

“Distributed Renewable Energy for Sustainable Development”

Hosted by Power Foundation of India in collaboration with Climate Policy Initiative

Date: 27th February 2024; Venue: The Ashok, New Delhi

Summary of the Event

Power Foundation of India, under the aegis of Ministry of Power, Government of India, along with Climate Policy Initiative, hosted a conference on ‘Distributed Renewable Energy for Sustainable Development’ in New Delhi on 27th February 2024.

India has set an ambitious target of achieving net-zero emissions by 2070. In that regard, the country has set a target to achieve 50% of its cumulative electric power installed capacity from non-fossil fuel based sources by 2030. This target, a component of India’s Nationally Determined Contributions (NDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC), demonstrates India’s strong commitment to a low-carbon development strategy.

Rural India, constituting majority of the land area and population, plays a crucial role in India’s decarbonization efforts. Rural areas face unique climate related challenges, such as emissions from use of biomass in cooking, burning of crop residue and community waste, diesel engines/pumps usage and methane emissions from agricultural activities. Decarbonizing rural economy requires distributed, community-driven, localized, and innovative energy solutions. This has significantly increased the importance of Distributed Renewable Energy (DRE) solutions.

The aim of the conference was to raise awareness about the benefits of DRE projects in India’s energy transition and sustainable development, as well as facilitate knowledge sharing. The

conference featured insightful sessions, covering The Role of DRE in India's Sustainable Development; Role of DRE in empowering communities; Uptake of DRE solutions for the Micro Small and Medium Enterprises (MSME) sector; and Business Models (including Financing DRE). The conference brought together stakeholders from the Government, Private and Public sectors, and policy think tanks. Key attendees included central government officials, policymakers, state utilities, technology providers, financial institutions, MSMEs, international organizations, Non-Governmental Organizations (NGOs), consultants, and academia, contributing valuable insights and enriching the dialogue with diverse perspectives and expertise.

The discussions during the conference highlighted the issues and challenges faced in deploying DRE systems, and proposed solutions and policy actions to exploit DRE potential in the country. This note summarizes the discussions and the key takeaways from the conference sessions.

Inaugural Session

The inaugural session of the conference was marked by the august presence of Shri Bhupinder Singh Bhalla, Secretary, Ministry of New and Renewable Energy; Shri Sanjiv Nandan Sahai, Director General, Power Foundation of India; Shri Gurdeep Singh, Chairman & Managing Director, NTPC Limited; Dr. Tripta Thakur, Director General, National Power Training Institute; and Dr. Dhruva Purkayastha, Director, Climate Policy Initiative.

Dr. Dhruva Purkayastha described DRE as a holistic approach that encompassed several Sustainable Development Goals, such as increasing agricultural farm income, improving

livelihoods, and promoting health and education. He emphasized DRE as a key tool for achieving sustainable green growth in India, highlighting its potential to support India's energy security and NDC goals. Dr. Purkayastha stressed the need for a transformative approach to DRE that includes economic, social, and technological components to supplement political will for a transformative change.

Dr. Tripta Thakur emphasized the importance of renewable energy in addressing environmental concerns and ensuring energy security. She identified distribution, electrification, and digitalization as the three pillars of energy transition. She highlighted the increasing significance of DRE in the future.

Shri Gurdeep Singh discussed DRE's potential beyond traditional sources, like rooftop solar, small wind turbines, and compressed biogas. He highlighted how biomass recycling can contribute to a circular economy. He noted that as grid power becomes costlier, some consumers will opt for their own resources, citing the example of NTPC's R&D institute, NETRA, which will disconnect from the grid, and entirely rely on in-house renewable energy to meet its energy demand.

Shri Sanjiv Nandan Sahai captured the essence of DRE in the three Es: *Environment* friendly, cost *Efficient*, and *Equitas* by generating additional farm income. Since disparate sporadic events of DRE are visible on the ground, he advocated the need for identifying sustainable business models for DRE. He proposed that the hidden cost/subsidy on renewable energy should be utilized to promote local DRE solutions.

