



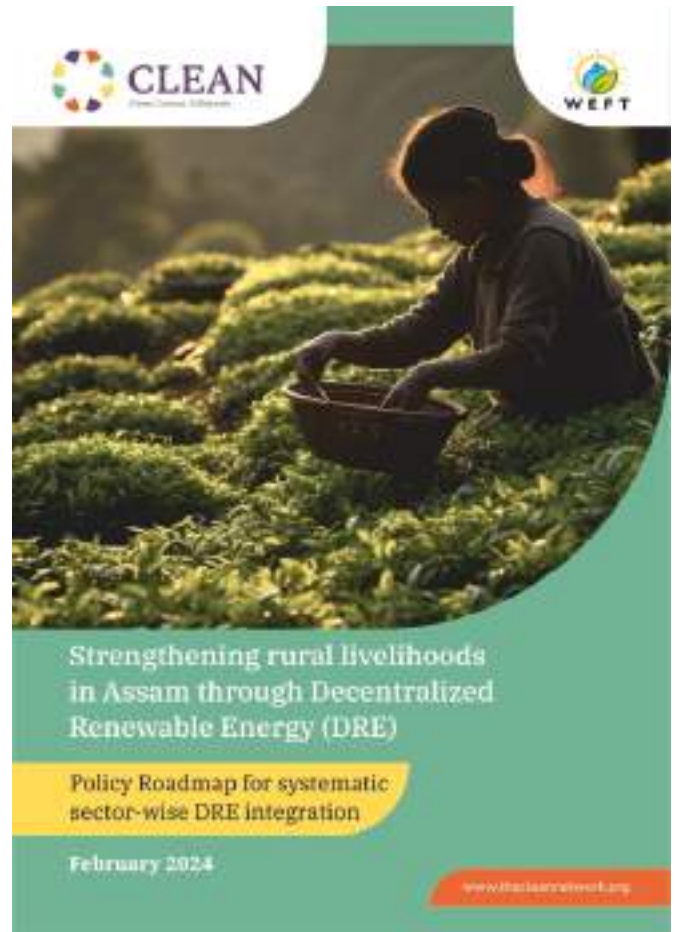
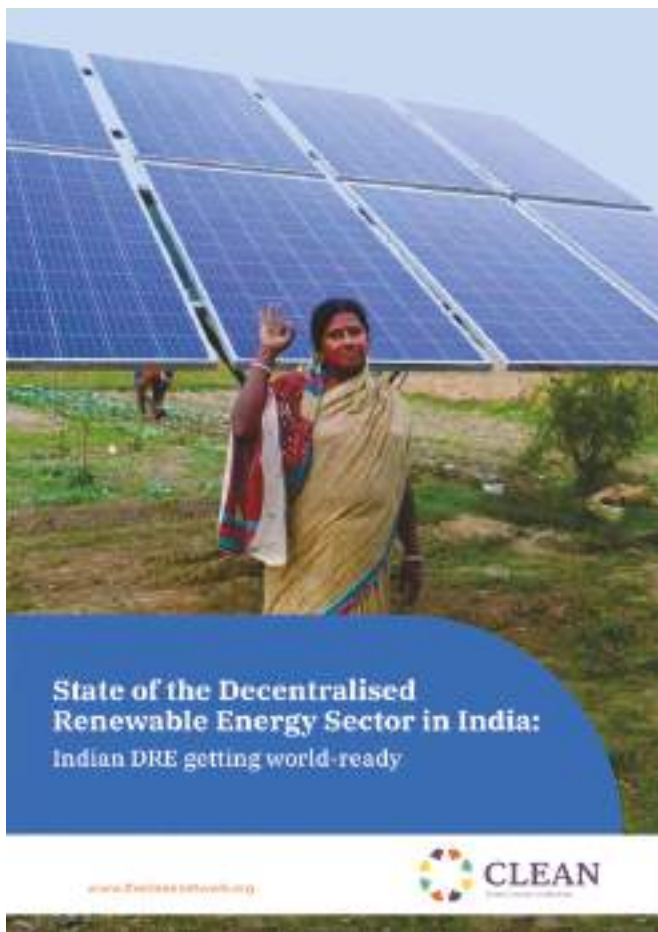
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Framework for
DRE for rural livelihoods
in Assam:
Policy Brief

