"Consultative Workshop on "Energy Transition Financing: State Level DISCOM's Decarbonization Strategies"

Supported by HSBC India and Partnered with Trust Bridge and Engenuity and held at Marigold Hall, IHC, 20th December, 2024


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ASHOKA CENTRE FOR PEOPLE CENTRIC ENERGY TRANSITION

ACPET

Consultative Workshop on "Energy Transition Financing: State Level DISCOM's Decarbonization Strategies"

Supported by HSBC India and Partnered with Trust Bridge and Engenuity


Panelists:

Dr. Nikhil Sud, Professor, Director, Ashoka University
Mr. Vaibhav Chaudhary, Director, Ashoka Centre for People Centric Energy Transition
Shri Rakesh Kacker, Honorary Advisor, Ashoka Centre for People Centric Energy Transition

Moderator
Dr. Anandajit Goswami, Research Fellow, Ashoka Centre for a People-Centric Energy Transition (ACPET), Ashoka University

Speakers
Dr. Anandajit Goswami, Research Fellow, ACPET
Mr. Ranjit Chandra Vallabhaneni, Mr. Prodyut Mukherjee, Founder, Engenuity
Dr. Renuka Sane, Managing Director, Trust Bridge

Organized by
Ashoka Centre for a People-Centric Energy Transition (ACPET), Ashoka University

Report written by
Ms. Navya, Junior Research Associate, ACPET
Dr. Anandajit Goswami, Research Fellow, ACPET

Friday, 20 December – 09.30-13.00

Abstract

The session explored critical pathways to decarbonize India's electricity distribution companies (DISCOMs) while addressing financial, technical, and regulatory challenges. As DISCOMs grapple with high losses and renewable integration complexities, the workshop emphasized innovative solutions to enhance operational efficiency and sustainability.

Several dimensions of decarbonization strategies were examined. First, the role of hybrid renewable energy solutions combining solar, wind, and energy storage in delivering reliable, cost-effective power supply was discussed. Second, innovative financing mechanisms, including carbon credits and climate-linked debt swaps, were highlighted as essential tools to bridge funding gaps for clean energy transitions. Finally, policy measures for improving renewable energy penetration, addressing intermittency, and enabling agricultural solarization were critically reviewed. Discussants highlighted key challenges in DISCOM decarbonization, including funding gaps, renewable intermittency, and regulatory barriers.

1. Context Setting By Panellists

Dr. Nikhil Sud set the context of the work done by Centres of Ashoka University and in that parlance the importance and relevance of the work done by Ashoka Centre for People Centric Energy Transition (ACPET). Mr. Vaibhav Chaudhary established the broad contours of the work being done by ACPET across its four verticals of – a) Energy Policy, b) Decarbonisation and Resource Efficiency, c) Energy Transition Financing and d) Social Impacts of Energy Transition along with the extensive analytical work being conducted in the "Energy Futures" Lab of ACPET. Shri Rakesh Kacker established the larger vision and segments of the ongoing "Energy Transition Financing" project supported by HSBC India where across two sub components – a) Decentralised Energy Transition Financing Solutions and b) Discom Specific Clean Energy Transition Financing Solutions are looked upon.

2. Presentations by the panellists

(a) Dr. Anandajit Goswami, Research Fellow, ACPET

Dr. Anandajit Goswami presented the key findings of the ACPET work on financing strategies for DISCOM decarbonization, focusing on innovative modelling approaches to optimize renewable energy integration. He posited that a robust modelling framework is essential for addressing the financial and technical challenges faced by India's electricity distribution companies (DISCOMs).
Dr. Goswami presented a least-cost optimization model of ACPET designed to evaluate hybrid renewable energy solutions, considering cost, technology, power quality, renewable energy share, and unmet demand constraints. He emphasized that such an approach enables DISCOMs to identify optimal strategies for increasing renewable energy penetration while maintaining cost efficiency and supply reliability.

The methodology of the model involved analysing Tamil Nadu's DISCOM demand profile, validating data, and exploring scenarios based on thermal tariffs and renewable energy contributions. Dr. Goswami illustrated how the model incorporates constraints like interstate transmission possibilities, balancing power needs, and renewable energy intermittency to develop actionable solutions for public and private Discoms across the states of India.

The results demonstrated that hybrid renewable solutions combining solar, wind, and energy storage can significantly enhance the renewable energy mix, with potential cost implications based on varying thermal tariffs. Dr. Goswami highlighted that this framework not only supports India's net-zero commitments but also provides insights into the clean energy transition's financing needs, setting a precedent for scalable, sustainable DISCOM strategies.

