Renewable energy supplies

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Renewables play a critical role in clean energy transitions. The deployment of renewables for electricity generation, for heat production for buildings and industry, and in transport is one of the main enablers of keeping average global temperature rise below 1.5?C. Modern bioenergy is today the largest source of renewable energy globally, with a more than 50% share of global use in 2022. Bioenergy is discussed separately, and this page is dedicated to other renewable technologies.

Recent progress has been promising, and 2022 was a record year for renewable electricity capacity additions, with annual capacity additions amounting to about 340 GW. Key policies announced in 2022, especially REPowerEU in the European Union, the Inflation Reduction Act (IRA) in the United States and China"s 14th Five-Year Plan for Renewable Energy, will lend further support to accelerate renewable electricity deployment in the coming years.

Solar PV is today the only renewable energy technology on track with the Net Zero Emissions by 2050 (NZE) Scenario. Wind, hydro, geothermal, solar thermal and ocean energy use needs to expand significantly faster in order to get on track. Non-bioenergy renewables need to increase their share of total energy supply from close to 5% today to approximately 17% by 2030 in the NZE Scenario. To achieve this, annual renewable energy use must increase at an average rate of about 13% during 2023-2030, twice as much as the average over the past 5 years.

Countries and regions making notable progress in advancing renewables include:

Renewables, in particular wind and solar technologies, are responsible for one of the largest shares of global CO2 emission reductions between now and 2030 in the NZE Scenario. They offer an alternative to investment in new fossil fuel power generation plants and displace generation from existing units.

In the NZE Scenario, renewable power in the form of direct electricity use or indirect use, e.g. in the form of renewable hydrogen, is expected to displace the majority of fossil fuels use in end-use sectors, especially industry and transport. Renewable heat sources like modern bioenergy, geothermal plants and solar heaters will also play a major role in decarbonisation of the heating sector.

In 2022, renewable energy supply from solar, wind, hydro, geothermal and ocean rose by close to 8%, meaning that the share of these technologies in total global energy supply increased by close to 0.4 percentage points, reaching 5.5%. Modern bioenergy"s share in 2022 increased by 0.2 percentage points, reaching 6.8%. Record renewable electricity capacity additions in 2022, and an increase in hydropower availability, allowed non-bioenergy renewables to achieve their second highest share growth in history. This result is second only to growth in 2020, an unusual year, when the Covid-19 pandemic led to a global economic crisis and resulting decrease in total energy consumption, while use of renewables remained robust.

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The supply of renewables needs to accelerate to reach around 13% expansion annually over 2023-2030 to align with the NZE Scenario. Despite record renewable electricity capacity additions in 2022, supply growth was still significantly below that level. Much faster deployment of all renewable technologies in all regions of the world will be needed to put the world on track with the NZE Scenario.

Electricity generation from renewables accounts for about 40% of the total renewable energy supply. For non-bioenergy renewable sources, this share is as high as 80% with the remainder in the form of heat produced in solar thermal and geothermal installations. Wind and solar PV evenly accounted for about 85% of 2022"s record growth in renewable electricity generation of over 600 TWh. The rest of the growth came from hydropower generation, which increased by about 2%. Electricity and heat generation growth in geothermal, concentrated solar power (CSP) and ocean technologies mostly stalled in 2022 due to limited capacity additions. In total, in 2022 non-bioenergy renewable sources accounted for almost 30% of electricity generation.

Solar PV has been the fastest growing technology by capacity additions in recent years and is aligned with the NZE Scenario. In the case of wind, hydropower and bioenergy, more efforts are needed to get on track, as growth in recent years and that expected in the near future is significantly below required levels. Other less widely used renewable technologies, such as CSP, geothermal and ocean power, are not on track and require a rapid step-up in support.

Renewable electricity is subject to policy support and national targets in the majority of countries around the world. Various types of support have been implemented, including technology-specific measures. The following important changes have been implemented in the past couple of years:

For all renewable power and heat technologies, long-term targets and policy stability are essential to ensure investor confidence and continued growth. At the same time, policies need to adapt continuously to changing market conditions to achieve greater cost-competitiveness and to improve the integration of renewables into the energy system.