

# **Towards a Fair Price on Carbon: Aligning Growth and Climate Policy in Emerging Markets**

Kshetra Rao

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## **Abstract**

*Carbon pricing is widely regarded as one of the most practical and economically efficient tools for reducing greenhouse gas emissions. By placing a financial cost on carbon, governments aim to shift production and consumption toward lower-emission alternatives without prescribing specific technological pathways. While this approach has been tested and refined in high-income countries, its application in emerging economies remains uneven, shaped by local political, institutional, and economic realities.*

*This paper explores how carbon pricing has taken root in a selection of emerging economies, with a closer look at the experiences of South Africa and Chile. Drawing on policy developments between 2018 and 2024, the study investigates how these countries have designed and implemented national carbon pricing schemes, and how such efforts interact with broader goals around energy security, fiscal reform, and sustainable development. It also considers how carbon pricing fits within the international framework shaped by the Paris Agreement, particularly in the context of Nationally Determined Contributions (NDCs).*

*The findings point to a mixed but instructive picture. Chile's carbon tax, though modest in price, has benefited from institutional coherence and integration with broader fiscal policies. South Africa's scheme, introduced in a coal-dependent and energy-constrained context, has faced more visible challenges around enforcement, industry resistance, and public trust. These contrasts underscore the importance of local context in shaping outcomes, and suggest that effective carbon pricing requires more than just a price—it demands credibility, consistency, and political commitment.*

*Ultimately, the paper argues that carbon pricing in emerging economies should not be judged solely on short-term emissions outcomes. Its value also lies in its potential to build state capacity, send long-term investment signals, and gradually align national policies with global climate commitments. For these reasons, this study contributes to a deeper understanding of how emerging markets can approach climate policy not just as a burden, but as an opportunity to reimagine growth.*

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## **I. Introduction**

Few climate policies generate as much debate and confusion as carbon pricing. In theory, it is simple: put a price on carbon, and markets will do the rest. But in reality, especially in emerging economies, the story is far more complicated. These countries are navigating a double bind. They must address climate change while also fighting poverty, expanding energy access, and fueling industrial growth. For them, carbon pricing is not just a tool. It is a test of economic resilience, institutional capacity, and political will.

Over the last decade, carbon pricing has moved from the pages of textbooks into national policy frameworks. Mechanisms like carbon taxes and emissions trading schemes have been adopted across the globe, supported by the logic that making pollution expensive incentivizes cleaner alternatives. Yet, while high-income countries often have the luxury of institutional stability and economic buffers, emerging markets face tougher questions. Can they afford the economic friction of carbon pricing? Will it slow down development or spark innovation? And who bears the cost?

There has been no shortage of research on carbon pricing, but most of it centers on the developed world. When it comes to emerging economies, the literature is thinner and often treats them as an afterthought. Many studies rely on aggregate, cross-country comparisons that obscure local contexts. This paper takes a different approach. It focuses on the economic logic, design challenges, and policy impacts of carbon pricing in emerging markets, drawing from the experiences of countries like South Africa and Chile, without committing to a direct comparison.

South Africa, a country heavily dependent on coal and burdened with structural inequality, introduced its carbon tax in 2019. The policy was met with resistance from industry and labor groups, and its impact has been shaped as much by energy insecurity as by environmental intent. In contrast, Chile began implementing its carbon tax earlier, in 2017, as part of broader tax reform. With stronger institutions and a more stable energy grid, Chile offers a test case of how carbon pricing can be integrated into fiscal and environmental governance.

This paper explores the period from 2018 to 2024 using both descriptive and econometric tools. It asks how carbon emissions, GDP growth, energy intensity, and industrial output shifted in the wake of carbon pricing. It also considers how the institutional and economic context of each country shaped these outcomes. By using

fixed-effects and difference-in-differences methods, this study aims to isolate the causal impact of carbon pricing policies while acknowledging the political economy in which they operate.

