

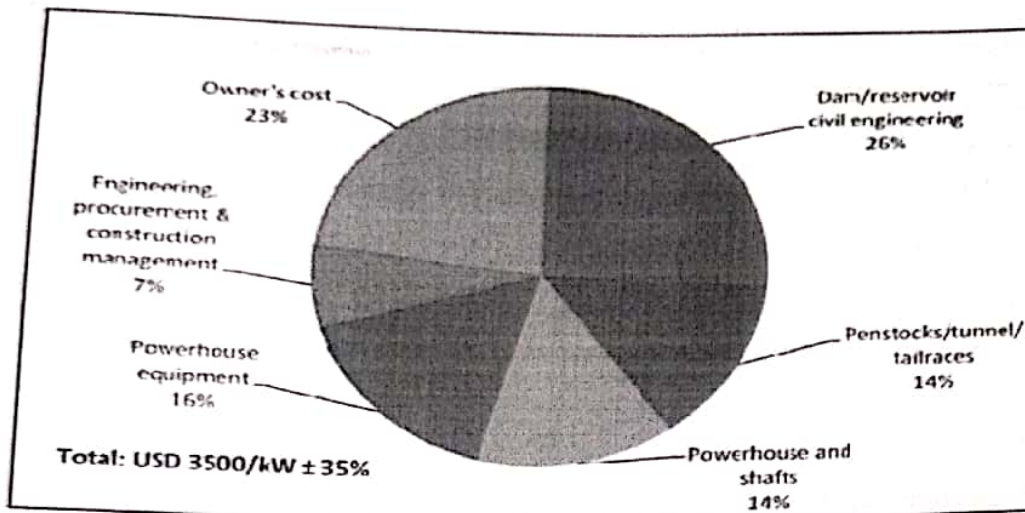
## **Global Hydropower Scenario:**

Hydropower constitutes 21% of the world's electricity generating capacity. The theoretical potential of worldwide hydropower is 2,800 GW, about four times greater than the 723 GW that has been exploited. Yet, the actual amount of electricity that will ever be generated by hydropower will be much lower than the theoretical potential, due to the environmental concerns and economic constraints. About 44 % of the world's hydropower was generated in four countries in 2002, mostly large- and mid-scale plants. Asia accounted for 24% of the world's hydro generation, with 618 GWh, followed by North America with 23% (595 GWh) and Europe with 20% (537 GWh). Canada with 315 GWh is the largest producer of hydropower in the world followed by China with 309 GWh. Brazil with 282 GWh and the United States with 255 GWh comes after them. Even though Canadian hydro generation is growing, China will overtake Canada very soon, if it has not already done so, to become the largest hydro generator in the world. In Western Europe and the United States, the scope for additional hydropower is limited, as the most economic sites have already been developed and further expansion is hindered by environmental concerns. In North America, hydropower is the most widely used form of renewable energy. The installed hydropower capacity amounts to 175 GW (67 GW in Canada, 99 GW in the US, and 10 GW in Mexico).

Hydropower generated around 4,250 terawatt hours (TWh) of clean electricity worldwide in 2021, down from the record of 4,370 TWh in 2020. Lower than average rainfall in many regions contributed to this downturn in generation.

An estimated 62,500 power plants are operating around the world, with a total installed generating capacity of more than 6,000 gigawatts (GW) in 2015. The nine largest operating power plants in the world by capacity are all hydroelectric power plants.





## GLOBAL NUCLEAR POWER PLANT SCENARIO

### Nuclear Power in the World Today

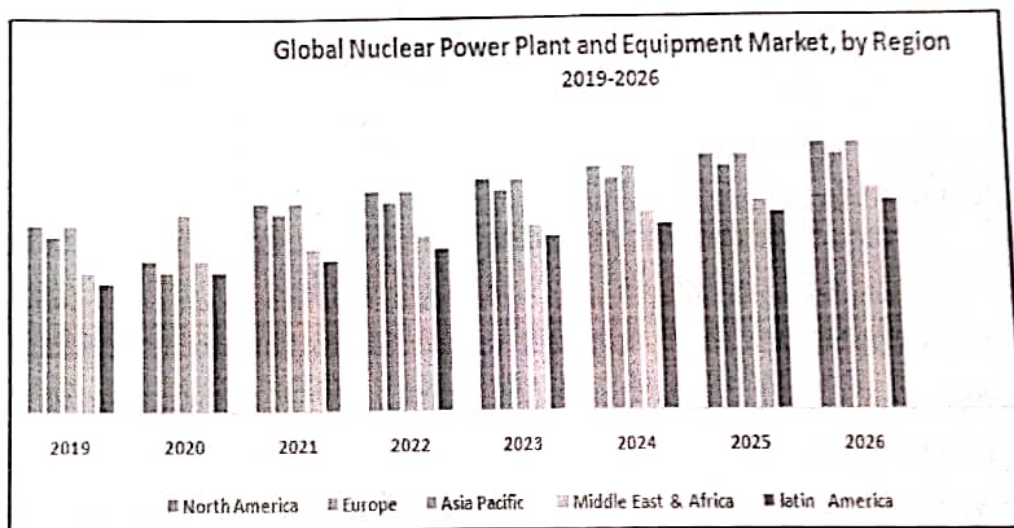
- The first commercial nuclear power stations started operation in the 1950s.
- Nuclear energy now provides about 10% of the world's electricity from about 440 power reactors.
- Nuclear is the world's second largest source of low-carbon power (28% of the total in 2019).
- Over 50 countries utilize nuclear energy in about 220 research reactors. In addition to research, these reactors are used for the production of medical and industrial isotopes, as well as for training

