



DECENTRALISED RENEWABLE ENERGY FOR JOB CREATION IN INDIA

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 **Swaniti Initiative**

Leveraging Decentralised Renewable Energy in India for Job Creation

Promoting rural livelihood activities through DRE solutions



Source: Topsun Energy/Uma Gupta

The Government of India has sent strong signals through the direction and pace of India's energy transition to meet India's renewable energy generation capacity target of 175 GW by 2022. As electricity systems across the globe undergo a paradigm shift towards decentralization¹, the same is being mirrored across India. Brought by technological disruptions, innovation in business models and dire need, electricity is being increasingly decarbonized by the infusion of more renewables into the grid. At the same time, innovative business models that offer electricity as a service are burgeoning. Together, this is leading to wide-scale adoption of renewable energy in various forms.

While emission mitigation is an important objective of renewable energy deployment, the employment generated from the renewable sector is of considerable significance for a developing country like India. This is further illustrated by the "Powering Jobs Census 2019: The Energy Access Workforce" the first annual jobs

¹ The Future of Electricity New Technologies Transforming the Grid Edge, March 2017, World Economic Forum

census for the decentralized renewable energy (DRE) sector which highlights the importance of the sector in improving the lives of Indian citizens.

What is Decentralised Renewable Energy?

Decentralized renewable energy or DRE, refers to any system that uses renewable energy to generate, store, and distribute power in a localized way. This can include small stand-alone devices (solar lanterns or advanced biomass cooking stoves), integrated solar home systems (SHS) that power multiple devices or appliances for a single household, and smaller generation and storage resources that feed isolated or localized distribution networks (mini-grids or micro-grids).

In India, DRE has shown a particular potential for its rural community in the areas of lighting, agriculture and enterprise. Solar lanterns, solar lighting systems and micro-grids have been lighting the lives of millions of people in rural areas, while solutions such as utility renewable markets and solar rooftops are impacting urban regions. Similarly, small innovations utilizing DRE are seeing an uptake in agriculture. According to a report by GOGLA, India is one of the largest off-grid solar markets in the cash segment with 1.3 million products sold in the first half of 2018, showcasing the market potential of focussed DRE².

Rural India and DRE

The first wave of DRE in rural India was brought on with the aim of providing basic lighting needs. However, the next frontier of electrification in India is to provide productive applications in the rural ecosystem.

Stepping stones for this expansion have already been put in place with the introduction of solar pumps, solar dryers, solar-powered micro cold storage, solar-powered sewing machines and such in rural agriculture. The Government of India is doing its part to promote and integrate clean energy across rural India's economy, with a special focus on healthcare, food processing and agriculture.

For instance, as part of the Kisan Urja Suraksha evam Utthaan Mahabhiyan (KUSUM) scheme, 1.75 million off-grid solar pumps will be installed by 2022 to support farmers. Similarly, to support healthcare services, the Chhattisgarh Renewable Energy Development Agency (CREDA) leveraged a solar grid connection to act as a reliable source of power in Primary Health Centres to allow treatment of more patients.³

² Global Off-Grid Solar Market Report Semi-Annual Sales and Impact Data, January - June 2018, GOGLA

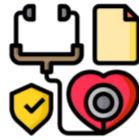
³ Ramji, A., Patnaik, S., Mani, S., & Dholakia, H. H. (2017). Powering primary healthcare through solar in India: lessons from Chhattisgarh. Council on Energy, Environment and Water: New Delhi, India.

TARGET SECTORS FOR DRE SOLUTIONS IN INDIA



Agriculture

DRE solutions like solar pumps, solar dryers etc, have the ability to create wide social and economic impact by providing access to affordable energy to small-scale enterprises and agricultural workers.



Healthcare

Basic critical services such as storage for vaccine, lighting of healthcare facilities and running sterilization autoclaves, which need continuous access to power can be solved through DRE solutions. A backup grid can also act as a boon for areas with limited continuous electric supply.



