



RESEARCH BRIEF

Exploring India's Green Trade: A Pathway to Sustainable Economic Growth

Climate change is a global commons problem where coordinated action across nations produces far greater benefits than fragmented efforts. The combined benefits of coordinated climate action far surpass the aggregate costs. This creates a strong case for international cooperation and shared responsibility.

India, as one of the world's largest and fastest-growing economies, stands at a pivotal juncture. India has already exceeded major Nationally Determined Contribution (NDC) targets well ahead of schedule. With revised NDCs till 2035 expected to be announced by the Government of India, India is reinforcing its commitment to transparency and accountability in climate governance.

Environmental Goods

As global climate action accelerates, trade policy is increasingly seen as essential for environmental sustainability, with Environmental Goods (EGs) playing a central role. EGs as defined by the International Monetary Fund (IMF) include both goods connected to environmental protection, such as goods related to pollution management and resource management, and adapted goods, which are goods that have been specifically modified to be more "environmentally friendly" or "cleaner"¹. This study uses the Asia-Pacific Economic Cooperation (APEC) list of EGs because it better reflects developing country needs.

India's Sustainability-Trade Nexus

Sustainability has shifted from a peripheral concern to a central force shaping global trade. Governments are increasingly embedding sustainability criteria into trade agreements and border measures, while businesses are incorporating environmental and social metrics into operations and investment strategies. This shift is visible in the rise of green trade instruments such as carbon border mechanisms, product sustainability standards, and disclosure mandates, which now influence competitiveness across markets.

India's evolving climate commitments, articulated through its NDCs, reflect this global transformation. Having achieved its initial goals of reducing emissions intensity and expanding non-fossil fuel power capacity well ahead of time, India has now further strengthened its 2030 targets. These commitments support broader ambitions in renewable energy expansion, electric mobility,

energy storage, and climate-resilient development while generating opportunities for green jobs and technological innovation. The policy momentum also strengthens India's emerging role in EGs, a sector that aligns economic growth with environmental objectives. By developing capabilities in renewable energy technologies, waste management systems, water treatment solutions, and energy efficient equipment, India is positioned to capture new export opportunities, as global demand for green technologies rises. At the same time, environmental regulations particularly those introduced by the EU, such as Carbon Border Adjustment Mechanism (CBAM), Ecodesign for Sustainable Products Regulation (ESPR), EU Deforestation Regulation (EUDR), and Corporate Sustainability Due Diligence Directive (CSDDD) are reshaping global trade conditions by making sustainability compliance a prerequisite for market entry. India's strategy to expand EGs exports, enhance supply-chain transparency, and upgrade industrial processes is, thus, tightly linked to maintaining competitiveness.

The recently concluded India-EU Free Trade Agreement aims to facilitate trade in low-carbon goods and technologies, supported by EU technical and financial assistance, though without exemptions from environmental regulations like CBAM. While compliance obligations may impose new burdens on Indian exporters, the provisions in the FTA on cooperation, recognition of verifiers, and potential alignment of carbon pricing systems create pathways to ease adjustment. By integrating sustainability into its trade framework, India could convert regulatory pressures into strategic advantage, reinforcing its position in global value chains, while advancing national prosperity and contributing to global climate goals.

Trade in Environmental Goods

Between 2015 and 2024, global trade in EGs expanded rapidly, driven by rising sustainability commitments and clean technology adoption. Based on the APEC list of EGs, global exports more than doubled from US\$ 246.9 billion in 2005 to US\$ 542.5 billion in 2024, reflecting the growing importance of green technologies in industrial transformation and climate policy.

Global Exports: In 2015, China, Germany, and USA dominated EG exports with a combined share of 40.7%. By 2024, concentration at the top intensified, with these three economies jointly accounting for 44.1% of global exports. Meanwhile, emerging economies such as India expanded their participation, with India's share more than

¹ Macroeconomic Climate Indicators Dashboard, IMF (https://climatedata.imf.org/datasets/8636ce866c8a404b8d9baeaffa2c6cb3_0/about)

doubling from 0.7% in 2015 to 1.6% in 2024, supported by domestic manufacturing initiatives like the 'Make in India' and 'Production Linked Incentive' (PLI) schemes and rising global demand for renewable energy equipment.