The timing of this analysis is important. As global conversations intensify around carbon border adjustments and climate-linked trade, countries without credible carbon pricing mechanisms may find themselves at a disadvantage. For emerging economies especially, designing carbon pricing policies that are economically viable and politically durable is no longer optional. It is a prerequisite for full participation in the low-carbon global economy.

What follows is not just an evaluation of emissions data or GDP curves. It is an attempt to understand how policy translates into practice, how theory survives contact with reality, and what lessons countries navigating development and decarbonization simultaneously can offer the rest of the world trying to walk the same tightrope.

## **II. Methodology**

### **Theoretical and Conceptual Framework for Carbon Pricing**

Carbon pricing rests on a basic but powerful idea: polluters should pay for the environmental harm they cause. When greenhouse gas emissions go unpriced, markets fail to reflect their full societal costs. Carbon pricing—whether through taxes or emissions trading—corrects this by internalizing externalities and creating economic incentives to shift toward cleaner alternatives.

The economic theory behind this approach dates back to Arthur Pigou, who proposed that taxes could align private behavior with public welfare. A carbon tax sets a fixed price per ton of emissions, offering cost predictability. Emissions trading systems, on the other hand, limit total emissions and let the market determine the price through permit trading. Both tools can work, though they differ in complexity, transparency, and political appeal.

In emerging economies, these instruments face unique challenges. Energy systems are often heavily reliant on fossil fuels, and institutional capacity to monitor emissions or enforce compliance may be limited. The risk of burdening low-income households is also higher, making equity considerations central to policy design. If carbon pricing increases fuel or electricity prices without compensation, it can deepen inequality and provoke public resistance.

The concept of “effective carbon pricing” is key here. It’s not just about the official tax or permit price, but the overall economic signal after accounting for subsidies, exemptions, and energy taxes. In many cases, fossil fuel subsidies offset the impact of carbon pricing, weakening its effectiveness. Removing those subsidies while introducing carbon pricing can enhance credibility and fiscal efficiency, but must be done carefully to avoid social backlash.

Revenue use is another critical element. Carbon pricing generates public funds that can be reinvested in renewable energy, adaptation infrastructure, or direct support to vulnerable groups. This “revenue recycling” not only improves fairness but can strengthen political buy-in.

Other mechanisms, such as voluntary carbon crediting, play a supplementary role. While they allow firms to offset emissions by funding climate projects, these systems often lack transparency and can delay deeper structural change. Crediting can be part of the solution, but it cannot substitute for economy-wide decarbonization.

Ultimately, carbon pricing is not a silver bullet, but it can be a cornerstone of climate policy. Its value goes beyond immediate emissions reductions. It helps build long-term credibility, guide investment, and integrate environmental goals into fiscal and industrial planning. In emerging economies, where the stakes of development and decarbonization are intertwined, the design and sequencing of carbon pricing will shape not just climate outcomes, but the future trajectory of growth.

### **Carbon Pricing in Multilateral Climate Agreements**

Global efforts to address climate change have increasingly turned to carbon pricing as a key policy tool, yet its formal role within multilateral climate agreements has been both evolving and contested. While the United Nations Framework Convention on Climate Change (UNFCCC) laid the foundational principles of international cooperation on climate, it did not explicitly institutionalize carbon pricing in its early texts. That changed with the Kyoto Protocol, which introduced flexible mechanisms—such as the Clean Development Mechanism (CDM), Joint Implementation, and International Emissions Trading—marking the first serious global move toward market-based climate solutions.

The Kyoto Protocol’s market mechanisms were pioneering, but limited in scope and participation. Only developed countries faced binding emissions targets, and the system struggled with issues of transparency, verification, and uneven benefits. However, these early experiments paved the way for more inclusive and adaptive frameworks under the Paris Agreement.

Adopted in 2015, the Paris Agreement shifted the paradigm from top-down targets to nationally determined contributions (NDCs), allowing countries to tailor their commitments to local contexts. Article 6 of the agreement is particularly relevant to carbon pricing. It introduced provisions for voluntary cooperation through

carbon markets, creating space for countries to trade emission reductions to meet their climate goals more cost-effectively. The goal was to strike a balance between flexibility and integrity, encouraging ambition while preventing double-counting or loopholes.

