

The Sustainability Imperative: Lessons from Taiwan's Thirty-Year Energy Journey

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Abstract

In 1995, Taiwan was characterized by a "grow now, clean up later" philosophy, where rapid economic ascent as an "Asian Tiger" came at the cost of severe environmental degradation. Thirty years later, Taiwan has pivoted from prioritized energy-intensive industrialization to a mandated 2050 Net-Zero Emissions goal. This paper provides a longitudinal analysis of Taiwan's energy trajectory, bridging historical developmental critiques with contemporary strategic imperatives.

The study examines the decoupling of GDP growth from carbon emissions, navigating the "Middle-Income Trap of Energy" where fossil fuel dependency threatens long-term sustainability. Central to this transition is the "Silicon Shield" dilemma: the challenge of maintaining global semiconductor dominance while meeting the increasing, stable-power demands of high-tech manufacturing through renewable sources. By evaluating the "12 Key Strategies" of the 2023 Climate Change Response Act—including the phase-out of nuclear power and the aggressive expansion of offshore wind—this paper identifies the governance frameworks and economic and social trade-offs necessary for a successful transition. The findings suggest that Taiwan's experience serves as a critical case study for island-based economies balancing national security, economic competitiveness and climate responsibility.

Keywords: Taiwan; Energy Transition; Net-Zero 2050; Sustainable Development; Semiconductor Industry; Climate Change Response Act; Offshore Wind; Decarbonization