Renewable energy technology adoption among apparel exporters in Bangladesh: Current state and future pathways

Atonu Rabbani, Kazi Mohammed Omar Alif, Fahim Tawfiq Khan, Amal Chowdhury, Sadril Shajahan, Md. Faizul Islam

- Apparel exporters in Bangladesh already face considerable pressure from buyers to adopt RET. Investment in rooftop solar panels represents a win-win proposition, providing both a reliable power source and reduced overall energy costs.
- Our findings indicate that RET adoption amongst apparel exporters remains low: only 31% of factories have adopted RET (predominantly rooftop solar), with very low average capacity. Half of all solar installations do not even contribute to production processes.
- The primary drivers for adoption are economic benefits from lower energy costs and environmental considerations.
- Financial barriers, particularly large upfront installation costs, have been reported as the principal obstacles, especially for smaller factories.
- Concerted support from both government and industry bodies is essential to accelerate RET adoption. Access to finance specifically designed for RET investment can help the industrial sector become more sustainable, meet buyer expectations, and contribute towards the country's NDC commitments.

POLICY BRIEF BGD-24144

OCTOBER 2025

This project was funded by the IGC

theigc.org

DIRECTED BY

FUNDED BY

Policy motivation

As a low-lying delta with an extensive coastal and riverine system, Bangladesh is considered one of the world's most climate-vulnerable countries (IPCC Sixth Assessment Report). Consequently, renewable energy adoption has garnered significant attention domestically. Bangladesh is a signatory to the Paris Agreement and recently updated its commitments in the third iteration of its Nationally Determined Contribution (NDC 3.0, GoB, 2025). Energy and industry feature prominently within the NDC framework.

Apparel exporters, which constitute the largest share of Bangladesh's manufacturing sector, face mounting pressure from international buyers as consumers in the Global North become increasingly environmentally conscious. This shift is reflected in numerous global commitments to develop more sustainable supply chains (Isokangas, 2020). Within this context, this study provides a comprehensive assessment of current energy transition efforts within the ready-made garment (RMG) sector.

The study draws upon a census of all apparel exporters in Bangladesh and a comprehensive survey to understand the motivations and barriers faced by RMG companies in adopting renewable energy technologies (Rabbani et al., Forthcoming). These findings can guide policymakers in promoting further renewable energy technology (RET) adoption within the RMG sector and potentially across other industries.

Overview of the research

Study Design and Methodology

Bangladesh's ready-made garment (RMG) sector comprises over 3,320 active apparel manufacturing units, heavily concentrated in and around Dhaka, the capital city. This study focuses on Savar (Dhaka district) and Gazipur, which together host more than half of the country's factories, making them critical hubs for understanding sectoral dynamics.

Sampling Strategy

The research utilised the Mapped in Bangladesh (MiB) database to establish a sampling frame of 1,937 factories in Gazipur and Savar. After excluding smaller outlying areas with fewer than 30 factories per police station, a stratified random sample was drawn, selecting approximately 39% from each stratum across three batches to target 650 factories.

Enumerators contacted 1,090 factories. Of these, 29% were non-operational or temporarily closed, and 5% declined participation. Ultimately, 671 factories

granted access, yielding 661 completed interviews—slightly exceeding the initial target.

Data Collection

The Centre for Entrepreneurship Development (CED) conducted a three-day training workshop for enumerators from April 15–17, 2025. Field surveys were administered from April 19 to May 6, 2025, across Savar, Ashulia, and Gazipur. Interviews were conducted in private factory settings using the ODK Collect mobile application to ensure data quality and respondent confidentiality.

Research Questions

This study addresses two key questions:

- What is the current status of renewable energy technology (RET) adoption in the garment sector, and what drivers and barriers have influenced factories' transition to sustainable energy sources?
- What policy interventions do apparel exporters expect to facilitate renewable energy adoption and support the broader energy transition?

Qualitative Component

To contextualise and validate quantitative findings, the study incorporated 30 key informant interviews with diverse stakeholders, including factory owners, policymakers, BGMEA executives, representatives from multilateral agencies, and international buyer groups.

Key findings

The research shows that while environmental commitments drive the sector's adoption, it has been constrained by limited technical support, physical infrastructure constraints and lack of access to finance. Currently, firms are acting more on their own strategic calculus than on immediate mandates from abroad.

Early-stage uptake, led by larger firms

- One in three garment factories has installed solar photovoltaic (PV) systems, which remain the dominant renewable energy technology in Bangladesh's export-oriented apparel sector. Among the 661 factories surveyed, 211 have installed solar panels, nearly all on existing rooftops.
- The average installation age is 73 months (around six years), suggesting that adoption gained traction around 2019. However, average installed capacities remain low, and only about half of the

adopting factories use renewable energy directly in production processes rather than for auxiliary needs such as lighting or offices.

- Adoption has been skewed towards larger and older factories. Factories that participated in stringent safety and compliance initiatives and have Workers' Participation Committees (WPCs) are also much more likely to adopt renewables.

