

Renewable Energy Transforming Rural Women

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Renewable energy has been a boon for women in rural India – whether by ensuring safety through solar-powered streetlights, reducing drudgery by replacing thigh-reeling techniques in the textile industry, generating jobs through self-help groups that connect people to the electricity grid or simply allowing more time for education and skill development. RE can be transformative for India's economy, agriculture, job market, and especially for women. We are just unlocking the potential on our path to net zero.

Renewable energy is transforming the lives of rural women in India and has the potential to do much more. At the Conference of the Parties (CoP) in Egypt in 2022, India announced that it plans to invest heavily in renewable energy, aiming to achieve about 50 per cent of electricity from non-fossil fuel-based energy resources by 2030. In rural India, renewable energy can drive energy availability in previously unconnected areas, generate jobs, enable social transformation and accelerate economic growth.

For women, renewable energy is a boon. Several initiatives have been taken by the Indian government, especially by the Ministry of New and Renewable Energy (MNRE), to bring out policies that leverage renewable energy (RE) as a change-maker in rural women's lives.

“With the [Women in Renewable Energy] initiative within the ministry, I realised that it is not only the participation of women but also the immense possibilities and potential that Decentralised Renewable Energy (DRE) applications have for women



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to reduce drudgery and improve their livelihood opportunities,” said Indu Shekhar Chaturvedi, MNRE Secretary, at the ‘Workshop on Policy and Intervention for Women in Renewable Energy’ organised by the government in New Delhi in October 2022.

Over the years, this relationship between clean energy and women has only deepened – from Rajasthan to Odisha. We will touch upon the various facets where renewable energy has improved women’s lives – socially, economically, and environmentally.

Renewable Energy and Employment

A Council on Energy, Environment and Water (CEEW) analysis estimates that India’s targets of 1,00,000 MW of solar and 60,000 MW of wind power capacity will generate about 1.3 million direct jobs. Realising this massive opportunity, the National Institute of Solar Energy (NISE), an autonomous institute of MNRE, has organised the ‘Surya Mitra’ skill development programme in collaboration with State Nodal Agencies. The programme will prepare candidates to become entrepreneurs in the solar energy sector. Special emphasis is being given to rural women candidates during the selection process. Renewable energy not only opens up new job opportunities for women but also helps the state and market tap into a woman’s potential as a skilled and well-trained employee.

For instance, when Smart Power India signed a Memorandum of Understanding (MoU) in 2019 with the Central Electricity Supply Utility (CESU) of Odisha to improve power facilities in the state, it not only set an example by employing skilled rural women but also generated evidence on the business benefit rural women employees bring. They leveraged the presence of Self-Help Groups (SHG) in each village and introduced the concept of ‘bijulee didi’. Even civil society has realised the potential of renewable energy to create safe, sustainable, and productive jobs for rural women.

Farmer and rural entrepreneur, Lalita Devi from Uttar Pradesh is the team leader of the Khet Kisan producer company, which produces local pickles, jams and powder made from bananas. Considering the challenge of cooling and storing the products, the group purchased biomass-based cold storage, a technology supported by the CEEW’s Powering Livelihoods (PL) programme. It allows farmers to store their produce until market demand and prices

increase, enabling them to earn a better price in an environmentally sustainable manner. The company’s turnover is Rs. 6.7 crore, of which biomass-based cold storage generating revenue of approximately Rs 1 crore. Powering Livelihoods is an initiative by CEEW-Villgro to support DRE-based enterprises to scale their businesses through an integrated gender lens.

