



**Research Unit**  
Press Information Bureau  
Government of India

## India's Renewable Energy Boom: Job Creation and Sustainable Growth

*Jobs in India's Renewable Sector Soar to 1.02 Million in 2023*

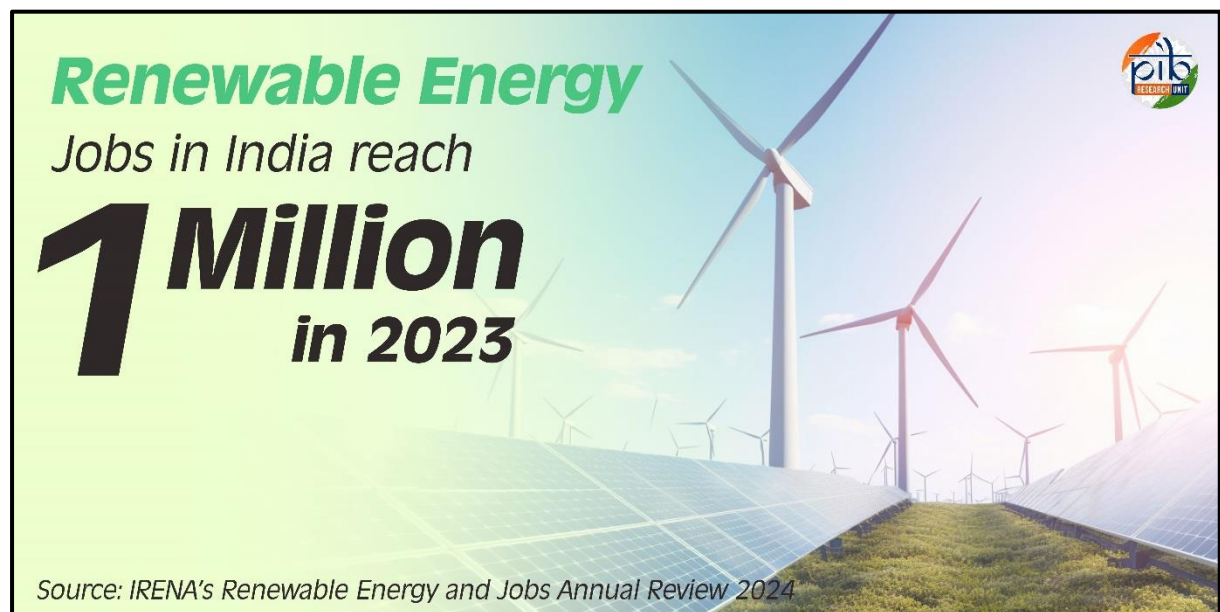
(Ministry of New and Renewable Energy)

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### Introduction

In a significant milestone for India's renewable energy sector, the total number of jobs reached an estimated 1.02 million in 2023, according to the 2024 Annual Review by the International Renewable Energy Agency (IRENA). The global renewable energy workforce grew to 16.2 million, up from 13.7 million in 2022, with India making a notable contribution to this rise. The report, developed in collaboration with the International Labour Organization (ILO), highlights India's growing leadership in clean energy and its focus on creating green jobs that drive economic growth.

As renewable energy continues to grow in India, it is not only boosting the economy but also creating sustainable livelihoods for millions. The sector plays a vital role in shaping a greener future, supporting India's journey toward energy independence and environmental sustainability while opening up new avenues for employment across the country.