Food Processing

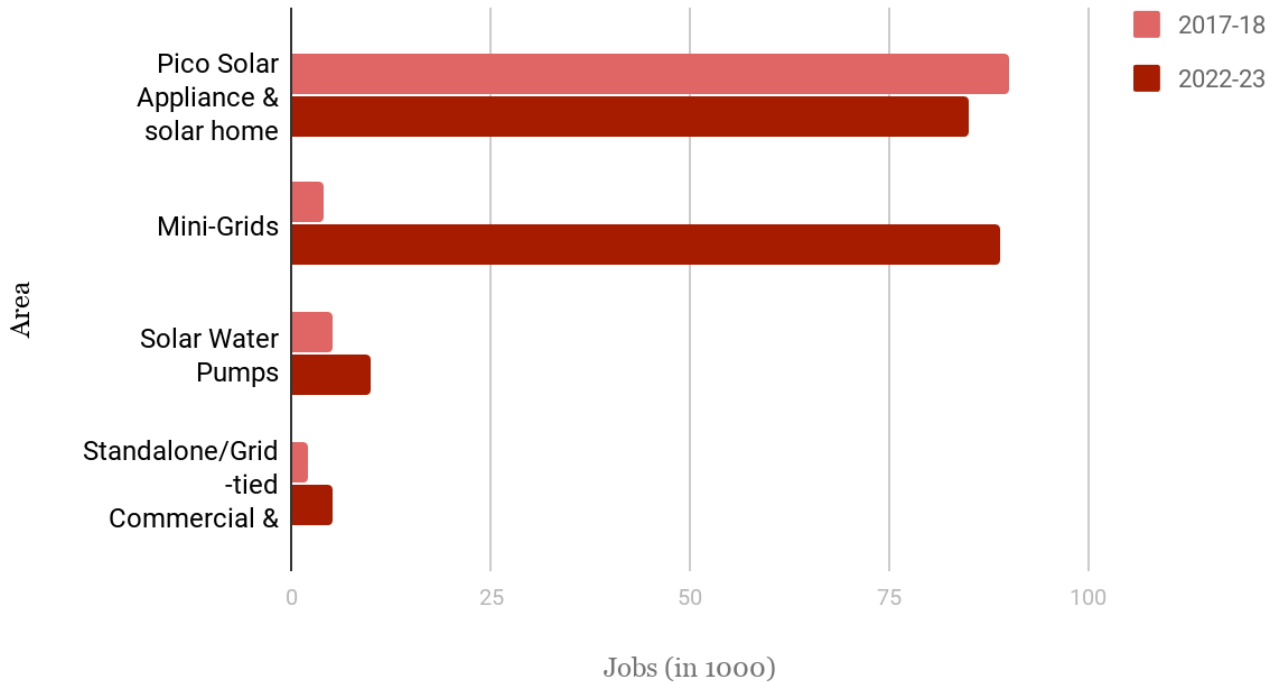
DRE solutions can be implemented to solve challenges related to storage and handling, and value-added processing. These would greatly increase shelf-life of agri-produce and reduce dependency on manual labour.

DRE and job opportunities for rural India

According to estimates by Power for all, DRE has already grown a significant workforce compared to traditional utility-scale power sectors, and is expected to more than double by 2022-23 if the mini-grid market continues to expand at a rapid pace⁴. In 2017-18, the DRE sector in India provided 95,000 direct jobs as compared to 92,400 jobs from the on-grid solar sector. By 2022-23, the DRE sector could provide as many as 190,000 direct, formal, full-time equivalent jobs in India under a high mini-grid penetration scenario.

⁴ Power for All, 2019. Powering Jobs Census 2019: The Energy Access Workforce

Forecast for formal jobs In India's DRE sector



Source: Power for All, 2019. Powering Jobs Census 2019: The Energy Access Workforce

Companies that sell pico-solar appliances (that use small amount of power for gadgets such as calculators, cameras and mobile phones), solar home systems, and other small, off-grid appliances directly to customers - are considered to be the "job engine of the DRE sector", expected to add 86,000 direct, formal jobs nationwide by 2022-23.