Global Imports: In 2015, China (accounting for 19.8% of global imports) was the world's largest EG importer. However, by 2024, USA (accounting for 16.3%) emerged as the top importer, driven by significant clean-energy investments and policy incentives. India's share in global imports grew from 1.8% in 2015 to 3.3% in 2024, reflecting its accelerating renewable energy targets and increasing thrust on environmental monitoring, among others. India's EG import bill rose to nearly US\$ 18 billion by 2024, with strong demand for advanced analytical instruments, purification systems, and photovoltaic components.

Leading Environmental Goods in Global Trade

Across global markets, renewable-energy-related goods, solid and hazardous waste management equipment, and environmental monitoring instruments emerged as the leading traded segments. Photovoltaic cells experienced particularly rapid expansion, peaking at over US\$ 66 billion in global exports in 2023, while machinery used for waste processing and recycling continued to grow steadily. Demand also surged for instruments used in pollution tracking, industrial process optimization, and regulatory compliance driven by stricter global environmental standards and the shift toward circular economy practices.

India's Trade in Environmental Goods

For India, the evolving landscape presents both opportunities and structural challenges. India ranks as the sixth-largest global market for environmental technologies exports².

Exports: India's EG exports grew at a CAGR of 12.7% between 2015 and 2024, more than double the growth rate of its overall exports, indicating a gradual shift towards higher value green manufacturing. India's share in global exports of EGs has gradually increased from 0.7% in 2015 to 1.6% in 2024, amounting to US\$ 8.5 billion. The largest export market for India's EG exports was USA, with a share of 34.9% in total EG exports of India, as it is one of the largest solar markets in the world. Other markets for India's EG exports include Germany (5.9%), UAE (4.3%), Saudi Arabia (2.9%), China (2.8%), among others. Key export drivers include photovoltaic modules, electric motor components, gas-turbine parts, and specialized environmental machinery.

Imports: India's EG import bill has risen sharply in recent years, increasing from about US\$ 7.2 billion in 2015 to US\$ 17.9 billion in 2024. Within EGs, the composition of

imports reveals a clear shift towards low-carbon energy equipment, particularly solar value chain products. India's EG imports are highly concentrated, with China alone accounting for 44.1% of total EG imports. Other major import sources include Germany (9.4%), USA (6%), Singapore (5.8%), among others. PV cells and modules emerge as major items, accounting for cumulative imports of around US\$ 4.5 billion in 2024, reflecting India's rapid scaling-up of solar generation capacity under its climate commitments. Machinery, instruments, and parts used for measurement, control, and purification are among the other dominant EG imports for India.

Revealed comparative advantage analysis shows that India holds competitive strength in about one-third of EG categories, particularly in renewable energy components and industrial machinery, while lacking competitiveness in precision instruments and high-tech analytical devices. Going forward, strategic industrial upgradation, deeper integration into global value chains, and diversification of import sources would be essential for strengthening India's role in the global green economy.

Regional Benchmarking of India's Environmental Goods Trade

Global trade is undergoing a profound shift as sustainability becomes a central pillar of economic policy and international commerce. Countries are aligning trade strategies with environmental objectives, which is creating new opportunities in low carbon technologies while raising the bar on standards, compliance, and competitiveness.

In Asia, this transition is particularly dynamic. The region's rapid industrialization, integration in global supply chains, and diverse economic structures are shaping distinct pathways toward greener trade. Southeast Asian economies alongside India are seeking to balance growth with environmental responsibility by adopting clean technologies, circular economy practices, and greener manufacturing systems.

Against this backdrop, understanding India's position relative to its Southeast Asian peers is essential for strategy. Besides India, the study focuses on five strategically important Southeast Asian economies viz. Singapore, Vietnam, Malaysia, Thailand, and Indonesia, within the context of green trade. Across these five countries along with India, aggregate EG exports rose from US\$ 18.1 billion in 2010 to US\$ 46.8 billion in 2024 (witnessing a CAGR of 6.5%).

Adapting to Environmental Regulations

Governments and regulatory institutions across major economies are embedding environmental standards into trade frameworks in order to address climate change, resource depletion, and ecological degradation. As a result, environmental regulations are no longer limited to

² International Trade Administration, USA: India Country Commercial Guide(<https://www.trade.gov/country-commercial-guides/india-environmental-technology>)

domestic policy measures; they increasingly function as instruments shaping global trade flows and supply chains.