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Framework for DRE for rural livelihoods in Assam: *Policy Brief*

Rural livelihoods context in Assam

Assam has a vibrant natural resource-based economy. During the last four years, the state achieved a remarkable growth rate of over 10% per year with agriculture and allied activities leading the growth. Agriculture along with livestock, forestry and fishing account for over a quarter of the state's income. Other major livelihoods sectors include tourism, handicrafts and sericulture. It is recognised that the state has tremendous potential for growth, particularly given its rich natural resource base, as well as its positioning as the gateway to the North East region of India and to export markets in South Asia and South-East Asia.

Mechanisation and technology adoption is low in livelihoods sectors— for instance, agricultural mechanisation in Assam is just 0.99 kW/hectare¹ (as compared to 4.4 kW/ha in Punjab) and only 5% of gross cropped area is under irrigation. The reasons cited for low technology adoption include low affordability, lack of technology customisation, lack of exposure and erratic power supply.

While overall shortfall of power in the state is only 2%, farming and other rural livelihoods activities are constrained by outages, affecting their productivity. Diesel powered generators are commonly used as back-up.

In such a context, Decentralised Renewable Energy (DRE) can prove to be a game-changer.

DRE to strengthen Assam's rural livelihoods

DRE systems are typically small-scale energy units that use renewable sources of energy like small hydro, agriculture & forest biomass waste, wind, solar, etc. to generate and distribute energy close to the point of use, ensuring limited or no transmission and distribution loss. DRE contributes to climate change mitigation and protecting natural capital. It is less vulnerable to the volatility of the fossil fuel markets and brings added benefits of stimulating local employment, technological development, and economic growth.

DRE offers an opportunity for Assam's economic growth to be decoupled from emissions, this means that Assam can move to a low or zero carbon growth² pathway by adopting DRE. Being small and decentralized systems, DRE offers opportunities to create models of energy self-reliance (Figure 1). Livelihoods and community services (like schools, hospitals) constrained by unreliable energy can benefit from DRE integration³⁴



1. <https://eands.dacnet.nic.in/PDF/February2021.pdf>
2. It is estimated in the agriculture and allied sectors for Africa, for instance that, by powering irrigation, cold storage and lighting with DRE, emissions can be reduced by 20%. Cold storage can additionally avoid emissions from food wastage (Powering Agriculture with Renewable Energy- A Just Transition for Food Systems), <https://www.powerforall.org/>
3. A recent study shows that just 12 DRE technologies can impact 37 million livelihoods and create revenue of USD 48 billion in India (Source: <https://www.ceew.in/publications/decentralised-renewable-energy-technologies-market-impact-potential-for-sustainable-livelihoods-india>)
4. More people were employed for installing just 3.8 GW of rooftop solar than were employed for installing 26.2 GW of utility-scale solar in the last five years in India



Figure 1: DRE can create many opportunities in the state

Proposed DRE for Livelihoods Framework for Assam

The DRE for livelihoods framework for Assam has three components:

1. Policy interventions

As part of an initiative to strengthen Assam's rural livelihoods through systematic integration of DRE, a range of policies were analysed. These policies spanned the supply side (renewable energy) and demand side (end-use / livelihoods sectors). The front-runner for mainstreaming DRE from the supply side is the Assam Renewable Energy Policy, notified on 13 October 2022. The policy is encouraging in its general push for solar on-grid and off-grid by various customer categories, in the promotion of RE-based power generation as well as in the provision of irrigation through solar pumps. Nevertheless, some additions / modifications are suggested in Table 2 (towards the end of the document), so that the Policy has more "teeth" to integrate DRE systematically.

