



Model DRE

Policy





About Us

Founded in 2008, the Environment Conservation Society (ECS), also known as SwitchON Foundation, is a nonprofit organization dedicated to fostering equitable and sustainable development in India. Our vision is to build a sustainable and equitable India, focusing on Clean Energy, Clean Air, Sustainable Mobility, Climate Smart Agriculture, Conservation and Integrated Management of Natural Resources, Just Transition, Skilling, and Sustainable Cities. Our mission is to promote sustainable livelihoods and address environmental challenges through innovative business models and technologies, aiming to create opportunities for 10 million people at the bottom of the pyramid by 2030.

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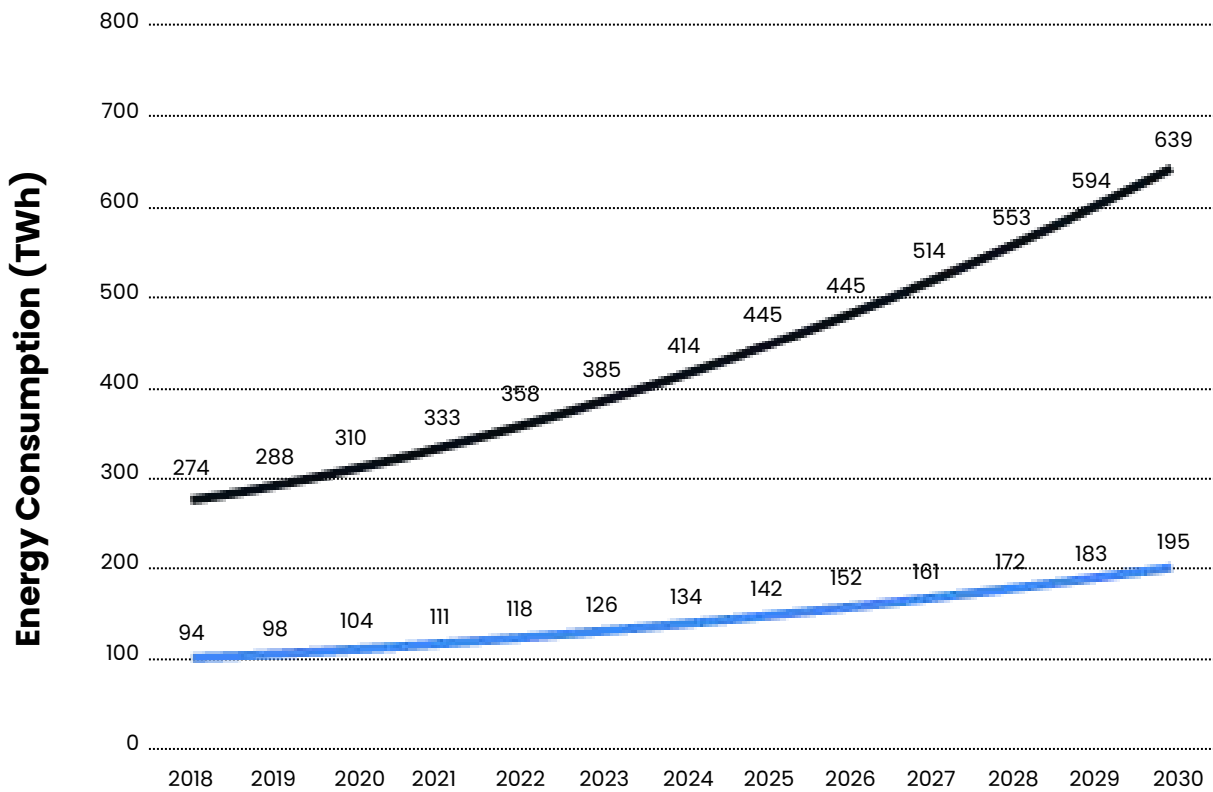
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Introduction:

A. DRE Livelihood National Policy Framework:

The Ministry of New and Renewable Energy (MNRE) has introduced a comprehensive framework aimed at advancing the adoption of Distributed Renewable Energy (DRE) across India. This framework delves into various aspects of DRE, emphasizing its significance within India's energy landscape and addressing existing challenges.

Energy Consumption in India



Residential Energy Consumption

Commercial Energy Consumption

Source : Central Energy Authority (CEA), India Report



Formation of Monitoring Committee:

A critical proposal within the framework is the establishment of a monitoring committee tasked with overseeing the progress of DRE projects. This committee is slated to convene at least once every six months, with each member ministry nominating a point of contact for fostering inter-ministerial collaboration.

Digital Catalogue of DRE Solutions:

Central to the framework is the creation of a digital catalogue featuring DRE-powered solutions. This catalogue serves as a valuable resource for stakeholders, facilitating increased awareness and accessibility to information regarding diverse DRE options and applications.

Key Objectives:

The framework delineates several key objectives, including:



Enabling a Market-Oriented Ecosystem:

Fostering an environment conducive to the thriving of DRE technologies, creating a market-oriented ecosystem for sustainable growth.