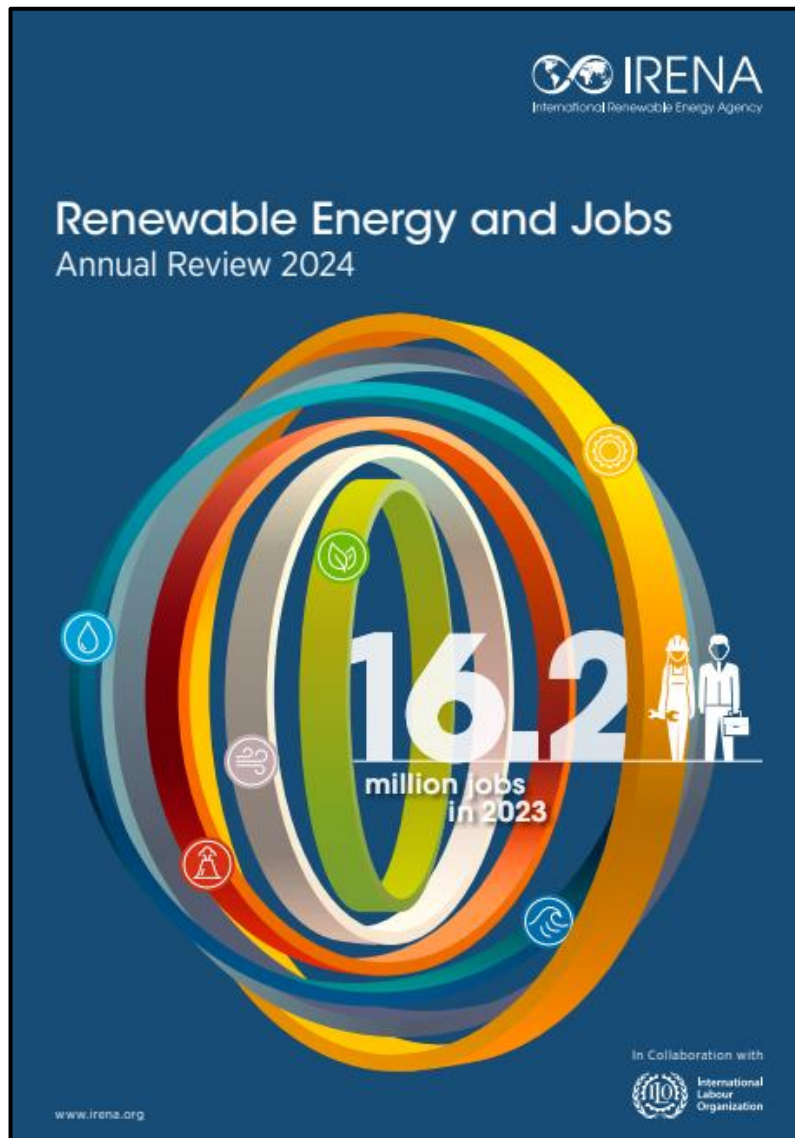


## Overview of IRENA's Renewable Energy and Jobs Series

The IRENA Renewable Energy and Jobs series provides a comprehensive overview of employment trends within the renewable energy sector. It examines the global landscape of renewable energy technologies and analyzes employment across different countries, including India. The report assesses public and private sector policies influencing job creation, such as those related to renewable energy deployment, industrial growth, skill development, and labour market initiatives. Although detailed information on education, skill requirements, and workforce attributes in renewable energy remains limited, the series emphasizes the need for decent work to ensure a fair and inclusive energy transition.

Each edition of the series presents the most recent data,

focusing on key aspects like employment in energy access, gender equity in the workforce, and the demands of a just transition. Since 2011, this series has been a part of IRENA's broader analysis of the socio-economic effects of a renewable energy-based transition, covering topics such as job creation, the development of local capacities, women's participation in the sector, and education and training opportunities. The reports also explore the impact of renewable energy pathways on jobs, GDP, and overall human welfare, with projections up to 2050.



## Key Findings in 2024 Report

❖ In 2023, India had an estimated 1.02 million renewable energy jobs.

❖ Hydropower was the largest employer in the renewable sector in India, providing around 453,000 jobs, and accounting for 20% of the global total, second only to China.

❖ The solar PV sector in India employed about 318,600 people in both on-grid and off-grid systems. India added 9.7 GW of solar PV capacity in 2023 and ranked fifth globally for new installations and cumulative capacity, which reached 72.7 GW by the end of the year.

❖ India's operational module manufacturing capacity stood at 46 GW in 2023, expected to grow to 58 GW in 2024. Similarly, cell manufacturing capacity was 26 GW in 2023 and is projected to reach 32 GW in 2024, making India the second-largest PV manufacturer globally after China.

❖ IRENA estimates that in 2023, India had 238,000 jobs in grid-connected solar PV, an 18% increase from 2022. Around 80,000 people worked in the off-grid solar sector.

