temperature rise to below 2°C (United Nations Framework Convention on Climate Change [UNFCCC], 2015). A key metric is carbon intensity, defined as GHG emissions per unit of economic output. This commentary analyzes Mexico's post-Paris emissions using the IPAT framework (Impact = Population × Affluence × Technology), testing the hypothesis that Mexico's carbon intensity declined more rapidly after the Paris Agreement (2016–2022) than before it (2001–2015), indicating a policy-driven shift.

Using the World Bank (2025) database, carbon intensity (T) was calculated as total GHG emissions including LULUCF (Mt CO_2e) divided by GDP (population × GDP per capita). Average annual growth rates (AAGR) were computed for each IPAT component. From 2001–2015, emissions rose by 2.40% annually, driven by population growth (1.37%) and rising carbon intensity (0.74%).

In contrast, 2016–2022 saw emissions decline (−0.40%) and carbon intensity drop sharply (−1.25%), despite continued population growth (0.86%). However, GDP per capita stagnated (−0.01%), suggesting the decline was more economic than structural (Engström & Kolk, 2024).

Table 1: *Average Annual Growth Rate of IPAT Forces in Mexico*

Period	*CO_2	**Population	***GDP per capita	Carbon Intensity
2001–2015 Pre-Paris Agreement	2.40	1.37	0.30	0.74
2001 – 2015 Pre-Paris Agreement Without Recession (Year 2008)	2.43	1.36	0.36	0.72
2016–2022 Post-Paris Agreement	−0.40	0.86	−0.01	−1.25
2016–2022 Post-Paris Agreement Without COVID-19 Pandemic (Year 2020-2021)	0.59	0.91	0.85	−1.18

Source: *Author's own calculation based on data from the World Bank (2025).*
** Total greenhouse gas emissions including LULUCF (Mt CO2e): EN.GHG.ALL.LU.MT.CE.AR5*
*** Population, total: SP.POP.TOTL*
**** GDP per capita (constant LCU): NY.GDP.PCAP.KN*

Excluding COVID-19 years (2020–2021), emissions rose (0.59%) and GDP per capita recovered (0.85%), yet carbon intensity still declined (−1.18%). This hints at modest efficiency gains but not a decisive Paris-driven shift (Ramírez & Ng, 2024). As Abbas (2025) describes, this outcome is characteristic of middle-income economies like Mexico, resulting in a relative decoupling rather than the structural transformation observed in developed economies.

As part of its ambitious Nationally Determined Contribution (NDC) under the Paris Agreement—which commits the country to achieving net-zero GHG emissions by 2050 through the incorporation of climate objectives into key sectors like energy and transport policy—Mexico has pledged to decarbonize the electricity sector by expanding renewable energy use, generating 35% of its electricity from clean sources by 2024, and achieving a 35% reduction in

GHG emissions and reducing black carbon emissions by 51% (unconditional) and 70% (conditional) by 2030 (Alemán-Nava et al., 2014; Buira et al., 2021; García Hernández & Lucatello, 2021; Ministry of Environmental and Natural Resources, 2016). Nevertheless, Mexico struggles with policy implementation due to a lack of resources and coordination across levels of government, as the country appears to have prioritized fossil fuel production and rolled back clean energy initiatives (Morales, 2024; Secretaria de Medio Ambiente y Recursos Naturales, 2022; Sosa-Rodriguez, 2013; Soto-Montes-de-Oca et al., 2022).

This information is supported by the International Energy Agency (2025), which shows the dominance of natural gas and a slow growth of non-hydro renewables, indicating limited progress toward decarbonization for absolute emissions reduction. Although, Grande-Acosta and Islas-Samperio (2017) demonstrated a feasible Low-Carbon Scenario (LCS) capable of reducing GHG emissions from the electric power sector by 79% by 2035, Mexico appears far from achieving this goal.

In conclusion, Mexico achieved relative decoupling post-2016, but the data do not strongly support a Paris-driven reduction in carbon intensity. The decline appears tied to economic slowdown and pandemic disruptions. Structural transition remains limited, and future analysis should explore sector-specific trends and policy implementation.

Acknowledgment

The author contributed to the concept, writing, and editing, and takes full responsibility for the paper's content, accuracy, and integrity. The author acknowledges the use of ChatGPT as a tool that provided insights into the topic and supported readability and language. Consensus AI was used for the literature review. All errors, biases, and omissions remain the author's responsibility, not those of the AI tools. A detailed AI Usage Log for all contributors to this special issue is available as a separate PDF file.

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