How is electrical energy used

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Electrical energy is the most convenient form of energy for most human uses. Electrical energy is easy use and move from one location to another, but it is almost impossible to store in any large quantity. It can be used for running computers and most appliances, home heating, and even transportation. Electricity is used by industry, households, and businesses--accounting for 18% of end use energy worldwide.[2]

The energy itself is held in the movement and configuration of electric charge. The flow of electric charge (usually electrons) is electric current. Charge can build up on a capacitor and store electrical energy. This energy is physically carried in the electric fields and magnetic fields associated with how charges are arranged and moving, but can easily be turned into most energy services.

Electrical conduction is the physical phenomenon that allows electricity to be transported easily. Wires, materials made out of conductors (usually metals), are capable of transporting this energy hundreds of kilometers. This system of transporting electrical energy is called the electrical grid.

Electrical energy is not a primary energy source, but rather an energy currency (read more in the article electricity as an energy currency). Primary energy (like wind or natural gas) goes into an electric generator to make electricity for easy use and transport. The energy that is transported and used by so much of the modern high energy society must come, fundamentally, from some primary fuel or primary flow.

Electrical energy is very convenient, and as a result more and more of the energy used by a high energy society is in the form of electricity, see figure 1. The rate of electrical energy use is growing faster than the rate of electricity use, see figure 2.

Figure 1. The above graph shows how electricity use is growing as a percentage of the total final energy use in the world.[2] This shows that the flexibility of electricity creates a strong incentive to have as great a fraction of energy produced in that form as is possible.

Figure 2. The above graph shows how electricity use is growing faster than the total final energy use in the world.[2] This shows that the flexibility of electricity creates a strong incentive to have as great a fraction of energy produced in that form as possible.

Explore the data in the simulation below to find out how the electrical energy varies by country and by sectors within that country. Click on a sector on the right side of the visualization to explore its end use paths in more detail, and click "see all categories" to return to the original screen.

Even though we use it every day -- for lighting our homes, charging our mobile devices, taking a hot shower and so much more -- electricity can be a confusing concept to fully grasp. In this article, we will review the

basics of what electricity is and answer the burning question: "How does electricity work?"

Within each atom, there are three building block particles that make up all matter: protons, neutrons and electrons. Protons and neutrons can be found packed tightly into the center of the atom -- the nucleus. Electrons, much smaller in mass, orbit around the nucleus.

Protons carry a positive charge, and electrons carry a negative charge. These opposite charges attract each other. The atom is in balance when there are an equal number of protons and electrons. (Note: neutrons do not carry a charge and can vary in number.)

Electrons usually remain at a constant distance from the nucleus in what are known as "shells." Closest to the nucleus is a shell that can hold up to two electrons. The next closest shell can hold up to eight electrons. Shells further out can hold more.