Chintan Research Foundation

TISS HYDERABAD
नवती NAVATI
1936 - 2026

EVENT REPORT

Implementing India's NDCs

Aligning Power, Fuels, and Policy

Orgasnised at the

HYDERABAD POLICY CONCLAVE: THE INDIAN ERA

School of Public Policy and Governance, Tata Institute of Social Sciences (TISS), Hyderabad

27 April 2025

ABOUT CRF

Chintan Research Foundation is an independent think tank dedicated to shaping policy through rigorous research and thought leadership. With a strong focus on fostering collaboration between policymakers and industry, CRF integrates practical insights into its research and advocacy efforts. It conducts comprehensive research to support informed decision-making and engages with stakeholders through discussions, events, and publications. CRF's research is focused on three core domains – Climate Change & Energy Transition, Economy & Trade, and Geopolitics & Strategic Studies.
For more details, refer to the website: www.crfindia.org

ABOUT TISS

Established in 2011, the TISS Hyderabad Off-Campus is a premier institution specializing in Social Science education, public policy, and governance. Located in Rajendranagar, it is a key campus of the Tata Institute of Social Sciences, offering interdisciplinary MA, PG Diploma, and PhD programmes. The campus is renowned for its academic rigor, focusing on social justice, sustainable livelihoods, and policy research.
For more details, refer to the website: www.tiss.ac.in

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BACKGROUND AND CONTEXT

India's updated Nationally Determined Contributions (NDCs), recently submitted to the UNFCCC, mark a calibrated yet consequential step forward in its climate ambition. The country now targets a 47% reduction in emissions intensity of GDP (from 2005 levels), a 60% increase in non-fossil installed power capacity, and the creation of an additional 3.5 - 4 billion tonnes of carbon sink by 2035.

While these targets build on a strong track record, like overachievement in non-fossil capacity, rapid renewable energy expansion, and sustained emissions intensity reduction, the central policy challenge has decisively shifted from target-setting to implementation at scale.

India's transition is distinct. Unlike industrialised economies, it must simultaneously balance development, energy access, affordability, and energy security. This makes decarbonisation not a binary shift away from fossil fuels, but a system optimisation problem shaped by national priorities.
Against this backdrop, the panel discussion convened by the Centre for Climate Change and Energy Transition (CCET), CRF, examined how India can align power systems, fuel choices, and policy instruments to deliver on its NDCs.

PANELLISTS

MODERATOR

DR. DEBAJIT PALIT
Centre Head, CCET
Chintan Research Foundation

PROF. USHA RAMACHANDRA
Former Director of Energy Studies,
Administrative Staff College of India

DR CHANDRA SEKHAR BAHINIPATI
Professor of Economics,
IIT Tirupati

MR VENKAT RAJARAMAN
C EO, Cygni Energy Pvt. Ltd.

SESSION OVERVIEW

The session began with a context-setting presentation by Dr. Akanksha Jain (Research Consultant, CRF), followed by a panel discussion moderated by Dr. Debajit Palit (Centre Head, CCET, CRF).

Context Setting: Electrons and Molecules Framework

A central conceptual anchor of the discussion was the shift from a fossil vs non-fossil binary to an "electrons and molecules" framework.

- Electrons (direct electrification): mobility, railways, low- to medium-temperature industrial heat
- Molecules (alternative fuels): steel, fertilisers, aviation, long-haul transport

This framing emphasises that the transition should be guided not by ideology, but by physics, economics, and sectoral suitability. The key policy question, as articulated in the session, is not which technology is better, but where should electrification be prioritised, and where are molecules unavoidable?

Key Themes from the Panel Discussion

- The panel underscored that India's NDCs are credible and likely achievable, with some targets potentially being met ahead of schedule. However, the real challenge lies in: Sequencing technologies appropriately, Avoiding premature or inefficient deployment, Ensuring least-cost decarbonisation pathways

- Dr Bahinipati highlighted the economic trade-offs, noting that climate investments must be evaluated against competing developmental priorities. He also raised concerns around: Thermodynamic

inefficiencies in certain pathways, Risks of maladaptation and negative externalities and the need to account for regional inequality, particularly in coal-dependent states

- A recurring insight was the need to prioritise system-level efficiency over technology enthusiasm. The examples for the same being: Inefficiencies in hydrogen-to-electricity conversion cycles and the questionable use-cases such as hydrogen-based cooking vs direct electrification. The panel stressed the importance of evaluating technologies based on cradle-to-grave efficiency, not just innovation appeal.

