Solar energy germany

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Far from being a sun-drenched country, Germany has one of the highest solar power outputs in the world and boasts cutting-edge research. The government"s aim to largely base electricity production on renewables is...

The photovoltaic industry is playing a key role in shaping Germany"s sustainable energy future. Solar power is already one of the most important renewable energy sources for the supply of both electricity and heat....

Solar photovoltaics are on the list of renewable energy sources Germany would like to transition to using more. In fact, in the European Union, Germany already produced the most electricity from solar PV plants in...

Germany has capitalised on solar PV"s growth. According to GlobalData, in 2014, solar PV made up 20% of its power mix, with fossil fuels (coal, oil and gas) dominating at 43% and wind at 21%. In 2023, solar PV...

Wind power was once again the most important source of electricity in 2023, contributing 139.8 terawatt hours (TWh) or 32% to public net electricity generation.This was 14.1% higher than the previous year"s production. The share of onshore wind power rose to 115.3 TWh (2022: 99 TWh), while offshore production fell slightly to 23.5 TW (2022: 24.75 TWh). The expansion of wind energy continues to lag behind the government"s plan: By November 2023, only 2.7 gigawatts (GW) of onshore wind had been newly installed, compared to the planned 4 GW. The expansion of offshore wind farms is even slower: In 2023, only 0.23 GW offshore wind capacity was newly installed, compared to the planned amount of 0.7 GW, due to required tenders and long construction times.

The contribution from hydropower increased compared to 2022, from 17.5 TWh to 20.5 TWh. The installed capacity of 4.94 GW, however, has hardly changed compared to previous years. At 42.3 TWh, biomass was at the same level as in 2022 (42.2 TWh). The installed capacity biomass is 9 GW.

In total, renewables produced around 260 TWh in 2023, around 7.2% more than in the previous year (242 TWh). The share of renewable energy generated in Germany in the load, i.e., the electricity mix that comes out of the socket, was 57.1%, compared to 50.2% in 2022. In addition to public net electricity generation, total net electricity generation also includes in-house generation by industry and commerce, which is mainly generated using gas. The share of renewable energy in total net electricity generation, including the power plants operated by "establishments in the manufacturing sector, mining and quarrying", is around 54.9% in 2023, compared to 48.2% in 2022.

The load on the electricity grid amounted to 457 TWh, around 26 TWh less than in 2022. Due to the high electricity prices and higher outside temperatures, electricity was probably saved significantly. The increase in self-consumption of solar power also reduced the load. The load includes the electricity consumption and grid losses, but not the pumped-storage power consumption and the self-consumption of conventional power

plants.

After coal-fired power plants in Germany ramped up their production in 2022 due to outages of French nuclear power plants and distortions in the electricity market caused by the war in Ukraine, their share in electricity production fell significantly in 2023. Due to the drop in exports of coal-fired power and this years favorable wind conditions, electricity generation from coal-fired power plants in November 2023 was 27% below the generation in November 2022.

Overall, generation from lignite for public net electricity consumption fell by around 27%, from 105.9 TWh down to 77.5 TWh. Additionally, 3.7 TWh for industrial own consumption are added to this. Gross electricity generation fell to the level of 1963.

Net production from hard coal-fired power plants for public electricity consumption amounted to 36.1 TWh (minus 35%) and 0.7 TWh for industrial own consumption, which is 21.4 TWh lower than in 2022. Gross electricity generation fell to the level of 1955. The use of natural gas to generate electricity remained slightly below the previous year"s level at 45.8 TWh for the public electricity supply and 29.6 TWh for industrial consumption. Due to the shutdown of the last three nuclear power plants in Germany (Emsland, Neckarwestheim and Isar) on April 15, 2023, nuclear power contributed only 6.72 TWh to electricity generation, which corresponds to a share of 1.5 percent.

With the expansion of fluctuating renewable power plants, the need for grid expansion and storage capacity is also increasing. Battery storage systems, which are installed decentrally to buffer the generation of wind and solar power, are particularly well suited for this application. The private household segment is showing strong growth, as well as the segment photovoltaic systems. Overall, installed battery capacity almost doubled, rising from 4.4 GW in 2022 up to 7.6 GW in 2023, while storage capacity rose from 6.5 GWh to 11.2 GWh. The installed capacity of German pumped storage is around 6 GW.