

Roundtable Discussion on Net-Zero Scenarios for India's Buildings Sector

Concept Note

In terms of energy demand and greenhouse gas (GHG) emissions, the buildings sector is at the unique intersection of several other sectors. Operational energy in the form of electricity required for appliances and other purposes in buildings contributes to almost 35% of India's total electricity demand. The embodied energy of materials used for building construction is another major contributor to the energy demand and emissions from the buildings sector. For instance, almost 60% of the demand for cement comes from the buildings sector. Further, urban form or the way that the built environment is planned (for example, sprawl vs compact cities) contributes to land-use change emissions. Thus, while buildings contribute to a very small share of direct GHG emissions (via cooking fuels), they create a larger impact through indirect emissions. Currently, the buildings sector directly and indirectly contributes to almost 30% of India's total GHG emissions.

Further, the buildings sector directly plays a role in one's well-being. Development goals and well-being necessities such as housing for all, thermal comfort, access to quality healthcare and education, and clean fuels for cooking are directly linked to the buildings sector. Therefore, it is one of the key sectors wherein development and climate action (both mitigation and adaptation) need to coexist as India continues its growth to achieve a developed country status.

The [Sustainable Alternative Futures for India \(SAFARI\)](#) model developed by the Climate Mitigation team at the Center for Study of Science, Technology and Policy (CSTEP) is driven by specific development goals and not purely gross domestic product and thus helps explore climate action scenarios without compromising on well-being. In addition, owing to the sectoral interlinkages modelled, it helps analyse the cross-sectoral impact of interventions. For example, the impact of using alternative construction blocks on the brick and cement industry or the impact of urban sprawl vs taller, densely constructed buildings on land-use change and overall material use can be analysed using the model. A detailed space cooling module also helps determine how to bridge the gap between thermal comfort demand and the penetration of fans and air conditioners in the country.

In this regard, we are conducting a roundtable discussion on 'Net-Zero Scenarios for India's Buildings Sector' on 18 December 2023 at CSTEP, Bengaluru. At the event, the potential and feasibility of the following levers in moving towards a net-zero future will be discussed: use of energy-efficient appliances and electric cooking; promotion of rooftop photovoltaics; use of alternative construction materials such as autoclaved aerated concrete blocks and stabilised earth blocks; use of alternative fuels (thermal substitution rates) in the cement industry; cement production process shares and use of blended cement; steel production process shares; use of hydrogen and electricity in the industry; carbon capture, utilisation, and storage (CCUS); increased shares of solar and wind in the power sector; and compact cities (with taller buildings).

Some of the crucial questions to be answered through these discussions include what are the limits to these levers in terms of technical potentials (and whether those may change by 2070), what are the other challenges regarding implementation, what are the low-hanging fruits for immediate action and impact, and are there different technologies to be focussed on during each decade going forward based on cost, technology availability etc.

Date: 18 December 2023

Venue: CSTEP, Bengaluru



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About CSTEP

The Center for Study of Science, Technology and Policy (CSTEP) is one of India's leading think tanks, with a mission to enrich policymaking with innovative approaches using science and technology for a sustainable, secure, and inclusive society. Our current work is anchored in the grand challenges of our time, namely, Clean Energy Transition, Clean Air for All, and Sustainable and Secure Future for all.

About Climate Mitigation Team

Climate change mitigation involves strategies aimed at decreasing greenhouse gas emissions, promoting renewable energy sources, improving energy efficiency, and implementing sustainable practices. CSTEP focuses on building models to simulate India's future across sectors, such as transport, industries, buildings, agriculture, and forestry, to find interventions required to achieve a sustainable and secure future. Our work also involves the study of certain themes that cut across sectors (quality of life and development vs climate action, water and land demands for agriculture vs power, etc).