Article 6 has three core components: Article 6.2 focuses on bilateral or multilateral cooperation; Article 6.4 aims to establish a centralized UN-supervised crediting mechanism; and Article 6.8 covers non-market approaches. These tools are still being refined through ongoing negotiations, particularly around issues like accounting standards, transparency, and the role of legacy credits.

What's clear is that multilateral frameworks now recognize the value of carbon pricing not only for emissions reduction, but also for fostering international cooperation, channeling finance, and supporting sustainable development. By embedding carbon market principles into international law, the Paris Agreement created a normative and institutional backbone for countries—especially emerging economies—to align domestic pricing schemes with global efforts.

For nations like South Africa and Chile, these frameworks provide both a blueprint and a benchmark. Engagement with Article 6 can help leverage external support, tap into carbon finance, and strengthen the credibility of national policies. However, effective participation depends on institutional readiness, legal clarity, and the ability to monitor and report outcomes—conditions still unevenly distributed across the Global South.

As countries continue to implement and revise their NDCs, the relevance of multilateral carbon pricing frameworks is set to grow. Article 6, if operationalized effectively, has the potential to transform fragmented national efforts into a more coherent and connected global market for carbon mitigation.

### **Türkiye – A Missed Opportunity in Carbon Pricing**

Türkiye's engagement with international climate agreements has long been shaped by a complex classification within the United Nations Framework Convention on Climate Change (UNFCCC) system. As an Annex I country under the Convention, but not listed in Annex B of the Kyoto Protocol, Türkiye occupies a legal gray area. This ambiguity has historically diluted its obligations and made the implementation of carbon pricing mechanisms politically and institutionally challenging.

The result has been a policy gap. Türkiye did not participate in the Kyoto Protocol's Clean Development Mechanism (CDM), missing out on both technical support and the financial incentives that carbon crediting provided. These early absences created long-term consequences. While other emerging economies began experimenting with market-based mechanisms and aligning their climate policies with international standards, Türkiye lagged behind in developing a comprehensive carbon pricing system.

To date, the country has yet to operationalize a national carbon pricing framework. This has constrained its ability to attract investment in clean energy infrastructure, improve energy efficiency, and meet long-term sustainability goals. The absence of a clear pricing signal for carbon has also meant that high-emitting sectors continue to operate without meaningful cost pressures to reduce emissions.

And yet, Türkiye is not without options. Its strategic position—economically, geopolitically, and environmentally—could allow it to become a leader in climate cooperation, particularly through engagement with Article 6 mechanisms under the Paris Agreement. Introducing a robust carbon pricing mechanism would not only support emissions reductions but could also unlock innovation, improve policy alignment with EU trading partners, and attract foreign investment in renewable and energy-efficient technologies.

Ultimately, Türkiye's case underscores the cost of delay. In failing to establish a carbon pricing system early on, it has foregone economic and environmental gains. But it also illustrates the potential for rapid progress—should political alignment, regulatory capacity, and public trust converge in favor of action.

### **Voluntary Carbon Markets and Credit Mechanisms in Türkiye**

In the absence of a legally mandated national carbon pricing scheme, Türkiye has increasingly turned to Voluntary Carbon Markets (VCMs) as a transitional strategy to engage stakeholders in climate action. VCMs allow businesses, non-state actors, and even subnational governments to finance emissions reduction projects and purchase carbon credits based on verified results. These markets have grown in prominence as tools for early engagement in carbon pricing, particularly in economies where regulatory infrastructure is still evolving.

For Türkiye, VCMs offer more than a means to offset emissions—they provide a testing ground for institutional learning, public-private cooperation, and technical capacity-building. The flexibility of VCMs has enabled a variety of actors to participate, from renewable energy developers to forest conservation projects, all contributing toward the country's broader climate objectives. In doing so, VCMs have helped establish foundational experience in carbon accounting, project verification, and market transactions, all of which are critical if Türkiye eventually transitions to a formal Emissions Trading System (ETS) or carbon tax.

