

# Nuclear Energy - Related Developments

Nuclear Energy plays a critical role in achieving sustainable economic and social development. Modern civilisation heavily depends on energy for daily activities. Energy is like a lifeline for the sustenance and progress of the entire world. Nuclear energy plays a vital role in the world economy by generating jobs, income and facilitating trade on a massive scale.

## **What is Nuclear Energy?**

Nuclear Energy is the energy in the nucleus or core of an atom. Tiny units that make up all matter in the universe are called atoms.

## **How is Nuclear Energy produced?**

Nuclear energy is released by splitting the atom, using the process called Nuclear fission.

## **How is electricity produced using Nuclear Energy?**

A nuclear reactor is a power plant that can control nuclear fission to produce electricity. In the nuclear reactor, uranium is used as fuel. Atoms of uranium are split, which creates fission products which cause other uranium atoms to split, thus creating a chain reaction. The energy from this chain reaction is released in the form of heat. This heat is used to warm the nuclear reactors cooling agent, which results in the formation of steam. This steam turns the turbines, which drive the engines or generators to produce electricity.

## **Where was the first nuclear reactor located, that produced electricity?**

Argonne National Laboratory was the first nuclear reactor to produce electricity was located in Idaho, USA. It was in the year 1951.

## **Where was the first nuclear power plant designed to provide electricity to a community?**

It was set up in Obninsk, Russia in 1954.

## **What are the advantages of electricity produced using Nuclear Energy?**

1. It is a source of clean energy.
2. It helps in the development of a country's economy without adversely contributing to climate change.
3. It does not emit any greenhouse gases.
4. It can be built in urban or rural areas.

## **Nuclear Energy - Electricity production across the Globe**

1. Approximately 10% of the world's electricity is produced using nuclear energy.
2. Worldwide, nuclear power plants are operational in around 30 countries.
3. In France, approximately 75% of the electricity is produced by Nuclear energy.
4. A total of around 450 nuclear reactors are operating worldwide for generating electricity.

### **Nuclear Energy - Uses**

1. Provides electricity to a nation without polluting its environment unlike electricity produced from thermal sources like coal.
2. Source of huge employment for a nation.
3. It helps in boosting the economy of a nation and helps in achieving Sustainable Development Goals.
4. Nuclear power is used for space explorations.
5. Used for providing potable water through desalination
6. Used in cancer treatment
7. Used for sterilizing medical equipment.
8. A country's security needs are addressed by using nuclear-powered submarines and nuclear powered
9. Nuclear radiation is used in the treatment of food by killing bacteria, insects and parasites that cause illness.
10. Nuclear energy could play a major role in transportation by acting as a substitute for fossil fuels.

### **Nuclear Energy Facts - India**

1. Till 2009, India was excluded from global nuclear trade as it was non signatory of Nuclear Non-proliferation treaty due to its nuclear weapons program. This was a hindrance in the development of India's Civil Nuclear energy program.
2. Approximately 2.5% of India's energy requirements are met through nuclear energy.

### **Locations of Nuclear Power Plants - Planned in India**

1. Gorakhpur
2. Chutka - Madhya Pradesh
3. Mahi Banswara - Rajasthan
4. Kaiga - Karnataka
5. Kudankulam - Tamil Nadu

### **Locations of Nuclear Power Plants - Proposed**

1. Haripur - West Bengal
2. Rajouli, Nawada - Bihar
3. Bhimpur - Madhya Pradesh
4. Jaitapur (Ratnagiri District) - Maharashtra
5. Kovvada (Srikakulam District) - Andhra Pradesh
6. Nizampatnam (Guntur District) - Andhra Pradesh
7. Pulivendula (Kadapa District) - Andhra Pradesh
8. Chhaya - Mithi (Bhavnagar District) - Gujarat

## **Locations of Uranium Resources**

1. Tummalapalle (Kadapa District) - Andhra Pradesh
2. Nalgonda District - Telangana
3. East Singhbhum District - Jharkhand
4. West Khasi Hills District - Meghalaya
5. Udaipur District - Rajasthan
6. Yadgir District - Karnataka
7. Rajnandgaon (District) - Chhattisgarh
8. Sonbhadra District - Uttar Pradesh
9. Rudraprayag District - Uttarakhand
10. Una District - Himachal Pradesh
11. Gondia District - Maharashtra