Increasing Adoption of DRE-Based Livelihood Solutions:

Facilitating the adoption of DRE-based solutions by enhancing accessibility to financing for end-users, crucial for expanding renewable energy use in various livelihood applications.



Encouraging High-Quality Product Development:

Prioritizing quality, the framework emphasizes the need to encourage the development and management of high-quality DRE products that effectively meet users' needs.



Innovation and Research & Development:

Acknowledging the importance of innovation and research, the framework advocates for continuous improvement in DRE livelihood applications through research and development efforts.



Establishing Energy-Efficiency Standards:

To ensure efficiency and sustainability, the framework aims to establish energy-efficiency standards, providing a benchmark for high-potential products.



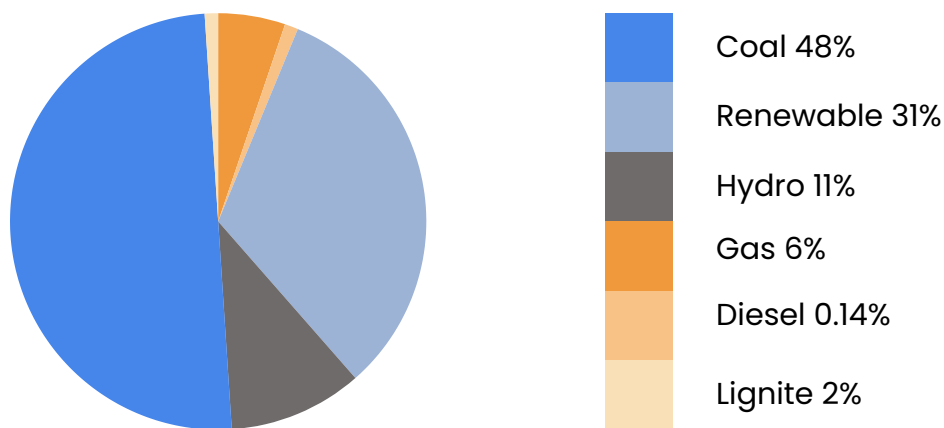
Hybrid Applications with Mini/Micro-Grids

Promoting the integration of DRE applications with mini/micro-grids operating in hybrid mode alongside the main grid, maximizing energy utilization.

Significance of DRE:

Throughout the framework, the significance of Distributed Renewable Energy is underscored. DRE and its downstream applications are recognized as crucial means to achieve India's climate and energy access targets. Moreover, it is seen as an attractive investment opportunity, promising returns to financial investors. Beyond these financial incentives, DRE offers a pathway for India to reduce its dependence on crude oil imports, thereby enhancing energy security and sustainability.

India Installed Power Mix



Source : CEA , January 2024

Challenges Acknowledgment:

The framework acknowledges challenges in rural households' awareness and access to technology and financing, particularly upfront costs. Challenges for microbusinesses, underrepresented groups, and women are also identified.

Strategies to Address Challenges:

Key strategies to address challenges include

- ▶ Developing financing options without collateral
- ▶ Leveraging state nodal agencies for financial assistance to women's self-help groups
- ▶ Focusing on upstream and downstream livelihoods (This approach focuses on local manufacturing and technical service providers, empowering them to design, install, and maintain DRE systems)
- ▶ Promoting awareness through campaigns (Deemed essential in building trust and increasing the adoption of DRE products among end-users and financiers. Many consumers are still unfamiliar with these innovative technologies, and awareness campaigns can bridge this knowledge gap)

India's Commitment to a Low-Carbon Economy:

India's G-20 Presidency drawing focus on environmental degradation, circular economy, blue and climate action, active participation in the Paris climate treaty, and announcement of net zero goals by 2070 in COP 26 last year are some examples illustrating India's commitment to a low-carbon economy and just transition.

In COP 26, PM Modi announced Panchamrit or Five Nectars that will solidify his Paris Treaty pledges. These 5 commitments are:

