

# The Basic Method Analysis of Electrical Engineering

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## Opinion Article

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### DESCRIPTION

Early machines were first powered by animal and human labour.

#### Waterwheel

Around 300 BC, waterwheels started to develop all across the world. They used moving water to create rotary motion, which was then used to mill grain and power timber, machining, and textile activities. Modern water turbines employ water flowing through a dam to power an electric generator.

#### Windmill

Early windmills used wind energy to provide rotary motion for milling processes. The generator is also driven by modern wind turbines. The actuators of mechanical systems are then powered by this electricity through motors.

### Engine

The term "engine" comes from the word "ingenuity," and it originally referred to gadgets that could or might not be physical contraptions. Water inside a pressure vessel is heated by a steam engine, and the expanding steam powers a piston or a turbine. The aeolipile of Hero of Alexandria demonstrates this idea. This is called an external combustion engine.

Because it burns fuel (an exothermic chemical reaction) inside a cylinder and drives a piston with the expanding gases, a car engine is referred to as an internal combustion engine. A jet engine is an "internal combustion engine" because it employs a turbine to compress air that is then burned with fuel and expanded *via* a nozzle to propel an aircraft.

**Power plant**

An electric generator is rotated by the steam produced by the combustion of coal and natural gas in a boiler. A nuclear power plant produces steam and electricity using the heat from a nuclear reactor. A system of transmission lines is used to deliver this power for both commercial and residential consumption.

**Motors**

Electric motors provide rotational motion by using either AC or DC electric current. The actuators for mechanical systems, such as robotic systems and contemporary aeroplanes, are electric servomotors. Pneumatic and hydraulic systems use electrically powered pumps to force air or water into cylinders, respectively, to generate linear motion.

**Electrochemical**

Materials and chemicals can also serve as power sources. They may create electricity without altering their state, as is the case for solar cells and thermoelectric generators, or they may chemically deplete or require recharging, as is the situation with batteries. But each of these still needs to get their energy somewhere else. With batteries, it is the internal chemical potential energy that is already present. Light and heat, respectively, serve as the energy sources in solar cells and thermoelectric devices.

**Mechanisms**

A mechanical system's mechanism is put together from parts known as machine elements. These components provide the system shape and regulate its motion. The frame members, bearings, splines, springs, seals, fasteners, and coverings are typically the structural components. An aesthetic and functional interface between the mechanical system and its users is provided by the shape, texture, and color of coverings. "Mechanisms" are another word for the groups that direct motion. Although there are other specialised mechanisms like clamping linkages, indexing mechanisms, escapements, and friction devices like brakes and clutches, gears and gear trains are the most common category for mechanisms. This category also includes belt drives and chain drives, cam and follower mechanisms, and linkages. A mechanism's mobility or degree of freedom is determined by the amount of linkages and joints as well as the kinds of joints that were employed to build the mechanism. A mechanism's overall mobility is determined by how many restraints the joints impose in comparison to the links' unrestricted freedom.