**What is a Nuclear Power Plant?**

**Definition:** The power plant that is used to warm the water to generate[steam](https://www.elprocus.com/what-is-steam-boiler-working-principle-types-of-steam-boilers/), then this steam can be used for rotating huge turbines for generating electricity. These plants use the heat to warm the water which is generated by nuclear fission. So the atoms in the nuclear fission will split into different smaller atoms for generating energy.

### Working of Nuclear Power Plant

The elements like Uranium or Thorium are sued nuclear fission reaction of a nuclear reactor. Because of this fission, a huge amount of heat energy can be generated and it is transmitted to the coolant reactor. Here, the coolant is nothing but water, liquid metal otherwise gas. The water is heated to flow in a heat exchanger so that it changes into high-temperature steam. Then the steam which is produced is permitted to make a [steam turbine](https://www.elprocus.com/what-is-a-steam-turbine-working-and-its-types/) run. Again the steam can be changed back into the coolant & recycled to use for the heat exchanger. So, the turbine and alternator are connected to produce electricity. By using a transformer, the electricity which is produced can be increased to use in long-distance communication.

### Types of Nuclear Power Plant

There are two types of nuclear power plants such as pressurized water reactor and boiling water reactor.

#### Pressurized Water Reactor

In this kind of reactor, regular water is used as a coolant. This is kept at extremely high force so that it does not get a boil. A heat exchanger in this reactor transfers the heated water where the water from the secondary coolant circle is changed into vapor. Therefore, this loop is totally free from the material of radioactive. In this reactor, the coolant water works as a moderator. Because of these benefits, these reactors are used most frequently.

#### Boiling Water Reactor

In this kind of reactor, a single coolant loop is only available. The water is permissible to heat within the reactor. The steam is produced from the reactor when it heads out from the reactor & the steam will flow throughout the steam turbine. The main drawback of this reactor is, the coolant water approaches the fuel rods & the turbine. So, radioactive material could be located over the turbine.

### Site Selection for Nuclear Power Plant

The selection of the site for nuclear PowerPoint can be done by considering the technical requirement. The arrangement and working of a nuclear power plant mainly depend on the characteristics of the site.  
While designing the plant, the risks from the site must be considered. The plant design has to handle with tremendous natural occurrence & human-induced actions, without damaging the operational security of the plant.

Each site has to give needed necessities like discarded and decay heat sinks, power supply availability, excellent communications and efficient crisis management, etc. For a power plant, the estimate of the site typically occupies different stages like selection, characterization, pre-operational, and operational.

Nuclear Power Plants in India

There seven nuclear power plants in India which include the following.

* Kudankulam Nuclear Power Plant, located in Tamil Nadu
* Tarapur Nuclear Reactor, located in Maharashtra
* Rajasthan Atomic Power Plant, located in Rajasthan
* Kaiga Atomic Power Plant, located in Karnataka
* Kalapakkam Nuclear Power Plant, located in Tamil Nadu
* Narora Nuclear Reactor, located in Uttar Pradesh
* Kakarapar Atomic Power Plant, located in Gujarat

### Advantages

The **advantages of nuclear power plants** include the following.

* It uses less space compared with other power plants
* It is extremely economical and generates huge electric power.
* These plants are located near the load center because there is no requirement of huge fuel.
* It generates a huge amount of power in the process of each nuclear fission
* It uses less fuel to generate huge energy
* Its operation is reliable
* When compared with steam power plants, it is very clean and neat
* The operating cost is small
* It doesn’t produce polluting gases

### Disadvantages

The **disadvantages of nuclear power plants** include the following.

* The cost of primary installation is extremely high when compared with other power stations.
* The nuclear fuel is expensive so recovering is difficult
* High capital cost compare with other power plants
* Technical knowledge is required to operate this plat. So maintenance, as well as salary, will be high.
* There is a chance of radioactive pollution
* The response is not efficient
* The requirement of cooling water is double compare with a steam power plant.

### Applications

The **applications of nuclear power plants** include the following.

Nuclear energy is used in different industries all over the world for desalination of ocean water, production of hydrogen, district cooling/heating, the removal of tertiary oil resources & used in heat process applications like cogeneration, conversion of coal to liquids & help in the chemical feedstock synthesis.