

Electric power conversion 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.

The electric power industry provides the production and delivery of power, in sufficient quantities to areas that need electricity, through a grid connection. The grid distributes electrical energy to customers. Electric power is generated by central power stations or by distributed generation. The electric power industry has gradually been trending towards deregulation - with emerging players offering consumers competition to the traditional public utility companies.

Power Converters can include simpler tools such as transformer or more complex like a resonant converter. The term can also refer to a class of electrical machinery that is used to convert one frequency of alternating current into another. Power conversion systems often incorporate redundancy and voltage regulation.

Power converters are classified based on the type of power conversion they perform. One way of classifying power conversion systems is based on whether the input and output is alternating current or direct current.

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