Box 4.2: Carbon Markets and Financial Stability – Emerging Risks and Opportunities for Pakistan

Introduction

Carbon markets are a key tool for mobilizing private capital for climate mitigation and channeling funds from advanced economies to developing countries where mitigation is relatively more cost-effective. These markets put a price on greenhouse gas (GHG) emissions, operating through two main structures:

i. Compliance Carbon Markets (CCMs), such as cap-and-trade schemes put limits on the amount of carbon emissions that a firm can generate and allow efficient firms to sell their surplus carbon allowances in the market. EU's Emissions Trading System (ETS) is a leading example of CCM, and
ii. Voluntary Carbon Markets (VCMs) involve private entities voluntarily trading in carbon credits.

Carbon markets can help generate the required funding for climate objectives and complement the bank funding which is a primary source of finance in Pakistan like any typical developing economy. It is estimated that the country needs total funding of US$ 348 billion between 2023 to 2030 to meet its emission reduction commitment and adaptation requirements; on the other hand, annual climate finance received in last decade was US$ 1.4 – 2.0 billion.[18] However, as the financial institutions increase their exposure to carbon-linked instruments, these markets can create new risk channels that may affect banks and financial institutions' financial performance and soundness.

Current State of Pakistan's Carbon Market Landscape

Pakistani firms have so far accessed the international carbon markets mainly through the Clean Development Mechanism under Kyoto Protocol of 1997 and VCMs. To date, over 23 million carbon credits have been issued for domestic mitigation projects.[19] However, given the country's profile in terms of potential to mitigate carbon emissions and build resilience and adaptability, carbon markets still remain largely untapped with minimal direct exposure of domestic investors as well as the financial sector.

Policy makers in Pakistan have taken a number of initiatives to create an enabling regulatory environment for carbon markets. In this connection, the Ministry of Climate Change and Environmental Coordination (MoCC&EC) issued **Policy Guidelines for Trading in Carbon Markets** in November 2024, covering both VCMs and envisaging the creation of a national CCM. Once operational, the CCM will require high-emission firms to purchase carbon allowances, thus increasing their incentive to participate in carbon markets. Moreover, with the expansion in scope of EU's Carbon Border Adjustment Mechanism (CBAM),[20] Pakistani exporters will also face increasing pressure to decarbonize, potentially increasing domestic demand for carbon credits. Meanwhile, the **Pakistan Green Taxonomy** (PGT) has been issued to standardize definitions and classifications of climate-aligned activities and SECP has issued **ESG Disclosure Guidelines** enabling listed companies to disclose climate-related risks and activity-level data under a standardized reporting framework aligned with PGT. These initiatives are expected to support the growth of carbon markets by, inter alia, supporting Monitoring, Reporting, and Verification (MRV) systems. This could make carbon credit projects more investable for banks and capital market participants.

The development of carbon markets may also support capital-market deepening and risk mitigation within the financial system. A functional national CCM could support capital market participation in mitigation projects by providing a domestic carbon price benchmark, predictable compliance demand, and enhanced MRV infrastructure, improving price discovery and investor confidence. It can help hedge transition risk for banks in a broad sense by dispersing long-horizon climate risks across capital markets, stabilizing borrower cash flows, and limiting the need for banks to warehouse climate-related risks over extended periods. However, these effects are expected to materialize gradually.

[18] United Nations Pakistan – Common Country Analysis 2024 update (2025)
[19] Source: World Bank (2025). State and Trends of Carbon Pricing Dashboard. Available at: https://carbonpricingdashboard.worldbank.org/
[20] The compliance phase of CBAM entered into force on January 01, 2026.

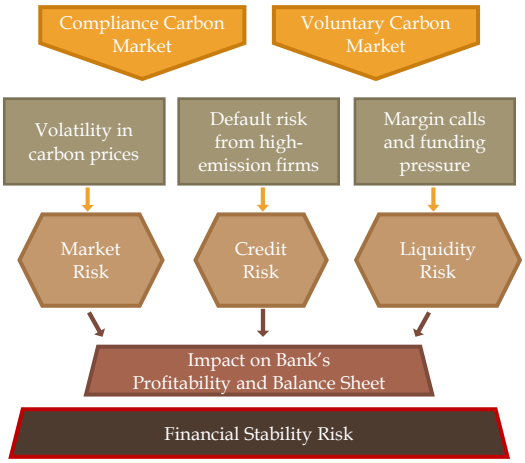
Risk Channels for the Financial Sector

Credit Risk: Carbon markets raise compliance costs for high-emission firms, potentially lowering their profitability and increasing their credit risk. ETS participants face not only higher costs but also exposure to carbon price volatility, increasing uncertainty for future cash flows. Evidence from the EU and US suggests that banks charge a "carbon premium" (higher lending spreads) for firms with higher emissions, especially under stress scenarios.[21,22] For Pakistan, SBP's FSR 2024 presented a scenario in which carbon taxes adversely impacted the profitability and repayment capacity of non-financial corporates (NFCs) in high-emission sectors.[23] While carbon taxes and carbon markets differ in mechanism, both act through carbon pricing. Thus, carbon markets, in whatever variant, could potentially introduce credit risks to Pakistani banks, especially as exposure to high-emission borrowers remains significant.