- Prof. Ramachandra identified distribution companies (DISCOMs) as the critical bottleneck in India's energy transition. She highlighted the challenges as : Financial fragility and legacy debt, Lock-in through long-term power purchase agreements (PPAs), Limited flexibility to integrate renewable energy and rising pressure from decentralised energy systems (rooftop solar, microgrids). She also highlighted a growing policy dissonance between central targets and state-level implementation capacity, compounded by Fragmented transmission planning, Inadequate real-time grid visibility and evolving tariff structures (e.g., time-of-day pricing)

- Dr Debajit Palit highlighted that the absence of an integrated energy policy is a major challenge. Currently, India's energy governance remains divided across multiple ministries: Power, New and Renewable Energy, Coal, Petroleum and Natural Gas, and Atomic Energy. This institutional fragmentation leads to siloed policy design, misaligned incentives, and inefficient resource allocation.

  The panel discussed the potential need for stronger coordination mechanisms, including proposals such as an Energy Transition Council, though concerns were raised about adding further bureaucratic layers without addressing core institutional misalignment.

- From an industry perspective, Mr Rajaraman highlighted the disconnect between electric mobility and supporting infrastructure. While policies such as FAME I, II, III and PLI schemes have driven EV adoption, the charging infrastructure remains inadequate, Energy storage policies are fragmented, and there isa lack of integration between EVs, grid systems, and storage technologies. He emphasised the need to: Treat EVs as part of the grid ecosystem, not just as load, Develop vehicle-to-grid (V2G) capabilities, Build a smart, flexible grid system

- The key takeaway from the session was the need to move from a Technology-Centric transition to a systemic transition. This includes:
  - Aligning generation, transmission, storage, and demand
  - Integrating policy, infrastructure, and finance
  - Ensuring coherence across sectors and states

KEY TAKEAWAYS

- Implementation, not ambition, is the real challenge in India's NDC journey.
- The electrons vs molecules framework offers a practical pathway for sectoral decarbonisation.
- System efficiency and sequencing must guide technology deployment.
- DISCOM reform and grid flexibility are central to enabling transition.
- India urgently requires an integrated energy policy to overcome institutional fragmentation.
- Alignment of energy storage and infrastructure will determine the success of electrification.
- The transition must be framed as a systemic, coordinated transformation, not a collection of parallel initiatives.

After the panel discussion, the floor was opened for the Q&A session with the audience.
A notable highlight was the strong resonance of the conceptual frameworks introduced by CCET, CRF, namely, the shift from a fossil vs non-fossil binary to the "electrons and molecules" approach, and the framing of India's pathway as a "systemic transition" rather than a purely "just" or "people-centric" transition. These ideas sparked considerable interest, with participants seeking clarity on how such frameworks could be operationalised in real-world policy and sectoral decision-making.

Several questions centred on international learnings, particularly from China's experience in scaling electrification. Audience members referenced companies such as BYD, and asked how India could adapt similar models of integrated manufacturing, supply chain control, and rapid infrastructure deployment to accelerate its own transition.

The discussion also extended to institutional design, with participants expressing interest in the proposed Energy Transition Council. Questions focused on its feasibility, structure, and implementation, particularly in the context of India's federal governance system. The panel elaborated on the need for a coordinated platform to align central and state governments, while cautioning that any such mechanism must avoid adding bureaucratic complexity and instead focus on effective inter-ministerial and inter-state coordination. Overall, the Q&A session demonstrated a high level of audience engagement and interaction.

CONCLUSION

The panel reinforced that India's energy transition is not merely a decarbonisation exercise; it is a developmental balancing act at an unprecedented scale. Ultimately, the success of India's climate commitments will depend on its ability to move from fragmented progress to coordinated execution, aligning power, fuels, and policy into a unified transition pathway.

Additional Highlights:

The session concluded with the formal launch of two issue briefs on green hydrogen authored by Dr Akanksha Jain, convened by Prof. Aseem Prakash (Professor and Director TISS, Hyderabad) and Dr Bhibhu Nayak (Professor, TISS Hyderabad), alongside the panellists. These briefs contribute to the ongoing discourse on the role of hydrogen in India's evolving energy transition landscape.

In addition, CRF's upcoming book Navigating the Climate Crisis: Perspectives and Actions from the Global South for Mitigation and Adaptation, edited by Dr. Debajit Palit, Dr. Akanksha Jain and Mr. Omkar Dhanke, was showcased, highlighting CRF's continued engagement with climate and energy policy research.

WAY FORWARD

As a follow-up to the session, a concise summary of the discussion, covering key insights, policy questions, and actionable takeaways, will be submitted to the Tata Institute of Social Sciences. This will contribute to a forthcoming Policy Brief and a National Implementation Compendium, aimed at informing policymakers on pathways to operationalise India's climate commitments, which would then be circulated amongst relevant ministries and organisations.

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