India's approach to environmental regulation is closely linked to its commitments under the Paris Agreement and its NDCs. These commitments are reshaping domestic environmental regulation, stimulating investment in renewable energy, energy efficiency, and green technologies.

Domestic environmental regulations are also creating demand for environmental technologies and services. India faces persistent environmental challenges, including severe air pollution, water contamination, and waste management pressures associated with rapid urbanization and industrial growth. Government initiatives such as the National Clean Air Programme and stricter emission standards for power plants have accelerated investments in pollution control technologies, water treatment systems, and environmental monitoring equipment. These regulatory initiatives not only address environmental concerns but also stimulate domestic production and trade in environmental goods such as renewable energy components, filtration equipment, and monitoring instruments.

While domestic regulation is driving internal transformation, the most immediate pressures on Indian exporters arise from environmental regulations implemented by major trading partners, particularly the European Union. Developed economies are increasingly introducing regulatory frameworks that internalize environmental costs into international trade. Unlike traditional trade barriers such as tariffs or quotas, these measures influence market access through sustainability requirements, carbon accounting obligations, and supply chain transparency standards. They apply across a broad range of sectors, including steel, aluminium, textiles, leather, agricultural commodities, and chemicals, thereby affecting large segments of India's export economy.

Among the many regulations introduced, three key regulatory instruments introduced by the European Union illustrate this transformation: the CBAM, the EUDR, and the ESPR which incorporates the Digital Product Passport (DPP). Together, these measures represent a framework that integrates sustainability criteria into international trade by imposing environmental performance requirements across the lifecycle of products and throughout global supply chains.

CBAM represents the most direct economic instrument within this framework. Implemented following a transitional reporting phase, CBAM imposes carbon costs on imports equivalent to those faced by European producers under the EU Emissions Trading System. The mechanism initially targets carbon-intensive sectors such

as cement, iron and steel, aluminium, fertilizers, hydrogen, and electricity. Importers must report the embedded emissions associated with imported products, including both direct production emissions and indirect emissions from electricity consumption. For Indian exporters, this creates a new compliance obligation requiring verified emissions data and transparent carbon accounting systems. Failure to provide verified data may result in the application of default emissions values based on the most carbon-intensive European producers, significantly increasing compliance costs and reducing price competitiveness.

Beyond carbon pricing, the EUDR introduces strict requirements for traceability in supply chains linked to land-use change. The regulation requires companies placing certain commodities on the EU market to demonstrate that their products are not associated with deforestation after a specified cut-off date. It applies to commodities such as cattle, soy, coffee, cocoa, palm oil, rubber, and timber, as well as derivative products including leather, furniture, and tyres. Compliance requires companies to submit detailed due diligence statements supported by geolocation data identifying the precise origin of raw materials. For Indian exporters, particularly those in leather and agricultural value chains, these requirements introduce new logistical and administrative challenges due to fragmented supply chains and the prevalence of smallholder producers.

The ESPR complements these measures by establishing product-level environmental performance standards. Unlike CBAM and EUDR, which focus primarily on carbon emissions and land-use impacts respectively, ESPR addresses the broader lifecycle sustainability of products. The regulation mandates standards related to durability, repairability, recyclability, energy efficiency, and the elimination of hazardous substances. Compliance is facilitated through the DPP, a digital documentation system that records sustainability attributes and lifecycle data accessible through QR-based tracking mechanisms. Implementation will occur gradually across sectors such as textiles, electronics, furniture, metals, and chemicals over the coming decade.

Together, these regulatory measures signal a fundamental shift in global trade governance. Environmental sustainability is no longer treated as a voluntary corporate commitment or a premium market attribute. Instead, it has become a baseline requirement for participation in international markets. Exporters must now demonstrate compliance with carbon accounting frameworks, sustainable sourcing requirements, lifecycle product standards, and full supply chain traceability. These obligations fundamentally alter the cost structures and operational strategies of firms participating in global trade.

Impact of Environmental Regulations on India's Trade

For India, the implications are particularly significant because many of the affected sectors represent major export industries. Carbon-intensive sectors such as steel and aluminium are directly exposed to CBAM compliance costs. Agricultural and leather exports face traceability obligations under the deforestation regulation. Textile exports, while not directly subject to CBAM, must comply with ESPR's circular economy requirements, including restrictions on hazardous chemicals and mandates for product durability and recyclability. Small and medium enterprises, which form the backbone of India's export sector, may face disproportionate compliance burdens due to limited technological capacity, fragmented supply chains, and limited access to environmental monitoring systems.