Renewable Energy as a Boon to Rural Enterprises

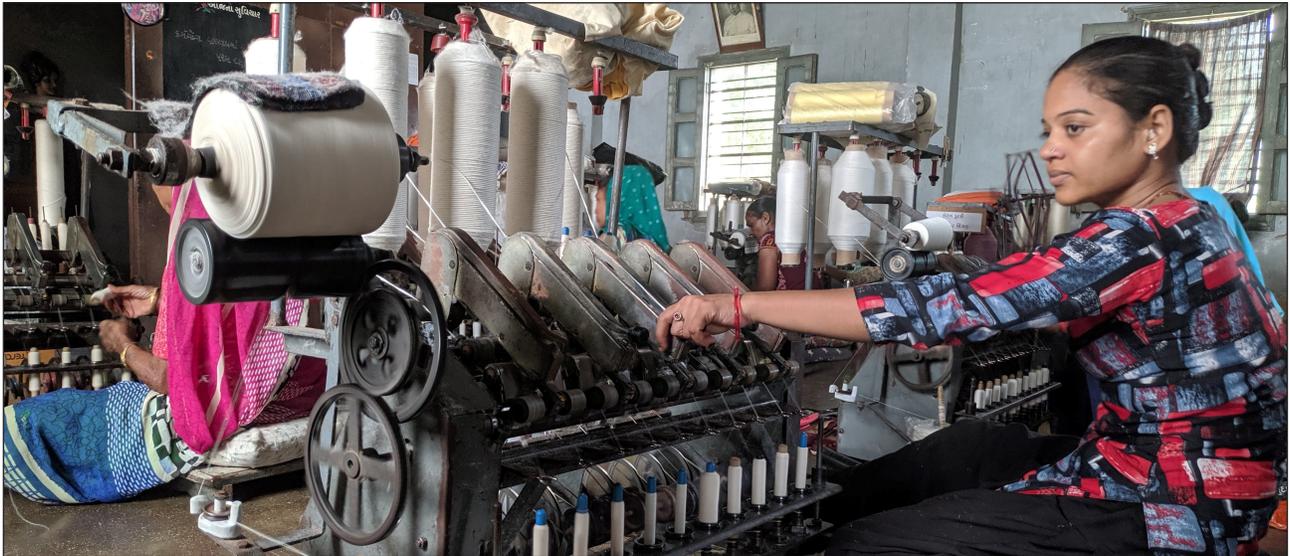
CEEW’s analysis of the National Sample Survey Office’s (NSSO) 73rd round survey of unincorporated non-farm enterprises indicates that owners of 4.4 million enterprises in rural India complained of erratic power supply as one of the top bottlenecks affecting their business. Workflow interruptions and the damage caused to sensitive electrical equipment by power fluctuations not only limit productivity but also hinder the establishment of new enterprises.

Energy supply to rural households improves the efficiency of businesses and helps increase women’s non-farm self-employment. Neetu Tandan is an Agra-based micro-entrepreneur who runs Shri Ambika Naturals using Kissan Dharambir’s energy-efficient multi-purpose food processor technology to create fruit squashes, aloe vera drinks, soaps and other nature-based products. She has been running this business for eight months and is able to generate decent revenue from it. She aspires to export her products to international markets one day.

Reliable energy access also affords women extra time that they can utilise in skill training sessions to get a job or start their own business. A women-led initiative, Hariyali Green, was implemented by the Association of Renewable Energy Agencies of States (AREAS) under MNRE (AREAS-MNRE) along with the Natural Resources Defense Council (NRDC) and the Self-Employed Women’s Association (SEWA). It aimed to enhance access to clean energy technologies and improve livelihood opportunities at the household level in rural India. Their goal is to create 100 Green Villages by 2025.

Distributed Renewable Energy (DRE) Spurring Rural Women’s Micro-Entrepreneurship

DRE is a renewable energy-based system that can generate and distribute energy independent of a centralised electricity grid and provides a wide range of services like lighting, cooking, space heating, and cooling. When we expand the horizon



from RE to DRE, we unlock many more jobs and livelihoods. In India alone, CEEW estimates a market upwards of USD 53 billion for using clean energy for productive enterprises in rural areas such as cold storage, looms, rice mills, and sewing machines. Each solar cold storage could augment the incomes for 50-100 farmers. Each agro-processing unit could help a group of farmers, or as in India, farmer producer organisations (FPOs). Additionally, there is significant potential in textile value chains and small, petty shops, especially for small refrigerators, including in value chains like dairy and fisheries.

In February 2022, MNRE released a draft policy framework for promoting DRE livelihood applications with an explicit gender emphasis. The policy supports the adoption of DRE livelihood technologies among women by providing access to finance for entrepreneurs and end users. This will support the women SHG members in creating new jobs and scaling their existing businesses using DRE technologies.

Established in 2013, Maitree Mahila, a dairy and agriculture producer company, is managed and run by rural women in Rajasthan's Dooni village. They process goat milk and its various products. The group has been using solar-powered DC refrigerators produced by PL-supported DeviDayal Solar enterprise since 2020 to help address the challenge of unreliable electricity. This has helped them increase their processing capacity by three times.

Another initiative by IIT Bombay, with major funding provided by MNRE, was Solar Urja through Localisation for Sustainability (SoULS). It aimed

to provide clean, efficient, affordable and reliable electricity even to the last mile households. Under its Solar Urja Lamp (SoUL) project, they have empowered village women from Bihar to assemble and distribute solar study lamps in rural areas without electricity access. In her interview with India Climate Dialogue, Neetu Devi from Gaya district said that being a 'Jeevika Didi' helped her earn a decent income of Rs. 50,000 for assembling 2,900 solar study lamps and distributing more than 200. These female clean energy entrepreneurs or agents curate innovative solutions to cater to women's needs.

Clean Energy Technologies Reduce Women's Drudgery

Access to energy can benefit women both at macro and micro levels. At the macro level, it strengthens livelihoods and boosts local economies, while at the micro level, it is responsible and caters to 'time poverty'.

