

# Carbon Border Adjustment Mechanism (CBAM): An Opportunity for Industrial Decarbonization in Pakistan

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## Abstract

Owing to its heavy reliance on fossil fuels, Pakistan's industrial sector faces significant challenges, especially in the backdrop of sustainability being mainstreamed in the development agenda. With increasing export compliance and reporting mechanisms, industrial decarbonization is not only an environmental but also an economic consideration. With key industries particularly the hard to abate sectors contributing heavily to carbon emissions, there is substantial potential for progress through the adoption of clean energy and decarbonization strategies. Given this challenge, this study uses a mixed method approach to analyze the integration of international trade frameworks, particularly the European Union's Carbon Border Adjustment Mechanism (CBAM) in incentivizing emission reductions and facilitating the transition to low-carbon technologies. Based on the qualitative analysis of Pakistan's industrial sector, the critical levers to address these challenges include emission accounting, enhancing energy efficiency, energy market reforms particularly the transition to renewable energy sources, use of alternate materials, stringent environmental regulations, and implementing carbon capture technologies. However, decarbonization and energy transition has a cost due to comparatively high technology prices, outdated infrastructure (especially for informal sector), increasing energy costs that require comprehensive solutions, including financial incentives, regulatory support, and the creation of a green financial framework. CBAM's role in this transformation cannot be understated, offering both market access and a compelling reason for industries to accelerate their decarbonization efforts.

**Keywords:** Carbon Border Adjustment Mechanism, Decarbonization, Industrial emissions



# 1. Introduction

Emissions from energy and industry have risen to 60% since the United Nations Framework Convention on Climate Change was signed in 1992. Globally, greenhouse gas (GHG) emissions grew by 51% from 1990 to 2021 (Ge, Friedrich and Vigna, 2024) whereas energy-related CO<sub>2</sub> emissions rose by 1.1% in 2023, increasing by 410 million tons (Mt) to reach a new record of 37.4 billion tons (Gt) (International Energy Agency 2024). In 2022, emissions from energy combustion and industrial processes accounted for 89% of energy-related GHG emissions (ibid). This higher proportion exposes the havoc that the industrial sector is playing in terms of global emissions. To achieve net-zero emissions by 2050, as proposed in the Paris Agreement, annual clean energy investment worldwide should be around \$4 trillion by 2030. Here lies the opportunity for the world's industrial sector to rapidly transition towards the adoption of clean energy and sustainable practices. Failure to implement this transformation will escalate climate impacts and lead to major disruptions in industries and economies worldwide. With Carbon Border Adjustment Mechanism (CBAM) around the corner, Pakistan's industrial sector is faced with challenges to decarbonize its industrial processes.

## Objectives

The study mainly examines the challenges faced by Pakistan's industries in light of CBAM and identifies potential growth areas for green investments, technological innovation, and carbon reduction in key industrial units. The study aims to:

- assess the potential impact of CBAM on Pakistan's carbon-intensive industries, particularly in terms of export competitiveness and costs,
- explore the opportunities for Pakistan to leverage CBAM to drive innovation in green technologies and energy efficiency in its industrial sector, and
- analyze the potential for Pakistan to generate revenue through carbon credit trading and attract foreign investment in green technologies, aligning with global sustainability trends.

## 1.1 CBAM and Future of Global Trade

In May 2023, the announcement of legal regulations to reform the European Union Emission Trading System (EU ETS) along with the introduction of the EU Carbon Border Adjustment Mechanism (CBAM) was a key milestone. Part of the EU's "Fit for 55"

legislative package, which was initially announced in July 2021, the new CBAM and ETS reforms are seen as pivotal measures to help Europe achieve a 55% reduction in emissions by 2030, relative to 1990 levels. These targets are outlined in the European Climate Law and form a key component of the broader European Green Deal strategy aimed at achieving climate neutrality by 2050.