(b) Mr. Ranjit Chandra Vallabhaneni, Founder, Engenuity

Mr. Ranjit Chandra Vallabhaneni, Mr. Prodyut Kujherjee of Engenuity presented a practical approach to decarbonizing DISCOM operations, focusing on demand-driven hybrid renewable energy solutions. He emphasized tailoring solar, wind, and storage configurations to match peak supply needs while maintaining cost efficiency.
Mr. Vallabhaneni highlighted case studies showcasing reduced thermal dependency and improved reliability through innovative design adjustments. He also stressed the role of blended financing and impact investments in overcoming funding gaps, offering actionable insights to integrate renewables sustainably.
His presentation underscored the need for scalable, affordable solutions that balance technical feasibility with real-world implementation challenges.

(c) *Dr. Renuka Sane, Managing Director, Trust Bridge*

Dr. Renuka Sane highlighted about the understanding of the consumer behavioural dimensions in internalising it in the power tariffs for the Discoms. According to her, this is crucial to reduce the financial losses for state discoms. She also highlighted about the need for regulatory innovation to understand the growing new market for Discoms when there will be large scale agricultural solarisation and roof top based solarisation for city consumers. Dr. Sane suggested to bring in new policy regimes to break the political economy based vicious cycle for tackling the regulatory assets of the power distribution companies when they will go for unbundling in the near future which has happened for the Tamilnadu Discom.

2. Comments by discussants

(c) TATA Power

TATA Power discussed two critical aspects of decarbonizing DISCOM operations. First, they emphasized the importance of developing short-time period specific consumer load forecasting to minimize financial losses for DISCOMs. By improving load forecasting accuracy, DISCOMs can better align energy supply with actual demand, reducing inefficiencies and the associated costs. This approach is particularly vital for integrating renewable energy sources, which are intermittent by nature, and helps in optimizing grid operations and avoiding overproduction or underproduction scenarios.
Second, TATA Power focused on cost optimization strategies for DISCOMs. They stressed the need for a comprehensive approach that integrates technology, data analytics, and hybrid renewable energy solutions to enhance operational efficiency. By focusing on reducing technical losses, optimizing energy procurement costs, and implementing advanced grid management systems, DISCOMs can significantly cut down operational expenditures. TATA Power highlighted that such cost-efficient strategies, when paired with appropriate financing mechanisms, can greatly accelerate the decarbonization process while ensuring financial sustainability for DISCOMs.

(d) TERI

The TERI discussants emphasized the need for exploring nuclear energy as a potential solution for providing base load stability as renewable energy sources grow. They suggested that nuclear power could complement renewables by ensuring grid reliability despite their intermittent nature and it needs to be considered for any future modelling design considering least cost optimisation frameworks. While recognizing challenges such as high costs and regulatory barriers, TERI representatives stressed the importance of considering nuclear as part of a balanced energy mix.

(e) WRI

The WRI discussants raised two key points. First, they questioned whether DISCOMs would be willing to make the necessary investments for decarbonization, given the upfront costs and financial challenges. Second, they highlighted the role of existing interstate agreements in managing load and ensuring reliable power supply. They emphasized that these agreements are crucial for addressing renewable intermittency and optimizing grid stability across regions.

3. Questions and comments

A number of perspectives emerged in the general discussion. RMI questioned the impact on existing thermal assets, particularly whether they are debt-free, and emphasized that focusing solely on renewable energy tariffs is insufficient. He suggested incorporating demand-side energy efficiency options into the strategies. Mr. Vaibhav Chowdhary, Director, ACPET, highlighted the potential for including Contracts for Difference (CfDs) alongside Renewable Energy (RE) tariffs and discussed DISCOMs' openness to exploring innovative options. He also raised concerns about managing increased electrification, assessing investment ratings, and balancing energy conservation with efficiency over the long term.

Dr. Renuka Sane from Trust Bridge emphasized the role of solarization in agriculture, the importance of demystifying costs, the impact of time-of-day tariffs on energy consumption behavior and their potential to reduce the financial losses of DISCOMs. She also encouraged looking into the potential of exchange markets. In addition to this, Trust Bridge highlighted virtual power plants and state procurement strategies as key areas to explore. Lastly, Sambodhi underscored the need for a long-term perspective on climate variability and questioned how diversity could be factored into modelling and planning for DISCOM decarbonization.

4. Conclusions

In their concluding remarks, the panellists underscored the importance of innovative strategies and collaborative approaches to address the challenges of DISCOM decarbonization. Dr. Anandajit Goswami emphasized the potential of hybrid renewable energy solutions and least-cost optimization models to enhance supply reliability and cost efficiency, aligning with India’s net-zero commitments.

The session reflected a shared recognition of the need for scalable, actionable solutions that balance technical, financial, and regulatory dimensions. The lively discussions and diverse perspectives demonstrated the urgency of integrating renewable energy, improving operational efficiency, and fostering long-term sustainability in DISCOM strategies.