

# "India's Quest For Nuclear Energy - A 75 7.8\* Year Perspective"

Among all the developing nations, India is the only one to have generated electricity using indigenously developed, demonstrated, and deployed nuclear reactors. India ranks third in terms of electricity production worldwide by producing 1207 TWh of electricity. Nuclear energy is the fifth-largest source of electricity for India. India also stands at seventh position in terms of the number of nuclear reactors, with over 23 nuclear reactors in 7 power. With an aim to increase its atomic power contribution from 3.2% to 5% by 2031, this surge in the nuclear energy contribution in India will help the country lead towards a more sustainable and economic future.

Nuclear power is an efficient way of boiling water to create steam, this steam is used to turn turbines, which creates electricity. Compared to other forms of renewable energy, nuclear energy is considered beneficial, because of its smaller land footprint and the amount of waste it produces. Nuclear energy uses 300 times less amount of land as compared to wind farms and 75 times less land as compared to solar photovoltaic plants. Nuclear fuel is energy-dense as a 1-inch-tall uranium pallet is equivalent to 120 gallons of oil and about 17,000 cubic feet of natural gas.

Nuclear energy carries a lot of significance for India. On 3<sup>rd</sup> December, 2021, Mr. Anil Kakodkar, the former chairman of the Atomic Energy Commission, stated that India can't meet the net-zero target without nuclear power. He also added that the nuclear power grid alone helps India to provide low-cost power and assist in grid balancing. In the long run, the country is planning

to increase the percentage contribution of nuclear energy to 25% of the total power capacity. The recent Jaitapur project in Maharashtra is projected to bring 21,000 crores (US\$ 2.8 billion) in revenues for the government and create 50,000 jobs. Nuclear energy is also considered to be greener as compared to traditional power sources.

The main objective of India's nuclear energy program was the utilization and development of atomic energy for peaceful purposes. India wanted to develop a cheap and efficient power source and use nuclear energy for various other research purposes like basic sciences, astronomy, astrophysics, cancer research and education. India's nuclear program has an ambitious three-stage power production program; this program was meant to be a closed fuel cycle program in which every stage feeds into each other. To put this in perspective in the first stage of the nuclear fuel cycle the spent nuclear fuel still contains 96% of reusable material, this material is used again in the second stage and reused for the third stage. This creates a closed chain where the fuel is being reused and recycled to maximize efficiency.

The country was about to successfully reach the first stage of the nuclear energy program in 2013 with over 22 nuclear reactors in 7 nuclear power plants. The country produces 6780 MW of nuclear. The country has already generated 755 billion units of electricity and has saved 650 million tons of CO<sub>2</sub> emissions. India is currently on the second stage of its ambitious nuclear program. The country is planning to construct 12 new nuclear power reactors by 2024. This will further reduce the price from Rs 4 per unit to Rs 3 per unit.

NAME :- Patel Jiya Amitbhai  
School Name :- Shri Saraswati English medium school, Modasa, Arvalli