These companies alone account for 97% of 95,000 DRE jobs created in 2017-18. In addition, they added 470,000 "productive-use jobs"- created by the DRE end users as a result of newly-acquired or enhanced electricity access-in the same year.⁵

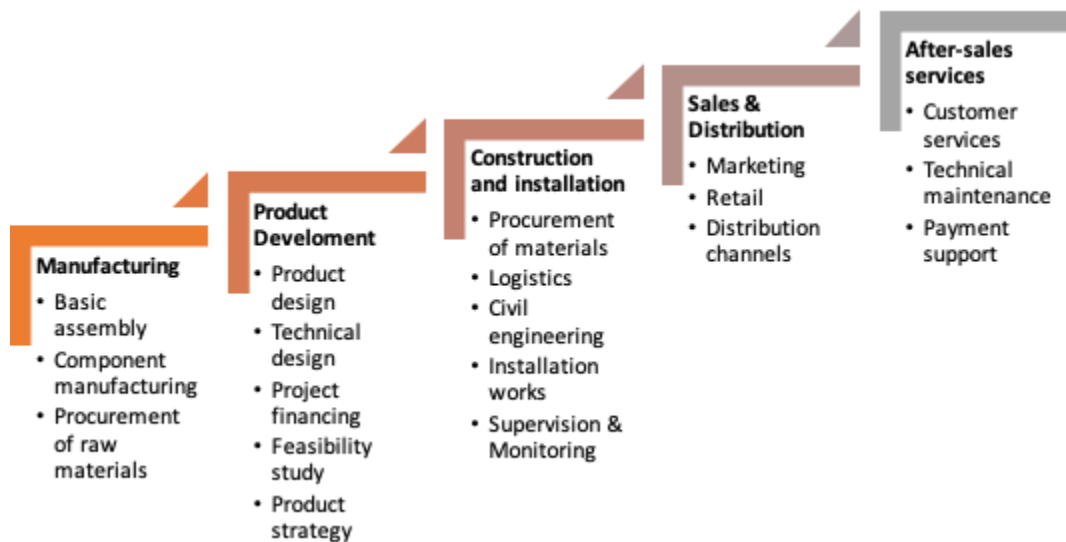
Retention and levels of engagement

A vast majority of direct jobs are full-time, with the Powering Jobs Census 2019 putting full-time DRE jobs at 90%. Furthermore, according to the survey, the average retention time for direct, formal, full-time DRE employees is more than 30 months. In addition to this, DRE sector's retention time and level of engagement

⁵ Power for All, 2019. Powering Jobs Census 2019: The Energy Access Workforce

are significantly higher than the large scale renewable energy sectors. For instance, in India, only 19% of wind power workers have permanent, full-time jobs, while the remaining jobs are short term, such as project construction. Thus, high levels of worker engagement and employee retention are other major benefits the DRE sector offers India.

The DRE sector has the potential to become an asset to our rural economy due to the scope of work it has the potential to create and the skill levels it can cater to. From the requirement of technical knowledge and implementation, managerial roles, sales and business development to basic assembly and manufacturing services, the sector would require an enormous workforce with varying skill levels to be truly vibrant. The image below is an illustrative example of the kinds of work possible in the rural economy in the DRE sector keeping varying skill levels in mind.



India's skilling challenge

The availability of appropriately skilled manpower has been identified as one of the most prominent challenges in hiring required personnel. A multitude of skilled workers across DRE projects would be needed to achieve India's targeted 100 GW of solar by 2022, with job opportunities being immense for every avenue.

Illustratively, analysis by CEEW and NRDC of the jobs created in the solar PV sector along with the related skills required in every phase of a solar project, estimates that India would need nearly 210,800 skilled plant design and site engineers and approximately 624,600 semi-and low skilled technicians for construction, most of whom would be needed to achieve the targeted 40 GW rooftop solar capacity addition. As many as 81,000 highly skilled workers would be needed by 2022 to carry out annual and ongoing performance data monitoring of

solar projects totaling 100 GW. An additional 182,400 workers would be needed by 2022 to carry out low-skill operation and maintenance functions for the numerous solar rooftop and utility scale projects. This is just one of the most prominent project streams possible.