This chapter explores the integration of VCMs into Türkiye's wider climate policy ecosystem, including their interactions with international frameworks such as Article 6 of the Paris Agreement. The mechanisms under Article 6—which facilitate cooperative approaches to emission reductions between countries—highlight how

voluntary markets could evolve into compliance instruments over time. However, the effectiveness of VCMs in Türkiye remains constrained by several key factors.

First, there is a persistent lack of awareness and understanding of carbon markets among domestic stakeholders, particularly in the private sector. Second, the country faces institutional limitations, including insufficient regulatory clarity and weak monitoring, reporting, and verification (MRV) systems. These technical shortcomings raise concerns about the credibility and environmental integrity of issued carbon credits. Third, there is minimal alignment between voluntary market activity and Türkiye's Nationally Determined Contributions (NDCs), which limits the role VCMs can play in achieving long-term emission targets.

Despite these challenges, VCMs retain strategic relevance. They provide a pathway for early movers, foster innovation in emissions reduction technologies, and position Türkiye as a potentially credible partner in international climate finance. Moreover, as discussions around carbon border adjustment mechanisms (CBAM) and green trade standards gain traction globally, maintaining a functional and transparent carbon crediting system, voluntary or otherwise, could become essential for accessing export markets and international funding.

Ultimately, the chapter argues that while VCMs are not a substitute for formal pricing instruments, they serve as a practical interim solution. With enhanced transparency, capacity-building, and alignment with national climate goals, voluntary carbon markets can bridge the current policy gap and prepare the institutional terrain for a more robust, state-led carbon pricing regime in the near future.

### **The Transformative Impact of CBAM and Carbon Pricing on Türkiye's Industrial Policy**

The introduction of the European Union's Carbon Border Adjustment Mechanism (CBAM) marks a paradigm shift in global climate governance, one that extends the reach of carbon pricing beyond national borders and compels trading partners to reckon with the embedded emissions of their exports. For Türkiye, a country deeply integrated into European supply chains, this shift is not just regulatory but strategic. It demands a reconsideration of trade policy, industrial competitiveness, and the pace of domestic climate reforms. This chapter explores the far-reaching implications of CBAM for Türkiye, particularly its potential to accelerate the adoption of domestic carbon pricing and catalyze transformation in the energy and manufacturing sectors.

The CBAM, designed to prevent carbon leakage and preserve the integrity of the EU Emissions Trading System (EU ETS), will initially target sectors like cement, steel, aluminum, fertilizers, electricity, and hydrogen. These are industries where Türkiye not only has significant export stakes but also deep carbon intensity due to continued reliance on fossil fuels, especially coal. The CBAM's transitional phase, which began in 2023, mandates emissions reporting without financial penalties. However, by 2026, exporters will be required to purchase CBAM certificates equivalent to the carbon cost embedded in their products—effectively pricing carbon at the EU's internal rate.

To remain competitive in this evolving landscape, Türkiye must either adopt a comparable domestic carbon pricing mechanism or face rising trade costs. This alignment pressure has already sparked a policy shift. The Turkish government has updated its Nationally Determined Contributions (NDCs), adopted new mitigation strategies, and initiated institutional preparations for a potential emissions trading system (ETS). These changes reflect not only external pressure but also a growing recognition that delayed action could isolate the country from green trade flows and climate finance opportunities.

At the sectoral level, the impacts of CBAM and prospective domestic carbon pricing are complex and uneven. Energy-intensive industries will face the greatest adjustment burden. For instance, the steel industry—one of Türkiye's key export sectors—must now consider not only operational decarbonization but also robust emissions reporting systems to maintain EU market access. This raises challenges for small and medium-sized enterprises (SMEs), which may lack the resources to adapt quickly, as well as for workers whose livelihoods depend on high-emissions industries. The distributional effects of carbon pricing, therefore, go beyond firms and markets to affect regions, employment, and income equity. Effective policy design must therefore consider compensation mechanisms, transition support, and targeted investment in clean technology and upskilling.

