

# With 45 years to go, how sustainable is India's road to net-zero? | Explained

India has a tough balancing act to pull off: availing good quality of life to a large share of its population while working towards its climate goals

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This April 14, 2024, photograph shows a general view of the Parsa East Kente Basan coal mine in Surguja district, Chhattisgarh. | Photo Credit: Idrees Mohammed/AFP

Every year, climate action draws significant attention in the months leading up to the United Nations' annual meeting of the Conference of the Parties (COPs). But the outcome of the 2024 U.S. presidential election **will likely have a greater impact** on the planet's climate future than **COP29 itself**, illustrating an important challenge in combating climate change: operationalising global cooperation towards a common cause even when national interests don't align with it.

For example, an economically developed country with sufficient resources per capita may not find it necessary to change course — whereas a populous and developing country like India will. A few COPs ago, India committed to achieving net-zero carbon emissions by

2070. Since then, it has implemented several policies while others are in the works to support this transition. It is widely acknowledged that this journey will not be without challenges, especially financial ones. However, other resource constraints such as land or water availability also matter, limiting the choices available for a sustainable long-term pathway for India.

## **Why net-zero at all?**

With each passing day, climate change is becoming more evident. The scientific consensus is that to avoid devastating and irreversible consequences, the world must keep the global average annual surface temperature rise to within 1.5 °C above pre-industrial levels. The current increase is at least 1.1 °C over that in 1880.

The Sixth Assessment Report of the U.N. Intergovernmental Panel on Climate Change estimated that from 2020, the remaining (cumulative) global carbon budget for a 50-67% chance of limiting temperature rise to 1.5 °C is 400-500 billion tonnes (Gt) of CO<sub>2</sub>. Currently, annual global emissions are around 40 GtCO<sub>2</sub>.

This means net global emissions must drop drastically to stay within the carbon budget. Several countries have announced net-zero targets, but we also really need a sharp decline in total emissions.

## **Is net-zero equitable?**

The developed world, having caused the problem of climate change in the first place, is expected to lead this transition and reach net-zero emissions well before 2050, allowing more time for developing countries to balance their development goals with climate action. These expectations aren't being met, however.

Developed countries are also expected to help finance climate action, but this hasn't materialised at the required scale either. Developing countries, especially those that are small islands, are bearing more than their fair share of the brunt of climate change.

So overall, neither climate change nor climate action is currently equitable. COP29 is expected to build consensus on the level of financing required.

India's per-capita emissions are among the lowest in the world. However, according to the [World Inequality Database](#), the per-capita emissions of the richest 10% are 20-times greater than that of the poorest 10% and in absolute terms almost half of the country's total. Climate change more severely affects the economically weaker sections.

India's size and diversity mean it's a country of countries, and some of them are more polluting than others vis-à-vis the climate. Importantly, India lacks the carrying capacity to support the developed world's lifestyle standards for its entire population. If it should, India will run into significant food shortage due to groundwater depletion by the 2040s, extreme heat stress in urban areas due to the ever-increasing vehicular pollution and AC use, irreversible biodiversity loss due to non-ideal land-use changes encroaching on habitats, etc.

India's lifestyle aspirations could easily become unsustainable in the long run, jeopardising our access to basic needs.

## **A new consumption corridor**

In a scenario where consumption rises unchecked and India electrifies all end-use applications, the power demand could increase nine-to tenfold by 2070. Meeting it entirely via renewable energy will require more than 5,500 GW of solar and 1,500 GW of wind, up from the current 70 GW and 47 GW, respectively.

This target is achievable if India's only priority is to expand renewable energy generation capacity. But if India is to maintain food and nutritional security, increase forest cover, and preserve biodiversity as well, these energy targets will become very challenging. By modelling land-use change dynamics over time, the authors have found going beyond 3,500 GW solar and 900 GW wind will demand considerable land trade-offs.

In sum, India has a tough balancing act to pull off: availing good quality of life to a large share of its population (which has significant material and energy implications) while working towards its climate adaptation and mitigation goals.

To this end, it is important to recognise the pitfalls of economic models. For example, the environmental Kuznets curve hypothesises that beyond a threshold, economic growth can be decoupled from carbon emissions. In reality, even the richest countries haven't achieved this decoupling (other than by shifting their emissions to poorer countries). This is why it is in our best interest to not aspire to achieve the lifestyle standards of the west.

Instead, we need to envisage a long-term strategy incorporating 'sufficiency consumption corridors', with a floor well suited to meeting our developmental goals and a ceiling of excess that will help avoid unsustainable growth. Equally, if not more, important are demand-side measures to help maintain this corridor of consumption that will keep us on a sustainable pathway. Our power consumption here could increase six- or sevenfold by 2070.

## **Demand and supply measures**

Some of these demand-side measures include the use of better construction materials and passive design elements to provide thermal comfort that doesn't require air-conditioning, energy-efficient appliances, public and/or non-motorised transport within urban areas and railways for intercity travel, local products to reduce the demand for long-haul freight, mindful dietary choices, and alternative fuels in industries in addition to some electrification.

On the supply side as well, India needs to further decentralise energy production (including by the use of rooftop solar cells and of solar pumps for agriculture). Finally, it should continue to expand its nuclear power generation capacity to diversify its energy mix and to complement a grid becoming more dependent on intermittent energy sources. Nuclear power could also offer a precious low-carbon baseload energy and help the government effectively phase out the national economy's dependence on fossil fuels.

As the world trundles towards its net-zero and other climate-related targets, the leeway for governments to miss some of them or postpone their achievement also shrinks. Of course some things are out of our control — for example who becomes the US President — but the things that we can we must, before we cannot.

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