

Renewable capacity highlights

11 April 2022

HEADLINE FIGURES

3 064 GW

Global renewable generation capacity at the end of 2021

9.1%

Growth in renewable capacity during 2021

257 GW

Net increase in global renewable generation capacity in 2021

60%

Share of new renewable capacity installed in Asia in 2021

88%

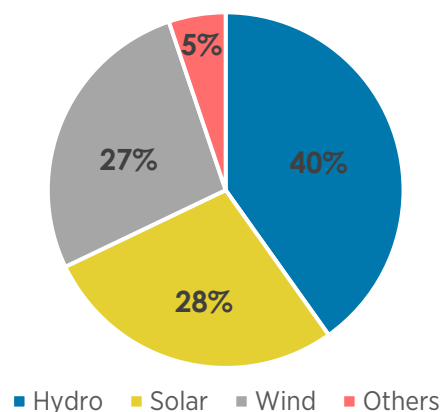
Wind and solar share of new renewable capacity in 2021

81%

Share of renewables in net capacity expansion in 2021

IRENA's renewable energy statistics can be downloaded at: www.irena.org/statistics

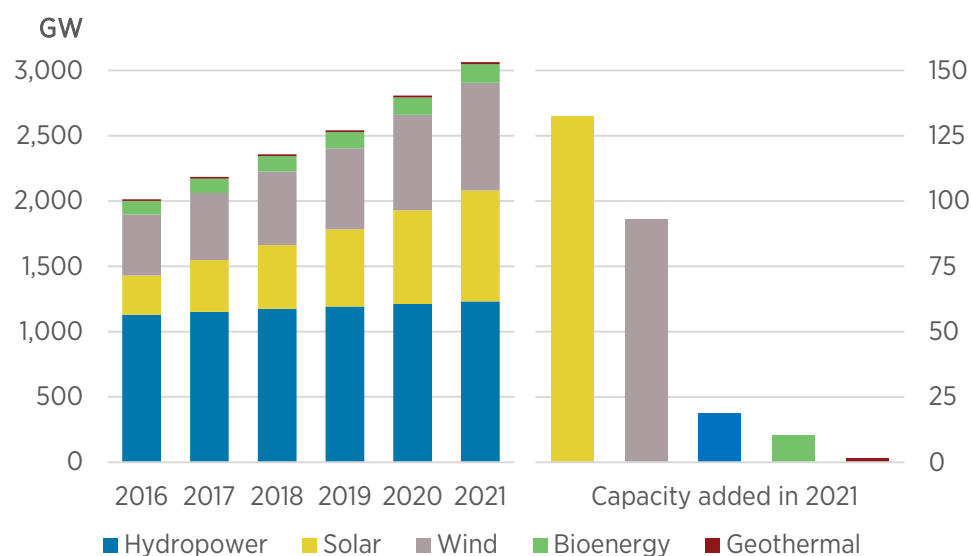
Renewable generation capacity by energy source



At the end of 2021, global renewable generation capacity amounted to 3 064 GW. Hydropower accounted for the largest share of the global total, with a capacity of 1 230 GW.*

Solar and wind energy accounted for equal shares of the remainder, with capacities of 849 GW and 825 GW respectively. Other renewables included 143 GW of bioenergy and 16 GW of geothermal, plus 524 MW of marine energy.

