

# A Comprehensive Study of Nuclear Science and Energy

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## ABSTRACT

Nowadays, as we know whole world is concerned about increasing pollution and climate change. The United Nation members taking many steps to control and limit their dependency on conventional methods for energy generations like excessive use of fossil fuels. Whole world is shifting towards renewable energy concept. In UN's Climate Change Conference 2022 called as COP-26, held at Glasgow, many nations including India set their targets for achieving "Carbon Net emission-zero" concept, which means that the amount of carbon the country producing also utilizing that carbon within their territory in constructive way, without harming nature. India set target to produce 500 GW of energy, purely through renewable sources by 2030 and achieve net emission zero target till 2070. Many other nations like Bangladesh, Cambodia, Ghana, Vietnam, Ethiopia set goal to achieve a 100 percent renewable energy concept by 2045–2050. There are many ways to produce energy by renewable sources such as solar energy, geothermal energy, wind energy, nuclear energy, tide energy and many others. Here Nuclear science concepts and nuclear energy is discussed in a comprehensive way. First of all, atoms are the basic building blocks of everything around us, and we are fully made up of them. The study of atomic nuclei and their applications, such as in nuclear power plants, atomic theory, and radiation, is referred to as nuclear science. Some main highlights of this paper are: - 1) Basic definitions 2) Rutherford's gold foil experiment and discovery of nucleus 3) Nuclear reactions and its types. 4) Nuclear energy its uses and harms. 5) NPT AND NSG. The history and evolution of the nucleus, as well as nuclear energy, will be studied and also the benefits and demerits of nuclear energy, along with some international organisations.

**Keywords:** Rutherford's gold foil experiment, Mathematical Physics for Nuclear Reaction, Nuclear Energy and its Production, Nuclear Proliferation treaty (NPT).