The application of CBAM began 01 October 2023 with a three-year transition period, during which EU importers of carbon-intensive goods were required to submit quarterly emission reports to the European Commission. Following the conclusion of the transition phase, tariffs will be gradually introduced in 2026 with full implementation expected by 2034. Initially, the CBAM will apply to cement, iron, steel, aluminum, fertilizers, electricity, and hydrogen though its scope is anticipated to expand to include all products covered by the EU ETS. The CBAM aims to support the decarbonization of European industries while addressing the issue of carbon leakage where businesses relocate production to countries with weaker climate regulations to avoid higher carbon costs. With the level playing field, CBAM ensures that the EU can continue its decarbonization efforts without losing competitive advantage (Oropoza 2023) (Ernst & Young LLP 2023). On the flip side, modelling suggests that the EU CBAM could cost developing countries US\$ 10.2 billion with some countries, like Zimbabwe and India, most exposed (Zero Carbon Analytics 2024).

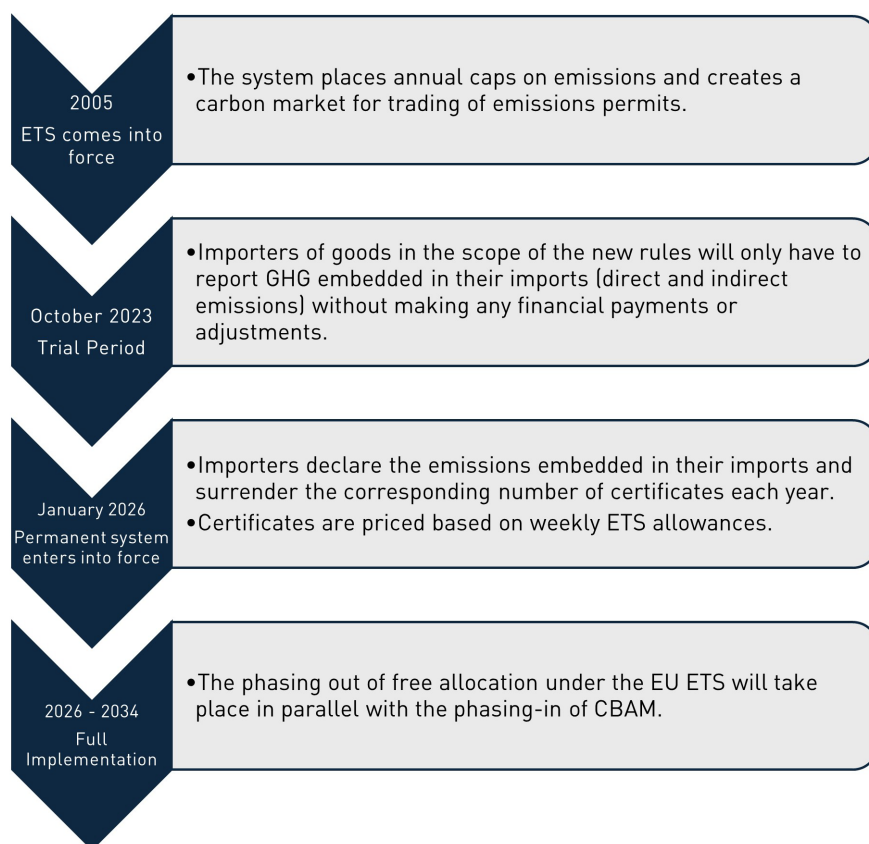


Figure 1: EU CBAM Timeline

Source: European Commission, ING Research

## 1.2 Pakistan's Industrial Landscape

The industrial sector, which is considered the backbone of modern economy, provides energy and materials that are essential for rapid growth. In Pakistan, the growth rate remained 1.21% in the Fiscal Year 2024 (Finance Division 2024) with a contribution of 20.76% to GDP in 2023 (Trading Economics 2023). However, as the country shifts towards an industry-driven economy, its energy consumption and carbon emissions are rising, given that over 98% of its energy comes from polluting sources. As global pressure to address climate change grows, Pakistan faces the challenge of reducing industrial emissions while maintaining economic competitiveness. Pakistan's industries often operate with higher carbon intensities than their EU counterparts due to outdated technologies, energy inefficiencies, and reliance on coal and other fossil fuels. The implementation of CBAM could have profound implications for its industrial exports. At the same time, the challenge presents an opportunity for Pakistan to transition toward more sustainable industrial practices and improving its competitiveness in the global market by 2030.