On the demand side, the policy analysis focused on seven livelihood sectors in Assam – agriculture, livestock, fisheries, tourism, bamboo, handloom and tea. The sectors were identified on account of the following:

- i. Policies impacting rural livelihood options which were currently yielding sub optimal incomes to poor people due to lack of access to reliable energy sources
- ii. The sectors had the highest potential for transformative change in the lives of a large number of rural poor with decentralized energy access
- iii. A DRE based intervention in the sectors would offer significant contribution to the GSDP (Gross State Domestic Product) of Assam from rural areas

2. Fostering policy convergence

DRE policy is most effective when it originates in the policy documents of the departments that are DRE users / adopters. The role of the energy ministry is important in terms of facilitating the adoption by way of technology provisioning, quality control, financial incentives, awareness and knowledge creation etc. However, policy commitments to DRE must also be visible in the schemes of the user-departments as part of their efforts to energise mechanisation, productivity improvement etc.

A review of sectoral / departmental policies in the above section, points to the following categories of policy changes that may be considered:

- Where mechanisation can help increase productivity and there is no provision in policy to support the same, this may be included with specific mention of relevant DRE-powered equipment
- Wherever incentives are there for mechanisation or energisation or electrification, these incentives can be reviewed and revised to clearly include DRE integration in the form of DRE-powered appliances / equipment and / or powering a unit / centre with DRE
- Policies that provide subsidy on grid electricity connections or grid electricity usage may be modified to include electricity from DRE; in fact, a higher subsidy may be extended to such clean and decentralised electricity for captive generation and use.
- Inter-departmental linkages already exist, for instance, between food processing and horticulture – these linkages are important more generally for value chain strengthening but also for DRE integration. For instance, while DRE in a horticulture value chain may fit in well with the Department of Horticulture,

higher scales of processing and DRE integration within them may be better suited under the Department of Food Processing.

- At the policy level, this translates into a critical need for departments to work together as this can create important synergies and avoid disconnects. It is encouraging that sectoral policies are already connected with each other in several cases. For instance, the Assam Agarwood Policy refers to incentives extended in The Industrial and Investment Policy of Assam, 2019. However, the Industrial Policy offers power subsidy of Rs. 2.00/unit of electricity consumed from APDCL and excludes captive generation. This can be counter-productive in the sense that deliberately lowering grid electricity tariff will dis-incentivise the adoption of DRE, whose strength lies in providing reliable and low / no-cost energy. Such policy disconnects need to be looked into as part of inter-Departmental co-ordination.

3. Ecosystem enablers- required to support the mainstreaming of DRE for livelihoods

DRE, being a nascent sector, has multi-dimensional challenges associated with technology customization, financing, market design, acceptability, after-sales service etc. However, there are case examples and good practices that have showcased the way to address these challenges, which will benefit the process of DRE integration in end-use sectors (Table 1).

That said, the state of Assam also needs to set in motion some processes and systems as “ecosystem enablers” for DRE. These ecosystem enablers which will be needed for the policy suggestions to have the required impact include:

- **Technology development & customisation:** DRE technologies are at different levels of development and several need R&D support. Even market-ready technologies often need inputs for customisation as per specific end-use application, e.g. DRE equipment for value addition to pig and cattle-rearing. The state will benefit from:
 - Partnerships with academic / R & D institutions, partners of the Atal Community Innovation Missions, FPOs as well as industry associations etc.

- Installation of demo units at strategic locations
- **Financing:** An oft-discussed barrier to scaling-up of DRE is the lack of financing opportunities for the sector. Current financial framework of MNRE subsidies and CSR grants is insufficient to scale-up DRE applications.
 - MFIs can be roped in for ‘third party sell’ or cross-selling of DRE products (where they partner with vendors of products to bundle these products to their existing clients/customers along with micro credit⁵).
 - At the state level, there are several financing options that can be considered for financing DRE projects. Examples include: Rural Infrastructure Development Fund (RIDF) of NABARD; NABARD Infrastructure Development Assistance (NIDA) and NABARD’s Rural Innovation Fund for more experimental work around DRE.
 - Public-Private-Partnership (PPP) model around ongoing projects such as APART which has a focus on common service centres (CSCs) and custom hiring centres (CHCs) – both of these are good entry points for integration of DRE as the source of energy.
 - Institutions like NABARD may be approached to design a scheme around DRE-powered livelihoods clusters in the state
 - Two ongoing state schemes can extend credit guarantees to ensure that eligible lending institutions extend collateral free credit to FPOs and MSMEs coming forward to adopt new technologies like DRE. Specific directives/ amendments may be required to ensure DRE are not left-out from getting benefits of these initiatives. The two schemes are
 - Credit Guarantee Scheme for agriculture operated by Small Farmers Agri-Business Consortium (SFAC) through lending institutions for the last ten years.
 - Collaboration between Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE) under SIDBI and state government for providing additional guarantee coverage for loans given by lending institutions to Micro and Small Units in Assam⁶.

