

GOVERNMENT OF INDIA  
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

**RAJYA SABHA**  
**UNSTARRED QUESTION NO. 1988**  
TO BE ANSWERED ON 08.08.2024

**Strategies for achieving net-zero emissions**

1988. SHRI AYODHYA RAMI REDDY ALLA:

Will the Minister of ENVIRONMENT, FOREST AND CLIMATE CHANGE be pleased to state:

- (a) the most effective strategies for achieving net-zero emissions, and how can they be implemented in various sectors;
- (b) how can we balance the need for rapid emissions reductions with the requirement for sustainable economic growth and development;
- (c) the implications of relying on carbon capture and storage technologies versus transitioning to renewable energy sources; and
- (d) how can we address the issue of carbon leakage and ensure that net-zero emission efforts in one country or sector do not lead to increased emissions elsewhere?

**ANSWER**

MINISTER OF STATE IN THE MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE  
(SHRI KIRTI VARDHAN SINGH)

(a) to (d) Climate change is a global collective action problem which is primarily caused by not only the current Greenhouse Gas (GHG) emissions but also by the historical cumulative GHG emissions mainly contributed by developed countries. Even though India's per capita GHG emission is minimal, India is committed to addressing the challenge with firm adherence to multilateralism keeping in mind the national circumstances and based on equity and the principle of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC), as enshrined in the United Nations Framework Convention on Climate Change (UNFCCC). Developed countries have to take lead in reducing their GHG emissions and by providing finance, technology and capacity building support to developing countries.

India, at the 26<sup>th</sup> Conference of Parties to the UNFCCC in November 2021, announced its target to achieve net zero by 2070. In pursuance thereof, India formulated and submitted its Long-Term Low Greenhouse Gas Emission Development Strategies (LT-LEDS) to the UNFCCC in November 2022, which reaffirms the goal of reaching net-zero by 2070. India's approach is based on the following four key considerations that underpin its long-term low-carbon development strategy:

- (i) **India has contributed little to global warming:** India's historical contribution to cumulative global GHG emissions is 4% despite having a share of ~17% of the world's population between 1850 and 2019 data.
- (ii) **India has significant energy needs for its development:** India's annual primary energy consumption per capita in 2019 was 28.7 gigajoules (GJ), considerably lower than both developed and developing country peers.
- (iii) **India is committed to pursuing low-carbon strategies for development and is actively pursuing them, as per national circumstances:** India seeks to identify and explore opportunities to shift to low-carbon development pathways, while ensuring adequate access to household energy, energy security, and energy for the development of all sectors of the economy.
- (iv) **India needs to build climate resilience:** India has a diverse geography that encompasses a wide range of ecosystems, from mountains to deserts, from inland to coastal areas, and from plains to forests, and is vulnerable to impacts of climate change. Adaptation measures and building resilience to potential climate impacts are necessary to maintain India's development gains and human development outcomes and sustain its growth and development.

India's LT-LEDS involves seven key strategic transitions, namely: (i) Low carbon development of electricity systems consistent with development; (ii) Developing an integrated, efficient, inclusive low-carbon transport system; (iii) Promoting adaptation in urban design, energy and material-efficiency in buildings, and sustainable urbanisation; (iv) Promoting economy-wide decoupling of growth from emissions and development of an efficient, innovative low-emission industrial system; (v) CO<sub>2</sub> removal and related engineering solutions; (vi) Enhancing Forest and vegetation cover consistent with socio-economic and ecological considerations; and (vii) Economic and financial aspects of low-carbon development and Long-Term Transition to Net-Zero by 2070.

The economic, technical and political feasibility of Carbon Capture Utilisation and Storage (CCUS) is highly uncertain. At present, retrofitting of existing thermal power generating units for CCUS implementation is not a viable option, until the technology is cost effective and less energy intensive. India requires considerable climate finance and technology transfer with effective international collaboration to implement CCUS on any significant scale. Transitioning to renewable energy generation is an important component of the LT-LEDS strategy. However, looking to the variability in generation of solar and wind power and its intermittent nature, round the clock energy storage system is also required. Pumped Storage Projects (PSP) and Battery Energy Storage Systems (BESS) are the major types of storage technologies available in the country.

As per the Sixth Assessment Report of Intergovernmental Panel on Climate Change (IPCC), 'carbon leakage' occurs when mitigation measures implemented in one country/sector leads to increased emissions in other countries/sectors. Global commodity value chains and associated international transport are important mechanisms through which carbon leakage occurs. To address this issue, developed countries need to drastically reduce their consumption of

resources and adopt climate friendly lifestyles. 'Mission LiFE' launched by India in 2022 seeks to channelise the efforts of individuals and communities into a global mass movement of positive behavioural change leading to change in demand and consequent change in policies to bring about paradigm shift from mindless and destructive consumption to mindful and deliberate utilisation of resources. It calls for a People's movement involving the Government as well as the private sector and above all public at large. It is relevant to mention that India has revised its Nationally Determined Contribution (NDCs) by including, "to put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation, including through a mass movement for 'LiFE'– 'Lifestyle for Environment' as a key to combating climate change" as one of the goals.

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