The textile sector in India has largely been manual labour intensive. The onset of new RE-powered efficient technologies, such as solar-powered spinning, reeling, and weaving machines, can help ease the lives of an estimated 45 million people directly employed by the Indian textile industry, 60 per cent of whom are women. These machines save time and improve efficiency while abolishing drudgerous practices such as 'thigh reeling' prevalent in the silk value chain. They are especially beneficial in the silk value chain where about 86.5 per cent of workers are women, according to CEEW analysis.

Kuni Dehury, a resident of Kardapal village in Odisha's Keonjhar district, runs a silk spinning centre. The major factor that makes the centre unique is the application of solar power to run it. The centre uses Reshamsutra's solar-powered reeling machines because of which women do not have to bear the burden of electricity bills or the labour-intensive thigh reeling process. Kuni Dehury was also praised by Prime Minister Shri Narendra Modi in his 'Mann Ki Baat' programme for her outstanding efforts. Reshamsutra is a PL-supported enterprise to upscale solar reeling machines and help rural women silk-reelers.

The benefits of these technologies have also been exemplified in several government enterprise development/support programmes and schemes. The Ministry of Micro, Small and Medium Enterprises (MSME), through Mission Solar Charkha, aims to create 50 solar charkha clusters, which employ spinners, weavers, stitchers, and other skilled artisans. One cluster of Solar Charkha would involve a maximum subsidy of Rs 9.59 crore. On International Women's Day in 2021, the Ministry of Textiles announced support for 8000 women thigh reelers from across the country with Buniyaad Reeling Machines so as to eradicate the unhygienic, thigh-reeling practice.

Solar Pumps – Powering Rural Women Farmers

Approximately, 76 per cent of agri-allied activities are dominated by women in India. Climate change is responsible for shifting rainfall patterns in many rural geographies. This makes access to water a primary concern for many rural women, whether for domestic, irrigation, or livestock use. Thus, access to small-scale irrigation systems has become essential for reducing farm production risks and improving the well-being of women farmers. The Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan Yojana (PM-KUSUM) scheme by the MNRE offers subsidies and other incentives like feed-in-tariffs to support the adoption of solar-powered irrigation systems. The scheme aims to add a solar capacity of 30,800 MW by 2022 with a total central financial support of Rs. 34,422 crore, including service charges to the implementing agencies, which has been extended to 2026.

Bahuri Devi is a small-holder tribal farmer from Gumla, Jharkhand and owns 0.63-acre of farmland. She grows vegetables such as potatoes, garlic, brinjal,

and cabbage. She received a micro solar pump from 'PRADAN' in June 2020, due to her association with a women's self-help group. After using a solar pump on her farmland, she generates an annual income of about Rs. 120,000, which was Rs. 100,000 earlier. With the use of a Khetworks solar micro water pump, she has been able to farm for two seasons in the last 1.5 years and save about Rs. 12,000 per year due to reduced usage of diesel. With the saved amount, she can now buy raw materials and spend on other household expenditures.

Another project showcasing the impact of community-based solar irrigation is the Jharkhand Opportunities for Harnessing Rural Growth (JOHAR). This project is run by the Jharkhand State Livelihood Promotion Society (JSLPS) in collaboration with the World Bank. The project supports tribal women SHG farmers in cultivating high-value crops by providing a 5-7.5 horse power (HP) solar pump at a subsidised rate. According to JOHAR team members, about 1,000 solar pumps have been installed already, and the project aims to support more than 3,000 pumps by 2023. JOHAR impacted over 2 lakh households by training women farmers representing 19 Farmer Producer Companies (FPCs) and 3800+ producer groups through capacity building and training on finance and allied themes.

Resilient Rural Health Systems for Women

Accessing reliable electricity is a significant constraint in rural health centres in India. According to CEEW's 2017 analysis, 4.6 per cent of functional Primary Health Centres (PHCs) in India are unelectrified. This affects over 38 million rural households. A 2021 study by Shastry and Rai states that lack of reliable electricity in healthcare centres is associated with a decrease of 64 per cent in child deliveries affecting women's access to safe healthcare.

Renewable energy can empower rural hospitals by providing uninterrupted electricity and upgrading basic and critical-care services. In Chhattisgarh, an assessment of 147 PHCs found that solar-powered PHCs showed a 78 per cent increase in deliveries. Nearly, 98 per cent of PHCs said that solar power helped with their daily functioning and improved the status of patients.

Social enterprises have developed portable maternity kits, which comprise portable solar torches

and basic diagnostic kits for testing for anaemia, blood sugar levels, and malaria in Kalahandi, Odisha. With the support of the solar kit, pregnant women were able to access check-ups at home, which has had a positive impact on mortality rates.