Shri Bhupinder Singh Bhalla lauded India's significant strides in the renewable energy sector and highlighted government initiatives like PM JANMAN, PM KUSUM, PM Surya Ghar Muft Bijli Yojana, National Biogas Programme, and Off-grid Programmes, among others. He

suggested that a comprehensive approach to DRE, considering both technical and economic dimensions, should be adopted. He mentioned that alongside large power plants, DRE can be utilised to optimize resource use at the country level.

Session 1 - "Role of DRE in India's Sustainable Development"

Moderated by Dr. Dhruva Purkayastha, the session included presentations and panel discussion featuring Dr. H N Sharan, Chairman of Desi Power; Mr. Girija Shankar, General Manager at EESL; Mr. P. C. Sharma, Joint Director of ISA; and Mr. Chintan Shah, Principal Advisor at NSEFI.

Dr. Sharan highlighted that electricity for productive usage will become the primary driver of social and economic development. He emphasized that rural development today involves integrated solutions for Energy, Water, Agriculture and Jobs. Local conditions differ greatly and depending upon centralised solutions alone is likely to be much more expensive and much less reliable. Therefore, a locally optimised mix of centralised and distributed systems should be explored. DREs in rural areas can take over the primary burden of energy and power supply for social and economic services in all villages in India. Their growth is vital for accelerating the progress of villages with reduced pollution. The size, structure, linkages and designs of DREs in villages will, however, be different from the DRE based solutions in industrial and urban sectors. Microgrids based on village DREs may or may not be connected to a distribution grid but a successful village DRE will need to be linked to productive loads. He added that DRE-driven microgrids must provide reliable round-the-clock electricity to connected and committed loads. Hybridisation of locally available renewable energy sources is essential for ensuring reliability with profitability. He opined that the current methods of planning and

designing DRE power plants were inadequate for optimising as villages have different load profiles and were highly varying in other local conditions. Thus, simulation and modelling techniques are essential to determine configurations, ratings, and financing conditions to ensure success. DRE project cannot succeed without training and skills development of local staff. Training and skills development should be included in the project management system and the cost of developing a village team should be included in the total project cost. Lastly, he highlighted the vital role of Government in the promotion and replication of DRE initiatives in villages. He recommended integration of proposed DRE systems with on-going village development schemes and job creation activities to transform villages faster and more economically than any other single program.

Chintan Shah emphasized that DRE projects should be replicable, scalable, and sustainable for creating a viable business case for private sector. He stressed that DRE should be viewed from the perspective of embedded generation as it is immersed in the distribution area, which helps avoid certain capital expenditure on the distribution network. He lauded the government's newly launched rooftop solar scheme, which may minimize the need for supply of free power.

Mr. Girija Shankar highlighted that the DRE projects are capital-intensive in nature and thus requires financial support from the government to make it economically viable. He mentioned that the most critical role of DRE is to tackle the challenges underlying extending the Grid in remote locations for providing affordable and reliable power. Accordingly, the projects should be customized to the local requirements so that reliable productive electricity can be supplied.

Mr. P.C. Sharma highlighted the critical role of capacity building, not only of technicians and engineers, but also bankers and investors. Advocating commercial viability of business models, he emphasized that business models should consider local conditions including

greater empowerment of local communities and not designed merely taking a subsidy-based approach .

Key takeaways from Session-1:

1. DRE projects should be customized as per local conditions and should address challenges that cannot be addressed by the grid in remote areas for providing affordable and reliable power.
2. DRE systems may be integrated with on-going village development schemes to maximize their reach.
3. DRE projects must strive for reliability and scalability, besides ensuring long-term sustainability.
4. Selection of DRE projects should be based on detailed project evaluation studies, which take into consideration quality of supply, development of local economy and likelihood, and commercial sustainability.

Session 2 – “Empowering Communities: The Role of DRE in Sustainable Development”

Moderated by Mr. Vivek Sen, Associate Director at Climate Policy Initiative, the session highlighting the role of DRE projects in empowering local communities included presentations and a panel discussion with Mr. Aklavya Sharan, Director of Desi Power; Mr. Kunal Vaid, CEO of Resham Sutra; Mr. Nitin Zamre, COO of The Infravision Foundation; and Ms. Bettina Loewentraut-Duran, Advisor at GIZ.

