Date: Sept 3, 2025

Public Lecture on

"Addressing Climate Change with a Just Transition to Clean Energy"

Conf. Room 1 India International Center, New Delhi

Toxics Link, in collaboration with the India International Centre (IIC), organised a Public Lecture on "Addressing Climate Change with a Just Transition to Clean Energy" on September 3, 2025, at the IIC main building in New Delhi. It was the third in the series of lectures on climate change.

In the panel were Dr Atul Kumar, Professor, Energy Studies Programme, Jawaharlal Nehru University, Dr Debajit Palit, Centre Head-Centre for Climate Change and Energy Transition, Chintan Research Foundation (CRF) and Mr Karthik Ganesan, Fellow and Director-Strategic Partnerships, Council on Energy, Environment and Water (CEEW). Toxics Link Associate Director Mr Satish Sinha moderated the session.

The lecture began with Mr Sinha extending a warm welcome to everyone and briefing the audience about the public lecture and the climate change series. He introduced the speakers and invited them to share their insights on the subject.

The first speaker Dr Atul Kumar, who was instrumental in supporting the formulation of India's National Action Plan on Climate Change and leading the development of a national level energy-economy-environment model to support the formulation of India's Nationally Determined Contribution submitted to UNFCCC as part of Paris Agreement, made a presentation on "India's Energy Transition: Pathways, Risks, and Reality".

He informed that as per the revised NDCs, India has achieved 36% decline in Emission Intensity of GDP between 2005-2020 against the commitment of achieving 45% reduction by 2030 (from 2005 levels), 50.24 % of installed Electricity Generation capacity from Non-Fossil Fuel-based sources against committed 50% by 2030, and 2.29 billion tonnes of additional Carbon Sink through forest/tree cover have already been achieved against the committed creation of 2.5-3.0 billion tonnes.

Dr Kumar gave a brief description of the different modelling approaches followed for energy transition and just energy transition, and said while a multi-scenario assessment for India's long-term projections shows clear pathways for clean energy transformation till 2070, the on-ground reality at present reveals significant gaps between ambitious targets and social realities, posing a transition challenge for India. "Justice has emerged as a crucial contour of this transition challenge, instrumental for achieving India's climate goals. Hence, understanding its narratives becomes important to address the present issues for a largely fossil-based economy," he said in his presentation.

He said while energy transition has been looked at from the optimisation modelling approach, for just transition, the perspective of stakeholders and experts are being taken and though their storylines are different, they move in the same direction.

Dr Atul Kumar

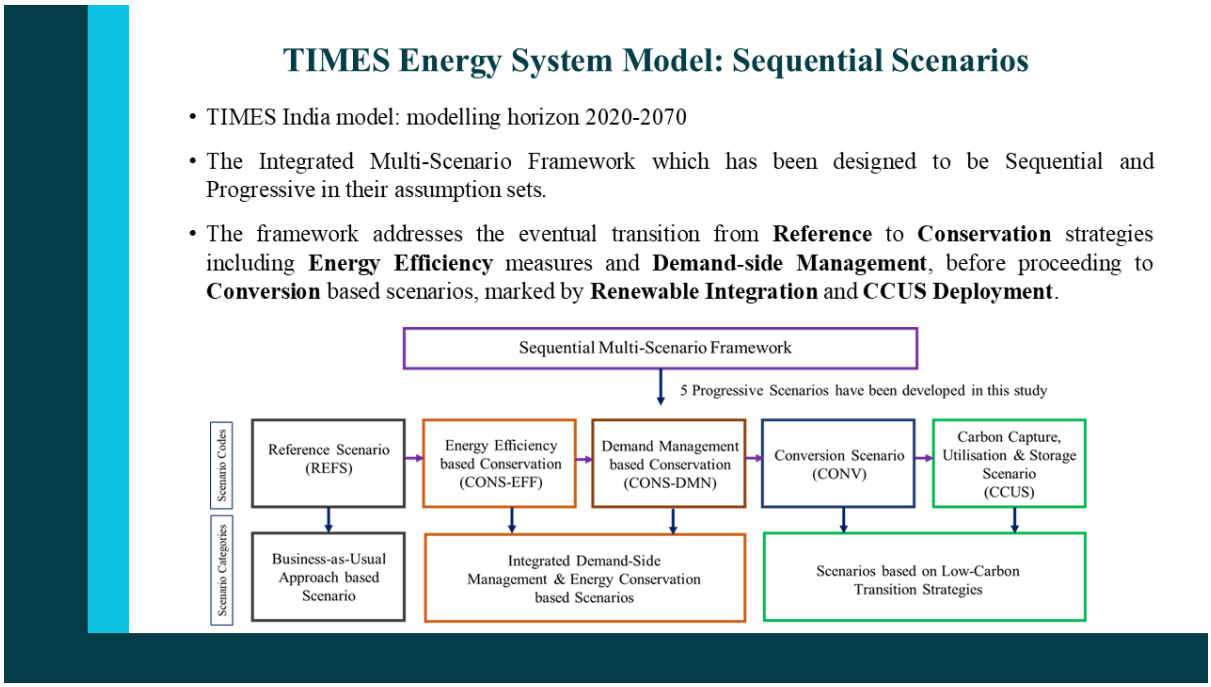
He said justice in energy transition is perceived distinctly and articulated differently by various stakeholders and mapping diverse perspectives offers valuable insights and has significant policy implications, particularly in the context of phasing down fossil fuels use in the Indian economy. Dr Kumar said the perspectives can be assessed across six themes: Scope of Just Transition- Labour, Regional and Systemic; Justice consideration- Distributional, Procedural and Recognition; Economic Diversification as a key pillar of Just Transition; temporal aspects of Just Transition; Responsibility of