❖ India had a cumulative installed wind power capacity of 44.7 GW in 2023, ranking fourth globally. The country added 2.8 GW of wind capacity in 2023, marking a significant increase after five years of slower growth.

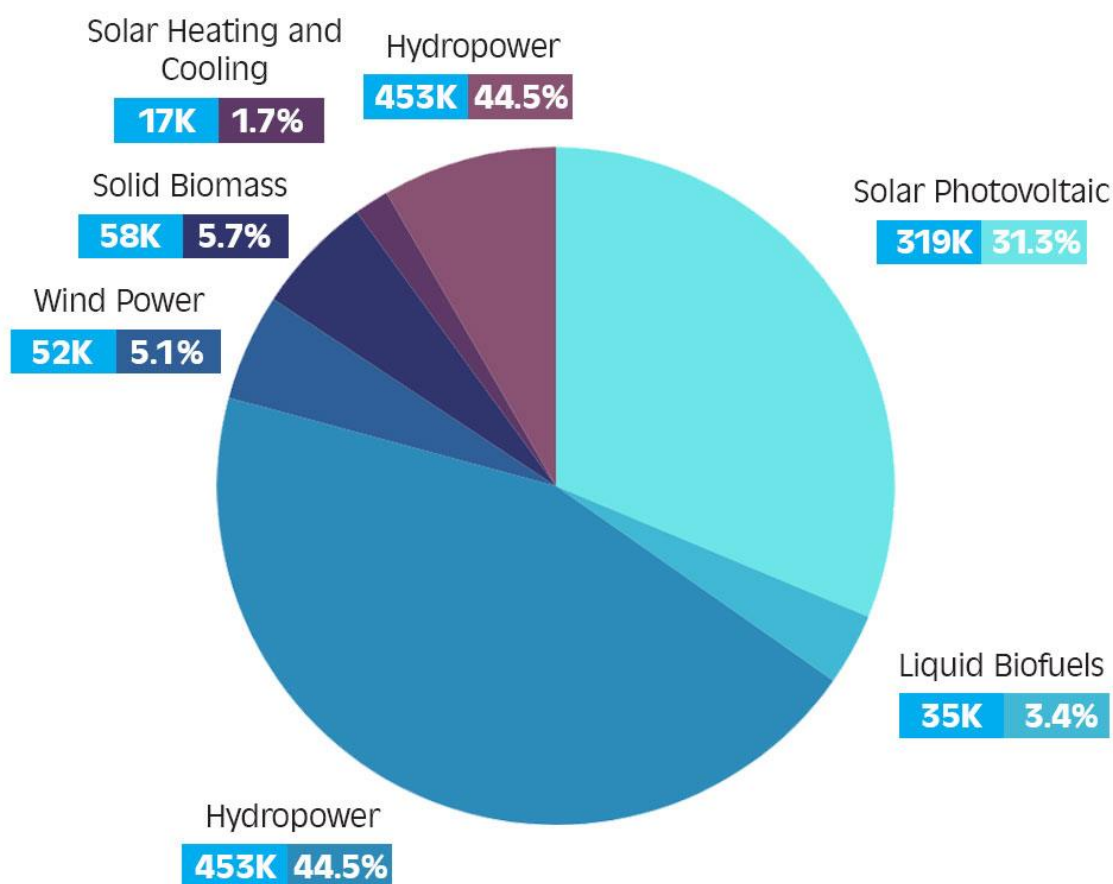
❖ The Indian wind sector provided employment to approximately 52,200 people in 2023, with around 40% in operations and maintenance and 35% in construction and installation.

## Renewable Energy Jobs in India (2023)

Out of the 1.02 million people employed in India's renewable energy sector in 2023, Hydropower and Solar Photovoltaic were the largest contributors, employing the most individuals. In addition to that, Wind Power generated 52,000 jobs, Liquid Biofuels provided 35,000, and Solid Biomass accounted for 58,000 jobs. The Solar Heating and Cooling sector employed 17,000 people, while Biogas created 85,000 jobs, showcasing the diverse employment landscape within the sector.



