

A large, abstract geometric pattern on the left side of the cover, composed of various shapes like circles, triangles, and squares in shades of green, white, and dark green, arranged in a complex, overlapping manner.

# **PATHWAYS FOR INDUSTRIAL DECARBONIZATION**

## **SMES UNDER BANGLADESH SMALL AND COTTAGE INDUSTRIES CORPORATION (BSCIC)**

**Policy Brief**



Global industry is shifting due to decarbonization, where emissions now affect market access, finance, and competitiveness. In Bangladesh, this is crucial for SMEs, which make up over 90% of industries, employ about 85% of workers, and contribute 25-30% of GDP, yet face energy and technology limits. Around 95.16% of power comes from fossil fuels, so SMEs rely heavily on them, making them a major and growing source of emissions.

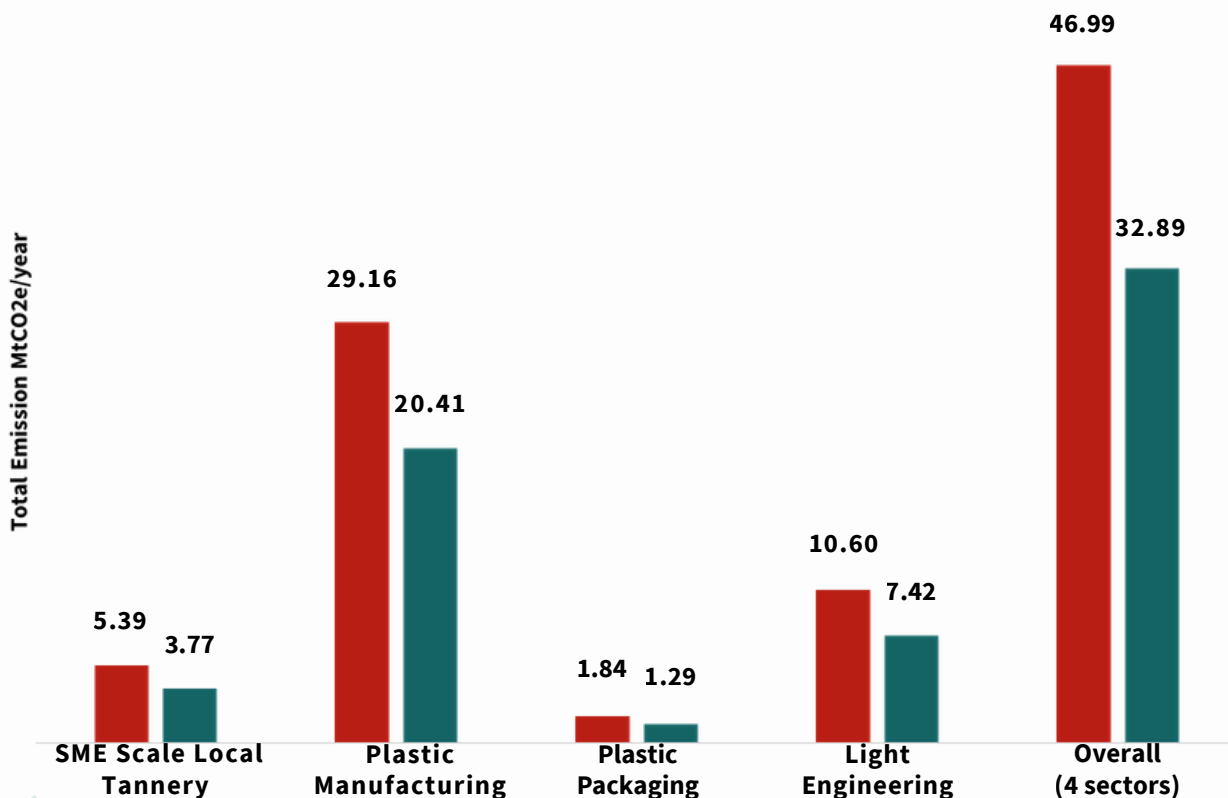
Bangladesh's NDC 3.0 targets a 69.84 MtCO<sub>2</sub>e reduction from the energy sector by 2035, highlighting urgent action. This report uses field data from BSCIC clusters, combining energy assessments, emissions baselines, techno-economic, solar, and financing analysis to identify practical SME decarbonization pathways.