This chapter also assesses the regulatory and technical barriers Türkiye must overcome to integrate CBAM compliance into its broader climate policy architecture. Chief among these are data transparency, the establishment of reliable Monitoring, Reporting, and Verification (MRV) systems, and inter-ministerial coordination. In many ways, these are not just technical challenges but governance ones—requiring institutional coherence and political commitment at both national and subnational levels.

Importantly, the chapter argues that the CBAM should not be viewed merely as a trade restriction but as a lever for transformation. If strategically managed, it could serve as a tipping point—driving Türkiye to modernize its energy infrastructure, reduce its coal dependency, and invest in low-carbon manufacturing. The signal sent by CBAM is clear: future competitiveness will be determined by emissions efficiency and climate credibility. Türkiye's response, therefore, must go beyond short-term compliance and embrace structural reform.

The analysis draws on policy developments, NDC updates, and CBAM alignment strategies between 2018 and 2024 to trace the evolution of Türkiye's climate-industrial interface. It also contextualizes the CBAM

within broader debates around climate justice, arguing that while carbon border adjustments risk disadvantaging developing exporters, they also incentivize climate ambition in countries with the capacity to respond. In Türkiye's case, the middle-income status, EU candidacy, and trade exposure create both vulnerability and opportunity.

In conclusion, this chapter underscores how the intersection of CBAM and carbon pricing is reconfiguring Türkiye's path to decarbonization—not as an external imposition, but as a domestic policy imperative. The transition will require not just technical readiness, but social dialogue, policy integration, and a long-term vision for sustainable growth. In this context, carbon pricing becomes more than a fiscal or environmental tool—it becomes an instrument of economic reorientation.

### **Establishing a Comprehensive Carbon Pricing System in Türkiye: Challenges, Opportunities, and the Road Ahead**

Türkiye stands at a critical juncture in its climate policy trajectory. While the global consensus around carbon pricing has solidified over the past decade, transitioning from fragmented experiments to more systematic approaches, Türkiye's journey remains in its formative stages. This chapter explores the evolving landscape of carbon pricing in Türkiye, examining the legislative groundwork, institutional readiness, and policy options that will shape its eventual system.

At the heart of carbon pricing lies a simple but powerful idea: emissions should carry a cost. But translating this principle into practice requires more than economic theory. It requires robust legislation, accurate emissions data, transparent governance, and political buy-in. For Türkiye, recent efforts have focused on building this foundation—developing national emissions inventories, consulting industry stakeholders, and initiating feasibility studies for various pricing mechanisms, including emissions trading systems (ETS), carbon taxes, and crediting schemes.

One of the key considerations in designing a pricing system is the sectoral composition of emissions. Türkiye's emissions are concentrated in a few high-impact sectors, notably energy production, heavy industry, and transport. A targeted approach—starting with the most carbon-intensive sectors—offers a pragmatic path forward. This sectoral sequencing allows regulators to gather experience, identify implementation gaps, and minimize economic disruption before expanding the scope of the policy.

However, the choice of instrument remains open. A national ETS could provide flexibility and market-based efficiency but requires sophisticated infrastructure, including monitoring, reporting, and verification (MRV) systems. A carbon tax offers simplicity and revenue predictability but may face resistance from businesses concerned about international competitiveness. Hybrid models, which combine fixed pricing in some sectors with tradable permits in others, are also under consideration. Ultimately, the best-fit approach will depend on institutional capacity, administrative ease, and political feasibility.

As Türkiye moves closer to formalizing its carbon pricing framework, international dynamics are accelerating the urgency. The introduction of the European Union's Carbon Border Adjustment Mechanism (CBAM) creates external pressure to adopt credible pricing at home to avoid trade penalties. At the same time, Türkiye's commitments under the Paris Agreement—reflected in its updated Nationally Determined Contributions (NDCs)—demand more concrete action to reduce emissions across the economy. In this context, carbon pricing is not only a climate tool but also a strategic instrument to align with global markets and attract green investment.