## 2. METHODOLOGY

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This study uses a mixed method approach to derive its analysis. The secondary data is obtained from academic research, industry reports, government publications, and relevant news sources. The analysis also incorporates insights from industry experts and statistical data from 2023 and 2024 reports on Pakistan’s industrial emissions, trade statistics, and global market trends. Secondly, the study also derives its insights from stakeholder consultation, key informant interviews, and particularly the policy dialogue on “CBAM as an opportunity for Industrial Decarbonization in Pakistan<sup>1</sup>”

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1 The dialogue was held at the 27th Sustainable Development Conference, organized by Sustainable Development Policy Institute (SDPI) in collaboration with Pak-German Climate and Energy Partnership in Islamabad in November 2024.



## **3.** IMPLICATIONS OF CBAM FOR PAKISTAN

### **3.1 Policies, targets and commitments**

The European Union, which , accounted for 15.3% of Pakistan's total trade in 2023 (European Commission 2023), continues to implement renewable energy standards as a trade barrier. Pakistan's immediate concern lies in ensuring the competitiveness of its businesses on the global stage. Though only 1.23% of Pakistan's exports are presently exposed to CBAM, the potential inclusion of textiles — an essential sector for Pakistan's export economy — necessitates the implementation of proactive strategic policies to sustain competitiveness in the European market (Hanif 2024). Initially targeting six key sectors (such as cement, aluminum, hydrogen, iron and steel, fertilizer, and electricity) the CBAM will eventually extend to all industries, including textiles, which make up the largest share of Pakistan's exports (Khan 2024). The World Bank's CBAM Exposure Index indicates that Pakistan faces moderate but significant exposure, particularly when compared to major exporters like India and China (World Bank 2023). With the CBAM's carbon pricing, industries may incur additional costs to comply with the EU standards, either through direct carbon taxes or the need to invest in cleaner technologies. These added costs could reduce Pakistan's export competitiveness in the EU market and undermine the profitability of these sectors, which are essential to the country's economy.

### **3.2 Revenue Generation through Carbon Markets**

While CBAM introduces higher costs, a "stick" factor, it also offers an avenue for revenue generation for Pakistan. If the country succeeds in reducing its industrial carbon footprint and complies with the EU environmental standards, it could access carbon credits or participate in carbon trading mechanisms. This would allow industries to generate revenue by selling surplus credits in carbon markets, serving a "carrot" factor. Pakistan can potentially leverage anywhere between \$2 billion and \$5 billion from carbon markets by 2030 if it properly manages and develops the nascent market, creates a conducive regulatory and policy framework to ensure benefits reach communities affected by the climate change impact (UNEP Copenhagen Climate Centre 2024). This shift could further enhance the country's export profile and create a potential income stream.

### **3.3 Technological Innovation and Investment Opportunities**

Global green technology investments reached \$1.77 trillion in 2023, a 17% rise from 2022 (Relander 2024). Pakistan could benefit from these trends by adopting cutting-edge technologies in energy-intensive industries, leading to significant opportunities for attracting foreign direct investment (FDI). Investors are increasingly prioritizing countries with clear policies on decarbonization. CBAM is likely to incentivize industries in Pakistan to adopt cleaner and more energy-efficient technologies. The requirement to reduce carbon emissions to meet EU standards could spur innovation within Pakistan's industrial sector, driving investments in renewable energy, use of alternate material, carbon capture and storage (CCS), and energy efficiency measures. The transition to greener technologies would help Pakistan improve the long-term sustainability and competitiveness of its industries.



