Electric power distribution in usa

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Net electricity generation by energy source for 2023[1]

The United States has the second largest electricity sector in the world, with 4,178 Terawatt-hours of generation in 2023.[2] In 2023 the industry earned $491b in revenue (1.8% of GDP) at an average price of $0.127/kWh.[3]

There are three major synchronous electrical grids in the continental US: the Eastern Interconnection, the Western Interconnection and the Texas Interconnection. Within these physical grids, there are Independent System Operators and Regional transmission organizations, which are not-for-profit organizations that operate an area of the grid and are obliged to provide indiscriminate access to various suppliers (e.g. power plant owners, transmission line providers) to promote competition. Some areas instead have a vertically integrated utility like Southern Company where everything is done by one company.

The U.S. electricity sector is regulated by different public institutions with some functional overlaps. The federal government sets general policies through the Department of Energy. Economic regulation of the distribution segment is a state responsibility, usually carried out through Public Utilities Commissions; the inter-state transmission segment is regulated by the federal government through the Federal Energy Regulatory Commission.

Electricity generation has been approximately flat in the last ten years,[4] but with significant changes in composition over that time. In 2013 coal was 38.8% of generation, natural gas was 27.6%, nuclear was 19.4%, wind was 4.1%, hydro was 6.6%, and solar was 0.2%. Because of this shift, CO2 emissions have gone down by 30%.[5]

scale installed electricity generation summer capacity[6] in the United States was 1161.43 gigawatts (GW), up 15.57 GW from 2021. The main energy sources for electricity generation include

Actual USA utility scale electricity generation[7] in 2022 was 4230.723 terawatt-hours (TWh) and was up 134.883 TWh (3.29%) from 2021. The USA also imported 56.97 TWh and exported 15.758 TWh:[16] making a total of 4271.88 TWh for consumption, up 114.78 TWh (2.78%) from 2021.

Electricity generation was primarily from the following sources:

The share of coal and nuclear in energy generation is much higher than their share in installed capacity, because coal and nuclear plants provide base load and thus are running longer hours than natural gas and

petroleum plants which typically provide peak load, while wind turbines and solar plants produce electricity when they can and natural gas fills in as required to compensate.

The following tables summarize the electrical energy generated by fuel source for the United States. Electric Power Annual[12] for 2022 data.

Fossil fuels--mainly coal and natural gas--remain the backbone of electricity generation in the U.S., accounting for 68% of installed generation capacity in 2010 and 63.1% in 2022. Coal production has fallen significantly since 2007 with most of the losses being replaced by natural gas, but also a growing fraction of non-hydroelectric renewables.

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