Solar Street Lights Boost Rural Women's Safety and Mobility

A major factor blocking women's economic integration is concern about public safety. In 2012, safety audits conducted by UN Women's partner Jagori in five municipal areas of Delhi identified that enabling street lights provides more safety as darker areas face the majority of crimes. Women restrict their activities and movements when they don't feel safe going outside, reducing personal empowerment and participation in the workforce.

In a 2020 study by Pal and Banerjee, the installation of 366 solar-powered street lights in four villages of the Golaghat district of Assam by Numaligarh Refinery Limited (NRL) helped women feel safe walking in the evening and at night. Solar street lights have also helped young girls who can now go for their tuition classes in the evening without fear.

Access to Clean Energy Equals Access to Better Education and Health

Women, because of gender-based division in household work, are involved in collecting fuel for cooking and transporting them over long distances. Rural Indian women, on average, spend five to eight hours every day on cooking, and 20 per cent of this time is used in securing fuel wood alone. This has, in turn, reduces their time for study, schooling, or paid employment. Further, biomass fuel causes severe and long-term health problems such as respiratory diseases.

The World Health Organisation (WHO) reports that 500,000 deaths occur yearly due to unclean cooking fuels in India. The International Energy Agency (IEA) estimated that the average firewood load carried by women for several miles daily varies from 25-50 kg. This labour work along with creating time poverty for women also impacts their postures and lead to back pain. Providing clean energy access can reduce the drudgery among rural women, giving them time for education or skill upgradation and improving their health.

How Renewable Energy can help Rural Women

The renewable energy sector has vast opportunities in its value chain and can promote gender equality if accessible to all. Access to energy has historically been crucial for women's economic development. Today, access to modern forms of energy is considered indispensable for alleviating poverty, accessing jobs, assuring independence, and providing social services. Because of its importance in furthering human development, access to energy was included among the United Nations' 17 Sustainable Development Goals (SDGs) in 2015. Significant intra-household dynamics link Affordable and Clean Energy (SDG 7) with gender equality (SDG 5).

In its study, the International Renewable Energy Agency (IRENA) stated that DRE solutions could generate a resilient energy system and support vital adaptation measures for women's communities. Also, long-term access to a reliable energy supply through DRE solutions builds services, self-resilience and adaptive capacity among women. It decreases their vulnerability to climate change risks without requiring huge upfront infrastructure investment.

While the past decade has seen significant advancement in interlinking RE and women's empowerment, a lot more can still be done. Empirical evidence shows that despite the renewable energy sector having immense possibilities for the involvement of women, they are still under-represented. A CEEW study reveals that in India, women account for only an average of 11 per cent of the total employees in the rooftop solar business of surveyed companies as compared to the global average of women in the renewables sector at 32 per cent.

Areas of action that all stakeholders should focus upon are:

- Need to educate and empower rural women on the benefits of RE and clean energy in improving their quality of life. For example, empowered women will demand more sustainable cooking energy, which frees up their time to engage in paid work and reduces their health burdens.
- Empowering women as energy entrepreneurs with the support of the country's Entrepreneurship Development Programmes (EDPs). EDPs can assist and facilitate access to

several government schemes and policies for women entrepreneurs in the energy space by supporting business registration and accessing government support.

- Going beyond energy provision and focusing on the productive use of DRE to improve women's socio-economic participation: their skilling, equipment financing, and market linkages for the products being produced by end-users.
- "Engendering" energy programmes and policies by conducting gender sensitisation and capacity-building sessions with policymakers. Identifying and responding to women's needs should be included within ministry mandates.
- Targeted gender budgeting to be prepared alongside the department budget for each ministry. This will assist and create a roadmap for each ministry and identify schemes and, therefore, implementation process gaps.
- A mechanism to collect sex-disaggregated data on policies/scheme end users across ministries needs to be developed. This will assist in better understanding the existing policy's impact on rural women and girls.

For renewable energy to truly transform the lives of rural women, all stakeholders – government, private industries, philanthropies, community-level

organisations and technology enterprises – will have to join hands. Only when women are at the centre of renewable energy expansion, will India be able to achieve both inclusive and sustainable growth.

References

1. <https://suryamitra.nise.res.in/info/About-Suryamitra.html>
2. <https://www.ceew.in/publications/building-workforce-indias-emerging-clean-energy>
3. <https://www.kviconline.gov.in/msc/>
4. <https://www.soulsiitb.in/>
5. <https://poweringlivelihoods.org/>
6. https://www.niti.gov.in/sites/default/files/2022-04/Discussion_Paper_on_Workforce_05042022.pdf
7. <https://pmkusum.mnre.gov.in/landing-about.html>
8. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0252705#sec007>
9. <http://www.ijsr.net/archive/v9i4/SR20414150536.pdf>
10. <https://www.ceew.in/publications/powering-primary-healthcare-through-solar-india>

