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India's Green Transformation

Over the past decade, sustainability has moved increasingly from the margins of development policy to its centre. India's journey towards Viksit Bharat 2047 provides an opportunity to demonstrate that environmental responsibility and economic progress are not competing objectives. Clean energy, resource efficiency, circularity, innovation, and climate resilience can become powerful drivers of competitiveness, investment, and employment.

India's green transformation is not about choosing between economic growth and environmental sustainability; it is about redefining growth itself. As India advances towards the vision of a developed nation by 2047, the challenge is to create jobs, expand infrastructure and improve living standards while using energy, water, and natural resources more efficiently. Over the past decade, this approach has increasingly been reflected in national policy through an integrated focus on clean energy, resource efficiency, climate resilience, and sustainable lifestyles. Sustainability has moved increasingly from the margins of development policy to its centre. The expansion of renewable energy, electric mobility, green hydrogen, energy efficiency, sustainable buildings, water conservation, circular economy initiatives, and Mission LiFE (Lifestyle for Environment) reflects a broader transformation in India's development approach.

The objective is not merely to make India greener, but to make its growth more resilient, resource-efficient and future-ready. Environmental responsibility is increasingly being viewed not as a constraint on development, but as an opportunity for innovation, investment, new industries and employment. India's green transformation is therefore a transformation in the way the nation produces, builds, moves, consumes, and grows.

Renewable Energy: Powering a Cleaner Growth Story

Renewable energy has emerged as a cornerstone of India's green transition. The National Solar Mission, launched in 2010, laid the foundation for large-scale solar deployment, while Renewable Purchase Obligations, Green Energy Open Access Rules and the Green Energy Corridor have helped create the policy and infrastructure ecosystem for renewable power.

Initiatives such as PM-KUSUM (*Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan*) are extending solar energy to the agricultural sector, while the Production Linked Incentive (PLI) scheme for high-efficiency solar photovoltaic (PV) modules is strengthening domestic manufacturing.

At the same time, India's green transition is not limited to increasing renewable-energy generation; it also emphasises improving energy efficiency across industries, households, and buildings. The Bureau of Energy Efficiency (BEE) has been central to this effort through initiatives such as the Perform, Achieve and Trade (PAT) scheme for energy-intensive industries, the UJALA programme for promoting energy-efficient lighting, and building-efficiency frameworks such as

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the Energy Conservation Building Code (ECBC) and Eco *Niwas Samhita*. These initiatives help reduce energy consumption, lower emissions and improve resource productivity, reinforcing the broader objective of achieving economic growth with greater environmental efficiency.

Green Hydrogen: Decarbonising Industry

Green hydrogen represents a major opportunity for industrial transformation. The National Green Hydrogen Mission, approved in 2023, targets at least 5 million metric tonnes of annual green hydrogen production by 2030, supported by about 125 GW of associated renewable-energy capacity. With an initial outlay of Rs 19,744 crore, the Mission seeks to establish India as a global hub for production, utilisation, and export of green hydrogen and its derivatives.

Its significance extends beyond energy. Green hydrogen can contribute to decarbonising hard-to-abate sectors such as steel, fertilisers, refining, shipping and heavy transport. It can also create a domestic ecosystem involving electrolysers, renewable power, storage, transportation, and related technologies.

The next phase will be critical: moving from policy announcements and targets to competitive production, reliable demand, infrastructure, standards and cost reduction. In this sense, green hydrogen illustrates India's larger development challenge, building new industries while simultaneously reducing the environmental intensity of existing ones.

Climate Action: From Commitments to Implementation

India's climate response is increasingly moving from commitments towards implementation across sectors and communities. At COP26 in 2021, India articulated its five-fold *Panchamrit* commitments, achieving 500 GW of non-fossil electricity capacity, meeting 50 per cent of its energy requirements from renewable sources by 2030, reducing projected carbon emissions by one billion tonnes, reducing the carbon intensity of the economy by 45 per cent and achieving net-zero emissions by 2070.

Alongside technological solutions, Mission LiFE places individual and community behaviour at the centre of climate action. Responsible consumption, energy efficiency, sustainable mobility and resource conservation can complement large-scale investments in infrastructure and technology. At the same time, adaptation is becoming equally important. Heatwaves, floods, droughts and changing rainfall patterns affect agriculture, infrastructure, livelihoods and urban systems. Climate-resilient infrastructure, early-warning systems, resilient agriculture, ecosystem protection, and water security must therefore become integral to development planning.

India's climate strategy is thus not simply about reducing emissions. It is about building resilience while ensuring that climate action remains aligned with energy security, economic growth and inclusive development.

Water Security: The Foundation of Sustainable Development

Water security is fundamental to India's economic and social development. Rapid urbanisation, agricultural demand, industrialisation, and climate variability are placing increasing pressure on freshwater resources. The policy response must therefore move beyond increasing supply to emphasise conservation, efficiency, reuse, and source sustainability.

