

There are currently 450 functional nuclear reactors in the world

How do they work?

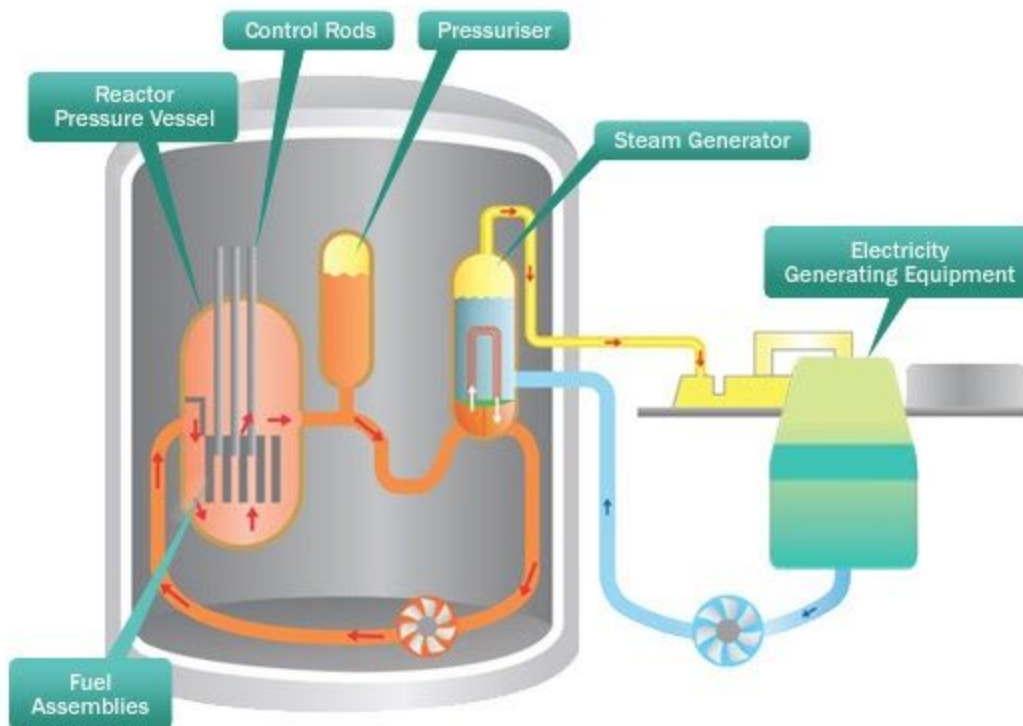
Nuclear reactors use the heat and energy produced by radioactive decay in a few elements to create power.

Types of nuclear reactors

There are currently three types of nuclear reactors that are in use, pressurized water reactors(PWR), boiling water reactors(BWR) and Pressurized heavy water reactors(PHWR).

(PWR) are the most common types of nuclear reactors which represent about 60% of reactors worldwide. They use regular water or light water as both their neutron moderator and coolant. PWR's primary circuit of water is under a high amount of pressure so even when heated up it does not boil. This water, in turn, goes on the heat up the secondary circuit that turns to steam turning a turbine which then generates electricity. PWR's two cooling systems separate the reactor cooling water and steam for power generation. In the instance of emergency venting, the steam released will be free from radioactive products.

