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India: Climate Change Issues

Global climate change presents multiple challenges to India. The country is faced with meeting its energy and economic development needs, reducing its greenhouse gas (GHG) emissions, and addressing the potential impacts of climate change. India is among the world's top emitters of GHGs, including carbon dioxide (CO_2), along with China, the United States, and the European Union; thus India's participation in global efforts to mitigate climate change would be crucial to their success. India accounts for 18% of the world's population and 7% of global CO_2 emissions in 2019, although its CO_2 emissions per capita are comparatively low. Energy use in India has roughly doubled since 2000, with 80% of demand supplied by energy generated from coal, oil, and solid biomass. Its reliance on coal and other fossil fuels results in India emitting more GHGs per unit of energy generated than other large countries.

Impact of Climate Change

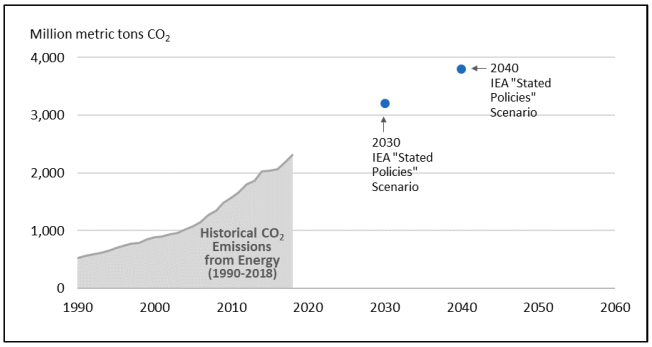
India is increasingly vulnerable to the effects of climate change. According to a December 2021 overview of the country's National Action Plan on Climate Change, "Climate change is one of the most critical global challenges of our times. Recent events have emphatically demonstrated our growing vulnerability to climate change. Climate change impacts will range from affecting agriculture—further endangering food security—to sea-level rise and the accelerated erosion of coastal zones, increasing intensity of natural disasters, species extinction, and the spread of vector-borne diseases."

The Intergovernmental Panel on Climate Change's (IPCC) Draft Sixth Assessment Report, *Climate Change 2022: Impacts, Adaptation and Vulnerability* provides both observations and projections of potential impacts of climate change on India. The report states that air temperature has increased in the 20th century over all of Asia, and Asian countries are experiencing hotter summer climates, resulting in increased energy demands. It also projects a decline in fisheries, aquaculture, and crop production, with climate change affecting rice and maize yields. Additional potential impacts to the region noted in the report include an increase in natural disaster-associated displacements of people; degradation and loss of coral reefs; increasing stress on fresh water resources; sea level rise; heat stress; an increase in mosquito borne disease; and an increase in intense tropical cyclones, among others.

Domestic Climate Policies

India's 1.4 billion people and growing middle class with patterns of increased consumption have created rapidly growing energy demand and resulting GHG emissions (see **Figure 1**). To meet projected growth in electricity demand over the next twenty years, India reportedly would need to add a power system the size of the European Union's. The

Figure 1. Historical Greenhouse Gas Emissions from Energy Sector and IEA Emissions Projections for India



International Energy Agency (IEA) projects that India is likely to continue to rely on coal as a primary source of energy for at least another decade, even as coal's share of power generation may decline. India is the world's second-largest producer of coal and, according to the Indian government, its coal production rose 8.6% during the 12-month period ending March 2022. India's expected rapid industrialization and urbanization likely will continue to create large energy demands, perhaps most notably in the area of space cooling.

By many accounts, transition away from coal to renewables is among the most important tasks facing Indian leaders as they address climate change and reform India's energy sector. Coal continues to account for nearly half of India's total energy consumption and about three-quarters of electricity generation. Renewable energy is India's second-largest source of power generation and the fastest growing, with solar sources growing by an average of 60% annually since 2015. The potential exists for further expansion of the generating capacity of renewables including in solar, wind, and hydroelectricity production.

Indian Prime Minister Narendra Modi has pledged to attain 500 gigawatts of non-fossil fuel energy generation by 2030, requiring a more than four-fold increase of current capacity. More than half of this addition would come in the solar sector. According to the IEA, solar accounted for approximately 4% of India's electricity generation in 2021.

The Green India Mission, one of the eight Missions under India's National Action Plan on Climate Change, aims to enhance carbon sinks, increase forest cover, and improve the quality of forest cover, but reportedly has not met interim reduction targets in all states.

Another key issue for India is emissions from vehicular transport. According to the IEA, "Oil demand for road freight transport in India has tripled since 2000" and "emissions from passenger road transport in India have also quadrupled since 2000." Government mitigation efforts

include Corporate Average Fuel Economy (CAFE) and other fuel efficiency standards. New Delhi has plans to boost usage of clean fuels, further tighten existing emission standards, and promote electric vehicles to comprise at least 30% of all passenger cars by 2030.