Renewable power capacity growth

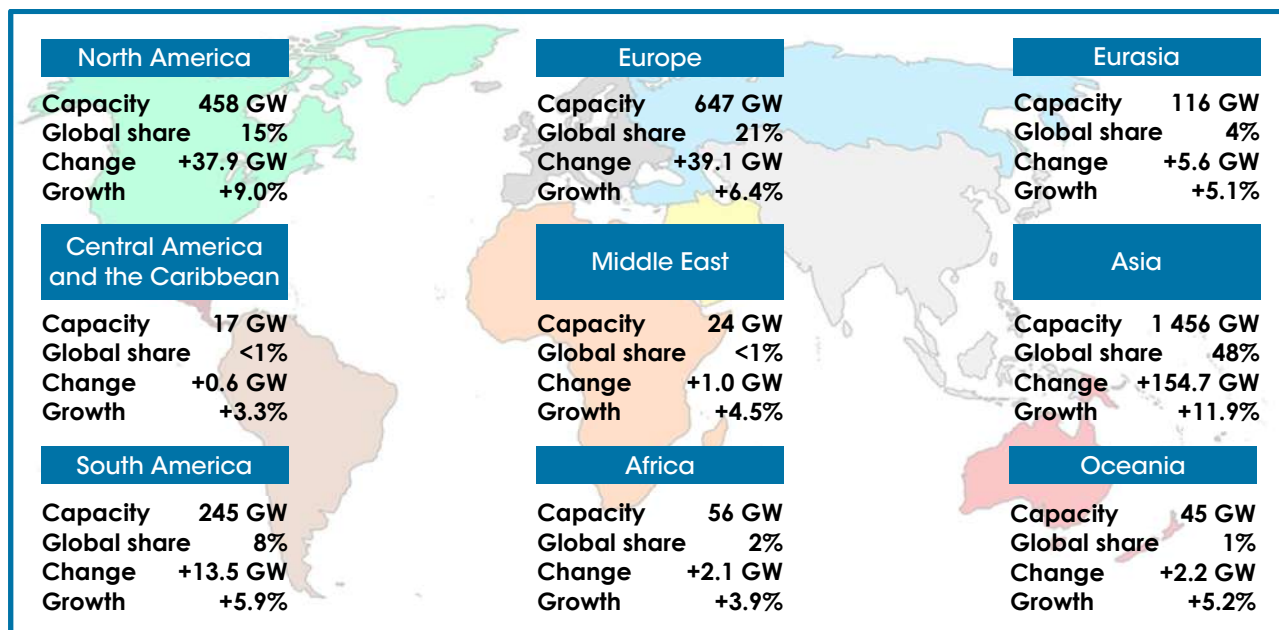


Renewable generation capacity increased by 257 GW (+9.1%) in 2021. Solar energy continued to lead capacity expansion, with an increase of 133 GW (+19%), followed by wind energy with 93 GW (+13%). Hydropower capacity increased by 19 GW (+2%) and bioenergy by 10 GW (+8%). Geothermal energy increased by 1.6 GW.

Solar and wind energy continued to dominate renewable capacity expansion, jointly accounting for 88% of all net renewable additions in 2021. Along with the higher growth of geothermal, this growth in wind and solar led to a high annual increase in renewable generating capacity.

* Note: these figures exclude pure pumped storage. At end-2021, this was an additional 130 GW, giving a total hydropower capacity of 1 360 GW.

Renewable generation capacity by region



For the complete dataset see: IRENA (2022), Renewable capacity statistics 2022, available at: www.irena.org/publications.

Asia accounted for 60% of new capacity in 2021, increasing its renewable capacity by 154.7 GW to reach 1.46 TW (48% of the global total). A huge part of this increase occurred in China (+121 GW). Capacity in Europe and North America expanded by 39 GW (+6.4%) and 38 GW (+9.0%) respectively, with a notably large expansion in the USA (+32 GW). Africa continued to expand steadily with an increase of 2.1 GW (+3.9%), slightly less than in 2020. Oceania is no longer the fastest growing region (+5.2%), although its share of global capacity is small and almost all of this expansion occurred in Australia.

Highlights by technology



Hydropower: Growth in hydro increased steadily in 2021, with the commissioning of several large projects delayed through 2021. China added 14.6 GW of capacity, followed by Canada with 1.3 GW.



Solar energy: With an increase in new capacity in all major world regions in previous years, total global solar capacity has now outgrown wind energy capacity.

Expansion in Asia was 76 GW in 2021 (compared to +77 GW in 2020), with major capacity increases in China (+53.0 GW) and India (+10.3 GW). Japan also added 4.4 GW and Republic of Korea expanded solar capacity by almost 3.6 GW.

Outside Asia, the United States added 19.6 GW of solar capacity in 2021, Brazil and Germany respectively added 5.2 GW and 4.7 GW and the Netherlands and Spain added more than 3 GW.



Wind energy: Wind expansion continued at a lower rate in 2021 compared to 2020 (+93 GW compared to +110 GW last year). China added 46.9 GW of new wind capacity, followed by the United States (+14.0 GW). Eleven other countries increased their wind capacity by more than

1 GW in 2021. While offshore wind remains a fairly small part of the sector, it continues to increase in importance each year and reached around 7% of total wind capacity in 2021.



Bioenergy: Net capacity expansion increased in 2021 (+10.3 GW compared to +9.1 GW in 2020). Bioenergy capacity in China expanded by 6.2 GW, leading net expansion in Asia and the world. North America was the only other region with significant expansion in 2021, adding 1.3 GW of bioenergy capacity.



