International Journal of Global Research Innovations & Technology (IJGRIT)
ISSN : 2583-8717(Online), Impact Factor: 6.972, Volume 03, No. 04, October-December, 2025, pp 86-90

Transitioning to a Green Economy: Opportunities and Challenges for Indian SMEs

Nisha Meena[1*]

[1]Assistant Professor, ABST, Government College Deoli, Tonk, Rajasthan, India

*Corresponding Author: nishasattu@gmail.com

Citation: Meena, N. (2025). Transitioning to a Green Economy: Opportunities and Challenges for Indian SMEs. International Journal of Global Research Innovations & Technology, 03(04), 86–90. https://doi.org/10.62823/ijgrit/03.04.8258

ABSTRACT

The global imperative to combat climate change and achieve sustainable development has ushered in the era of the green economy—an economic model focused on reducing environmental risks, enhancing resource efficiency, and fostering social inclusiveness. For India, a nation with ambitious commitments under the Paris Agreement and at the forefront of global climate action, this transition is not merely an environmental obligation but a strategic economic necessity. At the heart of this transformation lies a critical yet often understated force: India's vast and dynamic Small and Medium Enterprise (SME) sector.

Accounting for nearly 30% of India's GDP, over 45% of manufacturing output, and employing more than 110 million people, SMEs are the backbone of the Indian economy. MSMEs consume roughly 25% of the total energy used by Indian industries and contribute about 110 million tonnes of CO_2 emissions annually, indicating a substantial role in the nation's carbon footprint. A growing share of MSMEs are embracing sustainability with about 21% of MSMEs using solar energy and 31% adopting energy-efficient machinery suggesting rising interest in cleaner technologies

This study examines the opportunities and challenges faced by Indian SMEs in adopting green practices and sustainable business models. On the opportunity side, the shift towards a green economy offers SMEs access to cost savings through energy efficiency, enhanced competitiveness, innovation in eco-friendly products, improved brand image, and new market opportunities driven by increasing environmental awareness and regulatory support. Government initiatives such as renewable energy incentives, energy efficiency schemes, and green financing mechanisms further encourage sustainable adoption. However, Indian SMEs also face substantial challenges, including limited financial resources, lack of technical expertise, inadequate access to green technologies, regulatory complexity, and low awareness of sustainability benefits.

With supportive government policies, improved access to finance, capacity building, and technological advancement, Indian SMEs can successfully embrace green growth pathways. Their active participation is essential for India to achieve its long-term climate goals and sustainable economic development.

Keywords: Green Economy, Indian SMEs, Sustainable Development, Green Transition, Environmental Sustainability

Introduction

The concept of a green economy has gained global prominence as nations strive to balance economic growth with environmental sustainability. A green economy is characterized by low carbon emissions, efficient resource utilization, and social inclusiveness. In the Indian context, the transition to a green economy is not only an environmental necessity but also an economic opportunity. Small and Medium Enterprises (SMEs), which constitute nearly 30% of India's GDP and employ millions, play a critical role in this transition. However, their shift toward green practices is influenced by a variety of internal and external factors. This study explores the opportunities and challenges Indian SMEs encounter while adopting green strategies and examines the broader implications for sustainable development.

Accounting for nearly 30% of India's GDP, over 45% of manufacturing output, and employing more than 110 million people, SMEs are the backbone of the Indian economy. Their sheer scale and deep integration into national and global supply chains mean that their operational practices, energy

consumption, and production philosophies have a monumental collective impact on the country's ecological footprint. Consequently, the greening of Indian SMEs is not a peripheral activity but a central determinant of India's success in building a low-carbon, resource-secure, and competitive future.

The transition to a green economy presents Indian SMEs with a dual-edged proposition of unprecedented opportunities and formidable challenges. On one hand, it unlocks access to new markets driven by eco-conscious consumers and green public procurement, attracts sustainability-focused global investment, and promises significant cost savings through energy efficiency and waste reduction. It offers a pathway to innovation, allowing SMEs to develop unique green products and services, enhance brand value, and ensure long-term resilience against resource scarcity and regulatory shifts. Government initiatives like the Production Linked Incentive (PLI) scheme for renewables, schemes for sustainable agriculture, and the push for Electric Vehicles (EVs) further create a conducive policy ecosystem.

