



India is the fifth largest economy in the world and the fourth largest carbon dioxide emitter.
Photo by Muthazhagu Palanisamy.

Climate Resilient India

This article describes the environmental legislative actions of the Government of India, with an emphasis on climate policies, established climate targets, and the ongoing initiatives to help meet them.

India is the fifth largest economy in the world. Industrial growth, gross domestic potential increase, rapid improvements toward clean air and water, waste management, resilient infrastructure, public health management, per-capita energy demand management, and poverty eradication are some of the focus areas of development pursued by the Government of India. India's proposed 2020–2021 financial budget focuses on three themes—Aspirational India, Economic Development For All, and A Caring Society—that work toward a clean environment and meeting the nation's climate change control commitments.

Environmental Legislation

India has a rich history of environmental legislation, policy, and associated regulatory undertaking. Since the successful attendance of the United Nations Conference on Human Environment held in Stockholm (Sweden) in 1972, India promulgated the Water (Prevention and Control of Pollution) Act (1974), the Water (Prevention and Control of Pollution) Cess Act (1977), and the Air (Prevention and Control of Pollution) Act (1981) within a decade. Following this, India enacted The Environment (Protection) Act (1986) to holistically address and implement prevention, control, and abatement of environmental pollution.

The National Environment Policy (NEP) was developed in 2006 to extend the coverage of existing policies and review them from a sustainable development standpoint. The NEP details regulatory reform; programs and projects for environmental conservation; and economic initiatives, including focus areas for research and development, capacity building; and international cooperation. The NEP specifically addresses the issue of climate change and suggests a series of pivotal response measures, including voluntary partnership with other countries to collaboratively address climate change consistent with provisions of the United Nations

Framework Convention on Climate Change (UNFCCC).

Climate Change Action

India has consistently shown leadership on climate policy action(s) since the early 2000s. The launch of the International Solar Alliance at the United Nations Climate Change Conference (UNCCC) in Paris (2015), and the Coalition for Disaster Resilient Infrastructure (CDRI) at the recent United Nations Climate Action Summit (UNCAS) in New York (2019), demonstrate India's active role on climate initiatives.

Greenhouse Gas (GHG) Emissions

India is the fourth largest carbon dioxide (CO₂) emitter, after China, the United States, and the European Union, as of 2014.¹ The total GHG emissions of India are approximately 2,306 million metric tons of CO₂ equivalent (CO₂e), including land use, land-use change and forestry (LULUCF). The total GHG emissions excluding LULUCF are approximately 2,607 million metric tons of CO₂e, of which 73.2% of the emissions are contributed by fossil fuel-fired combustion from energy and manufacturing industries, transport, and related subsectors; 16% by agriculture through enteric fermentation, agricultural soils, and rice cultivation; 7.8% by industrial processes and product use (IPPU) mostly comprising of mineral, chemical, and metal industries; and 3% by solid waste disposal sites and handling of wastewater.²

India has a long-term goal of its per-capita emissions never to exceed those of the developed countries and to be a minor per capita emitter through 2030. Figure 1 shows the metric tons of CO₂ emissions per capita recorded between 1960 and 2014 for select countries, including the United States, Germany, and Brazil, Russia, India, China, and South Africa (collectively referred to as BRICS, nations of the emerging economies).³ As shown in Figure 1, India maintained its CO₂ emissions lower than one metric ton per