### SMEs represent a major share of emissions, with significant but concentrated reduction potential

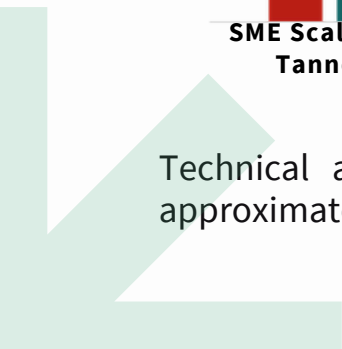
Analysis of four high-emission SME sectors-tannery, plastics manufacturing, packaging, and light engineering-reveals combined emissions of approximately 46.99 MtCO<sub>2</sub>e annually, representing:

- 11.23% of national emissions
- 40.12% of industrial emissions

■ Total Emission MtCO<sub>2</sub>e/year    ■ Expected Emission ( Considering 30% reduction)



Technical and process-based interventions alone can reduce emissions by approximately 14.1 MtCO<sub>2</sub>e annually.



## Targeted technological advancement of high-load systems offers immediate and scalable emission reduction opportunities

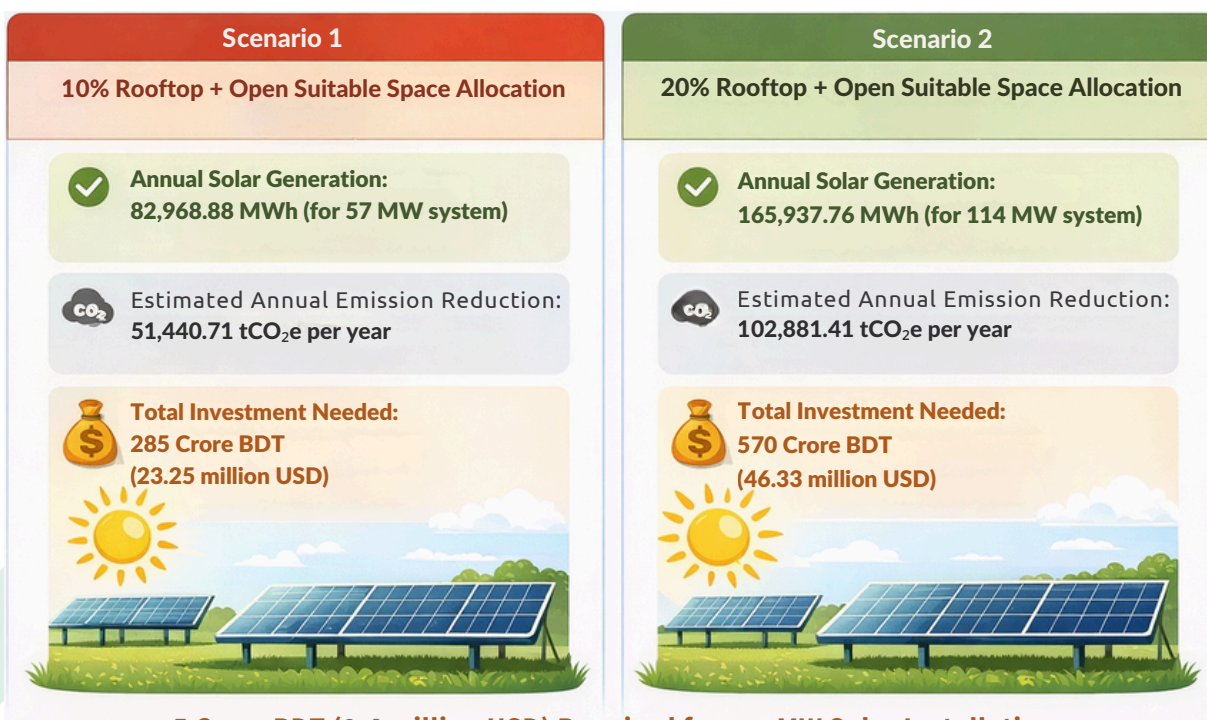
Across all analyzed sectors, production is almost entirely electricity-driven, and energy use is highly concentrated in motor-driven systems and continuous-load processes. This creates a clear entry point for rapid decarbonization through :