Developed Countries towards Just Transition in Developing Nations; and Just Transition as a Governance Mechanism.

Dr Kumar said coal is going to remain our major energy supply for the time being though its share in primary energy supply will reduce. "Renewables may gradually increase over time but it may put a lot of pressure on agricultural land. Modelling gave us an achievable pathway to move but justice is a key concern," he said and referred to a study on the implications of the coal phase down, which include land and loss of livelihoods of people engaged in coal-related work.

Presenting case studies of Chatra (Jharkhand) and Jharsuguda (Odisha) districts, he said though direct coal dependency in these districts is heavily concentrated within 5 km radius of the coal mines, the indirect dependence of the district is also very much around coal. The absence of landholdings among the households inhabiting this region exacerbates their vulnerability and decreases adaptive capacity, he said and added that heavy dependency of households on coal for livelihood is unlikely to decline abruptly; and so, the transition will have to unfold gradually and systematically, the key for which lies in economic diversification.

Giving the example of District Mineral Fund which has accumulated around Rs 1 lakh crore, a very miniscule amount of which has been spent, he said we can think about targeted CSR. Dr Kumar said a just transition requires region-specific approaches that address the unique socio-economic and geographic realities of these regions, ensuring equitable and sustainable development for affected communities. "We need to think about a gradual transition which is in line with the broad optimisation model. Slowly reduce over the time, rather than bringing an abrupt end.," he said.



A slide from Dr Kumar's presentation

He concluded by saying that changing the energy system may be easy but transitioning society is harder. But as of today, that is a necessity.

Dr. Debjit Palit in his presentation brought the paradox of India's energy transition into the forefront. "A few months back we achieved more than 200 gigawatts of renewable energy with 110 gigawatts of solar capacity but almost around the same time, coal output crossed the milestone of 1 billion tonnes for 2024-25. So, while we are expanding renewables in a big way, at the same time we are also expanding coal consumption in a big way with 70% of the energy in the grid being coal dependent," he said. He said though India ranks among the largest consumers of energy in absolute terms, the per capita energy consumption remains low at one-third of the global average and share of electricity is at less than 20% in total energy mix. This underscores a dual challenge: A vast growing population and significant inequalities in reliable energy access and consumption. He questioned whether the priority should be economic development and tackling energy poverty or climate action and sustainability? While India strives to balance between the two, the debate remains critical.

Dr Palit said electric vehicles (EVs) still rely on fossil fuel because of high dependence on coal for electricity generation, and studies say that the lifetime emissions of EVs are not any better than the Internal Combustion Engine (ICE) makers. The government also has shown its intent by promoting natural gas, with a target of 15% in total energy mix.

The Panel (Left to right): Dr Atul Kumar, Karthik Ganeshan, Dr Debajit Palit, Satish Sinha

He emphasised on the need to clearly prioritise policy goals, keeping in mind that India faces both carbon and particulate emissions. For cities like Delhi, particulate pollution may be a more immediate concern than global emissions. He stressed that modelling experts must account for such nuances to present clearer roadmaps. "While RE generation cost is falling, price alone probably cannot drive a large-scale shift from coal. Solar and wind are cheaper, but only when the sun shines or the wind blows" he said. While low tariff discoveries often make headlines, they do not reflect the full challenge of transitioning away from coal.

