



Green Economy and Circular Economy Models

For Prelims: [Climate change](#), [Precision Farming](#), [Zero-Budget Natural Farming](#), [Mangrove Initiative for Shoreline Habitats & Tangible Incomes](#), [Perform, Achieve, and Trade \(PAT\) Scheme](#), [National Cooling Action Plan](#), [Atal Bhujal Yojana](#), [Green Energy Corridor](#), [NITI Aayog](#), [Basic Customs Duty](#), [Carbon Border Adjustment Mechanism](#), [National Investment and Infrastructure Fund](#).

For Mains: [India's Green Economy Transition](#), [Circular Economy](#), [Integration of Green Economy & Circular Economy](#)

What is the Green Economy?

- The **Green Economy** concept highlights the shift from [fossil fuel](#) dependency to a low-carbon economy, aiming for [net-zero emissions](#) by embracing clean technologies.
 - The economy focuses on sustainability, inclusivity, and long-term growth, leveraging technology to address climate challenges.
- India's **transition to green energy** (e.g., increasing renewable energy sources) and [job creation](#) via distributed energy and green tech (solar, wind, electric mobility) are its key components.
- The green economy embraces the [circular economy model](#), aiming for sustainability through waste reduction and the reuse of resources. This involves [electronic waste management](#), **end-of-life vehicles**, and **toxic waste** recycling initiatives.

What are the Challenges in India's Transition Towards a Green Economy?

- **Pollution Control:** Despite the launch of the [National Clean Air Programme \(NCAP\)](#), **pollution levels** in many cities have seen only marginal improvements. The lack of sufficient **state-level funding** and weak enforcement of **environmental regulations** are key challenges in reducing air pollution and improving air quality .
- **Energy, Climate, and Growth:** India faces significant challenges due to its continued reliance on [fossil fuels](#) and [coal](#). The country's [energy security](#) and **access to clean energy** are key roadblocks. Transitioning to renewable energy is hindered by **financial constraints**, **technology gaps**, and a **lack of infrastructure**.
 - Additionally, [climate change](#) **adaptation** requires heavy investment in infrastructure to cope with extreme weather events, which disproportionately affect **developing countries** like India .
- **Inconsistent Fuel Blending:** India has set a target to increase the [ethanol blending](#) ratio to 20% by 2025, but progress is slow due to inconsistent **ethanol availability**, especially in regions far from production centers. The lack of infrastructure to support **biofuel adoption** further hampers progress .
- **Economic Disruptions:** The global shift towards **slowbalization (slowing of the process of globalization)** presents challenges for India, as trade restrictions and **geopolitical**

tensions (such as the [US-China trade war](#)) disrupt the supply chain for green technologies. India's [manufacturing sector](#) is still underdeveloped, limiting its capacity to fully participate in the global green economy .

- **Challenges in Transitioning the Workforce:** The shift from **carbon-intensive industries to green sectors** threatens millions of jobs, particularly in **coal-dependent states** like Jharkhand and Chhattisgarh.
 - Accelerated decarbonisation could transform over **30 million jobs by 2050**. The **absence of robust [skill development programs](#)** hampers the ability of workers to transition to green jobs.

What Steps are Needed to Accelerate Transitioning Towards a Green Economy?

- **Energy, Climate, Growth:** India can enhance its focus on [carbon pricing](#) and implement innovative policies such as [smart grids](#) and **carbon markets** to drive the transition to renewable energy. This should include the expansion of [solar PV](#) and [wind energy](#) capacity, backed by **green financing** initiatives.
- **Enhancing Domestic Manufacturing for Green Technologies:** Promoting **local manufacturing of solar panels, wind turbines, and energy storage systems** through the [Production-Linked Incentive \(PLI\) Scheme](#) can reduce dependence on imports.
 - This aligns with India's goal to produce **110 GW of solar module manufacturing capacity by 2025-26**, minimizing reliance on Chinese imports.
 - Coupling this with the [Make in India](#) initiative can drive job creation and green industrialization.
- **Battery Swapping and Electric Vehicles (EVs):** The introduction of a [battery swapping policy](#) will facilitate the growth of the **electric vehicle (EV)** market, addressing challenges like **charging infrastructure** and **charging anxiety**. This policy is aimed at increasing the use of **electric mobility in public transport and goods delivery**, thus reducing emissions from the transport sector .
- **Circular Economy and Green Industrialisation:** Expanding the **circular economy** through sectors like **waste management**, [agroforestry](#), and **sustainable manufacturing** will play a crucial role. The government's focus on [sustainable agriculture](#), including **private forestry and agroforestry**, is essential for promoting environmental sustainability while providing economic opportunities .
- **Expanding Mangrove and Wetland Restoration Programs:** India should scale up **nature-based solutions** by restoring mangroves and wetlands to enhance carbon sequestration and coastal resilience.
 - The [Mangrove Initiative for Shoreline Habitats and Tangible Incomes \(MISHTI\)](#) can be integrated with [Mahatma Gandhi National Rural Employment Guarantee Act \(MGNREGA\)](#) to provide livelihood opportunities.

What are the Initiatives Taken for a Green Economy?