# Estimated Direct and Indirect Jobs In Renewable Energy in India (2023)



Source: IRENA's Renewable Energy and Jobs Annual Review 2024

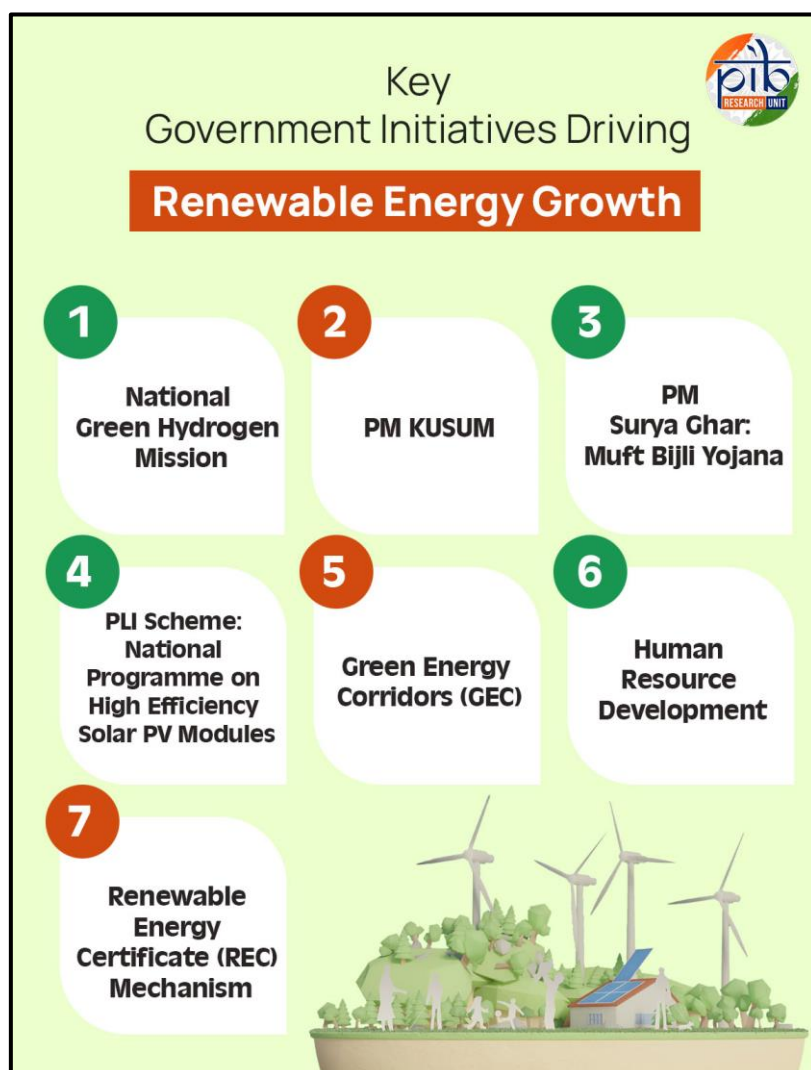
## Annual Electricity Generation from Renewable Sources

India's dedication to renewable energy is evident in the annual electricity generation trends over recent years. Here's a summary of the breakdown for the last four years:

Year	Renewable Energy Electricity Generation (in Billion Units)	Percentage Share of RE in Total Generation
2021-22	330.03	22.12%
2022-23	372.39	22.92%
2023-24	364.60	20.96%
2024-25 (Up to May 2024)	61.84	19.19%

## Major Government Initiatives

India is accelerating its transition to a sustainable energy future through a range of initiatives. Key programs include the National Green Hydrogen Mission, PM-KUSUM, PM Surya Ghar, and PLI schemes for solar PV modules. These efforts not only drive renewable energy adoption but also create significant job opportunities.



## **National Green Hydrogen Mission**

The Ministry of New and Renewable Energy is spearheading the National Green Hydrogen Mission, which was approved by the Union Cabinet on January 4, 2023, with a financial outlay of ₹19,744 crore. The primary objective of this mission is to position India as a global hub for the production, usage, and export of green hydrogen and its derivatives.