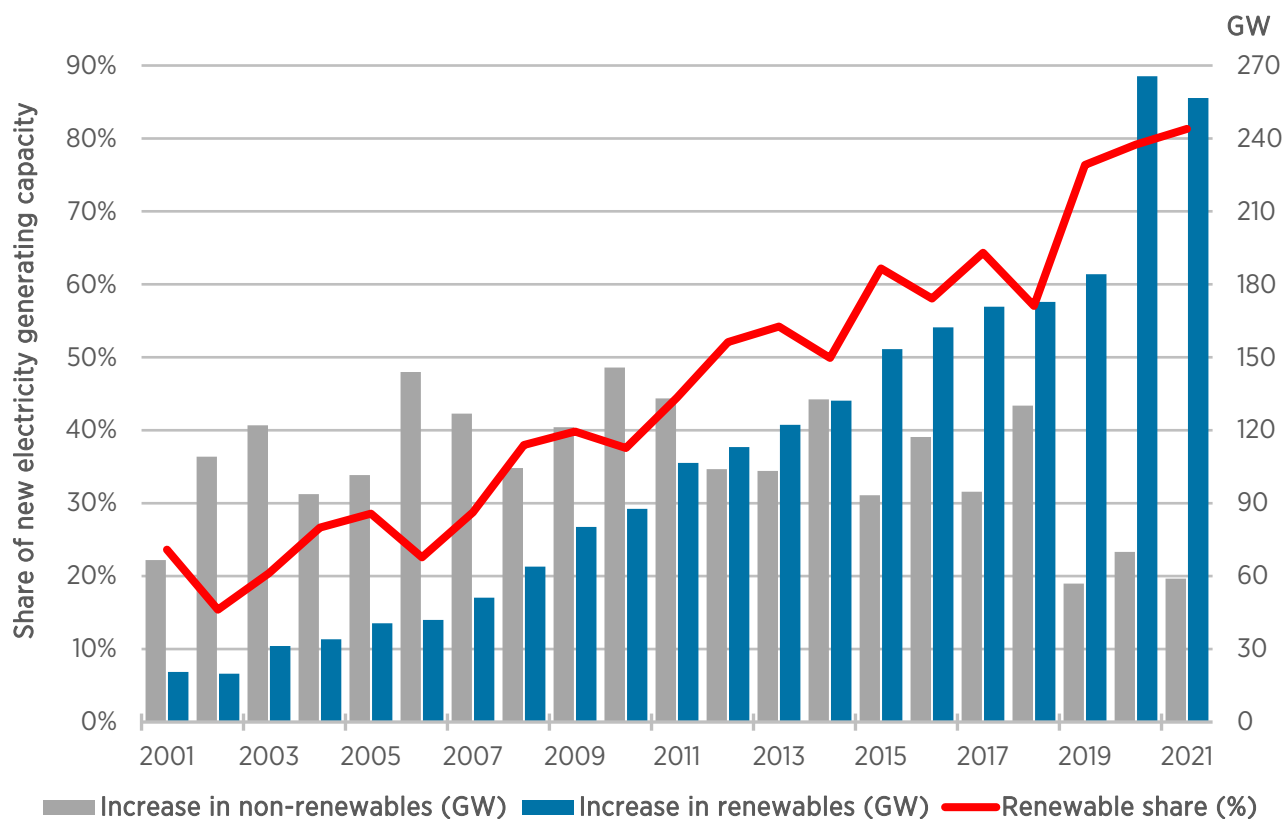
Geothermal energy: Geothermal capacity had an exceptional growth in 2021, with 1.6 GW added. The United States increased capacity by 1.3 GW in 2021, and other expansions occurred in Indonesia (+146 MW), Turkey (+63 MW), Italy (+30 MW) and Mexico (+25 MW).



Off-grid electricity: Off-grid capacity grew by 466 MW in 2021 (+4%) to reach 11.2 GW.* Solar expanded by 312 MW to reach 4.9 GW and hydro added 113 MW to reach 1.9 GW. Bioenergy and other capacity remained almost unchanged at about 4.5 GW.

* Note: these figures exclude Eurasia, Europe and North America.

Renewable share of annual power capacity expansion



In 2021, renewable generating capacity expansion slowed down slightly compared to 2020, while staying well above the long-term trend. Most of this expansion occurred in China and, to a lesser extent, the United States. Most other countries continued to increase renewable capacity at a similar rate to previous years.

The share of renewables in total capacity expansion reached 81% in 2021, compared to the figure of 79% in 2020. The renewable share of total generation capacity rose by almost two percentage points from 36.6% in 2020 to 38.3% in 2021.

The upward trend in these shares reflects not only the rapid and increasing growth of the use of renewables but also the declining expansion of non-renewable

capacity. At the global level, the latter is also affected by the large amount of net decommissioning that has occurred for many years in some regions.

In 2021, non-renewable capacity continued to expand in Asia, the Middle East and Africa (but with a much lower expansion in Middle East and Africa), while net decommissioning continued in Europe and Eurasia.

An energy transition requires that the use of renewables expands by more than the growth in energy demand, so that less non-renewable energy needs to be used. Many countries still have not reached this point, despite dramatic increases in their use of renewables for generating electricity.

Latest figures compared to previous estimates

Compared to the capacity statistics published in August 2021, the figures here have been revised upwards very slightly. Total renewable capacity in 2020 was reported as 2 802 GW last year and the new figure for 2020 is 2 807 GW (+0.18%).

As noted last year, most revisions can be explained by imprecise early reporting of distributed solar power generation in a few countries (which is often overstated). Upward revisions were also made this

year for a few countries where data were not available and estimates were made last year.

The other main revision has been an increase in the time-series for off-grid generation, where new figures have been found. Given the importance of increasing energy access and the widespread use of solar power for this purpose, countries are encouraged to continue expanding the collection of off-grid data for monitoring their national energy goals and targets.