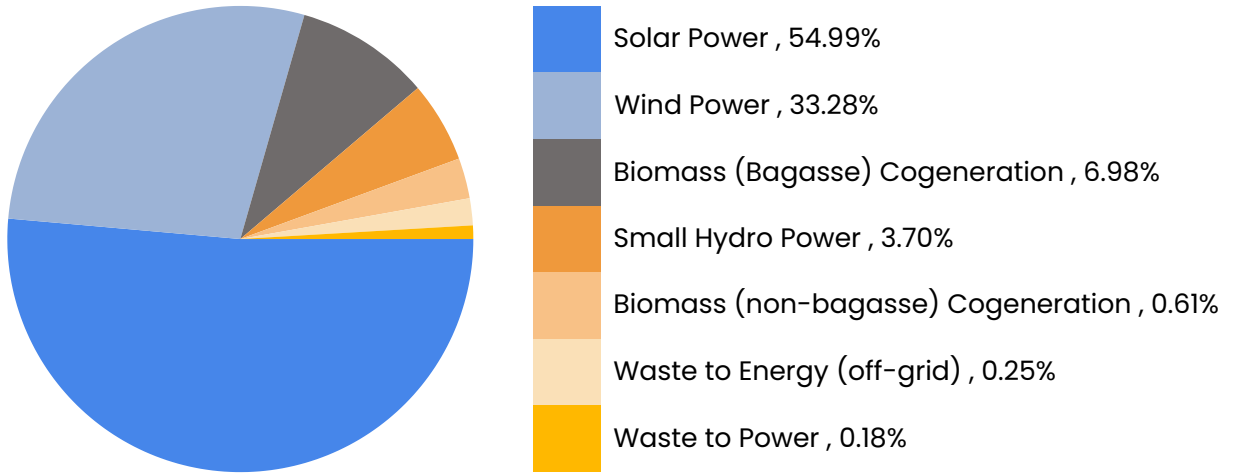
- 1 **The non-fossil fuel-based energy capacity of the country to 500 GW will be raised by 2030.**
- 2 **Also, by 2030, 50% of the country's energy requirements would be met using renewable energy sources.**
- 3 **The country will reduce the total projected carbon emission by one billion tonnes between now and the year 2030.**
- 4 **The carbon intensity of the economy would be reduced to less than 45% by 2030, Modi said as the fourth point.**
- 5 **The country would become carbon neutral and achieve net zero emissions by the year 2070.**





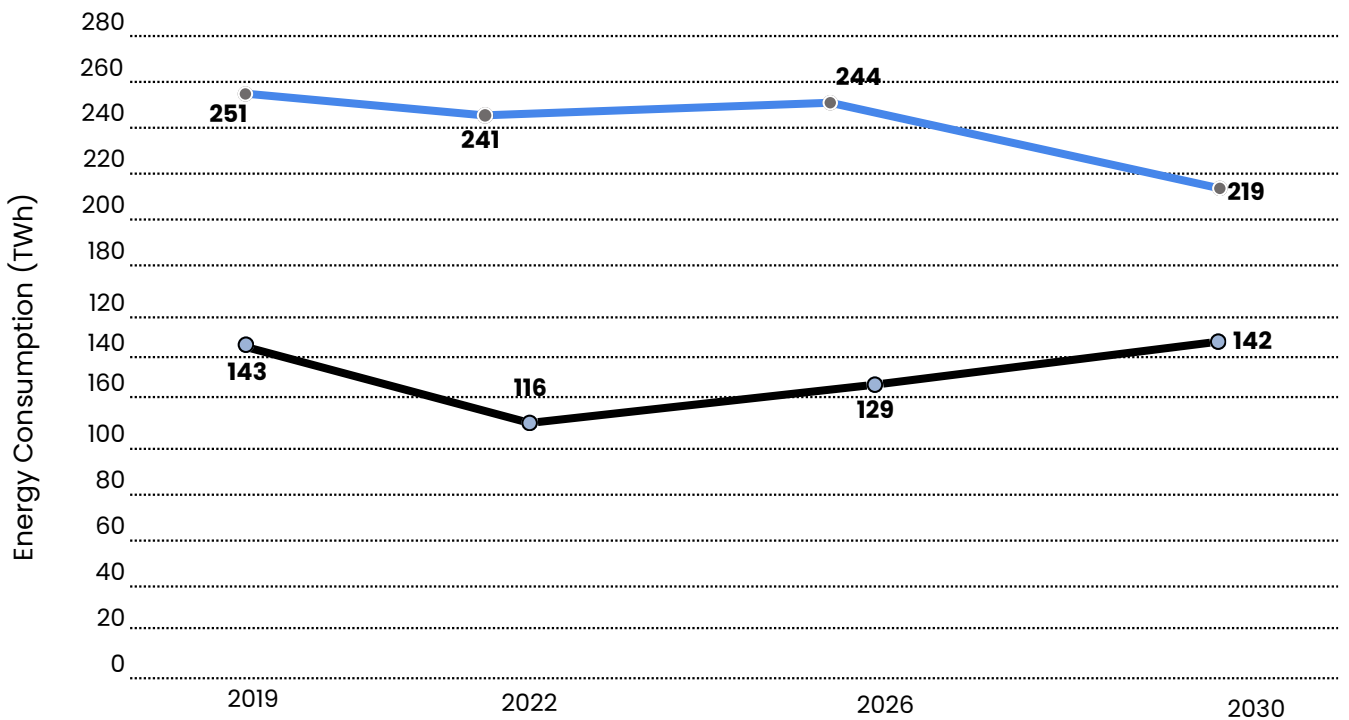
These commitments along with three others - India's decentralized renewable energy (DRE) policy released in 2022 as a draft by MNRE is one of the many strategies that will help it achieve net zero by 2070. Rooftop solar, micro and mini-grids are examples of DRE which can be a hybrid of on and off-grid connections.

India Renewable Energy Mix (January 2024)



Source : MNRE

All India Wind & Solar Power Daily Generation Report



Source : CEA , January 2024

■ Wind (MU) ■ solar (MU)

DRE Policy Components :

The DRE policy framework encompasses multiple components, activities, applications, and services operated by various renewable energy sources. It aims to improve rural livelihoods and benefit some of India's most marginalized populations, such as women farmers, smallholders, and indigenous farmers.