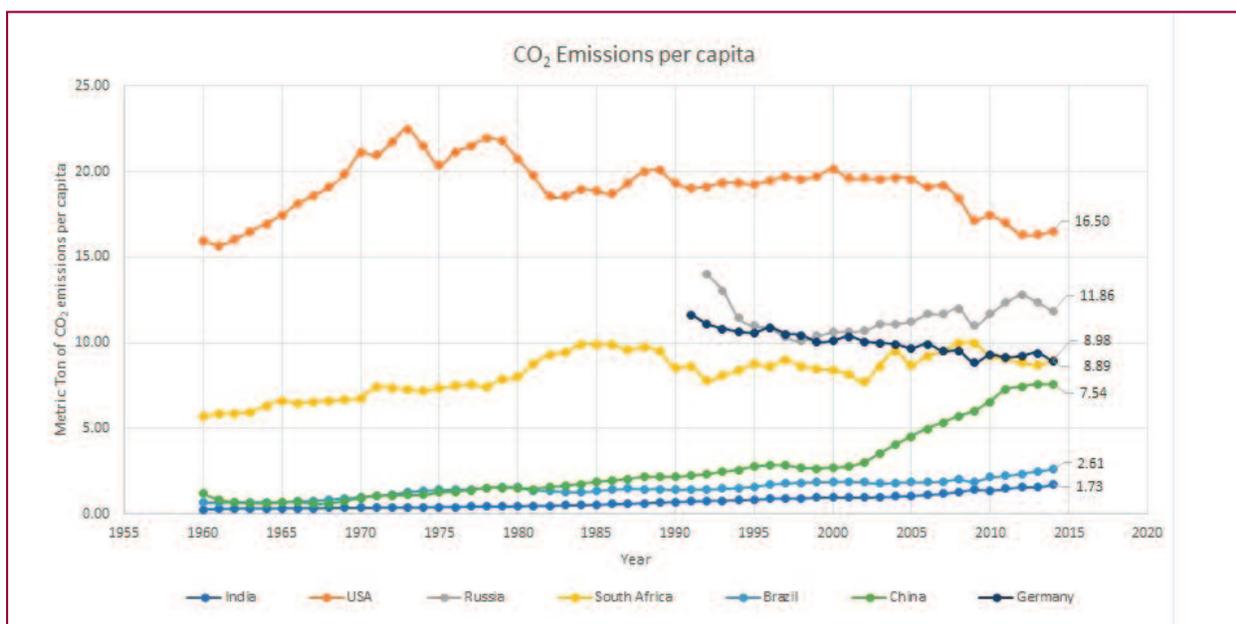


Figure 1. Select countries and CO₂ emissions per capita.

capita until 2003. Since 2014, India has shown its highest recorded per-capita emissions of 1.73 metric tons of CO₂, emitting approximately one ninth of the largest emitter, United States, which is recorded to generate 16.50 metric tons of CO₂ emissions per capita.

Climate Policies

India's vulnerability to climate change is reflected in the consistent changes to annual monsoon timeframes, melting of Himalayan glaciers, increased frequency of flooding due to short-duration and significantly high rainfall/precipitation events, to name a few. India began its adaptation to climate resiliency policies in the early 2000s, when it first supported a joint declaration on the significance of global warming at the 2002 UNFCCC.

In June 2008, India published its first National Action Plan on Climate Change (NAPCC), encompassing measures for climate protection and adaptation, through eight national mission priorities:

1. Solar
2. Enhanced Energy Efficiency
3. Sustainable Habitat
4. Water
5. Sustaining the Himalayan Ecosystem
6. Green India
7. Sustainable Agriculture
8. Strategic Knowledge for Climate Change

India also adopted 24 initiatives, encompassing science and research, policy development and implementation, international cooperation, and forestry, to achieve a low-carbon strategy in all sectors per its Post-Copenhagen Domestic Actions (CDA; 2009) commitment toward reducing GHGs by 20–25% from 2005 levels.

States and Union Territories of India have formulated the State Action Plan on Climate Change (SAPCC) to mainstream climate change challenges in their planning process. The following policies and strategies are in effect supporting the NAPCC and the SAPCC:^{4,5}

- Bharat Stage (BS) VI Emission Standards (2020), promoting stringent standards on mobile (vehicular) source emissions;
- National Wind-Solar Hybrid Policy (2018), promoting grid-connected wind-solar hybrid systems for efficient utilization of transmission infrastructure;
- National Policy for Farmers (2007), fostering sustainable agriculture;
- Integrated Energy Policy (2006), providing energy policy recommendations that address adverse environmental impacts and security concerns;
- National Electricity Policy (2005), focusing on globalizing access to electricity and promoting renewable energy resources;
- Energy Conservation Act (2001), supporting energy efficiency; and

- Several mechanisms geared toward energy efficiency and emissions reduction, such as the Clean Development Mechanism (2006), the Perform, Achieve, Trade Scheme (PAT; 2011), and the Zero Defect Zero Effect Model (2016).