This mission is set to deliver wide-ranging economic benefits by decarbonizing various sectors, including industry, mobility, and energy. It aims to reduce the country's dependence on imported fossil fuels while simultaneously fostering the development of indigenous manufacturing capabilities. Additionally, the mission is expected to create numerous employment opportunities across the value chain and stimulate advancements in cutting-edge technologies and an innovation ecosystem within the country.

The mission is also poised to generate numerous jobs through the establishment of an innovation ecosystem, where cutting-edge technologies related to green hydrogen will be developed. With a target to produce at least 5 million metric tonnes (MMT) of green hydrogen annually by 2030, and potentially increasing that to 10 MMT as export markets expand, the mission aims to drive sustainable job growth. This initiative is not only pivotal for India's energy transition but also essential for enhancing the renewable energy workforce, thus contributing to the overall employment landscape in the sector.

## **PM KUSUM**

The Government launched the PM-KUSUM scheme in March 2019, which was scaled up in January 2024 with the objective of providing energy and water security to farmers, enhancing their income, de-dieselizing the farm sector, and reducing environmental pollution.

The PM KUSUM Scheme has the following components:

**Component A:** Setting up of 10,000 MW of Decentralized Ground/ Stilt Mounted Grid Connected Solar or other Renewable Energy based Power Plants by the farmers on their land.

**Component B:** Installation of 14 Lakh Stand-alone Solar Agriculture Pumps.

**Component C:** Solarization of 35 Lakh Grid Connected Agriculture Pumps including Feeder Level Solarization.

The PM-KUSUM Scheme allows inter-se transfer of quantities between Component-B and Component-C. All three components of the scheme aim to add Solar capacity of about 34,800 MW by March 2026 with the total Central Financial support of ₹ 34,422 crore. The scheme also has direct employment generation potential. As per available studies, around 24.50 job-years are created per MW of small capacity solar installation. Therefore, besides increasing

self-employment, the scheme is likely to generate employment opportunities equivalent to 7.55 lakh job-years for skilled and unskilled workers.

### **PM Surya Ghar: Muft Bijli Yojana**

The PM Surya Ghar: Muft Bijli Yojana is a landmark initiative that was launched by Prime Minister Narendra Modi on February 15, 2024. It aims to transform India's energy landscape by providing free electricity to households. This ambitious scheme empowers households to harness solar energy by offering a substantial subsidy covering up to 40% of the cost of installing solar panels on their rooftops. By enabling widespread adoption of solar power, the scheme is poised to benefit 1 crore households across the country. Furthermore, it is projected to generate significant savings for the government, estimated at Rs. 75,000 crores annually in electricity costs. Through this initiative, the government underscores its commitment to promoting sustainable energy and ensuring energy access for all.

The PM Surya Ghar: Muft Bijli Yojana offers several significant benefits to participating households:

- ❖ **Free Electricity for Households:** The scheme provides households with free electricity by installing subsidised rooftop solar panels, significantly reducing their energy costs.
- ❖ **Reduced Electricity Costs for the Government:** By promoting the widespread use of solar power, the scheme is expected to save the government an estimated ₹75,000 crore annually in electricity costs.
- ❖ **Increased Use of Renewable Energy:** The scheme encourages the adoption of renewable energy sources, contributing to a more sustainable and environmentally friendly energy mix in India.
- ❖ **Reduced Carbon Emissions:** The transition to solar energy under this scheme will help lower carbon emissions, supporting India's commitment to reducing its carbon footprint.

The scheme is also expected to create approximately 17 lakh direct jobs across various sectors, including manufacturing, logistics, supply chain, sales, installation, operations and maintenance (O&M), and other services, thereby boosting employment and economic growth in the country.

### **PLI Scheme: National Programme on High Efficiency Solar PV Modules**

The Ministry of New and Renewable Energy, Government of India, is implementing the Production Linked Incentive (PLI) Scheme for the National Programme on High Efficiency Solar PV Modules, aiming to achieve Giga Watt (GW) scale manufacturing capacity in this sector with an outlay of ₹24,000 crore. The selection of solar PV manufacturers will be

conducted through a transparent process. The scheme includes provisions for a Production Linked Incentive (PLI) to the chosen solar PV module manufacturers for five years post-commissioning, based on the manufacture and sale of high-efficiency solar PV modules.