Concept of Green Economy

The concept of a green economy promotes sustainable development by integrating environmental protection into the process of economic growth, ensuring that development does not occur at the cost of nature. It encompasses all economic activities that emphasize the reduction of harmful emissions, improved energy efficiency, sustainable production and consumption, waste minimization, and circular use of resources, while also promoting social equity and responsible business practices. In recent years, noticeable reductions in carbon emissions have been observed, as manufacturing activities increasingly adopt sustainable methods of production to minimize environmental harm. Since core emissions originate from heavy industries such as steel and iron, the shift toward greener practices is particularly critical in these sectors. For Small and Medium Enterprises (SMEs), the transition to a green economy involves adopting environmentally friendly technologies, reducing waste generation, controlling emissions, and aligning business operations with broader sustainability principles.

Role of SMEs in India's Green Transition

Small and Medium Enterprises (SMEs) form the backbone of India's industrial sector, owing to their vast numbers, widespread geographic presence, and substantial contribution to resource consumption. As a result, SMEs play a pivotal role in shaping the country's environmental footprint. MSMEs consume roughly 25% of the total energy used by Indian industries and contribute about 110 million tonnes of CO_2 emissions annually, indicating a substantial role in the nation's carbon footprint. A growing share of MSMEs are embracing sustainability with about 21% of MSMEs using solar energy and 31% adopting energy-efficient machinery suggesting rising interest in cleaner technologies. Rooftop solar installations have reached 11.87 GW across India's MSME sector, helping reduce power costs by about 30% on average and potentially cutting 110 million tonnes of CO_2 annually if widely scaled. Their active adoption of climate-friendly and sustainable business practices can make a significant contribution to achieving India's Net Zero emissions target by 2070, improving overall national energy efficiency, and reducing pollution levels in major industrial clusters. Moreover, by integrating green technologies and sustainable processes, SMEs can enhance their competitiveness in global markets where environmental compliance and sustainability standards are increasingly valued. In view of these factors, the transition of SMEs towards a green economy is not only desirable but central to India's broader sustainable development agenda.

Opportunities for Indian SMEs in the Green Economy

The transition to a green economy presents several promising opportunities for Indian SMEs, beginning with significant cost savings through improved resource efficiency. The adoption of energy-efficient machinery, LED lighting, better insulation, and renewable energy solutions such as rooftop solar systems helps reduce electricity consumption and operating expenses. Similarly, waste minimization, recycling, and efficient use of raw materials lower production costs while enhancing overall operational efficiency, making sustainability economically attractive for SMEs.

Access to green finance and government incentives further strengthens these opportunities. Various policy initiatives, including SIDBI's SME Green Finance schemes, credit guarantee programs, subsidies for renewable energy installations, and tax incentives, reduce the financial burden of green investments. In addition, the growing global emphasis on Environmental, Social, and Governance (ESG) criteria has improved SMEs' access to funding from impact investors, commercial banks, and international development institutions, encouraging sustainable business practices.

Green adoption also offers SMEs a strong competitive advantage and avenues for market expansion. Increasingly, consumers and large corporations prefer environmentally responsible suppliers, pushing SMEs with green certifications such as ISO 14001, energy audit compliance, and BRSR alignment

into preferred positions within domestic and global supply chains. The growing demand for green products such as organic goods, biodegradable packaging, and renewable energy solutions creates new and profitable market segments for SMEs.

Moreover, the green transition drives innovation and technological upgradation. SMEs are encouraged to modernize equipment, adopt cleaner production processes, and integrate advanced technologies, which not only reduce environmental impact but also improve product quality, efficiency, and productivity. Over time, this leads to enhanced competitiveness and resilience.

Finally, the adoption of environmentally responsible practices significantly improves the reputation and sustainability branding of SMEs. A strong green image helps attract environmentally conscious customers, business partners, and investors, while also generating positive public perception and media attention. Collectively, these opportunities position green transition as a strategic pathway for long-term growth, competitiveness, and sustainability of Indian SMEs.

