

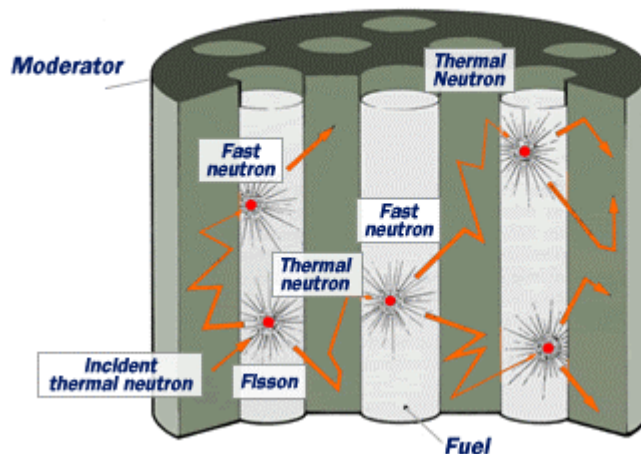
## Fuel rods and control rods

Conventional power stations burn coal, oil or gas to produce steam which drives turbines which in turn drive generators to produce electricity.

Fuel rods are made of enriched uranium oxide wrapped in a zirconium alloy (in PWRs) or stainless steel (in AGRs) container, which prevent the materials produced during fission from seeping into the coolant. In use the rods release high-speed neutrons and heat. The heat is ultimately transferred into water to create the pressurised steam that drives the electricity producing turbines.

In order to sustain a chain reaction the neutrons released by the fuel rods need to travel slowly. To achieve this thermal reactors contain a 'moderator' which causes the neutrons to lose energy and slow down. AGR reactors use a graphite lattice as their moderator, whilst PWRs use a sealed tank of normal water into which the fuel rods are inserted.

### Fuel Lattice and Moderator



To control the nuclear reactor (the equivalent of turning up or down the flame on your gas cooker) metallic control rods are inserted to absorb a proportion of the free neutrons which allow the chain reaction to continue. When the rods are fully inserted they absorb so many neutrons that the chain reaction is interrupted and the reactor stops. Once this happens, no more heat is produced from fission and the reactor begins to cool – just like an oven when you turn it off.

### Control Rod Control