Approach to COP Negotiations

In the lead-up to the 26th session of the Conference of Parties (COP26) to the United Nations Framework Convention on Climate Change (UNFCCC) in Glasgow, United Kingdom, high-level officials from the United States, the UK, and the European Union reportedly met with Indian officials to urge India to adopt a net-zero emissions target for mid-century. The Indian government elected not to update its Nationally Determined Contribution (NDC) ahead of COP26, although Prime Minister Modi did identify additional measures in his national statement to the COP26 Summit (NDCs represent each country's own commitment to meeting the goals of the 2015 Paris Agreement). India joined China to alter the summit's commitment in the final decision to "phase down" rather than "phase out" unabated coal usage, raising concern about whether the world can limit average global temperature rise to well below 2ºC.

India has for decades argued that developed countries caused the current climate crisis and should thus take the bulk of responsibility for mitigating it, and that developed countries should also support developing countries' climate mitigation efforts financially and technologically. In 2021, the Indian government stated that developed countries should provide developing countries "new and additional financial resources and environmentally benign technologies as committed under the UNFCCC." The same year, a senior Indian Environment Ministry official reportedly said, "We believe in the polluters-pay principle," and argued that developed countries, because they have contributed most of the emissions that led to climate change, should be responsible for assisting developing nations by putting a compensation mechanism in place.

In his speech to the COP26 World Leaders Summit, Prime Minister Modi stated, "India expects developed countries to make $1 trillion available as climate finance as soon as possible. As we track the progress of climate mitigation, we must also track climate finance. Justice would truly be served if pressure is put on those countries that have not lived up to their climate finance commitments."

Nationally Determined Contribution

COP27 is to take place in Egypt in November 2022. Most countries—including all G20 countries except China and India—updated their NDCs prior to COP26. An October 2021 United Nations synthesis report on NDCs found that "nations must urgently redouble their climate efforts if they are to prevent global temperature increases beyond the Paris Agreement's goal of well below 2C—ideally 1.5C—by the end of the century."

India's 2016 NDC pledges to reduce national emissions per GDP ("carbon intensity") by 33%-35% from 2005 levels; install the capacity for 40% of the country's electric power to be from non-fossil fuel-based resources by 2030; and create an additional carbon sink of 2.5-3 billion tons of CO_2 through additional forest and tree cover by 2030. At the COP26 summit, Prime Minister Modi announced that India would meet 50% of its energy requirements from renewables by 2030, reduce total projected carbon emissions by one billion tons by 2030, reduce the carbon intensity of its economy by 45% by 2030, and achieve net zero emissions by 2070.

Cooperation with the United States

In April 2021, President Biden and Prime Minister Modi established the U.S.-India Climate and Clean Energy Agenda 2030 Partnership "to explore and identify low carbon pathways to develop and undertake joint research and development projects, mobilize finance, develop and promote green technologies, and enhance technical collaboration aimed at building on complementarities for facilitating energy transition." A Strategic Clean Energy Partnership is one of the two main tracks of this mechanism, working on four "pillars" (Responsible Oil and Gas; Power and Energy Efficiency; Renewable Energy; and Sustainable Growth).

During his September 2021 visit to New Delhi, U.S. Special Presidential Envoy for Climate John Kerry joined Indian officials in launching a second track of the partnership: a bilateral Climate Action and Finance Mobilization Dialogue. New Delhi anticipates that this dialogue will "help in mobilizing finance to speed the clean energy transition." Two weeks later, President Biden and Prime Minister Modi met in Washington, DC, where the former expressed support for India's goal of installing 450 GW (later raised to 500 GW) by 2030, and the latter welcomed the United States' return to the Paris Agreement.

The United States welcomed India's announcement at COP26 that it would intensify its climate action, including its long-term vision to achieve net-zero emissions by 2070. Secretary of State Antony Blinken said that the United States "is supporting India's ambitious COP26 clean energy commitments by investing in renewable energy projects and mobilizing private sector financing," and notes that this effort includes a recently announced $500 million U.S. International Development Finance Corporation loan to build solar panels in India. The Quadrilateral Security Dialogue or "Quad" is another mechanism through which the United States and India—along with Japan and Australia—are undertaking initiatives to address climate change. At a May 2022 Quad summit meeting, the four leaders launched a new "Quad Climate Change Adaptation and Mitigation Package."

In the 117th Congress, Senate Foreign Relations Committee Chairman Senator Robert Menendez introduced the Prioritizing Clean Energy and Climate Cooperation with India Act of 2021 (S. 2719). The bill would establish a bilateral Climate and Clean Energy Partnership to deepen and expand bilateral cooperation. A similar bill (H.R. 8088) was introduced in the House in June 2022.

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