
IRENA
International Renewable Energy Agency

# Renewable Energy and Jobs
## Annual Review 2020

## Key Findings

**The renewable energy sector employed 11.5 million people, directly and indirectly, in 2019.[1] Renewable energy employment has continued to grow worldwide since 2012, when the International Renewable Energy Agency (IRENA) began to assess it on an annual basis. The solar photovoltaic (PV), bioenergy, hydropower and wind power industries have been the biggest employers.**

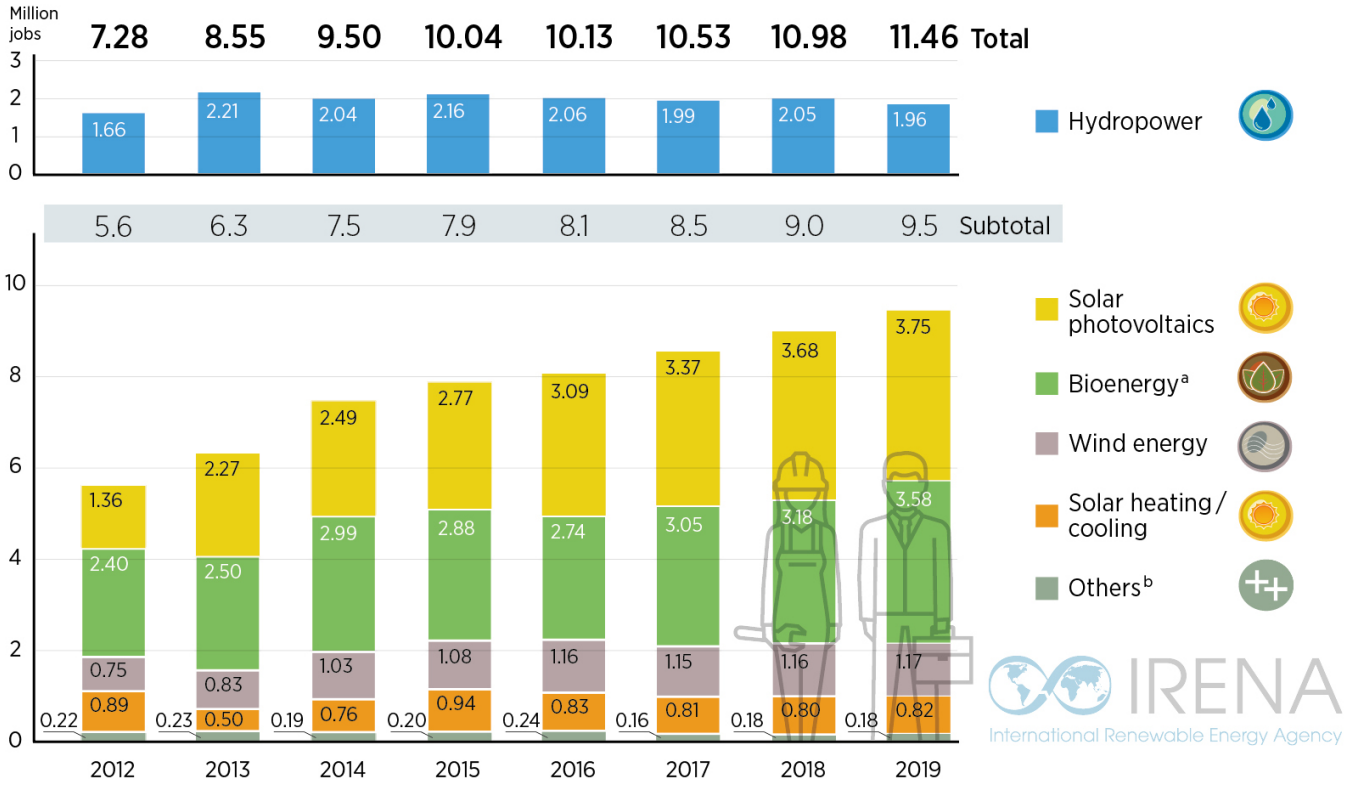
The bulk of global jobs relate to modern energy use, but the 2019 estimate includes jobs tied to the use of decentralised solar PV to expand energy access in parts of Sub-Saharan Africa and in South Asia. The figure shows the evolution of IRENA's renewable energy employment estimates since 2012.[2] The majority of these jobs are still held by men. The share of women in the renewable energy workforce is about 32%, compared to 22% in the energy sector overall (IRENA, 2019a).

- Employment in renewable energy worldwide was estimated at **11.5 million in 2019**, up from 11 million in 2018. Women hold 32% of these jobs.
- Most jobs have been created in a small number of countries, but employment benefits are showing up more widely, especially through the deployment of solar photovoltaic (PV) technologies. **Asia accounted for 63% of total jobs** in renewables globally.
- Although precise estimates remain scarce, **off-grid decentralised renewables are creating a growing number of jobs**, while also propelling employment in productive uses ranging from agro-processing and health care to communications and commerce in local communities.
- The solar PV industry retains the top spot, with 33% of the total renewable energy workforce. In 2019, **91% of global PV employment was concentrated in the ten countries** that lead in worldwide deployment and in the production of equipment.
- Driven by output growth of 2% for ethanol and 13% for biodiesel, **biofuels jobs worldwide expanded to 2.5 million**. Production expanded robustly in Brazil, Colombia, Malaysia, the Philippines and Thailand, all of which have labour-intensive supply chains, whereas output in the United States and the European Union fell.

*1 Data are principally for 2018 19, with dates varying by country and technology, including some instances where only earlier information is available. The data for hydropower include direct employment only; the data for other technologies include both direct and indirect employment where possible.*

*2 IRENA does not revise previous years' job estimates in light of improved or additional information that becomes available following the publication of a particular edition.*

## GLOBAL RENEWABLE ENERGY EMPLOYMENT BY TECHNOLOGY, 2012-2019




*Source: IRENA jobs database.*

*Note: Except for hydropower, where a revised methodology led to revisions of job estimates, numbers shown in this figure reflect those reported in past editions of the Annual Review.*

*a. Includes liquid biofuels, solid biomass and biogas.*

*b. "Others" includes geothermal energy, concentrated solar power, heat pumps (ground based), municipal and industrial waste, and ocean energy.*

- Employment in **wind power supports 1.2 million jobs**, 21% of which are held by women. Onshore projects continue to predominate, but the number of countries with offshore farms now stands at 18, up from 10 a decade ago. Supply chains are expanding.
- **Hydropower** has the largest installed capacity of all renewables, but its growth is slowing. The sector **employs close to 2 million people** directly, many in operations and maintenance.
- Building the skills base necessary to support the ongoing global energy transition from fossil fuels to renewables requires more **vocational training, stronger curricula, more teacher training and expanded use of information and communications technology** for remote learning.
- The COVID-19 pandemic reinforced the importance of **strong policy frameworks** for renewables to achieve social, economic and environmental objectives.



The findings outlined here are taken from:

IRENA (2020), *Renewable Energy and Jobs – Annual Review 2020 (Translated title here)*, International Renewable Energy Agency, Abu Dhabi.

ISBN: 978-92-9260-266-6