The scheme aims to build an ecosystem for manufacturing of high efficiency solar PV modules in India and thus reduce import dependence in the area of Renewable Energy. The objectives of the scheme include the following:

- ❖ Build manufacturing capacity for high-efficiency solar PV modules in India.
- ❖ Attract cutting-edge technology for the production of high-efficiency modules, with a technology-agnostic approach that incentivizes better-performing technologies.
- ❖ Promote the establishment of integrated plants to enhance quality control and competitiveness.
- ❖ Develop an ecosystem for sourcing local materials in solar manufacturing.
- ❖ Generate employment opportunities and achieve technological self-sufficiency.

### **Green Energy Corridors (GEC)**

The Green Energy Corridors (GEC) initiative aims to establish an intra-state transmission system for renewable energy projects across the country. The program provides Central Financial Assistance (CFA) to develop the necessary transmission infrastructure for the efficient evacuation of power generated from renewable energy projects in a total of ten states, encompassing both phases of the GEC.

- ❖ **Intra-State Transmission System Green Energy Corridor Phase-I:** This phase is being implemented by eight renewable-rich states: Andhra Pradesh, Gujarat, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Tamil Nadu. The respective State Transmission Utilities (STUs) carry out the implementation, focusing on creating a robust transmission network that facilitates the seamless transfer of renewable energy within these states, ensuring that generated power can be effectively delivered to consumers.
- ❖ **Intra-State Transmission System Green Energy Corridor Phase-II:** This phase is being implemented by seven states: Gujarat, Himachal Pradesh, Karnataka, Kerala, Rajasthan, Tamil Nadu, and Uttar Pradesh. The STUs are responsible for implementing this phase, which further enhances transmission capabilities, supports the growing renewable energy capacity, and improves grid stability.

Through the establishment of these corridors, the GEC initiative aims to optimize the integration of renewable energy into the national grid, promote sustainable energy practices, and contribute to India's energy security and environmental goals.



## **Human Resource Development**

The Human Resource Development (HRD) scheme for the renewable energy sector continues for the period of 2021-22 to 2025-26. The primary aim of this programme, overseen by the Ministry, is to institutionalize renewable energy education and training to ensure a steady supply of qualified and skilled manpower in the country. The scheme includes short-term trainings and skill development in renewable energy, fellowships for higher studies and research, enhancement of renewable energy education and training infrastructure, the establishment of Renewable Energy Chairs in academic institutions, and a National Renewable Energy Internship Programme. Through these initiatives, the HRD scheme aims to empower the workforce with the necessary skills and knowledge to drive India's transition to a sustainable energy future.

## **Renewable Energy Certificate (REC) Mechanism**

The Renewable Energy Certificate (REC) mechanism is a market-based instrument designed to promote renewable energy and facilitate compliance with Renewable Purchase Obligations (RPO). It addresses the mismatch between the availability of renewable energy resources in different states and the obligations of entities to meet their RPO. Under the REC scheme, revenue for a renewable energy generator consists of income from the sale of the electricity generated and revenue from the sale of environmental attributes in the form of RECs.

Entities eligible for the issuance of Certificates include renewable energy generating stations, captive generating stations that utilize renewable energy sources, distribution licensees, and open access consumers. This mechanism not only incentivizes the generation of renewable energy but also supports the broader transition to sustainable energy practices across the country.

## **Conclusion**

In conclusion, India's renewable energy sector has reached a significant milestone with a total of approximately 1.02 million jobs in 2023, showcasing the nation's commitment to a sustainable energy future. The IRENA report underscores the sector's vital role in driving economic growth and creating sustainable livelihoods. Initiatives such as the National Green Hydrogen Mission, PM-KUSUM, PM Surya Ghar, and the PLI scheme for solar PV modules are instrumental in expanding renewable technologies and enhancing workforce skills. By prioritizing job opportunities alongside energy transition, India not only advances its environmental goals but also fosters a robust economy that supports livelihoods nationwide. This dual focus on sustainability and employment positions India as a global leader in renewable energy, paving the way for a cleaner, greener future.

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