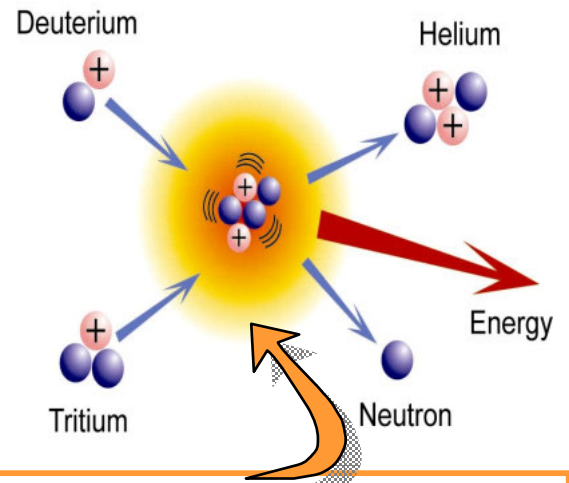


Nuclear energy is energy in the nucleus (core/centre) of an atom.

Atoms are tiny particles that make up every object in the universe. An atom's nucleus consists of neutrons and positively charged protons, while negatively charged electrons circle around the nucleus. Together they make up an atom.

Nuclear energy can be used to generate large amounts of heat, which can be turned into electricity. Nuclear energy is released in two different processes:

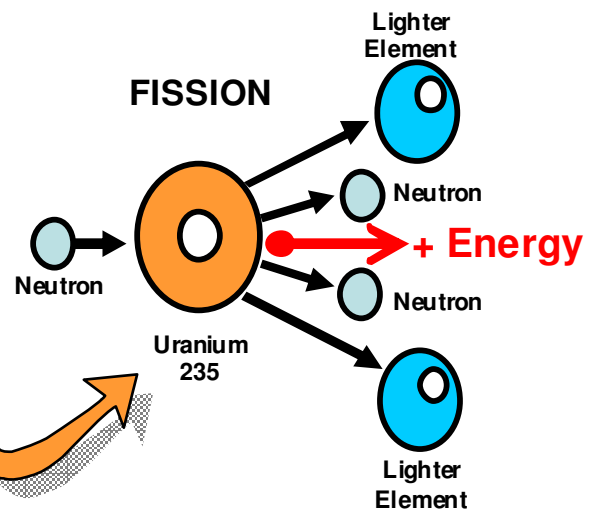
1. Nuclear Fusion
2. Nuclear Fission



In **Nuclear Fusion**, energy is released when atomic nuclei are combined or fused together to form larger nuclei or several ones. This is how the sun produces energy.

In **Nuclear Fission**, atomic nuclei are split apart to form smaller atoms, releasing energy. Nuclear power plants use nuclear fission to produce electricity.

During nuclear fission, a small particle called a neutron hits the nucleus of an uranium atom causing it to split. This releases a great amount of energy as heat and radiation. More neutrons are also released, these neutrons go on to bombard other uranium atoms, and the process repeats itself over and over again. This is called a chain reaction.



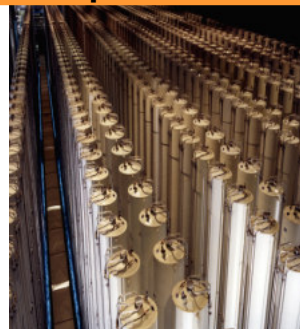
Nuclear Fuel - Uranium

The fuel most widely used by nuclear plants for nuclear fission is uranium.

Uranium is a **non-renewable** mineral. Uranium is mined and then refined to produce uranium oxide, called "yellow cake". This yellow cake is then further refined and enriched to produce a fuel for nuclear power stations. The largest producers of yellow cake in the world are Australia, Canada, Russia and Namibia.

Nuclear plants use a certain kind of uranium, U-235, as fuel because its heavy nuclei are easily split apart. U-235 is the processed into various shapes and form that can be used in nuclear fuel rods in nuclear power stations.

