Electric power production wikipedia

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This is a list of countries and dependencies by annual electricity production. China is the world"s largest electricity producing country, followed by the United States and India.

In 2019, world gross electricity production was 1.3% higher than 2018. Global electricity production has grown each year continuously since 1974, except for between 2008 and 2009, when the global financial crisis sharply cut demand.

In 2019, non-OECD countries" share of production reached 58.6% of world electricity generation - more than double the share they held in 1974. Increasing energy efficiency limited annual production growth between 2010 and 2019 to just 0.1% in OECD countries (membership as of April2021), compared with 4.6% in non-OECD countries.

Combustible fuels include coal and coal products, oil and oil products, natural gas, biofuels including solid biomass and animal products, gas/liquids from biomass, industrial waste and municipal waste.

Provisional data for 2020 show that gross electricity generation fell 2.4% across the OECD. Compared with 2019, the electricity mix shifted towards renewables, with lower generation from coal (-15.9%) offset in part by higher output from wind (+12.3%) and solar (+20.8%). This shift to renewables was driven in part by depressed electricity demand during Covid-19 lockdowns, low operating costs and priority access to the grid. In the OECD, combined output from wind, solar, and geothermal is now approaching that of hydro.

To restore small generators to service they could be started up as motors, with the normal energy source supplying no energy at all at first, but then that energy is added slowly back to driving the generator normally. While power at the beginning is taken from the grid into the generator (actually it is a motor at that time), with the power flow then in the negative direction, the direction of power flow soon is reversed to normal. No synchronization is needed in that case.

In restoring large power generators a major problem could be the time taken for the heat source to reach normality. This can take days in case of nuclear plants.. In the meantime severe restrictions on electricity availability must be expected. That is why many firms have their own generators that are switched on automatically if there is a power failure.

Think of an airport. There is a long corridor from which you can reach many platforms via doors. In a substation that long corridor is called a bus, and each door is a large circuit breaker connecting one or more transmission lines and/or one or more transformers and/or one or more generators or one or more loads (such as a distribution network of electric energy to users) to one or more busses, at one or more different voltages, in rare caes even at different frequencies.

This enables various operations to be carried out from a remote location, such as the operation of circuit breakers, the transmission to remotely located human operators of vital data from unmanned substations, such as voltage, current, power magnitude and power direction at various points of the substation. Even automatic synchronization can be effected remotely, if necessary, before two circuits are connected together by a circuit breaker at just the right time in the cycle.

Usually the grid contains many substations that are connected via transmission lines to one another. These substations contain protective equipment that in case of problems can automatically operate circuit breakers, disconnecting certain portions of the grid from the grid