5. CLEAN (2023)- How the Green Tech Sector Can Work with MFIs: Observations and Experiences from the DRE Sector

6. <https://www.northeasttoday.in/2022/09/19/assam-government-signs-mou-with-cgtmse-sidbi-to-facilitate-rapid-industrialization-revamp-msme-sector/>

- **Knowledge creation and capacity building:** There are a sizeable number of DRE projects in the state which has created general awareness among communities and officials about the use of DRE. However, a deeper understanding and knowledge, necessary to make informed decisions about selection of DRE, is low, particularly among officials of user-departments.
- An awareness creation on benefits of DRE inclusion (reliable power supply in regions where the grid is weak, improvement in farm productivity, reduction in losses of harvested farm produce, local value-addition, additional employment creation, contribution of DRE to climate resilience, poverty reduction, wastage reduction, increase in state's GSDP, reduction of stress on the grid etc.) would have a favourable impact.
- Further, issue-based or thematic knowledge dissemination (i.e. procurement procedures, system performance and maintenance aspects, quality and safety issues, national level RE schemes, etc.) and exposure visits for officials from the state and the national departments dealing with schemes relating to animal husbandry, drinking water, sanitation, NABARD, KVIC etc. would help in strengthening the capacities of user-departments aiming at deriving the maximum benefits from DRE integration.
- Departmental level partnerships with skilling programmes such as those offered by Skill Council for Green Jobs (SCGJ)⁷ would be beneficial to develop capacity building programmes for officials from user-departments. Consultations with state government officials about the support that they would require for this transition and provision of the same should be an integral part of capacity building initiative.
- **Monitoring, Evaluation Reporting (MER):** Systematic integration of any new technology including DRE, calls for good databases around demand, potential, lessons, impacts and other facets needed for system and programme design and improvement. It has been observed that data availability is limited in DRE sector. Data collection, collation, analysing and reporting should be institutionalised at the state level. District officers under the SNA or SRLM networks

could be employed for collection of field data at regular intervals to develop robust monitoring systems.

From the above, it is evident that there should be a single entity responsible for MER (Monitoring, Evaluation, Reporting) activities to ensure consistency, regularity and accountability.

DRE Implementation and Upscaling Facility

Considering the vast and diverse spread of livelihoods sector and sub-sectors, DRE integration in them needs to be facilitated in a coordinated, coherent, and competent manner. Such a requirement calls for a dedicated facility/mechanism which is tasked with the role and responsibility to bring DRE at the centre stage of state level planning and execution of livelihoods programmes. Specific purpose for creating such a facility would be:

- To coordinate across several end-use sectors and projects for integrating DRE technologies
- To upscale DRE planning, design, implementation, adoption, monitoring capacities across several end-use sectors
- To provide technical support to all DRE projects in terms of guidance in system designs and specifications, procurement, selection of vendors, quality control, inspection and completion approvals etc.
- To facilitate MNRE financial assistance and other financing mechanisms for DRE projects
- To create and maintain a Monitoring, Verification & Reporting (MVR) mechanism covering all DRE projects

Assam Energy Development Agency (AEDA) is a potential candidate for anchoring a "DRE Implementation and Upscaling facility" on account of its mandate, experience and expertise of managing renewable energy projects in the state. A directive/ notification from the highest decision-making body (i.e. CMO), communicating the purpose, role, and function of such a facility to all concerned departments/ offices in the state would facilitate its creation and planning for operationalisation, including arranging for funding and human resources.