Programmes such as *Jal Jeevan* Mission, *Atal Bhujal Yojana*, *Pradhan Mantri Krishi Sinchayee Yojana* and AMRUT 2.0 reflect different dimensions of this transition. The next priority should be to strengthen a circular water economy, particularly in cities and industry, by expanding wastewater treatment, recycling and reuse and reducing dependence on freshwater for applications that do not require potable water.

Groundwater recharge, watershed development, rainwater harvesting and water-efficient irrigation must be integrated with local planning and supported by data-driven monitoring and community participation.

The objective should be to move beyond the traditional "use and discharge" model towards "reduce, reuse, recycle, and replenish." Water security must become a core component of climate resilience and sustainable economic growth.

Resource Efficiency and Circular Economy

A green economy requires a rethink not only of the energy we consume but also of the materials we use and the systems through which products are designed, manufactured and discarded.

As India's economy and infrastructure expand, rising demand for minerals and materials makes resource efficiency increasingly important. Extended Producer Responsibility frameworks for plastics, e-waste and other waste streams are strengthening producer accountability. The next step is to deepen circularity across construction, automobiles, electronics, plastics, and manufacturing.

Markets for recycled materials, standards for recycled content, improved material-recovery infrastructure, and greater integration of informal recyclers into formal value chains can make resource recovery economically viable. Digital systems can further improve material tracking, transparency, and compliance.

The objective is to move from treating waste as an end-of-life problem to viewing it as a resource and economic opportunity, creating more value with fewer resources, reducing environmental pressures, and generating new avenues for innovation and employment.

Green Cities and Sustainable Infrastructure

With rapid urbanisation, cities will be at the centre of India's green transformation. Urban areas



concentrate economic activity, infrastructure and resource consumption. The manner in which cities are planned and built will therefore determine a significant part of India's sustainability trajectory.

Energy-efficient buildings, green construction, public transport, electric mobility and non-motorised transport must be complemented by efficient systems for water, wastewater, solid waste and energy management. Urban forests, wetlands and other blue-green infrastructure can help address heat, flooding and water stress while improving liveability.

Smart technologies and data-driven planning can further enhance resource efficiency and service delivery. Programmes such as AMRUT 2.0, the Smart Cities Mission and the National Mission on Sustainable Habitat provide important policy foundations for this transition.

The goal is to create cities that are not only economically productive, but also liveable, resilient and resource-efficient.

The Road Ahead: Making Green Growth the Mainstream

India's green transformation is ultimately about reshaping how growth is planned, financed and delivered. Sustainability must move beyond being treated as a separate environmental agenda to become an integral consideration in economic planning, infrastructure investment and development policy. A stronger ecosystem of sustainable finance can therefore convert environmental goals into investable opportunities, supporting innovation, competitiveness and long-term economic growth.

The next phase requires stronger coordination across energy, water, agriculture, industry, transport and urban development, supported by measurable targets, robust monitoring and transparent outcomes. Governments, businesses, financial institutions, research organisations and citizens must work together to accelerate the transition.

Equally important is ensuring that green technologies are affordable, scalable, and accessible. Sustainability cannot become a privilege; it must become an opportunity available across regions and communities.

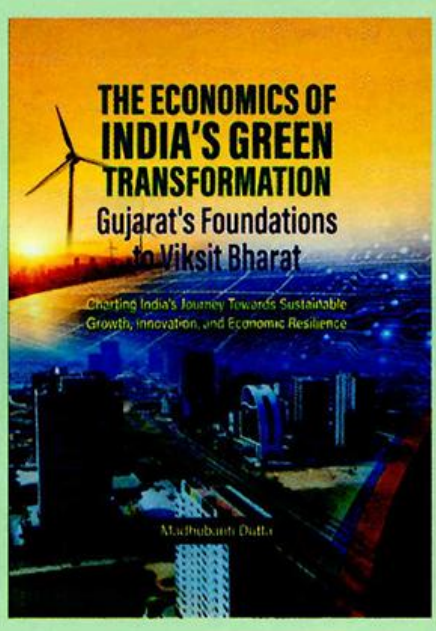
India's journey towards *Viksit Bharat* 2047 provides an opportunity to demonstrate that environmental responsibility and economic progress are not competing objectives. Clean energy, resource efficiency, circularity, innovation, and climate resilience can become powerful drivers of competitiveness, investment, and employment.

The transformation India seeks is therefore not merely a transition to a greener economy. It is a transition towards a more productive, resilient, resource-efficient, and inclusive model of development, one in which growth and sustainability reinforce each other and together form the foundation of a prosperous and future-ready India. ❑

BOOK PREVIEW

The Economics of India's Green Transformation: Gujarat Foundations to *Viksit Bharat*

Price : 270
Published by Publications Division



Through a multidisciplinary lens, the book explores how renewable energy, water resource management, climate-resilient infrastructure, digital governance, green industrialisation, and sustainable economic policies became interconnected pillars of India's development strategy. It demonstrates that India's green transformation is not merely an environmental agenda but a comprehensive model that combines economic growth, institutional reform, technological innovation, and ecological responsibility.