Adaptation and Mitigation Strategies to Comply with Environmental Regulations

Despite these challenges, environmental regulations also create opportunities for technological upgrading and market differentiation. Firms that adopt cleaner production technologies and improve resource efficiency could enhance their competitiveness in global markets increasingly shaped by sustainability criteria. Products certified as environmentally sustainable often command price premiums, while compliance with international environmental standards can facilitate access to environmentally conscious consumers and ESG-linked financing. As the global market for green technologies expands, early adoption of sustainable production practices can provide first-mover advantages for Indian industries.

The recently concluded India-EU Free Trade Agreement reflects this evolving relationship between trade and environmental governance. The agreement promotes cooperation in low-carbon technologies, renewable energy development, and sustainable resource management while providing tariff reductions for certain green goods. Although the agreement does not exempt India from compliance with CBAM requirements, it establishes mechanisms for technical cooperation, carbon data verification, and financial support to assist Indian industries in adapting to emerging regulatory standards. These provisions aim to facilitate technology transfer, support decarbonization efforts, and reduce compliance costs for Indian exporters.

Looking ahead, successfully navigating the emerging regulatory landscape will require coordinated action across government, industry, and financial institutions. Strengthening domestic environmental regulation, developing robust systems for emissions measurement

and reporting, expanding manufacturing capabilities in environmental goods, and investing in digital supply chain traceability will be essential. Integrating sustainability considerations into trade and industrial policy could enable India to convert regulatory pressures into strategic advantages.

By proactively adapting to evolving environmental standards and strengthening its capabilities in green technologies, India could safeguard its export competitiveness while advancing its broader goals of sustainable development and climate resilience.

Policy Recommendations and Way Forward

In the evolving landscape of global trade, environmental sustainability has become a central priority shaping policies, regulations, and economic strategies worldwide. Following policy recommendations outline a strategic pathway for India to strengthen its leadership and resilience in the global EGs trade ecosystem and become prepared towards the emerging global green norms. These measures include i). establishing a centralised environment trade body tasked to monitor international environmental trade regulations, publish sector-specific reports, and highlight high-potential goods with strong environmental relevance; ii). pursuing Mutual Recognition Arrangements (MRAs) with key partner countries to harmonize technical standards and certification requirements for environmental products; iii). increasing use of AI for enhanced deployment of renewable energy; iv). establishing dedicated export promotion zones for renewable energy technologies supported by infrastructure, logistics, and regulatory facilitation; v). developing green energy corridors to reduce power losses, improve grid reliability, and allow trading of clean energy across regions or even countries; and vi). extending green trade measures beyond environmental compliance to encompass social standards, labour rights, and resilient supply chain governance.

The contents of the publication are based on information available with India Exim Bank. Due care has been taken to ensure that the information provided in the publication is correct. However, India Exim Bank accepts no responsibility for the authenticity, accuracy or completeness of such information.

For further information, please contact

Mr. Gaurav Bhandari
Chief General Manager
Export-Import Bank of India
Maker Chamber IV, Floor 8
Nariman Point, Mumbai – 400021, India
Phone : +91 22 – 22860 305
E-mail : rag@eximbankindia.in
Website : www.eximbankindia.in

Contact Numbers: Ahmedabad: (91 79) 26576852, Bengaluru: (91 80) 25585755. Chandigarh: (91 172) 4629171/73, Chennai: (91 44) 28522830, Guwahati: (91 361) 2237607, Hyderabad: (91 40) 23307816, Kolkata: (91 33) 68261301, Lucknow: (91 44) 28522830/31 Mumbai: (91 22) 22861300, New Delhi: (91 11) 61242600, Pune: (91 20) 26403000, Abidjan: (225) 2720242951, Dhaka: (88) 01708520444, Dubai: (971) 43637461, Johannesburg: (27) 113265103, London: (44) 2077969040, Nairobi: (254) 741757567, Singapore: (65) 65326464, São Paulo: +55 (11) 30807561, Washington D.C: (1) 2022233238,