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The Energy Quadrilemma

- While India ranks among the largest consumers of Energy in absolute terms, the Per capita Energy Consumption remains low at one-third of the global average
- Share of electricity is at less than 20% in total energy mix
- This underscores a dual challenge:
  - A vast growing population, and
  - Significant inequalities in reliable energy access & consumption / energy poor
- Economic Development – Energy Poverty, Energy Security Energy Affordability
- Climate Action – Energy Sustainability
- Emissions – Carbon/GHGs and Particulate

What should we Prioritise?

Economic Development or Climate Action?

Dr Palit said India already has a large existing coal fleet delivering cheaper electricity compared to new renewables. But the uncertainty is how long will this cost advantage last? Renewables receive significant incentives and ISTS (Inter-State Transmission System) waiver which makes transmission cheaper. Though these incentives reduce RE's apparent cost, their true cost must be monetised and considered. He said coal prices are heavily distorted due to taxes, freight charges, and subsidies (35-78% of cost) and asked, "Will removing these levies and subsidies impact the macroeconomic factors? How will it impact price rise, inflation and a lot of other things."

He informed that India has 220 GW installed renewable capacity, but actual generation is only 22–24% with solar/wind contributing only at 10-12%. This mismatch shows a systemic challenge: high installed capacity but low real output. We lack storage capacity and have to focus on pumped storage plants, PSPs and batteries. But do we have the potential in India? He said studies indicate that in countries like Germany, adding variable renewables (VRE) increases grid balancing, storage, and transmission costs, increasing the price of electricity by almost 20 per cent. If that happens in India, affordability will become a concern.

"The rural energy sector will be impacted. The connections that we have expanded under Sahaj Bijli Har Ghar Yojana (Saubhagya) and Deen Dayal Upadhayay scheme, may face disconnections unless subsidies continue. But how much subsidy can India afford to provide?" questioned Dr Palit.

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Mr Ganeshan & Dr Palit

Agreeing with Dr Kumar on the impact of the shift to renewable energy, Dr Palit said about one million jobs will be impacted in this shifting from coal and Internal Combustion Engine (ICE) to EV. He further said the process of production of energy from renewable solar and wind is clean, but the mining of raw materials, manufacturing processes, and end-of-life disposal of equipment all carry environmental and social costs.

"We have to think of a plan to make renewable energy responsible energy," Dr Palit emphasised and added that we need to be cautious about energy security and raw material security. He said mineral sovereignty is a critical topic of conversations as a few countries are controlling the entire supply chain of critical minerals. "India must secure access to critical minerals as dependence on a few countries will weaken energy security," he opined.

Dr Palit said India also needs a policy framework to support workers affected by this energy shift. "It is not about shifting workers to a different sector, but thinking about the entire transition as a whole and preparing a national worker transition code. The key strategy for a balanced energy transition is to recognise that demand is non-negotiable. According to NITI Aayog and other studies, India's per capita electricity generation is projected to reach about 3,626 kilowatt-hours by 2047. Interestingly, that figure is roughly the current global average, including developed countries. So, by around 2050, India will only be catching up to today's world average. Even after considering lifestyle changes and efficiency improvements, India's per capita electricity consumption in 2047 is unlikely to fall below 3,600-4,000 kilowatt hours (kWh). This means energy demand will keep rising," he said.

He said as the push for Atmanirbhar Bharat increases, recent studies say that if manufacturing contributes around 30% or 40% to the GDP, the consumption of electricity will increase exponentially which renewables will not be able to meet in the short or medium term.

