# Renewable energy 270 kWh

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A fully decarbonised electricity sector is the essential foundation of a net zero energy system. Electricity is at the heart of modern economies, and its share of final energy consumption is projected to rise from 20% today to over 50% by 2050 in the Net Zero Emissions by 2050 Scenario as electricity demand increases rapidly to decarbonise end-use sectors. Unabated fossil fuels currently account for over 60% of total global electricity generation. To be consistent with the Net Zero Scenario, that share needs to drop rapidly to below 30% by 2030. The pace of deployment of low- and zero-emission sources has to pick up significantly in order to meet this milestone.

Wind and solar PV continued to grow strongly in 2022, with record-level additions in several regions, and recent policy developments are projected to further accelerate this growth. Countries and regions making notable progress include:

Global power sector CO2 emissions (from both electricity and heat production) increased by almost 220 Mt CO2 in 2022, a 1.5% increase compared to 2021, reaching an all-time high of 14.8 Gt CO2. This was driven mostly by a strong increase in coal-fired electricity generation, emissions from which grew by nearly 240 Mt (2.2%) compared to the year before, primarily as a result of gas-to-coal switching due to record natural gas prices in many regions. Electricity generation accounts for more than 90% of power sector emissions, far greater than the contribution from heat production.

Current trends are not on track with Net Zero Scenario milestones, which see power sector emissions fall by nearly 9% per year to 2030, reaching an emissions intensity of around 165 g CO2/kWh (a 65% reduction relative to 460 g CO2/kWh today), and the sector then becoming completely decarbonised by 2045.

Global electricity generation continued to grow in 2022, increasing by 2.4% (nearly 700 TWh) year-over-year, which is similar to the average annual growth observed over the previous 5 years. Record-level natural gas prices in the wake of Russia"s invasion of Ukraine led to natural gas-fired electricity generation stagnating at the global level, while nuclear electricity generation dropped by nearly 5% year-over-year, primarily due to maintenance outages at a large number of French nuclear plants and reduced output from Ukraine"s nuclear fleet. As a result, the increase in generation was shouldered almost exclusively by coal and renewables.

Global coal-fired electricity generation rose by nearly 2% (185 TWh) in 2022, driven mainly by gas-to-coal switching triggered by very high natural gas prices in many regions. Though the year-on-year percentage change is far less than the 8% growth seen in 2021 following the Covid-19 pandemic-related drop in 2020, in terms of total generation, coal continued its record-breaking streak for the second year in a row, generating more than 10 000 TWh, accounting for 36% of total generation.

Total renewable electricity generation reached another all-time high in 2022, exceeding 8 500 TWh, over 600

TWh (nearly 8%) more than in 2021. This increase was driven mostly by rising wind and solar PV production, which both grew by nearly 270 TWh. Hydropower output - still the world"s largest source of renewable electricity - increased by 70 TWh, although drought conditions continued to affect hydropower production in several regions including China, Europe and the United States. The share of renewables in global electricity generation reached nearly 30%, 1.5 percentage points higher than in 2021.

An important indicator of progress in the electricity sector"s clean energy transition is the share of low-emission technologies, including renewables, nuclear, carbon capture and storage and co-firing of ammonia and hydrogen. In 2022, almost 39% of generation came from low-emission technologies - an increase of nearly one percentage point from 2021, although far below the annual 4 percentage point increase needed to 2030 in the Net Zero Scenario.

Getting on track with the Net Zero Scenario will require profound transformation in the electricity sector to limit CO2 emissions, reduce air pollution and support energy access, with universal access achieved by 2030. A drastic shift is needed if nearly 75% of generation is to come from low-emission technologies by 2030.

In the Net Zero Scenario, solar PV leads in installed capacity by the mid-2020s. The share of unabated coal declines sharply from 36% today to 11% in 2030, with about 4% of coal-fired generation from plants fitted with carbon capture, utilisation and storage (CCUS). The share of natural gas in the Net Zero Scenario generation mix remains stable in the short-term because of its lower CO2 emissions, staying at around 22% until the mid-2020s and then declining to 15% in 2030.

Several major energy-consuming countries and regions have stepped up their commitment to renewables:

Despite progress on promoting renewables, emissions from fossil fuel generation continue to rise. Stronger policies targeting reductions in coal-fired generation are needed to ensure that progress in the deployment of renewables is not counteracted by increases in fossil generation.

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