Challenges Faced by Indian SMEs in Green Transition

A majority of SMEs face significant barriers, including high upfront costs for green technologies, limited access to affordable "green finance," and a scarcity of technical knowledge and skilled manpower to manage the transition. Complex compliance procedures, competitive pressures that prioritize short-term cost over long-term sustainability, and inconsistent enforcement of environmental regulations add layers of difficulty. For many small businesses operating on thin margins, the immediate financial viability of going green remains a pressing concern.

Indian SMEs face multiple interrelated challenges in their transition towards a green economy, with financial barriers emerging as the most significant constraint. The high initial investment required for adopting green technologies—such as energy-efficient machinery, pollution control equipment, and renewable energy installations—often exceeds the financial capacity of small firms. Limited access to institutional credit, stringent collateral requirements, and relatively high interest rates further discourage SMEs from undertaking long-term green investments, despite their potential cost savings in the future.

In addition to financial constraints, limited awareness and inadequate technical knowledge pose serious obstacles. Many SME owners and managers lack sufficient understanding of sustainability concepts, including energy efficiency, carbon footprint measurement, waste management practices, and sustainability reporting standards. The absence of structured training programs and technical support makes it difficult for SMEs to identify appropriate green solutions or to evaluate the long-term economic and environmental benefits of sustainable practices.

Operational and capacity constraints further hinder green adoption among SMEs. These enterprises typically function with small workforces and limited managerial expertise, leaving little flexibility to experiment with new processes. The implementation of green practices may disrupt existing production systems, require skilled personnel, or necessitate additional training, all of which demand time and resources that SMEs often cannot spare.

Regulatory and policy complexity also acts as a deterrent. Variations in environmental regulations across states, complicated compliance procedures, and frequent policy changes create uncertainty for SMEs. This regulatory ambiguity makes long-term planning difficult and reduces confidence in investing in sustainable technologies.

Finally, market-related limitations restrict the pace of green transition. Although demand for environmentally friendly products is gradually increasing, it remains limited in many sectors. Price-sensitive consumers are often unwilling to pay a premium for green products, affecting their commercial viability for SMEs. Together, these financial, technical, operational, regulatory, and market challenges significantly slow the transition of Indian SMEs towards a sustainable and green economy.

Government Policies Supporting SME Green Transition

Government policies play a crucial role in supporting the green transition of Small and Medium Enterprises (SMEs) in India. Following are the government initiatives in strengthening country's portfolio:

- **National Action Plan on Climate Change (NAPCC):** The NAPCC provides an overarching policy framework for climate action through its national missions, focusing on energy efficiency, renewable energy, sustainable industry, and climate resilience. It guides SMEs to align their operations with low-carbon and resource-efficient practices.
- **Perform, Achieve, and Trade (PAT) Scheme:** The PAT scheme promotes energy efficiency in energy-intensive sectors by setting specific energy consumption targets. SMEs that achieve

efficiency beyond targets can earn tradable efficiency certificates, creating financial incentives for reducing energy use.

- **National Solar Mission:** This mission encourages the adoption of solar energy across industrial and commercial sectors. SMEs benefit through subsidies, easier access to rooftop solar installations, and reduced dependence on fossil-fuel-based power.
- **MSME Sustainable (ZED) Certification Scheme:** The ZED (Zero Defect Zero Effect) scheme promotes quality manufacturing with minimal environmental impact. It supports SMEs in improving processes, reducing waste, enhancing energy efficiency, and accessing financial and technical assistance.
- **Green Credit Programme (GCP) 2023:** The GCP incentivizes voluntary environmental actions such as waste management, water conservation, afforestation, and emission reduction. SMEs can earn green credits that enhance environmental performance and regulatory compliance.
- **Pollution Control Norms and Environmental Audits:** Regulatory standards and periodic environmental audits ensure compliance with emission, effluent, and waste management norms. These measures encourage SMEs to adopt cleaner production technologies and improve environmental accountability.

Together, these policies aim to facilitate SMEs' transition toward sustainable operations by providing financial incentives, technical guidance, and regulatory support.