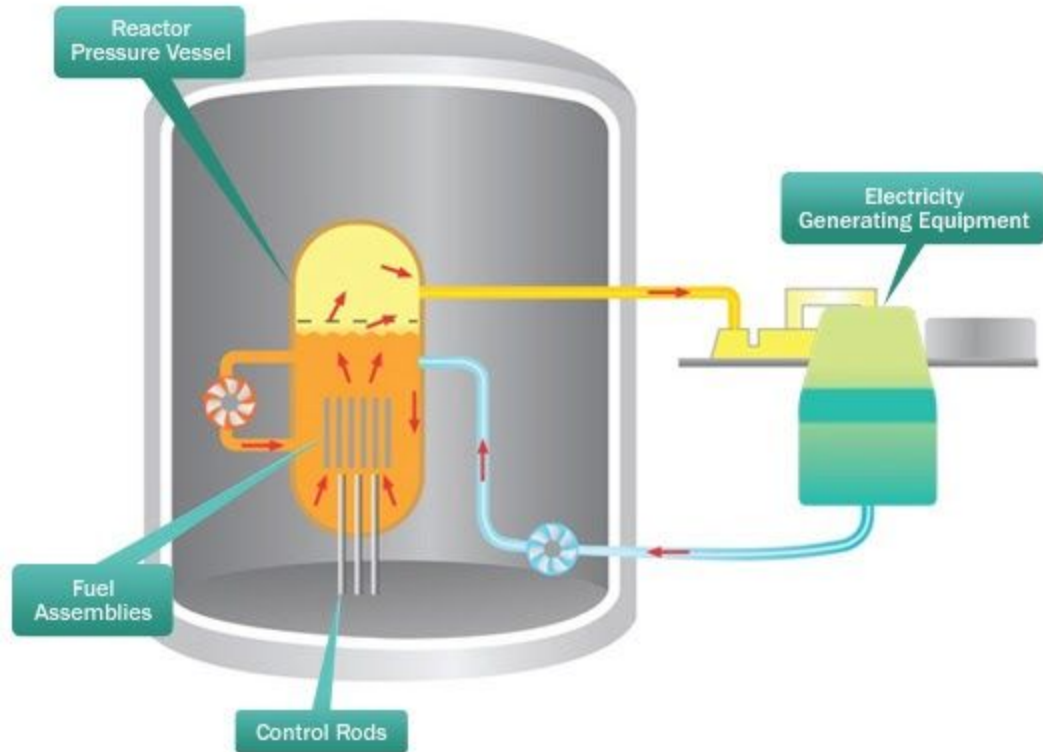
PWR diagram



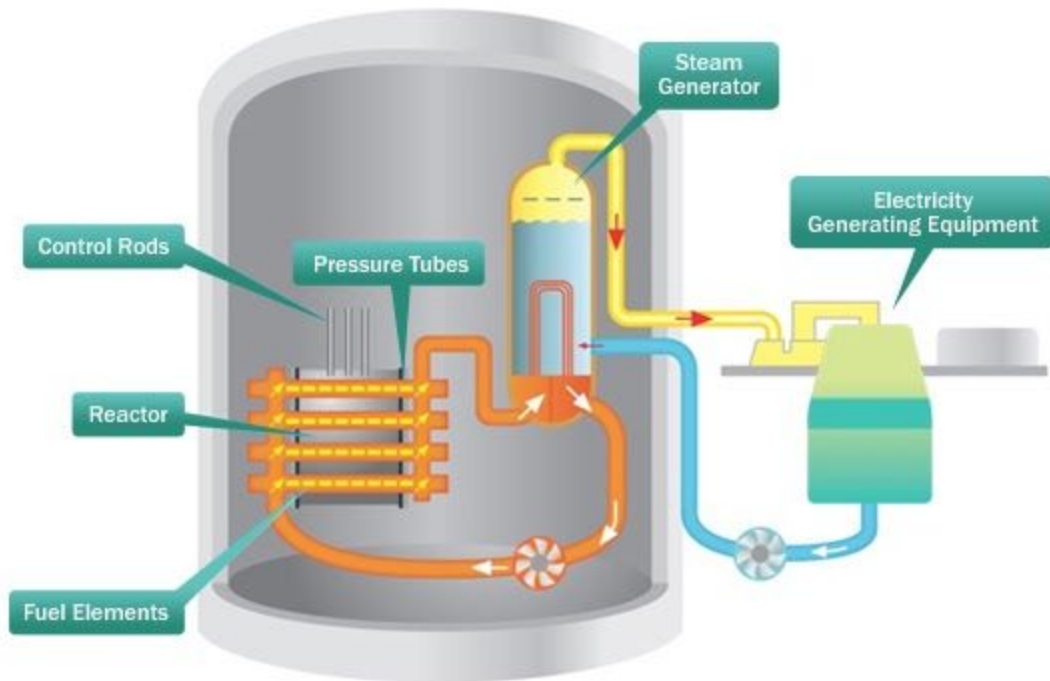
20% of the world's nuclear reactors are BWR. BWRs use regular water(light water) for their neutron moderator and coolant this reactor, unlike the PWR, only has one circuit of water in it

used both to cool moderate and turn the turbines used to create energy. Unlike in the PWR if steam is forced to be vented it can contain traces of radioactivity in it.

BWR diagram



PHWR's only take up 10% of the world's nuclear reactors. PHWRS uses heavy water(D_2O) as there neutron moderator and coolant. Heavy water absorbs the least among the common moderator materials so that it will least hinder the reaction making it far more efficient. This heavy water flows inside pressure tubes filled with Uranium, taking away reactor heat and delivering it to an adjoining circuit, just like PWR, to raise steam and drive a turbine-generator for the production of electricity.



The biggest problem with nuclear power is the waste that it produces which can take anywhere from 1,000 to 10,000 years to degrade while being harmful to humans through its duration. The reason it is backed by so many people because, it, unlike fossil fuels, creates little to no greenhouse gas emission, besides H₂O. the biggest danger in this technology is the escape and pollution of radioactive material in its vicinity. A prime example of this is the Chernobyl incident which, due to its meltdown, caused elevated cancer rates downwind of it for hundreds of miles. Other than the fact that nuclear reactors can make large areas of land uninhabitable it creates a clean efficient cost-effective source of energy.