## **4. SIGNIFICANCE OF PAKISTAN'S INDUSTRIAL DECARBONIZATION IN ERA OF CBAM**

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In 2023, the global decarbonization rate stood at just 1.02%, highlighting that the world must accelerate its efforts twentyfold to limit warming to 1.5°C above pre-industrial levels. Even to achieve the Paris Agreement's lower target of limiting warming to 2°C, an urgent shift is needed, with an annual decarbonization rate of 6.9% (PricewaterhouseCoopers [PwC] 2024). Industrial decarbonization can accelerate the clean energy transition, ensuring long-term economic growth. For Pakistan, the significance of CBAM lies in its potential to drive industrial transformation by providing economic incentives for carbon reduction. Approaching CBAM with a positive outlook will encourage Pakistan's industries to adopt cleaner technologies and reduce carbon emissions in order to maintain market access in the EU (Khan 2024). Furthermore, decarbonization serves to attract international investment in clean technologies, promoting innovation and supporting economic growth (Majid 2024).

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To effectively leverage these opportunities and address associated challenges, Pakistan must invest in modernizing its industries, improving energy infrastructure, and enhancing technical education. Additionally, creating a stable and secure environment that supports business growth is essential. By focusing on these areas, Pakistan can significantly boost its industrial productivity and competitiveness while benefiting from CBAM.



## 5. CHALLENGES AND OPPORTUNITIES

As per the European Commission, Pakistani exports to the EU are dominated by textiles and clothing. In 2023, this accounted for 73.2% of Pakistan's total exports to the EU. With exports amounting to €5.5 billion in 2020, the EU was Pakistan's largest export destination (Pakistan Business Council 2021). In the light of CBAM, Pakistani industries could face additional tariffs if they fail to reduce their carbon emissions. Cement, textiles, and steel contribute a significant portion to exports, making them vulnerable to the CBAM's carbon pricing – affecting their competitiveness in EU markets, hence depicting a bleak situation. Given the severe implications of CBAM for Pakistan's export competitiveness, this transition is not only about adapting to new trade requirements but also about aligning its industrial practices with global decarbonization trends. Though the implications of CBAM on export costs and competitiveness have been highlighted, it is equally important to recognize the systemic transformations that this policy demands from developing economies like Pakistan. Pakistan's reliance on carbon-intensive energy sources and outdated industrial practices creates significant barriers to meeting CBAM requirements, which necessitate a broader understanding of how Pakistan can position itself strategically within this evolving global framework. However, this challenge also presents an opportunity to reassess the country's development trajectory and provide access to new markets, technologies, and avenues for revenue generation and investment streams as global investors increasingly prioritize decarbonized economies. However, to fully capitalize on the opportunities presented by CBAM, Pakistan must address existing challenges.

- **Pakistan's Textile Supply Chain:** Implementing the CBAM in Pakistan's industrial sector, particularly textiles, presents significant hurdles. Though CBAM currently prioritizes industries like fertilizers, cement, metals, and hydrogen, the textile sector is indirectly impacted as it prepares for future compliance. The key challenge lies in establishing a robust carbon accounting mechanism for the entire textile supply chain, which typically comprises five tiers, ranging from manufacturers to farm-level producers. Without full visibility and accurate measurement of carbon footprints across all tiers, calculating product-associated emissions becomes infeasible.
- **Carbon Accounting and Verification Gaps:** The complexity of integrating carbon accounting systems, especially for tier-one manufacturers, is compounded by the need for transparency, authenticity, and third-party verification. While some companies, like Interloop, have adopted science-based targets, the lack of a

standardized and verified framework for carbon credit transfer within the supply chain remains a barrier. These challenges make it difficult for Pakistan's textile sector to meet CBAM requirements, which could impact global competitiveness and market access.