Yet, several challenges remain. Institutional fragmentation, limited cross-ministerial coordination, and gaps in public awareness could slow implementation. Moreover, the transition to a pricing regime may face opposition from sectors reliant on fossil fuels or vulnerable to price shocks. Addressing these issues requires inclusive dialogue, transparent communication, and just transition mechanisms to support affected industries and workers.

Despite these obstacles, Türkiye has a significant opportunity to leapfrog into a more modern and sustainable policy regime. By embedding carbon pricing within a broader climate strategy—linked to energy efficiency, industrial policy, and fiscal reform—the country can build a system that delivers both environmental and economic returns. Pilot programs, capacity-building initiatives, and knowledge sharing with countries that have undergone similar transitions could play a vital role in reducing start-up costs and policy missteps.

This chapter concludes by emphasizing that carbon pricing should not be viewed as a standalone policy. For Türkiye, its success depends on its integration with other reforms—from phasing out fossil fuel subsidies to scaling up renewable energy and building climate resilience. A well-designed carbon pricing system offers not only a means to internalize the cost of emissions but also a lever to accelerate the country's shift toward a low-carbon, innovation-driven economy.

### III. Conclusion

This study has traced the evolving role of carbon pricing as a climate policy tool, with a particular focus on its challenges and opportunities in emerging economies. From the foundational theories of internalizing externalities and the “polluter pays” principle to the application of carbon pricing mechanisms across multilateral agreements and national contexts, the analysis has shown that while the logic of pricing emissions is well-understood, its implementation remains complex and highly context-dependent.

Türkiye’s journey illustrates this complexity vividly. Positioned as an Annex I country under the UNFCCC yet outside Annex B of the Kyoto Protocol, Türkiye has faced a unique classification that has delayed its full engagement with global carbon pricing instruments. The absence of a comprehensive carbon pricing framework has not only limited access to financial mechanisms like carbon credits but also hindered investment in clean technologies. Chapters throughout this study have underscored how Türkiye’s institutional and legal infrastructure must evolve to support effective pricing strategies, particularly in light of its international obligations under the Paris Agreement and its aspirations for deeper trade integration with the European Union.

One key recommendation emerging from the analysis is the need to tailor pricing instruments—such as carbon taxes or emissions trading systems—to the specific structures of emissions across upstream, midstream, and downstream energy sectors. Doing so allows policymakers to align carbon pricing with actual emission profiles, thereby maximizing efficiency and environmental benefit.

The evolution of carbon pricing frameworks—from the Kyoto Protocol’s flexible mechanisms to the Paris Agreement’s Article 6 provisions—provides useful direction for Türkiye and other emerging economies. While the Clean Development Mechanism once offered developing countries a pathway to participate in carbon markets, the Paris Agreement demands a more robust and nationally anchored approach. Aligning with Article 6 not only allows for integration into new global carbon markets but also signals readiness to trade with jurisdictions such as the EU under instruments like the Carbon Border Adjustment Mechanism (CBAM).

As Türkiye moves toward its 2053 net zero emissions target and updates its Nationally Determined Contributions (NDCs), it must bridge existing gaps in governance, data collection, and institutional readiness. This study’s findings indicate that an effective carbon pricing system can serve as both a domestic reform tool and an international competitiveness strategy. Building a credible system—supported by legal clarity, public trust, and adaptive capacity—will be key to ensuring that Türkiye does not remain on the periphery of global climate governance.

In conclusion, carbon pricing should not be seen in isolation, but as part of a broader transformation that includes energy policy, fiscal reform, trade strategy, and social equity. For Türkiye, and for many emerging economies, success lies in the ability to integrate these elements into a coherent and forward-looking climate strategy—one that positions carbon pricing not just as an obligation, but as a catalyst for sustainable development and green economic growth.

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