Industry	Recommended Low-Emission Technologies	Process Optimization	Emission Reduction Potential (tCO <sub>2</sub> e/month)	Emission Reduction Potential (%)
SME Scale Local Tannery	IE3/IE4 motors, servo machines, auto drum control	Dewatering, Short-float tanning (reduces water and drum rotation time)	2.23-3.77	19-33
Plastic Manufacturing	Electric molding, inverter chillers, inverter compressors	Temperature optimization, heat recovery	1.97-2.97	33-49
Light Engineering	Servo presses, IE3/IE4 motors, Computer Numerical Control(CNC) machines	Batch scheduling, standby control	1.21-1.99	19-31
Plastic Packaging	LED-UV curing technology, Variable Frequency Drive (VFD) motors, digital printing	Job sequencing, auto shutdown	0.78-1.50	15-28

## Installation of solar panels at the industrial estate offers the largest structural opportunity for emission reduction

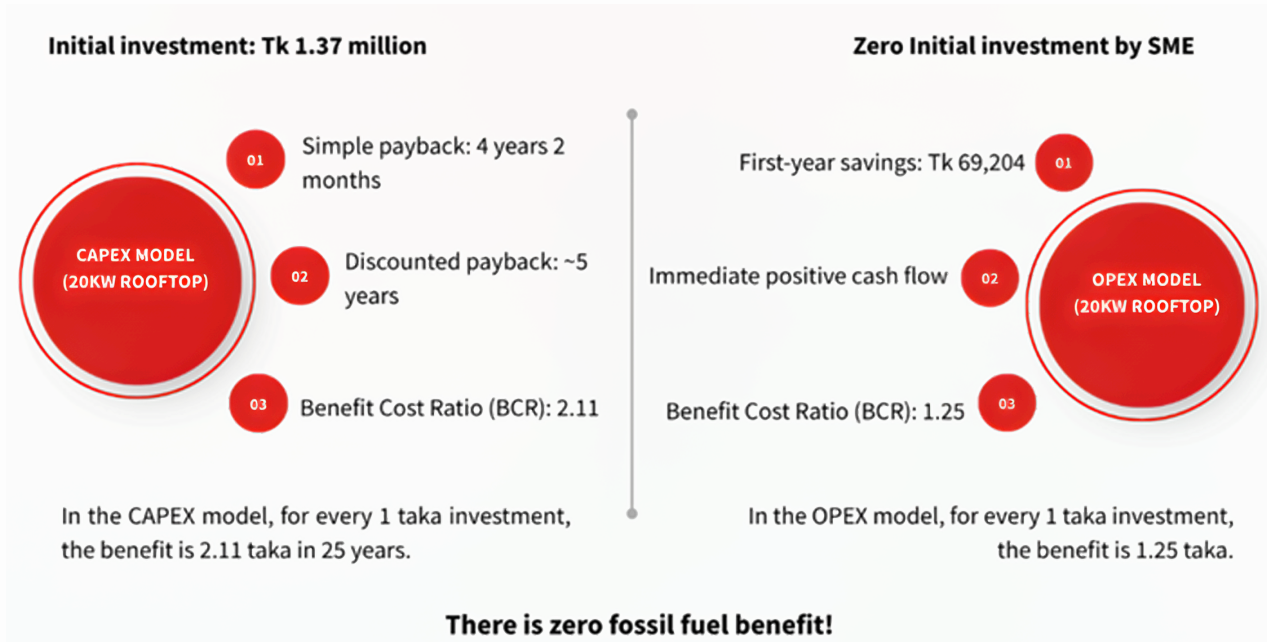
The largest emission reduction opportunity lies beyond individual factories-at the cluster level.Two deployment scenarios across BSCIC estates show strong potential:

### Solar PV Investment Scenarios



## Economic feasibility of installing solar system

Economic analysis confirms that solar adoption is viable under both CAPEX and OPEX models, but with different implications for scale.



The implication is clear:  
CAPEX maximizes returns, but OPEX enables adoption.