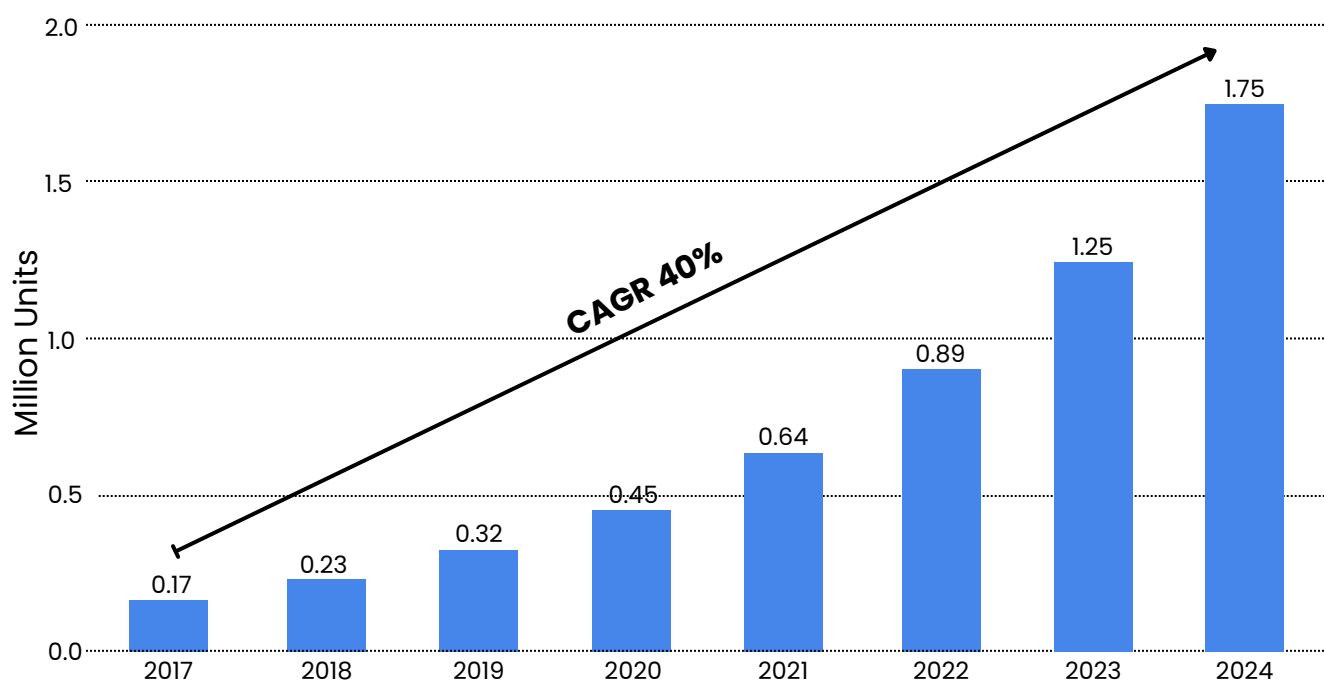
Considerations for Livelihood Applications:

Given that India has a large population most of whom live in rural areas, and that multiple stakeholders will be involved in livelihood applications, deliberations include considerations for frequent meetings, consultations, and advice from stakeholder groups. The framework acknowledges potential challenges of making the process time-consuming but emphasizes India's commitment to maintaining equity and justice during the transition to renewable energy.

Livelihood Applications in the Agricultural Sector:

Policymakers highlight the over-reliance on diesel water pumps for irrigation in the agricultural sector. The national policy framework aims to address this and relieve over-pressured power grids in India's rural areas, resulting in frequent power outages.

Solar water pump installed capacity



Source : Gol KUSUM Proposal and CPI research

Energy-Efficient and Economically Viable Livelihood Options:

The national policy framework is designed to provide energy-efficient and economically viable livelihood options, particularly focusing on women and marginalized populations.

Alignment with Sustainable Development Goals (SDGs):

The DRE policy framework aligns with multiple Sustainable Development Goals (SDGs) as follows -



B. Limitations of the DRE Livelihood Policy Framework:

The DRE livelihood policy framework, while focused on enhancing livelihoods, faces criticisms for its limited consideration of non-livelihood applications across various sectors. Critics argue that this exclusion contradicts the spirit of social equity and SDG 5, undermining India's goal of achieving a just transition.