"The question is are we ready to shift from coal or is a pragmatic phase transition a more responsible path?" he questioned and recommended that we should pursue a strategy that includes meeting the growing energy demand as reducing our energy demand will hinder development. He suggested use of

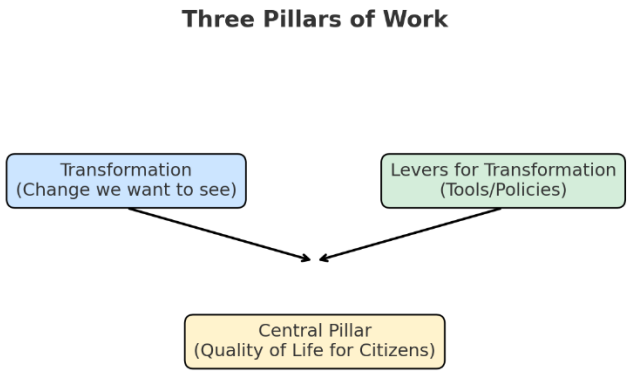
best available technology options. "India's current target (100 GW by 2047) is modest. Nuclear should be expanded and the country should start working on expanding research and development of technologies like CCUS (carbon capture, utilisation, storage), coal gasification, coal firing (biomass coal firing/green ammonia coal firing), carbon dioxide removal technologies, emission control systems, etc. We need to strengthen own R&D," he said and suggested we can form a consortium of countries in the global south and start doing joint R&D. He said natural gas is a cleaner alternative and like Europe India can also shift from liquid fuels to gas in the short to medium term by including Compressed Bio-Gas (CBG) blending till our grid becomes green or clean with more renewables and nuclear energy.

Dr Palit ended his presentation with the statement: "Coal will decline eventually, but because of economics and not ideology (renewables getting cheaper) and grid stability factors. To realise the vision of Energy Independence and Viksit Bharat by 2047, India must manage this transition with deliberate, inclusive, and evidence-based planning and informed implementation,"

The third speaker **Mr Karthik Ganesan,** a researcher specialising on energy and environmental issues, declared the debate on energy poverty and low incomes remain unchanged though India has achieved universal electrification, LPG access and big renewable energy penetration. "While addressing climate change and looking at just transition to energy, we need to take into consideration the sort of lifestyles it will support," he said.

Ganesan said Bloom Ventures, an investment company, reported in February that 90% of India's population does not have any discretionary spending abilities. The remaining 10% (140 million people), which is still like the population of a large country in Western Europe, use most of the energy and drive emissions. He said when we talk of the energy system and emissions, whose emissions are we serving is a fundamental question. "Are we servicing the demands and the needs of the rich when designing energy systems," he questioned.

He recalled the Greenpeace report "*The Hiding Behind the Poor Debate: A Synthetic Overview"*, and pointed out how the rich have become richer and have occupied more of the environmental space whereas the poor have not managed to get a fair share of what they want. "India's net-zero path will still mean lower than the emissions of China or the US by 2070, but the key question is: Does it actually improve the average citizen's quality of life?" he asked.



Karthik's organisation frames its work around three pillars

Ganesan said cooling will be a critical concern in a warming world, and unless India addresses the needs of its vast population, small tweaks will not suffice. With 54% of the population engaged in rain-fed agriculture, uncertainty in rainfall raises serious challenges for farmers' futures, making it vital to align their aspirations with the clean energy transition. He said different audiences perceive climate change differently—industries, for instance, focus on potential profits from carbon and green credits rather than narratives of deindustrialisation or degrowth. Ganesan said while consumption curtailment is necessary, heavy reliance on technologies like CCUS, especially in sectors like steel may not be realistic. "Many climate models depend on unproven options like biomass plus CCUS, but India must prioritise preparing its population for near-term impacts already locked in by historic emissions."

He said immediate concerns like air and water quality are crucial as ignoring them undermines health, productivity, and the demographic dividend. Giving the example of coal plants, he said retrofitting coal plants with SO_2 control systems, mandated a decade ago, could have greatly improved public health, but successive delays and policy rollbacks have left India, the only major coal consumer, without active SO_2 controls. Instead, debates like EVs versus coal power distract from real priorities. "Electrification of vehicles basically means more electricity from coal-based pipelines," he said.

Stressing that India must question dominant narratives, look beyond emissions and rethink its growth pathways to avoid repeating the same mistakes, he said that the focus must shift to domestic needs—land use, jobs, and quality of life—while exploring sustainable industries like bamboo-based materials, which India has the resources for but lacks industrial processing. "We need to get out of this narrative of what it is that we need as a country to drive us forward if you don't want to be in the same place in 2047," he opined and ended the session with a question, "Is emissions the only thing? Or is it something beyond."

Discussion

The public lecture as always ended with a question and answer session. The discussions centered on India's wind energy potential, richer nations in climate negotiations, India's Defence Ministry's renewable energy budget and sustainability efforts, etc.