Climate Targets

In 2015, at the UNFCCC COP-21 held in Paris, India made a bold commitment as part of its nationally determined contributions (NDCs) to reduce GHG emissions 33–35% (2005 levels) by 2030, by meeting 40% of total energy demand with non-fossil fuel sources and increasing forest cover to 33% from the 24% increase as measured in 2013. India set other non-quantified goals, such as establishing a sustainable way of living, increasing investments at developing the sectors susceptible to climate change, channeling funds from developed countries to mitigation actions, and joint collaborative research and development for climate resilient technologies.

Ongoing Initiatives and Accomplishments

India's GHG emissions is estimated to increase with the nation's economic growth. The Indian government is investing in low-carbon growth strategies that can help break this pattern and enable the country to keep on course with its climate action commitments through 2030. India is aligned to achieve its NDC goals of meeting 40% energy demand through non-fossil fuel resources and reducing GHG emission intensity ahead of schedule. With the rapid economic growth and increasing population (1.353 billion in 2018), current policies are geared toward expanding non-fossil generation capacity through wind and solar energy to cater to this fast-growing electricity market. Solar power generation has increased by 65% during the period 2014–2019, and non-fossil fuel power generation has reached 37%, which places India ahead of schedule in achieving its NDC target of 40% by 2030.

In the industry sector, one of the many ways India sets to achieve energy efficiency is through the PAT mechanism, whereby participating facilities are assigned energy savings target and the facilities that exceed their targets sell their energy savings certificates (ESCerts) to facilities that did not, much similar to an emissions' banking and trading scheme. Similarly, small and medium-size industries follow several new market-based emission reduction mechanisms.

Considering that more than 50% of India's population relies on agriculture, the government has taken measures to curb incompetent power distribution and use of inefficient pump systems and equipment, via disbursing funds to farmers for infrastructure development, and promoting solar-based power grid and pumps.

Policy Projections

The initiatives designed to strengthen India's renewable energy capacity and the current trend of falling renewable energy prices indicate that India is aligned to achieve its goals of meeting 40% energy demand through non-fossil fuel resources and reducing GHG emission intensity ahead

of schedule. Additionally, the Government of India is considering plans to increase its capacity target for renewables from 175 Gigawatt (GW) to 450 GW by 2030.

Furthermore, India, as part of its NDC, has signed on to be “2 °C compatible” by 2030 as per the Copenhagen Agreement (2009); however, compatibility with the Paris Agreement is to be reviewed, based on further progress with the ongoing NAPCC. In support of this commitment, during the 2020–2021 budget speech,⁶ India’s Finance Minister, The Honorable Nirmala Sitharaman stated, “India submitted its Nationally Determined Contribution, under the Paris Agreement in 2015 on a ‘best effort’ basis, keeping in mind the development imperative of the country. Its implementation effectively begins on 1st January 2021. Our commitments as action will be executed in various sectors by the Departments/Ministries concerned through the normal budgeting process.”

It will be important to watch for post-COVID-19 economic actions of nations and implications on the collective effort in control of global warming in the near future.

Summary

India is an environmentally sustainable economy that realizes its vulnerability to climate change and the critical need for environmental protection and emissions control. India’s commitment toward climate response has led several legislative and policy actions, associated stringent regulatory standards and compliance mechanisms to be put into effect since the seventies. The proposals made by India for making progress on the global climate change agenda are constructive and tie into its other key objectives of economic development and poverty eradication.⁷ With this continued momentum, the nation is well on its path to realize its climate policy objectives of mitigation and adaptation, becoming a climate resilient India. **em**

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