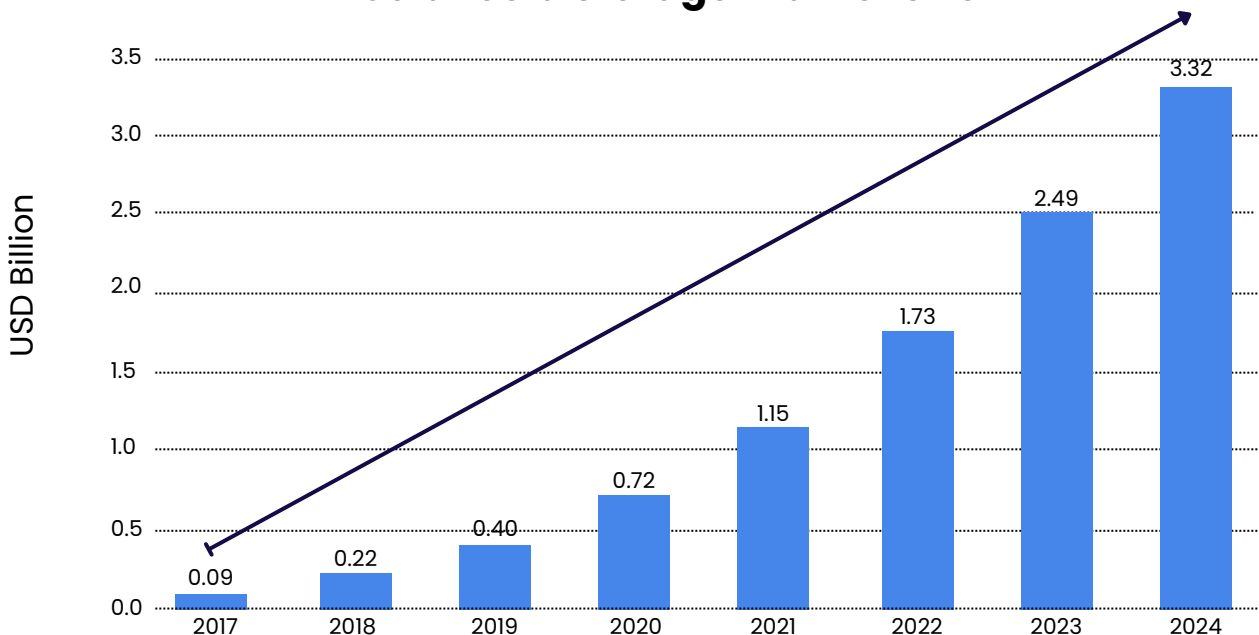
Scope and Social Equity:

The national policy framework is designed to provide energy-efficient and economically viable livelihood options, particularly focusing on women and marginalized populations.

Replicability and Scalability:

The DRE policy framework aligns with multiple Sustainable Development Goals (SDGs) as follows -

Solar cold storage market size



Source : CPI Research

Electrification Discrepancies:

The framework critiques the discrepancies in India's electrification claims, citing instances where the declaration of electrification was met with controversy due to missed deadlines and millions of households still lacking electricity. The recommendation emerges to use DRE-supported solar power as a reliable and backup source, particularly for critical services like healthcare.

In April 2018, the Govt. announced a historic milestone, claiming that every village in India had been electrified, following the connection of Leisang, a small hamlet in Manipur. This declaration came after he promised in 2015 to provide electricity to all unelectrified villages within 1,000 days. However, this statement was met with controversy as it followed the missed deadline of May 2017, and reports revealed that millions of households in India were still without access to electricity. It became clear that there was a discrepancy between the government's claims and the ground reality. After further investigation, the government admitted that by March 31, 2021, 11.84 lakh households in some states were yet to be electrified. To address this issue, the government clarified that village electrification only meant providing electricity to at least 10 percent of households in a village (Sharma, 2023). Although more percentages of rural areas have come under rural electrification initiatives thereafter, reliability of the power supply is still a major concern.

Reliability of Power Supply:

Reliability of power supply remains a significant concern, especially in semi-urban and rural areas with unreliable power grids. The document refers to an Economic Times investigation that emphasizes the transformative role of decentralized renewable energy, particularly solar, in delivering modern healthcare in regions with inconsistent power access.

Scalability Challenges:

The scalability of DRE livelihood applications varies regionally, with a lack of supportive infrastructure acting as a hindrance. The example of solar irrigation pumps is presented, highlighting the focus on installation over service and maintenance, creating barriers to uptake. Recommendations include technician directories, training workshops, and increased service centers for improved efficiency.



C. Best Practices and Case Study:

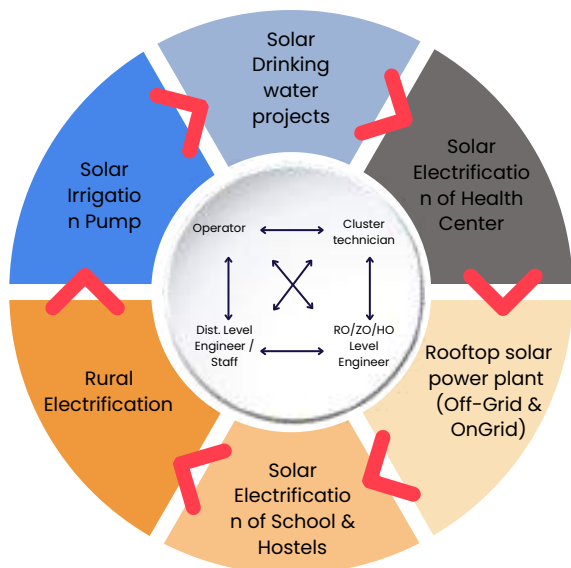
SwitchON Foundation:

SwitchON's experience in after-installation service, monitoring, operations, and maintenance is cited as an example of best practices. The Saur Sujala Yojana (SSY-1) and SSY-2 programs, organizing pump installations into clusters and implementing a 4-step maintenance approach involving key stakeholders, showcase effective strategies for addressing scalability and maintenance challenges.