While most analysis would strongly use numbers enumerating the essential role of site engineers and project managers, it is also important to account for opportunities to fulfil key roles played by unskilled or semi-skilled personnel, such as installers, security personnel, administrative support staff, construction labor and drivers. Induced activities such as sales services, customer care, food vendors, etc too have potential to generate additional employment opportunities.

The biggest challenge hampering the potential rocketship opportunity for job creation is skilling. Unavailability of appropriately skilled manpower – especially for construction and commissioning – has been identified as one of the most prominent challenges in hiring required personnel. For most DRE companies, technical talent is recruited from across many training institutes with different curricula, teaching standards, and levels of accreditation. This leads to concern over the quality of training, the lack of monitoring and evaluation metrics for such training programs. Thus, there is a need for better certification processes and, perhaps, for a collective industry-wide training curriculum that further takes into account gender parity and acknowledges India's widespread social constraints.

In addition to training programs driven by the private sector, public training initiatives are also key to transforming a young workforce. For example, the Indian government's Suryamitra program aims to develop the skills of youth considering employment in the solar PV project installation and the O&M industry. Since 2016, the program has certified over 20,000 electricians in the country. In a similar way, many other government programs can incorporate skilling avenues specific to the DRE industry.

#MakeInIndia: Encouraging Innovation In DRE

The Indian government's electrification plans, which predominantly focus on household electrification, need to be complemented in two ways: (i) product innovations for livelihood applications, which can use electricity efficiently and effectively; (ii) DRE-powered innovations that can bridge gaps in the centralised electricity supply system and which can power income-generating activities in rural areas. Together, these interventions can cater to a tremendous market.

However, there is extremely limited takeup in terms of young Indians trying to create local solutions in decentralised renewable energy. To counter this, the government, industry, education institutions, and investors are needed to close the skills gap for the sector. Past successes have been observed in many private sector-led training programs.

Key gaps in the rural innovation ecosystem:

- **Lack of financial support:** Given the high-risk nature of the product development process, there is a dire need for capital grants from philanthropic and public funds.
- **Inadequate physical infrastructure:** The pace of intervention is slowed due to limited access to fabrication labs and other such facilities where prototypes could be built and products could be tested.
- **Lack of policy clarity:** There is no clarity regarding the role of DRE along with the grid supply leading to business uncertainty for entrepreneurs. This affects the innovation ecosystem and the inflow of financial support for DRE-powered products.
- **Limited cost incentives:** Due to subsidised electricity rates in rural areas, the cost incentives for developing energy-efficient productive use appliances are limited. Improving the energy efficiency of appliances will be critical to improving the economic viability of DRE-powered products.

Increasing Opportunities for Interventions in DRE

- **Make skilling and female employment a mandatory part of public renewable energy projects** by introducing mandatory project obligations to train local workforces to maintain renewable energy installations, and to establish favourable conditions for women. This would help in ensuring the workforce has required technical skills the sector demands of them.
- **Create a regular joint working group between the Ministry of New and Renewable Energy, the Ministry of Skill Development and Entrepreneurship (MSDE) and the Skill Council for Green Jobs** to improve data availability concerning employment in the renewable energy sector.
- **Include job opportunities for (community-owned) renewable energy projects within the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA).** The integration of employment opportunities for the joint installation, operation and management of (community-owned) renewable energy projects into the MGNREGA scheme would give low- and unskilled workers and women the opportunity to connect, through this established employment scheme, to opportunities offered from renewable energies, and to create a sense of ownership for renewable energy in their villages.
- **Leverage decentralised renewable energy (DRE) solutions as an enabler for rural commerce** especially in areas such as agriculture and the Agri value chain.

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Swaniti Initiative is a non-partisan social enterprise that delivers development solutions to legislators and governments. The organisation focuses on the issues of health, education, gender, livelihood, human welfare and governance. The vision of the organization is to facilitate evidence based policy reforms and further help the government utilise its resource with utmost efficiency to ensure development of the community at the last mile.



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