

## Various Pros and Cons of Nuclear Energy

Nuclear energy is the energy released by a chain reaction, specifically by the process of nuclear fission or fusion in the reactor. The source of fuel used to generate nuclear energy is mined and processed uranium (enriched uranium), which is utilized to generate steam and produce electricity. As of today, nuclear energy is considered as one of the most environmentally friendly sources of energy as it produces fewer greenhouse gas emissions during the production of electricity as compared to traditional sources like coal power plants. Nuclear fission is the process that is used in nuclear reactors to produce a high amount of energy using an element called uranium. It is the energy that is stored in the nucleus of an atom.

While being environmentally friendly is the big plus of nuclear energy, disposal of radioactive waste and protecting people and the environment from its radiation is a big con of nuclear energy. Therefore, expensive solutions are needed to protect mother earth from the devastating effects of nuclear energy.

When we think about this resource, many of us think about nuclear bombs or the meltdowns that have happened at a number of nuclear plants around the world. That being said, nuclear energy is definitely a type of renewable energy that we need to look at. In this article, we're going to explore the pros and cons of nuclear energy.

### Cons of Nuclear Energy (Disadvantages)

#### 1. Environmental Impact

One of the biggest issues is the environmental impact in relation to uranium. The process of mining and refining uranium hasn't been clean. Actually transporting nuclear fuel to and from plants involves a pollution hazard. Also, once the fuel is used, you can't simply take it to the landfill – it's radioactive and dangerous.

#### 2. Radioactive Waste Disposal

As a rule, a nuclear power plant creates 20 metric tons of nuclear fuel per year, and with that comes a lot of nuclear waste. When you consider each nuclear plant on Earth, you will find that number jumps to approximately 2,000 metric tons a year.

The greater part of this waste transmits radiation and high temperature, implying that it will inevitably consume any compartment that holds it. It can also cause damage to living things in and around the plants.

Nuclear power plants create a lot of low-level radioactive waste as transmitted parts and supplies. Over time, used nuclear fuel decays to safe radioactive levels, however, this takes a countless number of years. Even low-level radioactive waste takes hundreds of years to achieve adequate levels of safety.

Anti-nuclear environmental group Greenpeace released a report in January 2019 that detailed what it called a nuclear waste 'crisis' for which there is 'no solution on the horizon.' One such solution was a concrete nuclear waste 'coffin' on Runit Island, which has begun to crack open and potentially release radioactive material.

#### 3. Nuclear Accidents

The accident in Three Mile Island in 1979, the Chernobyl accident that occurred on 26 April 1986 at the Chernobyl Nuclear Power Plant in Ukraine, was the worst nuclear accident in history. Then there was

another accident that happened recently in Fukushima in Japan in 2011. Although the casualties were not that high, it caused serious environmental concerns. Its harmful effects on humans and ecology can still be seen today.

Despite all the safety measures in place in these nuclear plants, different factors caused them to go into meltdown causing devastating effects for the environment and for local inhabitants who had to leave the affected areas. The radioactive waste produced can pose serious health effects on the lives of people as well as the environment.

#### **4. High Cost**

The initial costs for building a nuclear power plant are steep. A recent virtual test reactor in the US estimate rose from \$3.5bn to \$6bn alongside huge extra costs to maintain the facility. South Africa scrapped plans to add 9.6GW of nuclear power to its energy mix due to the cost, which was estimated anywhere between \$34-84bn.

At present, the nuclear business let waste cool for a considerable length of time before blending it with glass and putting it away in enormous cooled, solid structures. This waste must be kept up, observed and watched to keep the materials from falling into the wrong hands and causing problems.

These administrations and included materials cost cash and on top of the high expenses needed to put together a plant, which may make it less desirable to invest in. It requires permission from several international authorities, and it is normally opposed by the people who live in that region.

The nuclear plants are cheap to run and produce inexpensive fuel, but the initial costs are huge.

#### **5. Uranium is Finite**

Typical renewable energy sources such as solar and wind are in infinite supply. Nuclear energy is not a renewable fuel source. Just like other sources of fuel, uranium is also finite and exists in a few of the countries. Uranium is in limited supply although currently abundant. There is still the risk of running out eventually.

Uranium has to be mined, synthesized, then activated to produce energy, and it's very expensive to go through this process. It produces a considerable amount of waste during all these activities and can result in environmental contamination and serious health effects, if not handled properly.

#### **6. Hot Target for Militants**

Nuclear energy has immense power. Today, nuclear energy is used to make weapons. If these weapons go into the wrong hands, that could be the end of this world. Nuclear power plants are a prime target for terrorism activities. Little lax in security can be brutal for humankind.

#### **7. Fuel Availability**

Unlike fossil fuels that are available to most of the countries, uranium is a very scarce resource and exists in only a few of the countries. Permissions of several international authorities are required before someone can even think of building a nuclear power plant.

DOE and its national labs are working with industry to develop new reactors and fuels that will increase the overall performance of these technologies and reduce the amount of nuclear waste that is produced. It also works to provide accurate, fact-based information about nuclear energy through its social media and STEM outreach efforts to educate the public on the benefits of nuclear energy.

### **Is Nuclear Energy Renewable?**

The definition of renewable energy involves unlimited availability of the resource, the capability to replenish itself and the characteristic to cause minimum impact on the environment. The question of whether nuclear energy is renewable still elicits debates to this day despite the fact that it is a low-carbon power generation source. The 5 substantiated renewable sources of energy used on a daily basis include solar, wind, hydro, geothermal and biomass.

However, the largest point of view stipulates that nuclear energy is not really renewable. This hinges on a wide range of facts such as:

The chief raw material for the production of nuclear energy (uranium) is not a renewable resource. Uranium resources are quite limited, and the mining and refining process mightily impacts the environment. Also, the transportation of uranium is risky. Safe transportation involves significant capital outlay and a lot of energy consumption.

After processing uranium, significant amounts of radioactive waste are generated. The resultant elements have extensive storage requirements and are known to stay radioactive and hazardous for thousands of years. Most countries have tried to recycle it, but the whole process is ineffective and relatively expensive, not to mention it's a daunting task to store it safely. To add insults to the injury, nuclear storage sites can become prime targets for terrorists who are hellbent on killing more people simultaneously.