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NUCLEAR REACTORS

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We know that a pellet of uranium could produce as much energy as a large mound of coal. Uranium and other radioactive materials are used as fuels in nuclear reactors.

A nuclear reactor is a device that generates power from radioactive fuels through controlled chain reactions. The components of a fission reactor are the fuel (usually uranium), the moderator (water, heavy water or graphite), the control rods or blades (cadmium, hafnium or boron), the coolant, the pressure vessel (tubes), the steam generator and the containment (the safety system). The latter also contains shielding to prevent the escape of radioactivity to the outside. The major types of nuclear reactors are a pressurized water reactor, a boiling water reactor, an advanced gas-cooled reactor, a light water graphite-moderated reactor and a fast neutron reactor. In an effort to find other options to harness nuclear energy, scientists are trying to build fusion reactors. One such device, called a tokamak, is being investigated. It is a trialed mechanism constructed to use fusion energy. Inside a tokamak, the power that is produced through atoms fusion is absorbed as heat in the vessel walls. As well as a traditional power plant, a fusion power station will harness this heat to generate steam and then electricity with the help of turbines and generators. Moreover, this reactor does not need Uranium-235. It can use hydrogen obtained from sea water. This reactor will also be very efficient and affordable. Much less heat will be wasted. Also, the radioactive products from this reactor have short half-lives. So they will not have to be stored very long. Although tokamaks hold great promise, there are still problems that scientists have to solve. The temperatures required for fusion exceed 100 million degrees. So, if scientists find a way to achieve such temperatures, tokamaks may become practical and we will receive clean and sustainable energy for all.