- **Exports in Steel Sector:** Pakistan currently does not export steel or metals like aluminum due to stiff competition from the economies of scale in India and China. While China produces around one billion tons of steel annually (China's steel demand 2024)—more than the rest of the world combined—India's steel industry has grown its capacity from 142.3 million tons per annum in 2019-20 to 179.5 million tons in 2023-24 (Press Information Bureau 2024). In comparison, Pakistan produces only 9 to 10 million tons of steel per year (Pakistan Association of Large Steel Producers, n.d.). This stark disparity in production levels, coupled with the cost efficiency in primary steelmaking in these countries, leaves Pakistan's steel industry uncompetitive in global markets.
- **Reliance on Fossil Fuels:** The steel sector in Pakistan relies primarily on scrap steelmaking, which has a lower carbon footprint than primary steelmaking. However, the sector's energy mix is still heavily reliant on fossil fuels, making decarbonization a challenge. To remain competitive under the CBAM framework, an estimated 70-80% shift to renewable energy in the energy mix is required, a significant infrastructural and financial hurdle.
- **High Electricity Tariff:** A significant challenge facing Pakistan's industrial sector is the high electricity tariff, which impacts regional competitiveness, especially for export-oriented industries. The introduction of CBAM would further exacerbate this issue by adding additional costs, such as the CBAM fee, to industries already struggling with high energy costs. Pakistan's National Grid is 1.4 times more carbon-intensive than the European Union's grid, as highlighted by the World Bank's CBAM exposure index. This means that an exported commodity could incur an additional €40 in costs after CBAM is applied. Such an increase would reduce export competitiveness, discouraging industries from participating in the National Grid. As a result, the goal of increasing industrial demand for the grid could be undermined, and industries may opt for captive power solutions instead, further entrenching the challenges in Pakistan's power sector.
- **CBAM Tax on Primary Steelmaking:** With CBAM introducing taxes of approximately \$250-\$275 per ton for primary steelmaking, global trade patterns in steel are expected to shift. While this provides an opportunity to the Pakistan's scrap steel producers, the absence of renewable energy integration means Pakistani steel remains vulnerable to Scope 2 emissions penalties.
- **Policy and Financial Support:** The absence of a clear policy framework or financial incentives to promote decarbonization in the steel industry limits its ability to leverage CBAM as an opportunity. Without targeted subsidies or access to climate finance, the industry faces challenges in adopting renewable energy solutions or

enhancing efficiency to meet CBAM requirements.

- **Awareness and Preparedness:** Many industries in Pakistan lack an understanding of CBAM, including carbon accounting, net-zero targets, and compliance mechanisms. The complexity of the accounting process and limited education on sustainable practices leave key sectors underprepared for CBAM's partial implementation in 2026 and full-scale enforcement by 2030. This knowledge gap prevents industries from adopting the best practices in sustainability and carbon footprint reduction, limiting their ability to compete in the global marketplace.
- **Non-Mandatory Sustainable Reporting:** While the Securities and Exchange Commission of Pakistan (SECP) has issued guidelines on sustainable reporting, these are currently optional. This lack of mandatory reporting hampers the ability of industries to align with international standards and prepare for CBAM compliance.
- **Sectoral Vulnerability:** Although CBAM initially targets nine industries — primarily steel, cement, and fertilizers — Pakistan's exports, particularly in textiles and rice, are expected to face future exposure. Textiles alone account for approximately 60% of Pakistan's total exports, making it the 8th largest textile exporter in Asia (Board of Investment, n.d.). Additionally, rice exports crossed five million tons mark in 10 months (July-April FY24), earning \$3.4 billion, positioning Pakistan as the fourth-largest rice exporter (Mahmood 2024; Hussain 2024). However, limited preparedness in these sectors, especially in carbon accounting and sustainable supply chain practices, poses a significant risk to their global competitiveness under the CBAM framework.
- **Technological Gaps and Lag in Adoption:** Pakistan has yet to initiate CBAM-related measurement processes, unlike other countries that have begun aligning their industries with the EU regulations. This delay in adopting advanced technology and sustainability practices places the country at a competitive disadvantage.
- **Expertise and Resources:** Pakistan's export-oriented sectors, particularly textiles and rice, face significant challenges due to lack of standardized carbon accounting systems, inadequate emission tracking infrastructure, and limited access to international expertise in carbon management and climate policy, resulting in insufficient capacity to measure and reduce carbon emissions.
- **Compliance Gaps in Supply Chains:** While larger industries may have streamlined operations, their supply chains often include smaller, less-equipped entities that struggle to meet compliance standards. This creates significant risks, including penalties, exclusion from international markets, and reputational damage through practices like "naming and shaming." Pakistan's SMEs and informal sector, in particular, face challenges due to a lack of financial resources, technology, and expertise needed to meet CBAM and other global regulations. The fragmented nature of the supply chain, spanning from tier-one manufacturers to smaller informal units, further complicates efforts to ensure compliance across all levels.



