

Renewable capacity highlights

20 March 2023

HEADLINE FIGURES

3 372 GW

Global renewable generation capacity at the end of 2022

9.6%

Growth in renewable capacity during 2022

295 GW

Net increase in global renewable generation capacity in 2022

59%

Share of new renewable capacity installed in Asia in 2022

90%

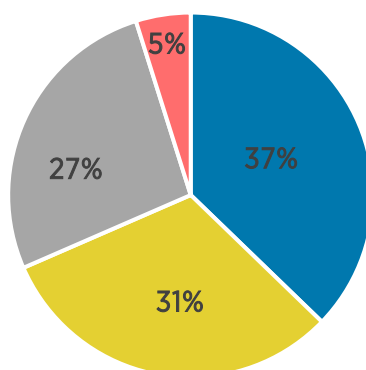
Wind and solar share of new renewable capacity in 2022

83%

Share of renewables in total net capacity expansion in 2022

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

Renewable generation capacity by energy source

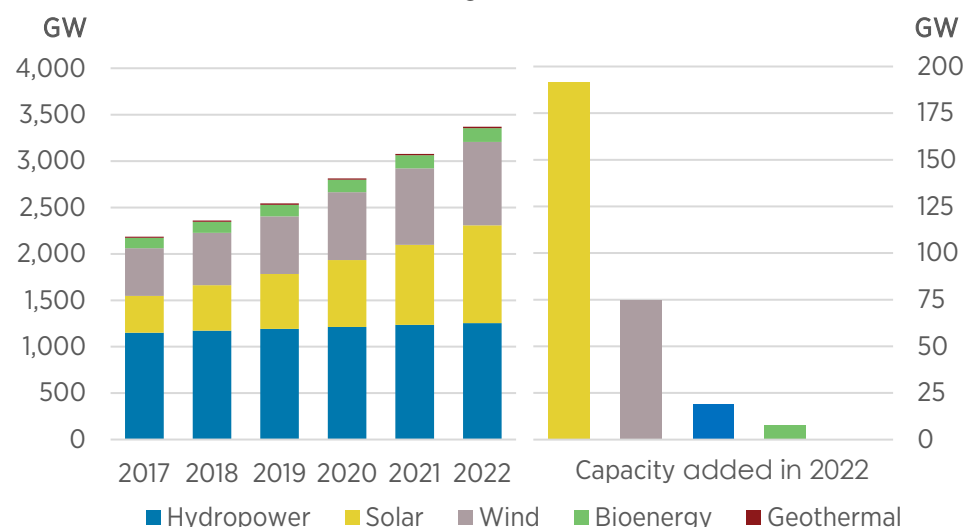


■ Hydro ■ Solar ■ Wind ■ Others

At the end of 2022, global renewable generation capacity amounted to 3 372 GW. Renewable hydropower accounted for the largest share of the global total, with a capacity of 1 256 GW.*

Solar and wind energy accounted for most of the remainder, with total capacities of 1 053 GW and 899 GW respectively. Other renewable capacities included 149 GW of bioenergy and 15 GW of geothermal, plus 524 MW of marine energy.