- Adoption appears to cluster in certain areas. In our focus regions (Gazipur and Savar), the incidence of solar is 32.8% of factories versus 30.6% nationally. Factory's adoption correlates positively with the presence of nearby adopters within 1.5 km.

Environmental Commitment and Energy Security Drive Adoption

Factories that have embraced renewable energy overwhelmingly cite environmental commitment and financial savings as their driving motives, cited respectively by 60% and 52% of adopters. Surprisingly, only 12% of adopters attributed their decision to direct buyer pressure.

High Costs, Limited Finance, and Technical Constraints Restrict Uptake

The dominant barrier is the steep upfront cost of installation, cited by 65% of non-adopters. Tellingly, 94% of the factories that did adopt solar financed the investment entirely with their own funds, highlighting limited access to green finance. 43% of non-adopters reported lacking the technical expertise needed to evaluate or manage installations, while 33% admitted to being unaware of viable renewable options. Among adopters, 75% reported insufficient roof space to expand capacity, particularly in dense industrial zones.

Policy Implications

Survey results show that over 90% of surveyed factories believe government agencies must lead renewable energy promotion, with buyers and BGMEA serving as complementary actors. This mixed-method study thus calls for a coordinated policy mix that combines access to finance, information dissemination, incentives, and data transparency to anchor Bangladesh's apparel sector in a sustainable energy future.

1. Expand SME-focused green finance

High upfront cost is the dominant barrier to adoption, yet currently almost all solar installations are self-financed due to a lack of affordable loans. As one industry respondent observed,

> ***"At 7% concessional rates, owners still hesitate; bring it closer to 3% and adoption will rise."***

The government, through Bangladesh Bank and SREDA, should launch dedicated green finance lines for SMEs that offer low-interest loans, longer tenors, and risk-sharing guarantees for rooftop solar and other RET projects.

2. Introduce targeted fiscal incentives

Nearly 59% of factories highlighted the need for fiscal incentives to ease the high upfront burden. Many owners remain cautious despite solar's long-term savings, so smart incentives can tip the balance in favour of action. A representative of the BGMEA noted that

> ***"Implementing phased financial incentives will ease the burden on SMEs transitioning to renewable energy."***

Time-bound, performance-linked tax incentives should be introduced to reward factories that install and use renewable systems.

3. Promote cluster-based solar solutions

Three-quarters of adopting factories cited a lack of rooftop space as the main reason they cannot expand their solar installations. To address this, the government and industry associations should facilitate off-site or cluster-based solar projects. Industrial park authorities, together with BGMEA/BKMEA, can pilot solar farms or cooperative rooftop schemes where multiple nearby factories pool resources.

4. Institutionalise buyer engagement for demand-driven sustainability

Only 12% of adopters cited buyer pressure as their main motivation for going green, yet international buyers exert a strong influence over long-term environmental upgrading, as 35% respondents identified it as a key source of assistance.

> ***"Buyers talk about sustainability but rarely align it with procurement terms. A joint framework could change that," noted a BGMEA representative.***

The government, BGMEA, and development partners should design a Green Compliance Recognition Framework that ties renewable adoption to export facilitation, branding, or preferential procurement, aligning buyer commitments with measurable factory action.

5. Streamline regulatory coordination through a one-stop facilitation system

64% of factories in our survey expected more promotional activities to raise awareness about renewable energy benefits. One policymaker also observed,

> ***"Entrepreneurs face too many disconnected offices when trying to adopt renewable technologies. There's no single window or coordinating agency to handle permissions, financing, and policy support."***

Disseminating information through a one-stop facilitation cell within SREDA, integrating clear procedural guidance, standardised approval timelines, and single-window submission for permits, incentives, and concessional loans, would improve the current landscape of renewable adoption, make it more predictable and investor-friendly.

6. Establish a Renewable Energy Data Observatory for the RMG sector

The absence of real-time data on renewable adoption limits effective sectoral policy targeting. One industry expert pointed out,

> ***"Policy targets should specify expected contributions by segment, including factory-level installations. At present, the targets are high-level and lack a sectoral allocation.***

SREDA should establish a Renewable Energy Data Observatory to track apparel sector adoption, capacity, and emission savings, creating the evidence base for adaptive policymaking.

References

GoB. (2025). Bangladesh's Third Nationally Determined Contribution (NDC 3.0). Ministry of Environment, Forest and Climate Change, Government of the People's Republic of Bangladesh.

Isokangas, P. (2020). Global governance in the fashion industry: An analysis of the Fashion Industry Charter for Climate Action as an instrument of transnational regulation.

Rabbani, A., Kazi Mohammed Omar Alif, Fahim Tawfiq Khan, Amal Chowdhury, Sadril Shajahan, & Md. Faizul Islam. (Forthcoming). Adoption of renewable energy technology adoption among apparel exporters in Bangladesh: Current state and future pathways [Working Paper]. International Growth Centre (IGC).