7. SCGJ is an initiative of the GoI aligned to the National Skill Development Mission. It is promoted by the MNRE and CII and covers all aspects of renewable energy, environment & climate change, and sustainable development. <https://sscgi.in/>

Table 1: Addressing myths and challenges to build preparedness for DRE

| CHALLENGES / MYTHS AROUND DRE | ADDRESSING THE CHALLENGES |
|--|---|
| <p>Financial attractiveness of DRE projects</p> <ul style="list-style-type: none"> • What are returns on investments • What would be payback periods from users' perspective | <p>Observations from studies and customer insights:</p> <ul style="list-style-type: none"> • All DRE appliances are cost-effective when electricity is unreliable • Solar dryer is financially attractive irrespective of electricity situation • Viability is best when products are used over the lifetime of around 10 years • Higher usage days per year improves financial returns – e.g. for a horticulture processor or dryer, usage of the appliance for multiple crops in different seasons improves viability |
| <p>Affordability</p> <ul style="list-style-type: none"> • Despite being financially attractive, mobilizing capital for investing in DRE becomes a challenge especially when working with socio-economically marginalized groups | <ul style="list-style-type: none"> • Targeted subsidies and policy incentives will help (as also aimed in some of the Policy Recommendations) • Business model innovations around “Energy as a service”, “Rent-to-own or Pay-As-You-Go” address this challenge⁸ |
| <p>Customization and quality control</p> <ul style="list-style-type: none"> • Ensuring low cost and reducing entry barriers is important for a new sector like DRE, but it is equally important to ensure quality • While some DRE products are well-developed, other applications need R&D support • Some well-developed products need customization to the local context with respect to type of crop being processed, water table from which pumping is to be done | <p>Empowering the DRE user / adopter/ purchaser on the following:</p> <ul style="list-style-type: none"> • Technical competency must be made available to the procurer (requiring a nodal agency as the guide) • Procurement process (pre-installation) must take into account what is needed, what is possible, development of system specifications for the tender with support of technically competent persons • Selection of vendor- criteria of pre-qualification and / or selection of vendors must also be done carefully; should include warranties, service contract |
| <ul style="list-style-type: none"> • Post-installation, there could be skills / capacity gap for proper upkeep, operations and maintenance | <ul style="list-style-type: none"> • Village level entrepreneurs can set up DRE service networks. • Training can be imparted in partnership with government and private ITIs • DRE vendors should be made responsible for proper training at the time of installation |
| <ul style="list-style-type: none"> • Specific awareness and understanding of what, why, how, and where about DRE technologies is lacking | <ul style="list-style-type: none"> • An anchor needed for DRE planning in the state, role of agencies like CLEAN is important. Local expos to be organized. IREAP (India Renewable Energy Appliances Portal)⁹ and similar portals can be used effectively |




8. An illustrative case study available at this link <https://avpn.asia/case-study/affordable-solar-energy-sources-for-low-income-farmers/>