Renewable power capacity growth

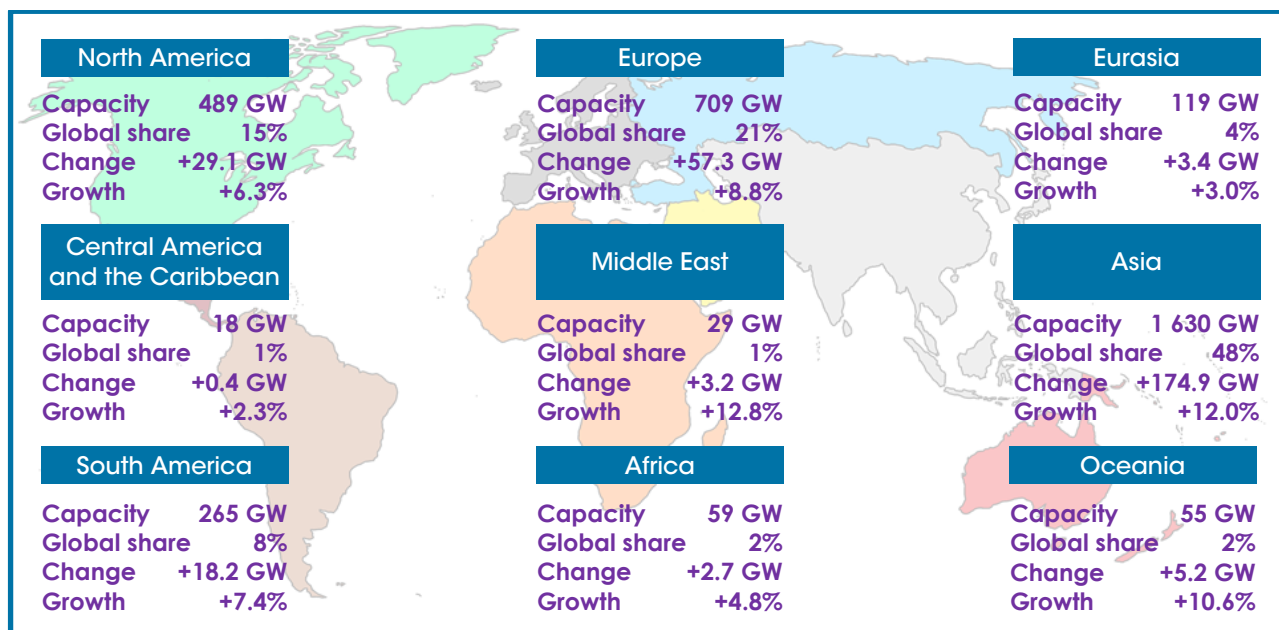


Renewable generation capacity increased by 295 GW (+9.6%) in 2022. Solar energy continued to lead capacity expansion, with a massive increase of 192 GW (+22%), followed by wind energy with 75 GW (+9%). Renewable hydropower capacity increased by 21 GW (+2%) and bioenergy by 8 GW (+5%). Geothermal energy increased by a very modest 181 MW.

Solar and wind energy continued to dominate renewable capacity expansion, jointly accounting for 90% of all net renewable additions in 2022. This growth in wind and solar led to the highest annual increase in renewable generating capacity and the second highest growth on record in percentage terms.

* Note: these figures exclude pure pumped storage hydropower. At end-2022, this was an additional 137 GW, giving a total hydropower capacity of 1 393 GW.

Renewable generation capacity by region



For the complete dataset see: IRENA (2023), Renewable capacity statistics 2023, available at: www.irena.org/publications.

Asia accounted again for about 60% of new capacity in 2022, increasing its renewable capacity by 174.9 GW to reach 1.63 TW (48% of the global total). A huge part of this increase occurred in China (+141 GW). Capacity in Europe and North America expanded by 57.3 GW (+8.8%) and 29.1 GW (+6.3%) respectively. Africa continued to expand steadily with an increase of 2.7 GW (+4.8%), slightly above last year. Oceania continued its double-digit growth with an expansion of 5.2 GW (+10.6%), largely due to expansion in Australia, and South America continued on an upward trend, with a capacity expansion of 18.2 GW (+7.4%). The Middle East also recorded its highest expansion on record, with 3.2 GW of new capacity commissioned in 2022 (+12.8%).

Highlights by technology



Hydropower: Hydropower expanded at a similar level to recent past years. Two-thirds of the expansion occurred in China. Other countries where capacity increased by more than 500 MW were: Canada, Ethiopia, Laos and Pakistan.



Solar energy: Solar photovoltaic power accounted for almost all the increase in solar power in 2022, with an increase in solar PV of 191 450 MW and an increase of 125 MW in concentrated solar power.

Expansion in Asia was 112 GW in 2022 (compared to +75 GW in 2021). Major capacity increases occurred in China (+86.0 GW) and India (+13.5 GW). Japan also added 4.6 GW, slightly more than in 2021.

Outside Asia, the United States added 17.6 GW of solar capacity in 2022, Brazil added 9.9 GW and the Netherlands and Germany added 7.7 GW and 7.2 GW respectively.



Wind energy: With an increase of 75 GW in 2022, growth in wind power continued to slow compared to the previous two years. China accounted for almost half of this expansion (37 GW) and capacity in the United States increased

by 7.8 GW. Most of the remaining capacity expansion occurred in Brazil and a handful of European countries. Offshore wind continued to account for about 7% of all capacity.



Bioenergy: Expansion slowed slightly in 2022 (+7.6 GW compared to +8.1 GW in 2021). Bioenergy capacity in China rose by 4.3 GW and other countries with major increases were Brazil (+854 MW), Indonesia (+735 MW) and Japan (+885 MW).



