

# INDIA'S EXPANDING CLEAN ENERGY WORKFORCE

OPPORTUNITIES IN THE  
SOLAR AND WIND ENERGY  
SECTORS



## Introduction

Job creation, skill development and COVID recovery are key priorities for the Indian government. Jobs created in the renewable energy (RE) market offer a significant opportunity to meet the government's multiple goals of employment generation, clean energy expansion, and economic development. As of August 2021, India reached a total installed capacity of 100 GW of RE, excluding large hydro.

This report provides an updated analysis on direct jobs created from solar and wind in financial year 2020 (FY20) and 2021 (FY21), building on earlier analysis by the Council on Energy, Environment and Water (CEEW), the Natural Resources Defense Council (NRDC), and Skill Council for Green Jobs (SCGJ).

This analysis uses workforce numbers, job-years per megawatt (MW), and the full time equivalent (FTE) coefficients calculated in earlier reports from data collected in 2017. This report provides updated findings and recommendations geared toward India's goal of 500 GW of non-fossil fuel electricity generation capacity, including 450 GW of RE, by 2030.

## Key Findings

- **India can potentially create about 3.5 million jobs (short and long term) by installing 280 GW solar and 140 GW wind capacity out of the 500 GW non-fossil electricity generation capacity goal by 2030.** These jobs represent those created in the wind and on-grid solar energy sectors. **A workforce of about one million can be employed to take up these green jobs.** Jobs created are different from the workforce needed, as one worker can perform more than one job.
- **As of FY21, the wind and solar energy sectors employ a workforce of 111,400.** The solar sector (utility-scale and rooftop solar) continued to employ the majority of this workforce with a 77 percent share (85,900) whereas wind accounted for 23 percent share (25,500).
- **COVID-19 impacted the Indian RE sector which created 48 percent less jobs in FY 21 compared to FY19.** A new workforce of only 6,400 was added in FY21 over 12,400 in FY19. Further, the total workforce addition in FY20 and FY21 combined (11,600) is six percent less than FY19 alone (12,400).
- **More than 78,000 trainees have been certified under the national-level solar energy Suryamitra training program** between 2015 and July 2021.
- With a focus on enhancing environmental awareness and integrating greening attributes across all job profiles and skill levels, **SCGJ developed two Greening National Occupation Standards (NOS) "Optimize resource utilization at workplace" and "Adopt sustainable practices at workplace."** These are being effectively mainstreamed in the training delivery across all job roles, with a specific focus to inculcate 'green knowledge' and 'green methods' for developing skills in all relevant sectors.

## Recommendations

There is significant opportunity to combine the government's job creation and energy transition goals. The following recommendations can help:

- **Higher focus on decentralized renewable energy (DRE) sources like rooftop solar, mini- and micro-grid systems can significantly increase the employment opportunities by achieving India's 500 GW of non-fossil fuel electricity generation capacity target.** The distributed nature of these projects makes them more labor intensive than utility-scale projects thereby increasing the jobs created across the project deployment cycle.
- **Ensure continuous deployment of RE capacities to restrain job loss through periodic tendering, providing relaxations to continue construction activities with necessary precautions even in special cases like pandemics** to ensure that the tendered projects meet the timeline, supporting the investments in the sector through streamlined processes, payment securities etc.
- **Strengthen domestic manufacturing of various technology components** to exploit the untapped employment potential and meet the requirements of the 500 GW of non-fossil fuel electricity generation capacity.
- **Promote rural skill development programs to take the transition closer to the community.** Our research indicates that the availability of skilled local workforce can accelerate the deployment of solar parks and mini/microgrid projects.
- **Regularly update the skilling curriculum through periodic industrial engagements** to bridge the skill gap and ensure timely availability of skilled workforce.
- **Strengthen transmission and distribution networks to integrate the growing intermittent RE in the coming years.** A robust grid and a flexible power system with storage are essential to integrate 500 GW of non-fossil fuel electricity generation capacity and serve end-users.
- **Land acquisition support by government will help in clearing a common bottleneck for clean power plants and grid projects.**



**3.5 Million Jobs** (short and long term) can be created by achieving **280 GW solar and 140 GW wind targets** of the 500 GW non-fossil fuel electricity generation capacity by 2030.