Nuclear technology uses the energy released by splitting the atoms of certain elements. It was first developed in the 1940s, and during the Second World War research initially focused on producing bombs. In the 1950s attention turned to the peaceful use of nuclear fission, controlling it for power generation. For more information, see page on History of Nuclear Energy.

Civil nuclear power can now boast more than 18,000 reactor years of experience, and nuclear power plants are operational in 32 countries worldwide. In fact, through regional transmission grids, many more countries depend in part on nuclear-generated

power; Italy and Denmark, for example, get almost 10% of their electricity from imported nuclear power.

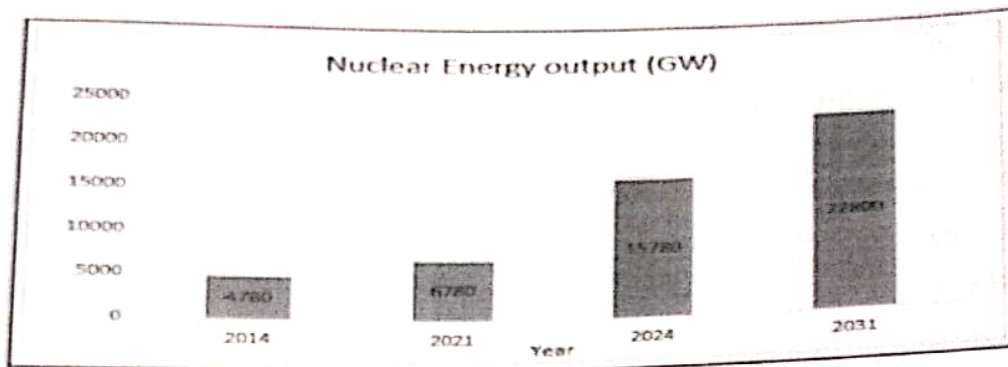
When the commercial nuclear industry began in the 1960s, there were clear boundaries between the industries of the East and West. Today, the separate American and Soviet spheres no longer exist, and the nuclear industry is characterised by international commerce. A reactor under construction in Asia today may have components supplied from South Korea, Canada, Japan, France, Germany, Russia, and other countries. Similarly, uranium from Australia or Namibia may end up in a reactor in the UAE, having been converted in France, enriched in the Netherlands, deconverted in the UK and fabricated in South Korea.



## Nuclear Power Scenario in India

- India has a largely indigenous nuclear power programme.
- The Indian government is committed to growing its nuclear power capacity as part of its massive infrastructure development programme.
- The government has set ambitious targets to grow nuclear capacity.
- Because India is outside the Nuclear Non-Proliferation Treaty due to its weapons programme, it was for 34 years largely excluded from trade in nuclear plant and materials, which hampered its development of civil nuclear energy until 2009.
- Due to earlier trade bans and lack of indigenous uranium, India has uniquely been developing a nuclear fuel cycle to exploit its reserves of thorium.

- Since 2010, a fundamental incompatibility between India's civil liability law and international conventions limits foreign technology provision.



## GLOBAL THERMAL POWER SCENARIO

The global thermal power plant market was valued at \$1,345.0 billion in 2020, and is projected to reach \$1,820.7 billion by 2030, growing at a CAGR of 3.2% from 2021 to 2030.

Thermal power plants convert the heat energy of primary fuels such as coal, to electric power. In most of the thermal power plants, combustion of primary fuels heats the water and transforms it to steam. The steam drives steam turbines, which eventually generates electricity. Subsequently, the steam is condensed and recycled back into the system. The thermal power plants may use several different types of heat sources, including fossil fuels, nuclear energy, biomass and waste.

The global thermal power plant market is primarily driven by surge in demand for electricity is expected to augment the market growth of coal-fired power generation. This is attributed to the increasing population which is creating demand for the residential sector. Rapid industrialization and urbanization along with the need for the energy in heavy industries is again expected to propel the growth of thermal power plant market. Thus, the surge in demand for electricity is projected to propel the market growth.

The thermal power plant market size is segmented on the basis of fuel type and region. By fuel type, it is analyzed across coal, gas, nuclear, and others. Region-wise, it is studied across North America, Europe, Asia-Pacific, and LAMEA.