- **Fiscal and Budgetary Measures:** The [Budget 2022-23](#) allocated Rs 1950 crore for high-efficiency **solar PV module production** and **battery production**, a step that aligns with India's goal of scaling up renewable energy.
- **Government Initiatives:** The [G20 Presidency](#) under India's leadership has focused on fostering **multilateral cooperation** to address global green growth challenges. India's leadership in the [Global South](#) has emphasized the need for **inclusive green finance** and support for **developing countries** in accessing green technologies.
 - Key initiatives like [Project Tiger](#), [Project Elephant](#), and the [National Coastal Mission](#) contribute to [biodiversity conservation](#) and environmental protection .
- **Green Energy and Industrial Policy:** The [Production Linked Incentive \(PLI\) Scheme](#) for manufacturing **solar PV modules** and **high-efficiency batteries** aims to make India a global leader in **clean energy production**.
 - Additionally, the focus on [biomass energy](#), **energy efficiency in commercial buildings**, and **coal gasification** are part of India's **green industrialization efforts** .
- **Biodiversity and Conservation:** India continues to improve its [forest cover](#), while also

addressing concerns about the loss of **natural forests** in certain regions.

- The government's **Green India Mission (GIM)** is a comprehensive plan to increase forest cover and restore biodiversity across the country .

What is a Circular Economy?

- A **Circular Economy** is one where **products are designed for durability, reuse, and recyclability** and thus almost everything gets reused, remanufactured, and recycled into a raw material or **used as a source of energy**.
- Circularity is about **keeping materials in circulation for as long as possible**. The ultimate goal is to reduce environmental and socio-economic impacts by reducing waste generation and **keeping materials at their highest value**.
 - It includes **6 R's** - Reduce, Reuse, Recycle, Refurbishment, Recover, and Repairing of materials.

What are the Challenges in Achieving Circular Economy (CE)?

- **Global Material Extraction and Overshoot:** As the global demand for materials grows rapidly, from 22 billion tonnes in 1970 to 70 billion tonnes in 2010, and is expected to double by 2060, **Earth's capacity to regenerate is exceeded**.
 - In 2023, humanity's demand surpassed Earth's ability to replenish its resources, intensifying issues like **biodiversity loss, pollution, and climate change**.
- **Fashion Industry Challenges:** Despite the increasing awareness of sustainability, the **fashion industry continues to face major challenges** in adopting circular economy practices.
 - Over the past 15 years, fashion consumption has more than doubled, while **garment lifecycles have become shorter**. This trend has resulted in **large-scale waste** and environmental harm.
- **Challenges in High-Impact Sectors:** High-impact sectors such as mobility, textiles, plastics, and construction present **significant roadblocks** to achieving circular economy goals. These **industries require systemic changes** to move toward more sustainable practices, and current efforts are insufficient to meet global sustainability targets.
- **Unclear Vision for CE:** Despite the Government's policy efforts the progress has been underwhelming; one of the major challenges is the **lack of a clear vision towards the end-goal** of India's circular economy mission and gaps in actual implementation of the policies.
- **Reluctance of Industries:** The Industries are reluctant to adopt the circular economy model **due to supply chain limitations**, lack of incentives to invest, **complex recycling processes**, and lack of information to support participation in reusing/ recycling/re-manufacturing processes.

What are the Initiatives For Achieving Circular Economy?

- **India's Initiatives:** India is actively promoting circular economy policies such as the **Draft National Resource Efficiency Policy (2019)**, the Steel Scrap Recycling Policy, the Vehicle Scrapping Policy, and sector-specific action plans.
- **Mission LiFE:** Launched in 2022, **Mission LiFE** focuses on **three main principles**: nudging behaviors towards responsible consumption (demand), enabling market responses to shifting needs (supply), and influencing government and industrial policies to support sustainable initiatives.
- **Plastic Waste Management and GTPI:** India's approach includes joining the **Global Tourism Plastics Initiative (GTPI)**, aiming to unite the tourism sector in transitioning towards circularity for plastics.
- **Global Alliance on Circular Economy and Resource Efficiency (GACERE):** India is a key member of the **Global Alliance on Circular Economy and Resource Efficiency (GACERE)**, which aims to foster a global transition to circular economic practices.

What are the Steps Needed to Promote Circular Economy?

- **Investment in Circular Systems:** A shift towards a circular economy **requires extensive investment in enabling policies**, infrastructure, low-carbon alternatives, and technologies. Additionally, **integrating circularity into business models** will help unlock more sustainable practices.
- **Sustainable Lifestyles:** Adopting sustainable lifestyles is vital to reaching the [SDG 12 targets on Responsible Consumption and Production](#). Key actions include reducing carbon footprints, supporting low-carbon alternatives, and **adopting more sustainable practices in mobility**, energy use, dietary choices, and new business models.
- **Green Jobs and Economic Opportunities:** Transitioning to a circular economy presents an **opportunity to generate green jobs** and enhance economic growth. It is estimated that India's shift to a circular economy could bring a **net economic benefit of USD 624 billion** annually by 2050 and create millions of jobs globally.
- **Syncing Laws with Implementation Strategies:** The government's initiatives need to be in **conjunction with implementable actions** with industry collaboration to reap the benefits of the circular economy.
- **Technology-Driven Recycling:** The government should **encourage R&D in the field of waste recycling** at the University and School levels to promote the active participation of the masses in technology enhancement in the field of waste management.
 - Also, composting centres can be established in cities to reuse organic waste, which will **enhance [soil carbon content](#)** and eliminate the need for chemical fertilisers.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. With reference to the Indian Renewable Energy Development Agency Limited (IREDA), which of the following statements is/are correct? (2015)

1. It is a Public Limited Government Company.
2. It is a Non-Banking Financial Company.

Select the correct answer using the code given below:

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (c)

Mains

Q. "Access to affordable, reliable, sustainable and modern energy is the sine qua non to achieve Sustainable Development Goals (SDGs)". Comment on the progress made in India in this regard. (2018)