## 6. POLICY RECOMMENDATIONS

- **Capacity Building and International Collaboration:** A concerted effort is required to enhance industry awareness and technical capacity to meet global sustainability standards, similar to initiatives like Germany's Development Corporation, which has partnered with over 100 textile factories to align their production practices with international environmental standards. Expanding such partnerships with organizations like OICCI, UNDP, and others to educate stakeholders on carbon accounting, net-zero goals, and compliance mechanisms will help accelerate the adoption of low-carbon practices across Pakistan's industrial sectors.
- **Policy and Institutional Support:** There is a need to strengthen institutional frameworks such as Responsible Business Help Desk to support industries in reducing emissions and adopting sustainable practices. This help desk, launched in partnership with Germany and the Federation of Pakistan Chambers of Commerce and Industry, can serve as a model to support large, medium, and small enterprises.
- **Carbon Pricing and Incentives:** The government should design a domestic carbon pricing mechanism that reflects Pakistan's unique industrial context, setting a gradual pricing structure that encourages industries to adopt low-carbon technologies. Industries that achieve carbon reduction targets may be offered financial incentives, such as tax rebates or grants. In addition, providing direct grants for the purchase of energy-efficient technologies — such as LED lighting or energy-efficient HVAC systems — would support businesses in lowering emissions. A model for this approach is Canada's carbon pricing system where industries are offered rebates for meeting emission targets. As a result of the carbon tax, annual emissions in British Columbia, a province of Canada, are 5% to 15% lower than they would otherwise have been (Beugin et al. 2018).
- **Textile Sector Prioritization:** Textile and rice exports, though not immediately impacted, should begin preparing for future inclusion under CBAM. Given that textiles account for approximately 60% of Pakistan's total exports, it is crucial to implement targeted decarbonization programmes for this sector. The government should create an industry-wide decarbonization roadmap, focusing on reducing emissions across the entire supply chain. This could include introducing subsidies for renewable energy installations in textile factories.
- **Develop a Comprehensive Carbon Accounting Mechanism:** Pakistan should implement a standardized carbon accounting framework for the textile sector, tracking emissions from raw materials to finished goods, ensuring transparency

and alignment with CBAM requirements. Developed with international expertise, this system could be scaled through partnerships with global carbon accounting firms like SGS to help scale up the system nationwide. Additionally, Early adoption of this carbon accounting mechanism will help industries prepare well before CBAM enforcement. This will minimize compliance shocks when CBAM regulations are fully implemented by 2030.