Strategies for Successful Green Transition

To accelerate the green transition of Indian SMEs, a comprehensive and supportive approach is essential, beginning with capacity building and training. Regular workshops, awareness campaigns, and technical training programs can significantly enhance SMEs' understanding of green technologies, carbon accounting practices, energy management, and sustainability standards. Such initiatives help build managerial and technical capabilities, enabling SMEs to make informed decisions and effectively implement sustainable practices.

Strengthening access to finance is another critical enabler. Banks, financial institutions, and development agencies should simplify green loan procedures, reduce collateral requirements, and offer concessional interest rates to encourage SME participation. The promotion of blended finance models—combining public funds, private investment, and carbon finance—can further reduce financial risks and make green investments more attractive and affordable for SMEs.

Encouraging collaboration and industrial clustering can also play a vital role in overcoming cost and resource constraints. SMEs operating within industrial clusters can share common facilities such as effluent treatment plants, waste management systems, renewable energy infrastructure, and logistics services. Such collective approaches reduce individual investment costs, improve environmental compliance, and promote knowledge sharing among enterprises.

The adoption of digital and smart technologies further strengthens sustainability efforts. Tools such as energy monitoring systems, smart meters, automation technologies, and digital reporting platforms help SMEs optimize resource use, improve operational efficiency, and accurately measure and track carbon emissions. Digitalization also supports transparency and compliance with sustainability reporting requirements.

Finally, policy simplification and a strong regulatory framework are essential to build confidence among SMEs. Streamlined environmental regulations, single-window clearance systems, stable policy environments, and transparent incentive mechanisms reduce uncertainty and compliance burdens. Together, these measures create a supportive ecosystem that enables SMEs to transition smoothly towards sustainable and environmentally responsible business practices.

Conclusion

The transition to a green economy presents both significant opportunities and substantial challenges for Indian SMEs. While the adoption of sustainable practices can lead to cost savings, innovation, improved competitiveness, and enhanced market reputation, challenges such as financial limitations, inadequate technical expertise, regulatory complexities, and limited market acceptance continue to hinder widespread adoption. With supportive government policies, improved access to finance, capacity building, and technological advancement, Indian SMEs can successfully embrace green growth pathways. Their active participation is essential for India to achieve its long-term climate goals and sustainable economic development.

References

1. NITI Aayog. (2024). *A green and sustainable growth agenda*. NITI Aayog. NITI Aayog
2. The Energy and Resources Institute (TERI). (2016). *Green growth and sustainable development in India: National technical report*. TERI. teriin.org
3. Ministry of Micro, Small & Medium Enterprises (MoMSME). (n.d.). *Green MSME portal / green MSME initiatives*. Government of India. green.msme.gov.in
4. Ministry of Micro, Small & Medium Enterprises (MoMSME). (2020). *MSME newsletter* (June 2020). Government of India. DCMSME
5. International Finance Corporation (IFC). (2017). *Green bond impact report*. IFC. IFC
6. World Bank. (2025). *Small and medium enterprises (SME) finance*. World Bank. World Bank
7. Nudurupati, S. S., et al. (2022). Transforming sustainability of Indian small and medium enterprises: A resource-efficiency and circular economy perspective. *Journal of Business Research*. ScienceDirect
8. Bhuyan, A. (2024). *Green growth for MSMEs: Overcoming barriers and scaling opportunities* (report). Centre for Sustainable Development. sustainabledevelopment.in
9. AFI (Alliance for Financial Inclusion). (2024). *Green transition measures for MSMEs*. AFI. afi-global.org
10. United Nations Environment Programme (UNEP). (2018). *Asia-Pacific roadmap: Supporting resource efficiency and sustainable industry / SMEs*. UNEP. UNEP - UN Environment Programme
11. Frontiers in Energy Research. (2023). Lv, Y. (2023). *Transitioning to sustainable energy: opportunities and challenges*.. *Frontiers in Energy Research*. Frontiers
12. Confederation of Indian Industry (CII). (n.d.). *Green manufacturing / manufacturing matters* (report). CII. cii.in
13. World Bank Group. (2021). *India — Country progress / green finance and sustainable banking initiatives* (progress report). World Bank. World Bank
14. NITI Aayog. (2020/2023). *Towards a clean energy economy: India green stimulus & strategy* (policy brief/report). NITI Aayog. NITI Aayog+1