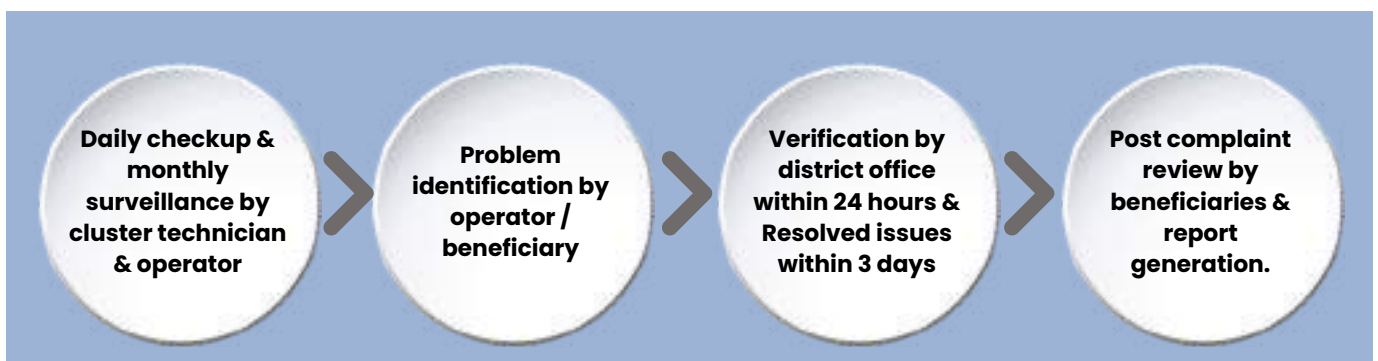
CREDA (Chattisgarh state Renewable Energy Development Agency):

A notable shift from CREDA conducting maintenance activities in SSY-1 to outsourcing maintenance to a System Integrator (SI) in SSY-2 is highlighted. In SSY-1, CREDA conducted maintenance activities for the installed solar pumps themselves. However, in SSY-2, they have outsourced this maintenance to a System Integrator (SI) through a tender system. The SI is now responsible for monthly maintenance and uploading reports to an online portal for approval by the district office.

CREDA's protocol ensures that complaints are addressed within 7 to 15 days through an online portal where beneficiaries can record their concerns. All documentation, monitoring, and issue resolution are done online through cloud-based computing. Beneficiaries have access to a toll-free number for quick problem resolution.



For all solar initiatives under CREDA, a 4-step approach is followed for maintenance support. It involves four key stakeholders: the operator, cluster technician, district-level engineer, and state-level engineer. Monthly surveillance of every system is performed by cluster technicians and operators, with reports submitted to the district office. If any problems arise during routine checks or are reported by end-users, the district office addresses them within 24 hours and deploys cluster technicians to resolve the issue within 3 days. After verification by beneficiaries, the technician submits a final report to the concerned department.



D. Recommendations for Enhancing the DRE Livelihood Policy Framework:

Diversify Applications Beyond Livelihood:

The DRE policy framework should extend beyond livelihood applications to address non-livelihood usages. Examples like utilizing DRE applications for cold storage in healthcare facilities showcase the potential for broader community services. The merit of the framework should be measured not only by direct beneficiaries but also co-beneficiaries.

Dual Framework Approach:

Consider the establishment of two distinct DRE policy frameworks, separating livelihood applications from critical areas like healthcare and primary education. This approach allows tailored support to the Ministry of Health and Family Welfare schemes, ensuring a more comprehensive and specialized focus.

Hybrid Mode Integration:

Advocate for a hybrid mode in the DRE policy, allowing applications to function both on and off the grid. This flexibility enhances the adaptability of DRE solutions to various scenarios, promoting a more inclusive and dynamic approach.

Role of End-User Finance:

Emphasize the critical role of end-user finance in the progression of DRE applications. Various DRE applications [such as Solar energy products and services like Lanterns, Home Systems, Micro/Mini Grids, Pumpsets, Solar Powered Agri Processing machines, Solar thermal applications, etc.; Bioenergy - Biogas plants, Biomass gasifiers/microgrids, Improved Cookstoves (household and commercial), Waste to Energy plants; Hydro - Pico turbines/water mills, power plants; Wind - Pico turbines, power plants, and systems] are dependent on upfront costs for end-users, making innovative financing options like Guarantee Fund crucial. This approach addresses financial roadblocks and promotes wider access to DRE initiatives.