- **Mandatory Third-Party Verification:** To ensure the accuracy and credibility of carbon accounting systems, the government should mandate third-party verification for all industries seeking export to EU markets. This could be implemented through certification bodies such as the Carbon Trust, which would audit industry carbon footprints and ensure compliance with international standards. Additionally, introducing a public registry of verified companies would increase transparency and incentivize others to adopt similar practices.
- **Government-Led Regulatory Framework:** Pakistan should create a national regulatory body tasked with overseeing carbon accounting systems and ensuring compliance across all industries. This body would set emission reduction targets, track industry progress, and provide financial assistance to companies adopting green technologies. For instance, the Ministry of Climate Change could create a carbon credit exchange to facilitate carbon credit trading and incentivize industries to meet their carbon reduction targets.
- **Pilot Projects for CBAM Readiness:** The government should initiate pilot projects within the textile industry to test different carbon accounting models and refine the process before nationwide implementation. The data collected from these pilots could help identify bottlenecks in the supply chain and suggest improvements.
- **National Decarbonization Plan for Steel:** Policymakers should develop a comprehensive, three-year national roadmap for decarbonizing Pakistan's steel sector. This plan should focus on increasing the use of renewable energy in steel production to 70-80% by 2027, reducing Scope 2 emissions and aligning CBAM standards. Additionally, the government could provide subsidies for the adoption of technologies that support lower carbon emissions. This will not only reduce emissions but also enhance Pakistan's export competitiveness.
- **Scrap Steelmaking as a Competitive Edge:** Pakistan's reliance on scrap steelmaking, which generates fewer carbon emissions compared to primary steelmaking, offers a competitive edge under CBAM. The government should actively promote this advantage in international markets, particularly in the EU, where lower-carbon steel is increasingly in demand. By marketing Pakistan's scrap-based steel production as a sustainable alternative, the country can tap into the growing demand for green steel in the global market, as demonstrated by the EU's Green Steel Initiative.

- **Facilitate Access to Climate Finance:** To support the decarbonization of the steel industry, the government should introduce climate finance programs or subsidized loans to help steel manufacturers adopt renewable energy systems or install energy-efficient technologies. The government could work with international financial institutions to secure funds that support the transition to decarbonized steel production in Pakistan, ensuring competitiveness in global markets.
- **Mandatory Sustainable Reporting:** The Securities and Exchange Commission of Pakistan (SECP) should introduce a mandatory sustainable reporting requirement for all major industries, particularly those with significant carbon. A clear, standardized reporting framework should be developed to guide industries in measuring, reporting, and managing their carbon emissions to enhance transparency, improve data reliability, and help industries identify emission reduction opportunities. Additionally, industries could be incentivized with financial or tax benefits for achieving significant reductions in emissions.
- **Partnerships, and International Collaboration for CBAM Compliance:** To facilitate the adoption of CBAM compliance in Pakistan, the government should utilize OICCI's access to multinational companies to facilitate technology transfer and best practices from global headquarters. Strong public-private collaboration is essential, with the government providing clear guidelines, incentives, and subsidies for clean technologies. These partnerships can address high initial costs for cleaner technologies, particularly for smaller players. Pakistan should also adopt successful CBAM readiness models from other countries and collaborate with the EU and international organizations to accelerate the integration of sustainable production and reporting practices.
- **Holistic Policy Approach:** An integrated, cross-sectoral approach is needed, where terms like CBAM, competitive markets, and carbon compliance are understood in a comprehensive, interconnected framework. It is crucial that various governmental divisions (e.g., Ministry of Energy, Ministry of Commerce, Ministry of Environment, etc.) collaborate to build a national policy that accommodates these global challenges while addressing Pakistan's internal power sector issues. This would involve creating clear communication channels, joint policy frameworks, and mutual coordination to ensure the entire sector—encompassing energy, environment, and industry—is aligned with long-term sustainability goals.
- **Strengthening Export Competitiveness:** Pakistan can also leverage its low labor costs and labor-intensive industries to attract foreign companies. To fully capitalize on this advantage, the government must work to ensure that Pakistan's electricity grid becomes cleaner and more reliable, which would, in turn, enhance the country's competitiveness for foreign investment. A clean grid would attract industries such as data centers, textiles, and technology-intensive sectors, allowing them to reduce their carbon footprint and meet European Union standards.