Mr. Aklavya Sharan’s presented a case study demonstrating the use of a DRE based hybrid micro-grid to support micro-enterprises and create employment opportunities in rural areas.

He identified key factors that influence successful adoption of DRE projects, which include finance, site data, optimized systems, market linkages, financing and regulatory frameworks.

Mr. Kunal Vaid shared his experience how small-sized solar-powered silk spinning and reeling machines were able to provide income opportunities to rural women using locally available resources, increase productivity, and reduce carbon dioxide emissions. He highlighted the lack of working capital, skill gaps and inadequate institutional capacity as key issues in adopting DRE solutions in remote areas.

Ms. Bettina Loewentraut-Duran highlighted that for DRE projects to be successful there should be sustainable impact beyond the project like livelihood creation and community empowerment. She cited successful DRE solutions from other countries, such as solar-powered ice machines and food processors, that created additional value for the agriculture sector. She emphasized the need for a conducive policy and institutional environment, availability of supporting infrastructure in rural areas, and risk-sharing arrangements to encourage investments in DRE-based business models.

Mr. Nitin Zamre discussed the PM Surya Ghar Muft Bijli Yojana, a recent Government of India initiative aimed at installing rooftop solar panels on 1 crore households. He highlighted the scheme's potential for adding rooftop solar capacity of 10 GW (assuming 1 kW per household) and stressed the need for aggregators to drive and promote the scheme. He emphasized that the aggregators could aggregate potential household requirements and offer to develop scalable projects with better access to affordable finance, a key challenge in the uptake of DRE projects.

Key takeaways from Session-2:

1. For DRE projects to be successful in remote areas, they must create a sustainable impact beyond the project like livelihood creation, offer income opportunities, and enhance productivity.
2. DRE initiatives should be supported by skill development, establishment of market linkages, access to finance and working capital, risk-sharing facilities, availability of supporting infrastructure and the establishment of conducive policy and a supportive regulatory framework.
3. Acknowledge the role of project aggregators to facilitate rapid adoption of DRE projects like rooftop solar, as they can develop scalable projects with better access to affordable finance.

Session 3 – “Uptake of DRE solutions by the MSME sector”

Moderated by Shri SCL Das, Secretary, Ministry of MSME, the session included presentations and a panel discussion with Mr. H. Subramaniam, ED, Fichtner India; Mr. Tushar Devidayal, CEO and Founder, DD Solar; Mr. Amol Balwant Shende, COO, WiSH Energy; and Mr. Debal Mitra, Senior Manager, CPI.

Mr. Das highlighted the importance of MSMEs with five E's: Economic importance, Employment, Export, Empowerment, and Environment. He described MSMEs as energy intensive with a high level of technological obsolescence. He emphasized the need to promote circular economy and make a business case for DRE in the MSME sector.

Mr. H. Subramaniam emphasized that MSMEs have become increasingly aware of the benefits of DRE such as improved energy security, lower energy costs, reduced carbon footprint, and

the production of green products that are attractive in the export market. He highlighted the need to develop customized solutions tailored to specific needs of the MSME sector. He stressed working at a meso level (a population size that falls between the micro and macro levels, such as a community-level approach) for greater adoption of DRE solutions. Additionally, he underscored the importance of fair allocation of risk and return in DRE projects.

Mr. Tushar Devidayal presented case studies demonstrating the benefits of solar refrigeration in various applications, such as dairy, fishery, fruit pulp storage, and local grocery or *kirana* stores. He stressed the importance of establishing market linkages and how DRE projects can lead to incremental rise in income. He highlighted the issue of high capex requirement of DRE projects, hindering the economic viability of such projects, and lack of access to affordable finance due to absence of credit ratings for MSMEs. He proposed the use of instruments such as cash flow-based lending, and Trade Receivables Discounting System (TReDS) to enable and facilitate credit for DRE systems.

Mr. Amol Shende discussed the potential of small wind turbines, especially in hilly and coastal areas, as well as for telecom towers and high-rise buildings. He highlighted that it is a niche product, still to be explored to its full potential, and by complementing with solar can create a unique offering, particularly for MSMEs by catering to their energy demand at a low cost.