Uranium is mined, then refined and enriched to produce nuclear fuel pellets

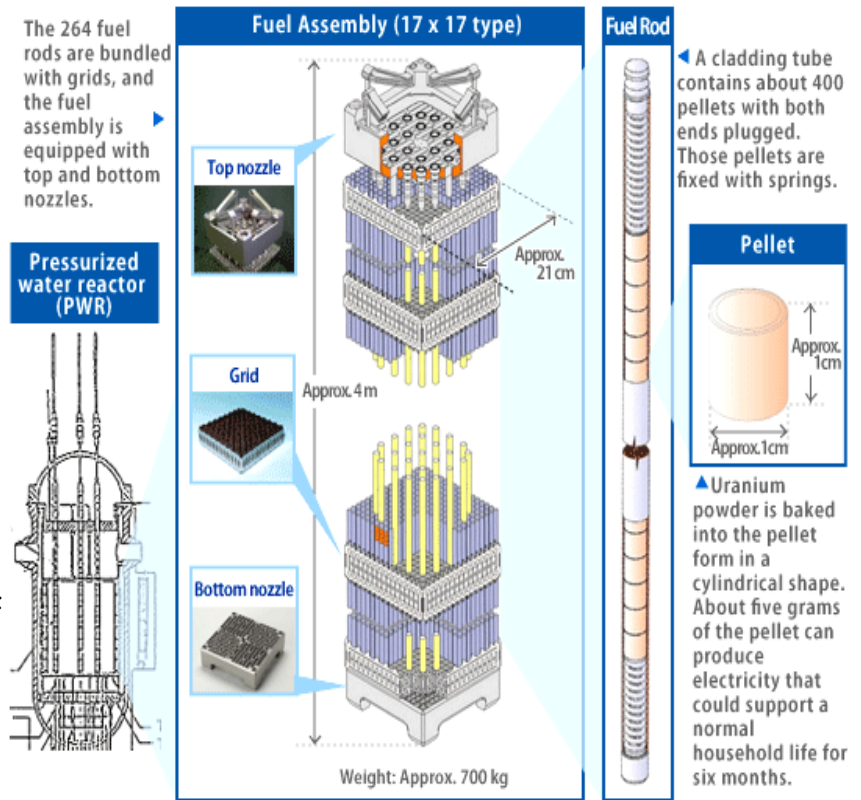


Nuclear power plants generate electricity...

Most conventional power plants burn fuel to generate heat to produce electricity.

Nuclear power plants use the heat given off during fission. Fission takes place inside the **reactor** of a nuclear power plant. At the centre of the reactor is the **core**, which contains the uranium fuel rods which are filled with fuel pellets.

The pellets are about the size of your fingertip, but each one produces the same amount of energy as 600 litres of oil. These energy rich pellets are stacked end-to-end in 4-meter metal fuel rods. A bundle of fuel rods is called a **fuel assembly**.



Nuclear power plants & the environment...

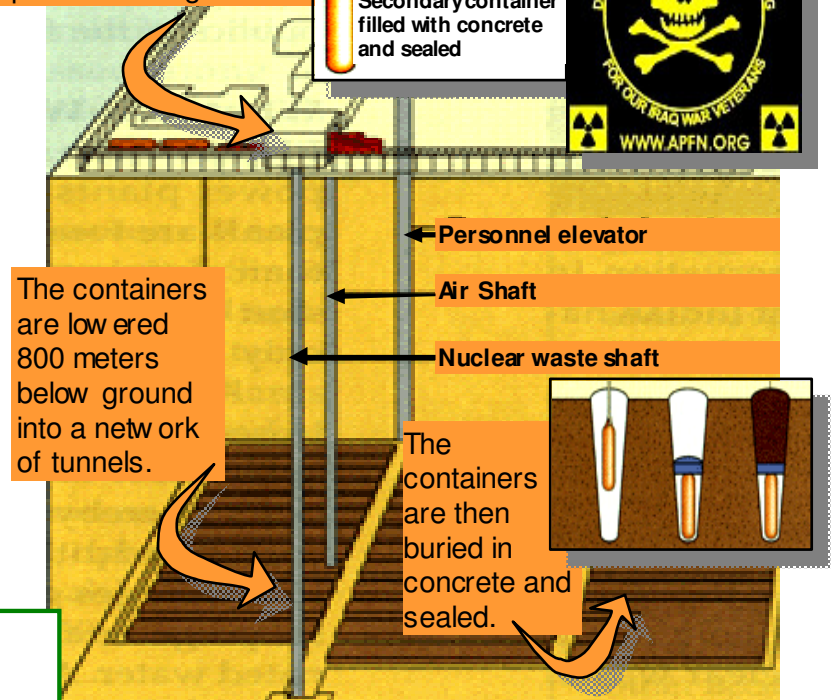
Like all industrial processes, nuclear power generation has by-product wastes: used fuels, other radioactive waste and heat. The generation of electricity in nuclear power stations does not directly emit carbon dioxide into the atmosphere, however **spent fuels & other radioactive wastes are a major environmental concern**.

Most nuclear waste is low-level radioactive waste. It consists of tools, protective clothing & disposable items that have been contaminated with small amounts of radioactive dust or particles.

However spent fuel assemblies are highly radioactive and remain so for many thousands of years. They must be stored in specially designed pools (water cools the fuel & acts as a radiation shield) or in specially designed dry storage containers. It is expensive to permanently store nuclear waste, and there are only a few facilities in the world where this can be done safely.

Nuclear waste is delivered by train or by trucks.

Nuclear waste is very poisonous and the waste fuel rods are contained in several sealed containers to prevent leakage.



Additional Information

http://en.wikipedia.org/wiki/Nuclear_energy
<http://en.wikipedia.org/wiki/Rossing>
<http://www.uic.com.au>

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