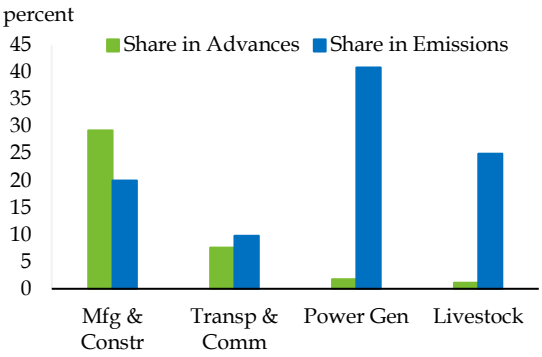
Market Risk: Carbon prices can be volatile, with abrupt price movements due to inflexible allowance supply (fixed quota) and exogenous shocks, particularly in capped systems like the EU ETS. Banks directly exposed to carbon instruments, such as allowances or carbon-linked derivatives, face potential mark-to-market losses. While current data indicate no exposure for Pakistani banks, the risk could arise if domestic carbon markets deepen and financial institutions begin trading or holding carbon-linked assets.

Liquidity Risk: Liquidity pressures can arise through funding withdrawals, margin calls, and impaired asset sales, especially during periods of market stress. In VCMs, banks involved in underwriting or pre-financing carbon projects may face difficulty in offloading credits in thin and fragmented markets. Furthermore, evidence from Europe shows that banks with higher exposure to transition risk face elevated funding costs in repo markets, especially during stress episodes.[24] While such a carbon premium has not been observed in Pakistan, this may reflect limited emissions data and early-stage development of climate risk pricing frameworks (**Figure 4.2.1**).

Carbon Markets Risk Transmission **Figure 4.2.1**



Banking Sector Exposure to High Emissions Sector **Figure 4.2.2**



Source: Pakistan 2024 Biennial Transparency Report and SBP Staff Estimates (illustrative)

Financial Stability Implications and Supervisory Outlook

Pakistan's financial system is materially exposed to transition risks as more than one-third of banking sector credit is directed toward high-emission sectors (**Figure 4.2.2**). As Pakistan advances toward a low-carbon trajectory, abrupt shifts in regulation, pricing, or investor preferences could stress the balance sheets of both borrowers and their lenders. Recognizing these risks, SBP issued the **Regulatory Framework for Effective Management of Climate-Related Financial Risks**, ensuring that financial institutions integrate

[21] For details on US evidence, see: Dong, Y., Hengge, M., Valencia, F. and Varghese, R. (2025). Carbon risk in loan pricing: commitment channels and real effects. IMF Working Paper WP/25/250. International Monetary Fund. Available at: https://www.imf.org/-/media/files/publications/wp/2025/english/wpiea2025250-source-pdf.pdf

[22] For details on EU evidence, see: Altavilla, C., Boucinha, M., Pagano, M. and Polo, A. (2024). Climate risk, bank lending and monetary policy. ECB Working Paper Series No. 2969. European Central Bank. Available at: https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2969~0f4c56a156.en.pdf

[23] Financial Stability Review 2024. State Bank of Pakistan.

[24] Source: Giuzio, M., Kahraman, B. and Knyphausen, J. (2026). Climate change, bank liquidity and systemic risk. ECB Working Paper No. 2026/3168. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=6039155

climate-related financial risk considerations into their governance, strategy and risk management frameworks, and **Climate Stress Testing (CST) Guidelines** in December 2025, mandating scenario analyses for both physical and transition risks. While current stress tests use carbon taxes as a transition risk proxy, the increasing relevance of carbon markets may warrant their inclusion in future CST frameworks.

While CST Guidelines offer a minimum set of shocks, the Network for Greening the Financial System (NGFS) provides a broader perspective on climate scenarios, which explicitly build carbon pricing paths to capture carbon-market effects.[25] For instance, in its 2022 stress tests, the ECB applied NGFS scenarios by embedding carbon price trajectories to assess credit and market risk impacts,[26] while the Oesterreichische Nationalbank (i.e., Austrian Central Bank) used NGFS-based carbon price shocks to estimate sectoral insolvency and capital effects,[27] offering a useful template for SBP to incorporate explicit carbon price modelling in future climate stress tests. However, to safeguard financial stability, the transition to a low-carbon economy should be gradual, well-coordinated and should appropriately signal regulatory expectations.

[25] NGFS Scenarios Portal
[26] For details, see: ECB Climate Risk Stress Test 2022
[27] For details, see: OeNB Climate Risk Stress Test 2021