9. <https://ireap.thecleannetwork.org/>

Table 2 : Suggested amendments in Assam Renewable Energy Policy 2022

| PARA NUMBER | SUGGESTED AMENDMENTS |
|---|---|
| Para 5- Objectives | Signal a clear focus on DRE by including among the objectives the following: To promote the use of DRE in MSMEs, rural enterprises and livelihood applications |
| Para 10.7.2- Decentralised Ground/ Stilt Mounted Grid Connected Solar Power Plant at Barren/ uncultivable land/ agricultural land – items iii), v) & vi | This para gives an opportunity to rural population for additional income by sale of electricity from their uncultivable land, even though it is not a direct and in-situ use of DRE for livelihood generation. Mention of how such power plants can also be strategically located and planned to power on-or near-farm livelihoods activities or for solarisation of agri feeders would be an important addition. |
| Para 10.9 – Promotion of other Renewable Energy sources | The para mentions pumped storage, biomass and solid waste management, as examples. This can be strengthened by mentioning specific products/ systems/ appliances such as mobile solar cold storage units, biomass stoves that need to be promoted under the policy |
| Para 14 - Decentralised & off-grid applications | Eligible projects under this para are solar PV pumps, mini/micro grids for un-electrified villages, other solar applications i.e. SHS, solar street lights, etc. However, the other solar applications is limited to government and certain other institutional buildings i.e. hospitals, schools. This may be modified to clearly include the possibility of including mini-micro grids for MSME and livelihood clusters in electrified as well as unelectrified areas |
| Para 14.3 item (iii) | May be expanded to include buildings that are used by panchayats, FPOs, NGOs, CBOs, R&D institutions in rural areas that are engaged in income generating and livelihood activities |
| Para 14.3 item (iv) | May be modified as -State will also provide support to local entrepreneur/ users associations, NGOs, personnel from tourism, horticulture sectors etc. on the use and benefits of DRE in their sectors as per the capacity building program |
| Para 18.2 - Nodal Agency | May consider AEDA as the Nodal Agency for implementation of DRE projects in the state. Further, the role of Nodal Agency for DRE may include- Coordinate with other departments such as horticulture, tourism, rural development, MSME etc. to facilitate and promote the use of DRE in their respective programmes and schemes |

Table 3: Sectoral policy recommendations in the immediate/ short and medium terms

| Relevant state-level policy that can be the entry point | DRE equipment/ interventions mentioned in the policy | Suggestion for DRE inclusion in the policy in the immediate /short term | Suggestion for DRE inclusion in the policy in the medium term |
|--|--|---|---|
| Sector/ Department- Multiple sectors: state-wide  | | | |
| <p>Chief Minister SamagraGramyaUnnayanYojana - ambitious scheme launched by the Government of Assam with the aim of doubling farmer's income</p> | <ul style="list-style-type: none"> DRE, solar powered pumps being supported under the scheme | <p>Subsidies and incentives for relevant DRE technologies across agriculture, fisheries, livestock, sericulture can be extended to include:</p> <ul style="list-style-type: none"> Solar powered micro irrigation system Solar pumps for fodder cultivation | <p>Subsidies and incentives for relevant DRE technologies across agriculture, fisheries, livestock, sericulture can be extended:</p> <ul style="list-style-type: none"> Solar rice milling, solar and biomass-based appliances for powering equipment to make puffed rice, flattened rice (poha) R&D of solar powered combined harvester Solar aerators, solar ice boxes, solar power plant to power aquaculture |
| Sector/ Department- Agriculture/ Horticulture  | | | |
| <p>Mukhya Mantri ka Sajuli Yojana</p> | <ul style="list-style-type: none"> Provides financial assistance to farmers to procure farm tools/ farm implements (not powered equipment) | <p>As the amount covered under the scheme is only Rs 5000 per farmer, it is proposed that the scheme be modified to allow farmers to contribute to co-owned equipment using this scheme to allow use of this scheme for mechanisation</p> | <ul style="list-style-type: none"> Gradually expanding the current scheme to include support for DRE appliances |
| Sector/ Department- Livelihoods focussed on cattle-rearing, piggery, backyard poultry  | | | |
| <p>Livestock policies based largely on national policies – National Livestock Mission</p> | <ul style="list-style-type: none"> NLM support powered equipment for breeding and fodder cultivation that are available as solar powered Dairy Sahakar Policy mentions support for renewable energy plants GobarDHAN scheme provides financial assistance for cluster/community level biogas plants | <p>Support for following DRE-powered equipment could be provided</p> <ul style="list-style-type: none"> DRE-powered sheds (lighting, ventilation), DRE for milk chilling, milk collection centres, milk processing Biogas generation from animal waste | <ul style="list-style-type: none"> Support for following DRE-powered equipment could be provided DRE powered egg incubators Solar pumps for fodder cultivation Improved cook stoves for animal feed preparation Solar powered semen/ vaccines stations; Solar freezers for semen storage |

