

Electric power system wikipedia

Electric power is the rate of transfer of electrical energy within a circuit. Its SI unit is the watt, the general unit of power, defined as one joule per second. Standard prefixes apply to watts as with other SI units: thousands, millions and billions of watts are called kilowatts, megawatts and gigawatts respectively.

In common parlance, electric power is the production and delivery of electrical energy, an essential public utility in much of the world. Electric power is usually produced by electric generators, but can also be supplied by sources such as electric batteries. It is usually supplied to businesses and homes (as domestic mains electricity) by the electric power industry through an electrical grid.

Electric power can be delivered over long distances by transmission lines and used for applications such as motion, light or heat with high efficiency.

Electric power is transformed to other forms of energy when electric charges move through an electric potential difference (voltage), which occurs in electrical components in electric circuits. From the standpoint of electric power, components in an electric circuit can be divided into two categories:

Since electric power can flow either into or out of a component, a convention is needed for which direction represents positive power flow. Electric power flowing out of a circuit into a component is arbitrarily defined to have a positive sign, while power flowing into a circuit from a component is defined to have a negative sign. Thus passive components have positive power consumption, while power sources have negative power consumption. This is called the passive sign convention.

The ratio of real power to apparent power is called power factor and is a number always between -1 and 1. Where the currents and voltages have non-sinusoidal forms, power factor is generalized to include the effects of distortion.

The fundamental principles of much electricity generation were discovered during the 1820s and early 1830s by the British scientist Michael Faraday. His basic method is still used today: electric current is generated by the movement of a loop of wire, or disc of copper between the poles of a magnet.

For electric utilities, it is the first process in the delivery of electricity to consumers. The other processes, electricity transmission, distribution, and electrical energy storage and recovery using pumped-storage methods are normally carried out by the electric power industry.

Electricity is mostly generated at a power station by electromechanical generators, driven by heat engines heated by combustion, geothermal power or nuclear fission. Other generators are driven by the kinetic energy of flowing water and wind. There are many other technologies that are used to generate electricity such as



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photovoltaic solar panels.

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