- **Inclusivity for Small and Medium Enterprises (SMEs):** A key challenge in CBAM implementation is ensuring SMEs are not left behind, as they often lack the financial resources, technical expertise, and access to clean energy solutions available to larger industries. Establishing a National Compliance Center can support SMEs by providing tailored guidance, resources, and technical assistance to meet CBAM requirements. This framework should offer step-by-step support, enabling SMEs to transition sustainably without excessive financial burden.
- **Addressing the Risk of Exclusion from International Markets:** With the implementation of CBAM, there is a significant risk that industries from developing countries like Pakistan could face barriers to entering international markets, particularly the European Union. To mitigate this risk, the government should actively engage with the European Union and other trading partners to advocate for a more inclusive and flexible approach to CBAM implementation, particularly for developing economies. Diplomatic channels should be used to negotiate a phased implementation of CBAM, providing industries with more time and support to adjust to the new compliance mechanisms.
- **Collaboration Across Sectors and Stakeholders:** The challenges presented by CBAM should be tackled through a collaborative, whole-of-sector approach. This means that not only government agencies, but also private sector stakeholders, civil society, and academia should be engaged in policy discussions, research, and implementation efforts. A multi-stakeholder platform could be created to regularly assess the impact of CBAM, monitor progress on tariff and grid reforms, and identify new opportunities for investment and innovation in the industrial and energy sectors.
- **Strategic Focus on Technology Transfer:** The integration of technology transfer, especially within key industries like textiles, manufacturing, and data centers, must be a priority. Facilitating the flow of green technologies and best practices from multinational corporations (MNCs) and transnational corporations (TNCs) that are already operating in Pakistan can accelerate the adoption of cleaner technologies across the industrial sector. A focus on energy efficiency technologies, as well as carbon capture and storage (CCS) technologies, would be essential in reducing the carbon intensity of Pakistan's industrial output, preparing for CBAM compliance, and enhancing competitiveness in global markets.
- **Decarbonizing the National Grid:** Decarbonizing the national grid is essential, as it remains heavily reliant on thermal power. Increasing the share of renewable energy—wind, solar, and hydropower—can lower electricity's carbon intensity, aiding CBAM compliance and attracting foreign investment from sustainability-focused companies. A clear green energy transition plan with defined targets and public-private investments is crucial.
- **Long-term Export Strategy:** As part of a broader national strategy, Pakistan should

develop a forward-thinking export strategy that integrates CBAM compliance into its industrial planning. This strategy should focus on creating a competitive, sustainable industrial base to meet evolving global market demands, especially from the EU. The strategy should consider all stages of the industrial value chain, from raw material extraction to final product exports, ensuring that Pakistan's exports remain competitive even as global standards for sustainability and carbon emissions become more stringent.

- **Addressing Financing Challenges:** Securing financing for the transition to cleaner technologies and CBAM compliance will be a key challenge. Both public and private sector financing mechanisms, including climate finance, green bonds, and international funding for sustainability projects, must be explored. The government should work closely with international financial institutions and private investors to unlock funding for key infrastructure projects, such as renewable energy installations, energy efficiency upgrades, and carbon capture technologies. Additionally, incentivizing financial institutions to provide low-interest loans or grants for green initiatives in the industrial sector would help mitigate the upfront costs of adopting sustainable practices.
- **Integrated Tariff Reform:** CBAM presents both a challenge and an opportunity for Pakistan, particularly in the energy sector. The decline in electricity demand due to high tariffs has shifted residential consumers to decentralized solutions like solar rooftops, causing a 13-15% decline in demand, putting pressure on the National Grid and driving up capacity charges. From the CBAM perspective, the solution lies in boosting industrial demand for the grid. However, with the grid's carbon intensity 1.4 times higher than the EU's, CBAM fees could raise export costs and reduce competitiveness. This could discourage industries from joining the grid, thus hindering the goals of the power sector. To address this, Pakistan must reduce tariffs in a way that is both carbon-efficient and sustainable, integrating CBAM and competitive market considerations

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