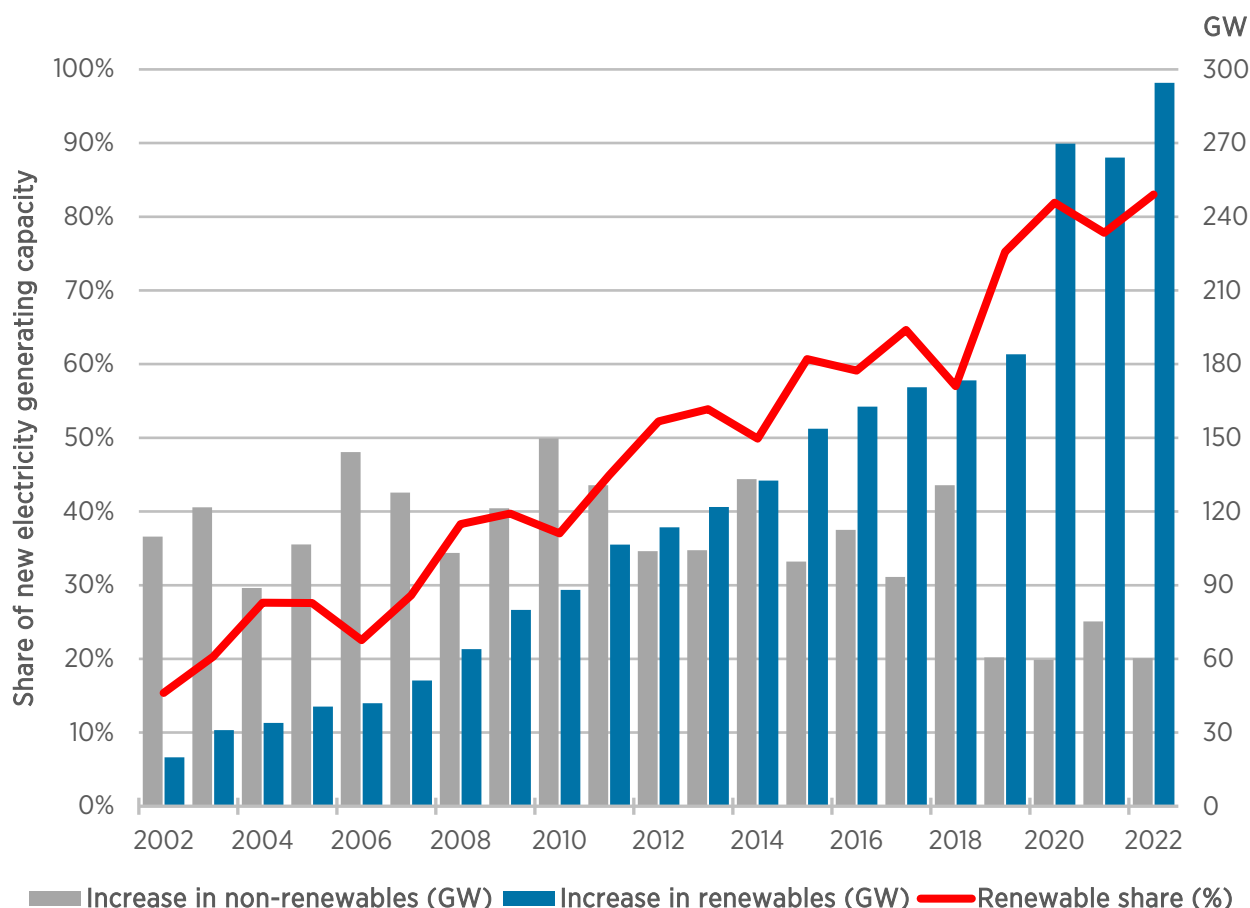
Geothermal energy: Geothermal capacity increased very little in 2022, with most of this expansion occurring in Kenya (+86 MW), Indonesia (+57 MW) and the United States (+56 MW).



Off-grid electricity: Off-grid capacity grew by 1 237 MW in 2022 (+11%) to reach 12.4 GW.* Solar expanded by 478 MW to reach 5.1 GW, off-grid hydro capacity remained about the same as in 2021 and all of the rest of this increase came from expansion of a broad range of different types of bioenergy.

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

Renewable share of annual power capacity expansion



In 2022, renewable generating capacity expansion increased compared to 2021 and stayed well above the long-term trend. As in previous years, most of this expansion occurred in China and, to a lesser extent, the United States. However, a broad range of other countries also increased their expansion of renewable capacity in 2022 compared to 2021.

The share of renewables in total capacity expansion reached 83% in 2022, compared to the figure of 78% in 2021. The renewable share of total generation capacity also rose by almost two percentage points from 38.3% in 2021 to 40.2% in 2022.

The upward trend in these shares continues to show both the rapid and increasing growth in the use of renewables and the declining expansion of non-renewable capacity. At the global level, the latter is

partly due to the large amount of net decommissioning that has occurred for many years in some regions.

As in previous years, non-renewable capacity expanded mostly in Asia in 2022 but it also expanded in most other regions and in many cases with a higher expansion than in 2021. The only region with a significant amount of non-renewable decommissioning was North America and, in contrast to most of the last decade, non-renewable capacity in Europe expanded rather than contracted in 2022.

This reversal of the trend in non-renewable capacity may be a temporary change in direction due to recent global events, but it will be something to monitor in the future with respect to the ambition for a global energy transition.

Latest figures compared to previous estimates

Compared to the capacity statistics published in August 2022, the figures here have been revised upwards very slightly. Total renewable capacity in 2021 was reported as 3 068 GW last year and the new figure for 2021 is 3 077 GW (+0.29%).

As noted in previous years, most revisions can be explained by imprecise early reporting of capacity and the unavailability of data to the year-end in some cases, so it may be expected that these figures could be revised upwards in June 2023.