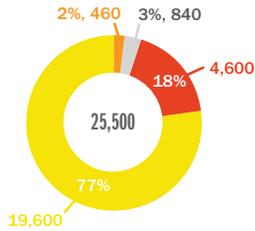


**1 Million Workforce** can be employed to take up these jobs from the solar and wind targets of the 500 GW of non-fossil fuel capacity by 2030.

**111,400 Workforce** employed by wind and solar energy sectors as of FY21.

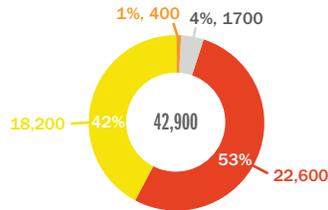


Cumulative Jobs Created for 39.2 GW of Installed Wind Capacity until FY21

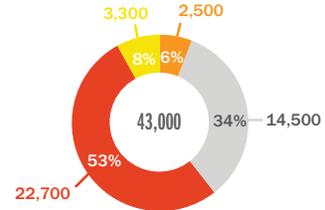


■ Business Development ■ Design ■ Construction and Commissioning ■ Operation and Maintenance

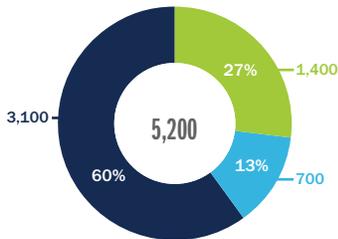
Cumulative Jobs Created for 35.6 GW of Installed Utility-Scale Solar Capacity until FY21



Cumulative Jobs Created for 6.5 GW of Installed Rooftop Solar Capacity until FY21

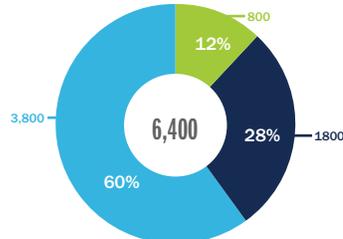


Solar and wind energy workforce added in FY20

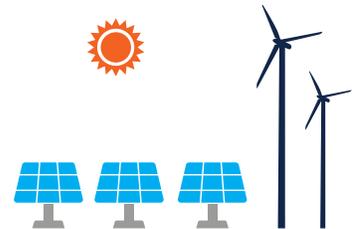


■ Utility-Scale Solar ■ Rooftop Solar ■ Wind

Solar and wind energy workforce added in FY21



■ Utility-Scale Solar ■ Rooftop Solar ■ Wind



**Total 100,000 Workers**

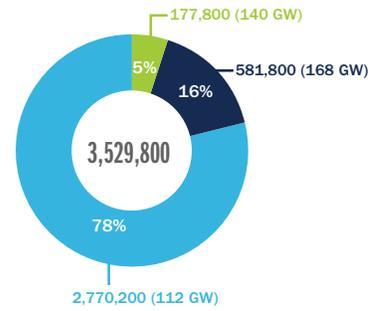
trained by SCGJ between FY16 and FY21 out of which



**78,000**

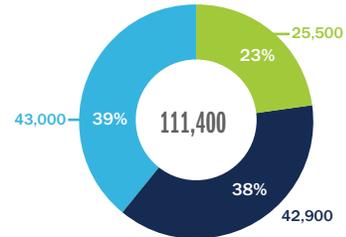
were certified under the national-level Suryamitra program

Sector-wise jobs creation potential by achieving 140 GW wind and 280 GW solar targets of non-fossil fuel capacity by 2030.



■ Utility-Scale Solar ■ Rooftop Solar ■ Wind

Cumulative workforce employed by wind and solar energy sectors as of FY21



■ Utility-Scale Solar ■ Rooftop Solar ■ Wind

### About this Study

This report is a part of series of issue briefs, reports, case studies, and fact sheets on clean energy in India. This employment discussion builds on three earlier issue briefs on clean energy jobs, *Powering Jobs Growth with Green Energy* (2019), *Greening India's Workforce* (2017) and *Clean Energy Powers Local Job Growth in India* (2015).