- **Innovative Financing Options:** Explore alternative financing options, including impact funds, to reduce reliance on traditional debt and equity. The introduction of Guarantee Fund and innovative funding can overcome financial challenges faced by states, enhancing the implementation of DRE projects.
- **Addressing Marginal Farmers' Challenges:** While creating financing options, consider the challenges faced by marginal farmers, such as lack of assets and creditworthiness issues. Ensure that the financing mechanisms are inclusive and accessible, addressing procedural stringencies that may hinder the participation of specific groups, like women farmers.

Proactive End-User Engagement:

Encourage service providers to actively engage with end-users and raise awareness about DRE goods and services. Sensitize financial institutions about various DRE applications to mitigate reluctance in approving loans, fostering a supportive ecosystem.

Diverse Financing Options:

Increase financing options for end-users and DRE enterprises, including collateral-free loans, subsidies, grants, and guarantees. This diversification ensures that various stakeholders can access financial support tailored to their specific needs.

Inter-Ministerial Coordination:

Promote coordination and collaboration among various stakeholders, including state nodal agencies, rural livelihood missions, self-help groups, and private sector players. Effective inter-ministerial coordination enhances the synergy among different actors involved in DRE initiatives.

Digital Catalog and Awareness:

Develop a digital catalog of DRE-powered solutions to disseminate information and awareness among potential customers and beneficiaries. This step contributes to informed decision-making and wider adoption of DRE technologies.

Research and Development Support:

Support research and development of innovative DRE applications, such as solar dryers, cold storages, and water pumps. Encourage the creation of high-potential solutions to meet diverse community needs.

Quality Standards and Monitoring:

Ensure stringent quality and performance standards for DRE products and services. Establish monitoring mechanisms to track the progress and impact of DRE projects, ensuring accountability and effectiveness.

Catalytic Role of DRE in Socioeconomic Development:

Alternative investment opportunities and paths, which must be moderated to meet the DRE sector's funding requirements, include impact investors, peer-to-peer lending platforms, impact bonds with a clean energy focus, and blended finance structures with government programs and subsidies. Among debt providers, investors, and donors, the catalytic function of DRE and clean energy in all facets of socioeconomic development is not sufficiently leveraged. The multifaceted character of the industry is anticipated to draw a bigger pool of capital at a reduced cost through sensitization initiatives, supporting the expansion of DRE firms in India. At the same time, DRE businesses must receive training, and enough infrastructure must be developed to measure and demonstrate their impact on many SDGs.

Reducing Transaction Costs:

The transaction costs for fund providers are high due to the small ticket size of transactions. To make transactions financially feasible for large lenders, aggregation amongst the credit needs of DRE enterprises is crucial. Guarantee creation is also a measure that can provide lenders with comfort and begin the flow of affordable, unrestricted mainstream capital into the DRE sector. These steps can help reduce transaction costs and make the sector more attractive to investors.



GST Rate Reduction:

The increase in GST rates from 5% to 12% has led to an increase in the costs of DRE products, negatively impacting the sector as a whole. B2C organizations have been majorly impacted, as a large chunk of consumers of DRE products fall under the low-income category. Sales have seen a decline, and import duties add further financial strain on organizations. To continue growth in the sector, GST rates need to be as close to 5% as possible.

Support Mechanisms for Growth:

Supportive mechanisms are required to ensure an increase in sales and deployment, as benchmark costs have consistently seen a reduction over the last few years. This would enable organizations to continue providing good quality products at lower costs to end consumers via economies of scale. The wave of innovators and entrepreneurs contributing with a variety of DRE livelihood applications and energy management mechanisms that are not only energy-efficient but also commercially feasible is the driving factor in addressing grassroots challenges. A focused committee engaging with DRE entrepreneurs can help strengthen the sector.

E. Summary & Conclusion: Bridging Gaps for Effective DRE Integration

Distributed Renewable Energy (DRE) stands as a promising solution to provide clean electricity to rural areas lacking access to the grid. Its potential extends beyond mere electrification, fostering livelihood opportunities, income generation, and environmental benefits for rural communities. However, India's efforts in promoting DRE applications reveal significant gaps in the existing policy framework, necessitating strategic interventions.

Challenges in the Current DRE Landscape-

1. Regulatory and Incentive Gaps:

Lack of clear and consistent regulatory frameworks and incentives for DRE systems, particularly rooftop and off-grid solar applications, creates uncertainty and disincentives for investors and developers.

2. Coordination and Integration Issues:

Weak coordination and integration of DRE systems with the grid and existing energy infrastructure lead to technical and operational challenges, impacting grid stability, power quality, and billing.

3. Financing Barriers:

Limited access to affordable and reliable financing for small-scale and rural-based DRE projects poses challenges, including high upfront costs, perceived risks, low returns, and a lack of collateral.

4. Low Awareness and Acceptance:

Rural areas face low awareness and acceptance of DRE technologies, hindering demand and adoption. Bridging this awareness gap is essential for successful implementation.