| Sector/ Department- Fisheries  | | | |
|---|---|---|---|
| Assam Fisheries and Aquaculture Policy 2023 | <ul style="list-style-type: none"> Encourages use of renewable energy (solar) especially in small fishing units for at various stages of fish production and supply chain, including post-harvest management and value addition | <p>Specific DRE (solar as well as biomass) technologies may be suggested:</p> <ul style="list-style-type: none"> Solar PV to power aquaculture equipment Biomass based dryers and cold storage Solar powered freezers on-boat Solar PV on boats Solar ice-making plants Solar lights and ventilation | Any new DRE technology for post harvest management and value addition |
| Sector/ Department- Tourism  | | | |
| Tourism Policy of Assam 2022 | <ul style="list-style-type: none"> Focuses on sustainable, inclusive tourism. Supports purchase of equipment or technology that reduces waste, encourages green energy adoption Reimbursement of 25% investment on renewable energy available, but program on subsidies needs review | <ul style="list-style-type: none"> Continued subsidy to tourism units installing renewable energy systems should continue Reimbursement of 25% investment on renewable energy can be extended to cover Solar rooftop solar, small wind, small hydro Biomass-based thermal systems for cooking and heating Use of solar energy for electricity generation, cooking needs and hot water requirements | <p>Reimbursement of 25% investment on renewable energy can be extended to additionally cover</p> <ul style="list-style-type: none"> Use of battery-operated vehicles charged by solar, solar powered boats; biomass pellet fired bon fires |
| Sector/ Department- Bamboo  | | | |
| The Assam Bamboo and Cane Policy | <ul style="list-style-type: none"> Policy has provision for 50% capital investment subsidy on electrical equipment. There are references to ethanol production NBM include activities such as making of pellets and activated carbon, bio energy extraction and establishment of ethanol gasifier | <ul style="list-style-type: none"> Policy provision on electrical equipment can be modified to include DRE-powered equipment Bamboo and cane waste to produce biomass pellets – can be suggested and incentivised | <ul style="list-style-type: none"> Incentives for ethanol production may be considered under policy Suggestion to use bamboo waste and/ or solar to power bamboo processing centres |

Sector/ Department- Handloom/ Sericulture



| | | | |
|---|--|---|---|
| <p>Assam Handloom Policy have not been extended; Assam Textile and Apparel policy was operational till 2022; National Handloom Development Programme in operation</p> | <ul style="list-style-type: none"> NLM support powered equipment for breeding and fodder cultivation that are available as solar powered Dairy Sahakar Policy mentions support for renewable energy plants GobarDHAN scheme provides financial assistance for cluster/community level biogas plants | <p>Several options for DRE integration can be suggested:</p> <ul style="list-style-type: none"> Solar sprinkler, solar irrigation pump Solar water heaters Solar/ biomass fired hot air generators for cocoon stifling Solar charkha, Solar powered motorized handlooms | <p>Several options for DRE integration can be suggested:</p> <ul style="list-style-type: none"> Biomass fired baby boilers/ improved biomass stoves for dye houses Solar powered motorized handlooms DRE can also be incorporated into processes like effluent treatment mandated for sustainable handloom |
|---|--|---|---|

Sector/ Department- Tea industry



| | | | |
|---|--|--|--|
| <p>Tea Development & Promotion Scheme (TDPS) of Tea Board of India Component 1: Plantation Development for Small Tea Growers Component 2: Quality Upgradation and Product Diversification</p> | <ul style="list-style-type: none"> Supports electrical equipment for irrigation (sprinkler equipment, motors, pump sets, etc.), mechanization (pruning machine, mechanical harvester, etc.), setting up of new and mini factories through subsidy extension | <ul style="list-style-type: none"> Electrically powered equipment that are already eligible for subsidy can be converted into standalone solar products Other DRE technologies for integration in the tea industry that can be suggested including: <ul style="list-style-type: none"> Solar roof top – powering crucial equipment Solar pumps, Solar sprinklers – Irrigation Small hydro/ solar mini grids - powering crucial equipment | <p>Biomass briquettes/ pellets - Can replace coal/ Piped Natural Gas (PNG) for drying/ withering</p> |
|---|--|--|--|