### About Council on Energy, Environment and Water

Council on Energy, Environment and Water (CEEW) is one of Asia's leading not-for-profit policy research institutions. The Council uses data, integrated analysis, and strategic outreach to explain – and change – the use, reuse, and misuse of resources. It prides itself on the independence of its high-quality research, develops partnerships with public and private institutions, and engages with the wider public. In 2021, CEEW once again featured extensively across ten categories in the 2020 Global Go To Think Tank Index Report. The Council has also been consistently ranked among the world's top climate change think tanks. CEEW is certified as a Great Place To Work®. [www.ceew.in](http://www.ceew.in) Twitter @CEEWIndia

### About Natural Resources Defense Council

Natural Resources Defense Council (NRDC) is an international non-profit environmental organization with more than 3 million members and online supporters. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world's natural resources, public health, and the environment. NRDC's India Program on Climate Change and Clean Energy, launched in 2009, works with local partners to help build a low-carbon, sustainable economy. [www.nrdc.org](http://www.nrdc.org) Twitter @NRDC\_India

### About Skill Council for Green Jobs

Skill Council for Green Jobs (SCGJ) is the sector skill council supporting National Skill Development Mission, National Solar Mission, Make in India, Smart City Mission, AMRUT and Swachh Bharat Abhiyan. SCGJ has been created under the Ministry of Skill Development and Entrepreneurship (MSDE) and promoted by Ministry of New and Renewable Energy (MNRE) with the mandate to undertake industry skills gap analysis, develop National Occupational Standards along with course curriculums and certification of trainers and candidates to support skill development activity in India. [www.sscgj.in](http://www.sscgj.in)

### Editorial Team

CEEW Researchers and Authors: Akanksha Tyagi, Ankit Nagarwal  
Project Directors: Neeraj Kuldeep and Arunabha Ghosh

NRDC Researchers and Authors: Charu Lata, Jessica Korsh  
Project Director: Sameer Kwatra

SCGJ Researcher and Author: Deepak Rai  
Project Director: Dr. Praveen Saxena

### Acknowledgements

The authors would like to thank Dr. Praveen Saxena, SCGJ; Ms. Amanda Maxwell, NRDC; Mr. Nitish Arora, NRDC; Mr. Neeraj Kuldeep, CEEW; Ms. Madhura Joshi, E3G; and Mr. Tanmay Bishnoi, Clean Energy Specialist for all for their review comments. We sincerely value the contributions of the following NRDC staff: Anjali Jaiswal, Kim Knowlton, Sameer Kwatra and Kriti Sehgal. The authors are grateful to the funders of our work for their generous support.

### Disclaimer

This issue brief presents independent analysis. Neither CEEW or NRDC have any financial or commercial engagements with SCGJ. The views expressed in this policy brief are those of the authors and do not necessarily reflect the views and policies of the Council on Energy, Environment and Water or the reviewers.

**Suggested Citation:** Akanksha Tyagi, Charu Lata, Jessica Korsh, Ankit Nagarwal, Deepak Rai, Sameer Kwatra, Neeraj Kuldeep, and Praveen Saxena. 2021. India's Expanding Clean Energy Workforce. Council on Energy, Environment and Water, Natural Resources Defense Council, and Skill Council for Green Jobs.

**Photo credits:** Shutterstock

Copyright © 2021 Council on Energy, Environment and Water (CEEW); Natural Resources Defense Council; and Skill Council for Green Jobs



Council on Energy, Environment and Water,  
Sanskrit Bhawan, A-10, Qutab Institutional  
Area, Aruna Asaf Ali Marg, New Delhi –  
110067, India  
[www.ceew.in](http://www.ceew.in)



Headquarters: 40 West 20th Street  
11th floor  
New York, NY 10011  
[www.nrdc.org](http://www.nrdc.org)



3rd Floor, CBIP Building, Malcha Marg,  
Chanakypuri, New Delhi - 110021  
[www.sscgj.in](http://www.sscgj.in)