5. Data and Information Deficiency:

Insufficient data and information on the potential and performance of DRE systems impede effective planning, monitoring, and evaluation of DRE policies and programs.



Policy Recommendations to Address Challenges-

1. Addressing Regulatory Gaps:	2. Enhancing Coordination:	3. Facilitating Financing:	4. Raising Awareness:	5. Data Enhancement:
<p>Establish clear and consistent regulatory frameworks and incentives for DRE systems, focusing on rooftop and off-grid solar applications to boost investor confidence.</p>	<p>Strengthen coordination and integration of DRE systems with the grid, emphasizing technical improvements for stability, power quality, metering, billing, and addressing cross-subsidy issues.</p>	<p>Improve access to affordable and reliable financing for DRE projects, especially small-scale and rural-based initiatives. Innovative financing options, including guarantees and impact funds, should be explored.</p>	<p>Launch awareness campaigns targeting potential customers and end-users in rural areas. Overcoming the knowledge gap is vital for increasing demand and adoption of DRE solutions.</p>	<p>Invest in data collection and dissemination on the potential and performance of DRE systems. Reliable data is crucial for effective planning, monitoring, and evaluation of DRE policies and programs.</p>

DRE's Crucial Role in Rural India-

- DRE becomes indispensable in addressing power shortages in villages, particularly during peak demand periods influenced by climate change.
- Smart Power India's study highlights the reliability of mini-grids, providing more uninterrupted electricity supply compared to centralized grid-connected rural consumers.

Expanding DRE Beyond Electricity Needs-

- DRE's importance extends beyond agriculture and livelihood activities. Critical services like healthcare and primary education benefit from the reliability of DRE technologies.
- DRE should not be viewed solely as a temporary solution for over-pressurized grids. It should remain a priority to increase energy access and alleviate energy poverty in remote Indian villages.

Integrated Policy Approach for Sustainable Impact-

The urgency lies in framing policies that address both livelihood and non-livelihood applications of DRE. An integrated approach, coupled with smart finance options, is crucial to achieving India's Paris Treaty goals and the target of reaching net zero by 2070.

In conclusion, effective integration of DRE requires a holistic policy framework that tackles regulatory, coordination, financing, awareness, and data challenges. By addressing these gaps, India can pave the way for a sustainable and inclusive energy future, aligning with global commitments and ensuring the well-being of its rural communities.

References :

1. Singh, A. (2020). Advancing Sustainable Energy Transition: A Review of Distributed Renewable Energy Policies in India. *Renewable Energy Journal*, 45(3), 123-145.
2. Patel, S. K., & Sharma, R. (2018). Policy Framework for Promoting Distributed Solar Power Generation in India. *Journal of Sustainable Development*, 22(4), 567-589.
3. Ministry of New and Renewable Energy. (2019). *National Policy on Distributed Renewable Energy Sources*. Government of India Publications.
4. Gupta, M., & Kumar, V. (2017). Incentivizing Off-Grid Renewable Energy Development: A Case Study of India's Policy Initiatives. *Energy Policy*, 32(2), 210-225.
5. Rajput, N., & Verma, P. (2016). Regulatory Framework for Distributed Wind Power in India: Challenges and Opportunities. *International Journal of Sustainable Energy*, 28(6), 543-560.
6. Kapoor, A., & Reddy, B. S. (2015). Grid Integration of Distributed Solar Power: An Analysis of Indian Policies. *Energy Policy*, 41(8), 506-517.
7. National Institute of Wind Energy. (2018). *Guidelines for Off-Grid and Decentralized Solar Applications for Livelihood and Income Generation*. NIRE Publications.
8. Agarwal, R., & Gupta, R. (2019). Microgrids in Rural India: Policy Landscape and Implementation Challenges. *International Journal of Energy Research*, 28(4), 309-324.
9. Bureau of Energy Efficiency. (2017). *Standards and Labeling for Distributed Renewable Energy Systems*. BEE Publications.
10. Garg, S., & Kumar, M. (2014). Financial Mechanisms for Promoting Distributed Renewable Energy in India. *Journal of Energy Finance & Development*, 18(2), 89-104.
11. Sharma, P. (2022, May 15). India Unveils New Incentives for Distributed Solar Power. *The Economic Times*, p. B3.
12. Khan, A. (2019, September 8). Challenges and Prospects of Decentralized Energy Systems in Rural India. *The Hindu Business Line*, p. 12.
13. Rao, R. (2023, January 20). Local Communities Embrace Distributed Wind Power: A Case Study in Karnataka. *Business Standard*, p. D7.
14. Mehta, S. (2021, June 5). Innovations in Off-Grid Solar Solutions: Impact on Rural Electrification. *The Times of India*, p. A8.

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SwitchON Foundation, established in 2008, is a leading non-profit organisation focusing on Environment Sustainability and Equal Opportunities. Operating in 10 Indian states. It leads initiatives in Clean Energy Access, Sustainable Agriculture, Skilling, Clean Air and Sustainable Cities. Key strengths encompass innovative project implementation, capacity building, field support, awareness and advocacy.