## Core Constraint: Not Technology, But Systems

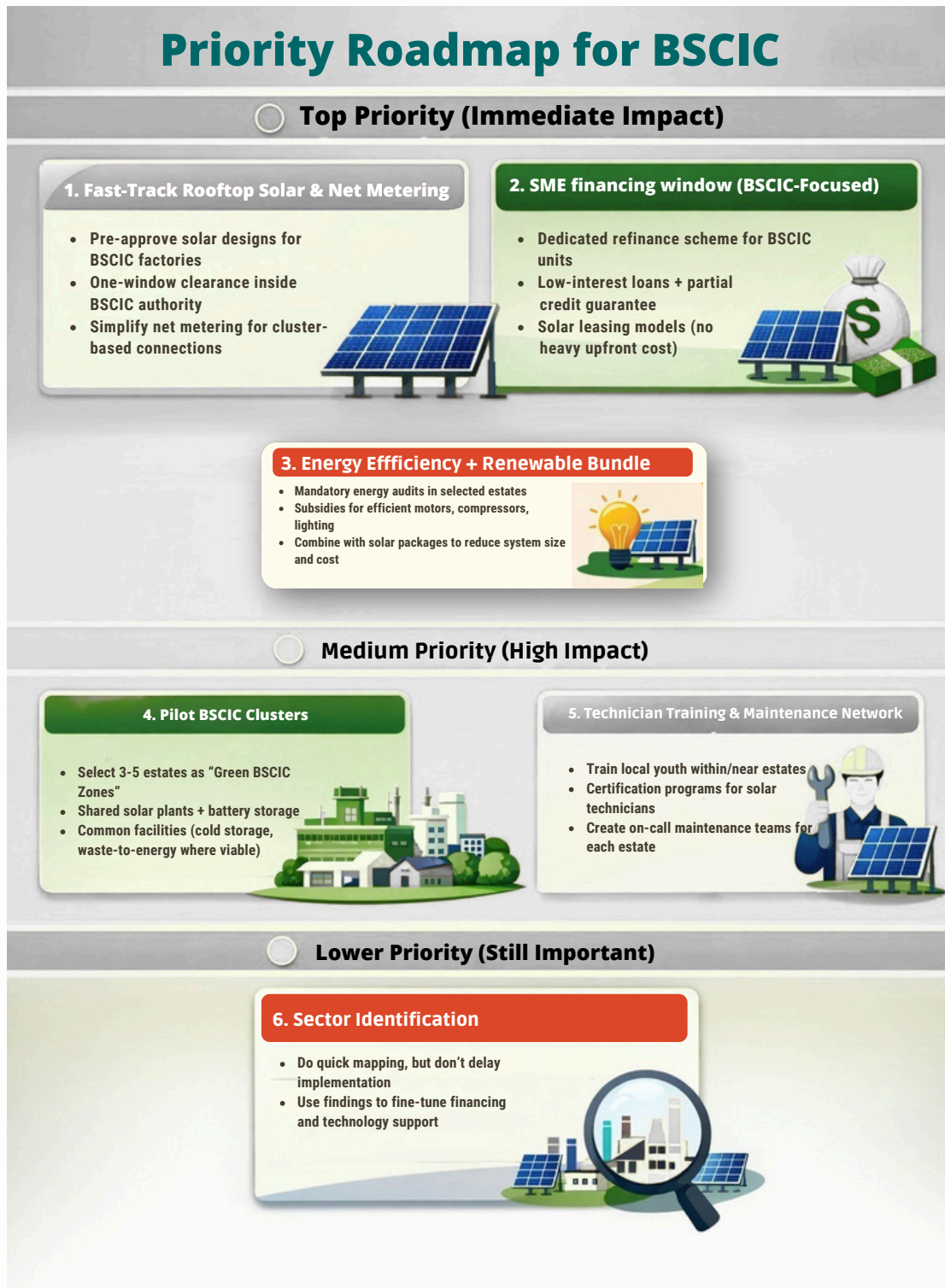
The primary barriers to SME decarbonization are structural:

- Limited access to finance
- Absence of standardized energy data
- Outdated machinery
- Weak institutional coordination

This creates a persistent gap between national climate ambition and on-the-ground industrial transformation.

# Policy Recommendations

Turning potential into impact now requires a prioritized and time-bound roadmap for BSCIC to drive scalable decarbonization.



If implemented effectively, BSCIC industrial clusters can transition toward nature-smart energy systems, reduced production costs, and enhanced global competitiveness, while contributing significantly to national emission reduction targets.