Mr. Debal Mitra highlighted the challenges faced by MSMEs in accessing low-cost loans, including perceived high credit risk and a lack of collateralizable assets. The absence of credit ratings of MSMEs has been a key issue for the high cost of capital. The small size and disaggregated nature of MSMEs, with the majority having connected loads of less than 300

kW, have hindered the flourishing of the RESCO-based opex¹ model. MSMEs predominantly install rooftop solar systems in the capex² mode, as capex models are more advantageous and cheaper in terms of the levelized cost of electricity. High transaction costs prevent capital from reaching individual MSMEs directly. Establishing a dedicated credit guarantee fund for green MSMEs could help reduce credit risk perceptions and unlock capital at reduced rates. Promotion programs that raise awareness about rooftop solar among MSMEs and institutionalize multi-stakeholder platforms connecting them with installers, financiers, and ecosystem enablers are essential. Suitable credit guarantee mechanisms could also be designed for RESCO projects, and aggregation and securitization structures could be developed for MSME clusters to diversify risk, reduce transaction costs, and improve liquidity.

Key takeaways from Session-3:

1. Conducting focused awareness campaigns highlighting the benefits of DRE, such as enhanced energy security, lower energy costs, reduced carbon footprint, and the production of green products for export markets, can significantly boost the adoption of DRE by MSMEs.
2. Ensuring fair allocation of risk and return will be critical in encouraging MSMEs to adopt DRE projects.
3. Working at a meso-level and adopting a cluster-based approach were identified as essential for achieving widespread adoption of DRE projects among MSMEs.
4. There is a need for a right policy support and incentive structure, particularly considering the high rate of technology obsolescence and lack of access to finance in

¹ Opex model: developer finances, owns and maintains the asset; MSME can pay pre-determined tariffs under a power purchase agreement

² Capex model: MSME finances and owns the asset, but avails of accelerated depreciation

the MSME sector, to ensure the success of DRE projects. This will also help in achieving our G20 commitment to doubling the rate of improvement in energy efficiency by 2030.

Session 4 – “Business Models (including Financing DRE)”

The panel discussion, chaired by Mr. R. S. Dhillon, former CMD, PFC Limited, featured Mr. Saurabh Kumar, Vice President-India, GEAPP; Mr. Upendra Bhatt, co-founder and MD, cKinetics; and Mr. Sabyasachi Majumdar, Senior Director, Care Ratings as speakers.

Mr. Dhillon highlighted a study indicating that 12 market-ready DRE technologies can impact 37 million livelihoods in India, generating revenue worth USD 50 billion for enterprises manufacturing DRE-based livelihood technologies. He emphasized the importance of finance for DRE based models and suggested the need to look beyond the conventional sources of finance as well as CSR funds, and explore utilizing Blended Finance and Viability Gap Funding. He also emphasized the important role that multilateral development banks can play in credit enhancement.

Mr. Saurabh Kumar identified high transaction costs and low household electricity consumption levels as barriers to DRE uptake, particularly of rooftop solar in the residential sector. He suggested demand aggregation to overcome the challenge of lack of access to finance and to develop institutional capacity at the discom level.

Mr. Upendra Bhatt suggested segregating the use case of DRE-based systems into DRE-based products, appliance, and projects, as they have different financial metrics associated with

them. He stressed the need to segregate projects as capex-heavy and capex-light and to bring retail and enterprise financing accordingly.

Mr. Sabyasachi Majumdar discussed the role played by credit rating agencies in facilitating investments in a particular sector, and how these agencies are evolving as they gradually recognize the inherent merit of any sector. They are going beyond the conventional charter of creditworthiness alone, and are incorporating Climate and ESG (Environmental, Social and Governance) risks into their charter. Such initiatives would help DRE-based ventures receive better credit ratings, increasing investor confidence and improving the flow of finance into these projects.

Key takeaways from Session-4:

1. Importance of financial instruments like Blended Finance, Viability Gap Funding, and not primarily depending on CSR funds through philanthropic institutions to finance DRE systems.
2. The projects should be structured in such a way to ensure that financing is more easily accessible and affordable, particularly in regions where traditional financing is limited.
3. Need for capacity building of financial institutions to enable them to effectively support the financing of DRE projects.
4. Need for the involvement of retail and enterprise financing to strengthen the financing ecosystem for DRE initiatives.