

## Various Pros 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.

### Pros of Nuclear Energy (Advantages)

#### 1. Low Pollution

Nuclear power also has a lot fewer greenhouse emissions. It has been determined that the number of greenhouse gases have decreased by almost half because of the prevalence in the utilization of nuclear power.

This avoids more than 470 million metric tons of carbon each year, which is the equivalent of removing 100 million cars off of the road. The thermal energy from nuclear reactors may also be used to decarbonize other energy-intensive sectors such as transportation, the largest contributor to carbon pollution.

Nuclear energy has the least effect on nature since it doesn't discharge any gasses like methane and carbon dioxide, which are the primary "greenhouse gasses." There is no unfavorable impact on water, land or any territories because of the utilization of nuclear power, except in times where transportation is utilized.

Nuclear Advocacy group the World Nuclear Association found that the average emissions for nuclear are 29 tonnes of CO<sub>2</sub> per gigawatt-hour (GWh) of energy produces. This compares favorably with renewable sources like solar (85 tonnes per GWh) and wind (26 tonnes per GWh) and even more favorably with fossil fuels like lignite (1,054 tonnes per GWh) and coal (888 tonnes per GWh).

#### 2. High Power Output

The fuel to power output ratio for nuclear energy is incredibly high. It has the capacity to meet city and industrial needs with just one reactor, let alone multiple. A relatively small amount of uranium can be used to fuel a 1000 Megawatts electric plant, thus providing enough electricity to power a city of about half a million people.

Renewable sources, such as solar and wind, provide only enough power to meet residential or office needs. They don't yet have the capacity of nuclear to handle large-scale power needs, especially in the manufacturing world.

### **3. Stable Base Load Energy**

Nuclear power plants provide a stable baseload of energy. Nuclear energy is widely used in America and makes up around 20% of all electricity generated in the United States. This efficient energy source comes from the 98 nuclear power reactors dotted around 30 different states in the US.

The stable production of power created by nuclear power plants means that it can ideally be used in conjunction with other forms of renewable energy. For example, when the wind is blowing, nuclear plants can adjust energy output to be lower.

Conversely, when the wind is not blowing, and greater energy is needed, nuclear energy can be adjusted to compensate for the lack of wind (or solar) generated power.

### **4. Low Operating Costs**

Nuclear power produces very inexpensive electricity and cheaper than gas, coal, or any other fossil fuel plants. The cost of the uranium, which is utilized as a fuel in this process, is low, and it is needed very little to produce massive power. Also, even though the expense of setting up nuclear power plants is moderately high, the expense of running them is quite low.

It has been estimated that even factoring in costs such as managing radioactive fuel and disposal nuclear plants cost between 33 to 50 percent of a coal plant and 20 to 25 percent of a gas combined-cycle plant.

The normal life of a nuclear reactor is anywhere from 40-60 years, depending on how often it is used and how it is being used. These variables, when consolidated, make the expense of delivering power low. Even if the cost of uranium goes up, the impact on the cost of power will be that much lower.

The US Department of Energy (DOE) estimates that to replace a 1GW nuclear power plant would require 2GW of coal or 3GW to 4GW from renewable sources to generate the same amount of electricity. Also, the impact on the cost of power will be that much lower.

### **5. Reliability**

It is estimated that with the current rate of consumption of uranium, we have enough uranium for another 70-80 years. A nuclear power plant when in the mode of producing energy can run uninterrupted for even a year and more without interruptions or maintenance, making it a more reliable source of energy.

As solar and wind energy are dependent upon weather conditions, the nuclear power plant has no such constraints and can run without disruption in any climatic condition. The consistent criticism of renewable energies, e.g., wind and solar energy are that they only produce power when the wind is blowing, or the sun is shining.

There are sure monetary focal points in setting up nuclear power plants and utilizing nuclear energy in place of traditional energy. It is one of the significant sources of power all through the country.

The best part is that this energy has a persistent supply. It is broadly accessible, there is a lot in storage, and it is believed that the supply is going to last much, much longer than that of fossil fuels that are used in the same capacity.

## **6. More Proficient Than Fossil Fuels**

The other primary point of interest in utilizing nuclear energy is that it is more compelling and more proficient than other energy sources. A number of nuclear energy innovations have made it a much more feasible choice than others.

They have high energy density as compared to fossil fuels. The amount of fuel required by the nuclear power plant is comparatively less than what is required by other power plants as the energy released by nuclear fission is approximately ten million times greater than the amount of energy released by fossil fuel atom.

## **7. It Doesn't Rely on Fossil Fuels**

This is one of the reasons that numerous nations are putting a lot of time and money into nuclear power. So what's nuclear power's greatest benefit, above any other benefit that we may explore? It doesn't rely on fossil fuels and isn't influenced by fluctuating oil and gas costs.

Coal and natural gas power plants discharge carbon dioxide into the air, which causes a number of environmental issues. With nuclear power plants, carbon emissions are insignificant.

## **8. Renewable?**

Nuclear energy is not a renewable resource. Uranium, the nuclear fuel that is used to produce nuclear energy, is limited and cannot be produced again and again on demand.

However, uranium reserves are estimated to last another 80 years, whereas fossil fuels have a much more limited lifespan. Since the Industrial Revolution, humans have been consistently and constantly depleting our fossil fuel reserves. If we continue consuming fossil fuels and keep increasing our consumption as the world population grows, the world is estimated to run out of oil by 2052, gas in 2060, and coal by 2088.

On the other hand, by using breeder and fusion reactors, we can produce other fissionable elements. One such element is called plutonium that is produced by the by-products of chain-reaction. Also, if we know how to control atomic fusion, the same reactions that fuel the sun, we can have almost unlimited energy.

Thorium is a greener alternative that has lately been come to notice. China, Russia and India already have plans to start using thorium to fuel their reactors in the near future.

## **9. Economic Impact**

Nuclear power provides many benefits to the economy with the number of jobs and prosperity a new plant brings.

According to the NEI, a new nuclear plant creates 400 to 700 permanent jobs and also thousands of others during its construction. Most nuclear sites have at least 2 plants. Whereas jobs created elsewhere is just 90 jobs for a coal plant, and 50 for a natural gas plant.

Each facility generates close to \$500 million annually in sales of goods and services. More workers at plants mean more people who need lunches and more people with money to spend.