

Advantages Of Using Nuclear Energy As A Power Generation Source

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The term 'nuclear energy' is getting much attention in the present time. Although the term nuclear energy comes with some bitter memories of Hiroshima and Nagasaki and the destruction caused in these places, it still has some attractive features as well. The utilization of nuclear energy can be made clean, safe and reliable. Nuclear energy can be used at a competitive cost without greenhouse emissions (Comby). The United States and France are among the countries that are getting huge benefits from the use of nuclear energy. Nuclear energy is playing a major role in the economic, technological, and defensive development of these countries.

Nuclear energy is derived by splitting the nucleus of an atom of radioactive material. The most common nuclear fuel is Uranium. However, Plutonium is also often used as an alternative. It is a very sophisticated and scientific process that requires extensive expertise ("Nuclear – Energy Explained, Your Guide To Understanding Energy – Energy Information Administration"). If not handled with care, a nuclear power plant can be a nuclear explosion waiting to happen. Chornobyl is a classic example of a nuclear reactor getting out of control, though it should be noted that Chornobyl was one and only such incident in entire history. Despite the hazards attached to it, nuclear energy is a cost-efficient source of energy, brings technological breakthroughs and is being accepted by the world widely.

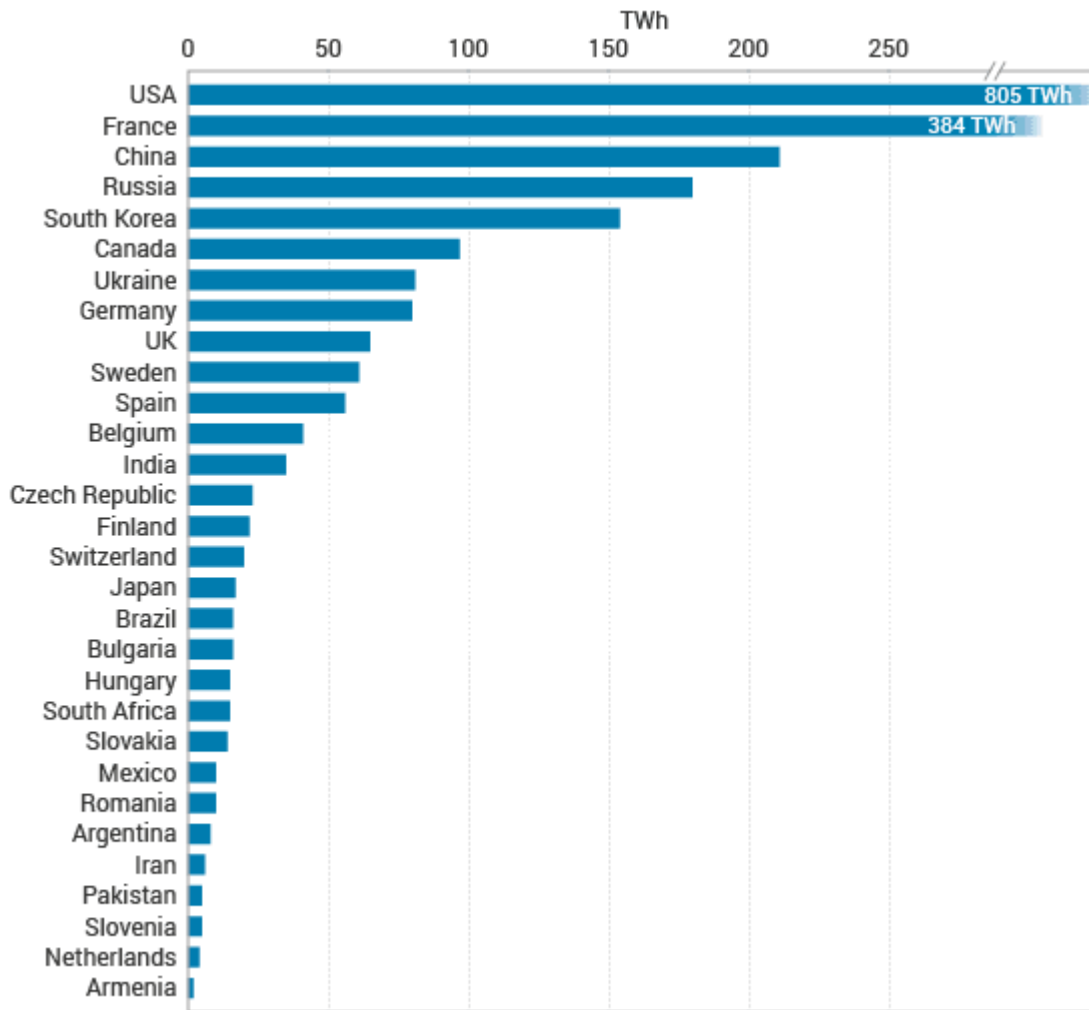
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Using fossil fuels for the generation of electricity causes issues like the emission of greenhouse gases which is adverse for the health of human beings and all living beings as a whole. In this case, nuclear energy is one of the reliable sources of the generation of electricity. However, the generation of electricity from nuclear energy needs to be managed and monitored for safety. For the production of electricity from nuclear energy, safety is a focal point. Some of the pros of nuclear energy are mentioned as follows:

Reliability:

Nuclear reactors can produce power 90 percent of the time, thus making it a dependable source of energy. The periods of refueling can be substantially reduced by taking advantage of the latest scientific developments. With the passage of time, these advancements have been seen in the country of the United States. This country has developed reactors with the latest advancements,

which are meant to last for decades. Reports have shown that there are some reactors in the United States that can survive for more than 40 years (Kato 53-57). Out of these reactors, many reactors are reaching the verge of perfection, making them function flawlessly. Projections have listed that these reactors can still operate for more than twenty years. Hence the reactors developed in the United States are a good source of energy for the future. Since the nation is deriving its energy from a cost-effective source, it is having a positive impact on the economy as well.



Source: IAEA PRIS Database

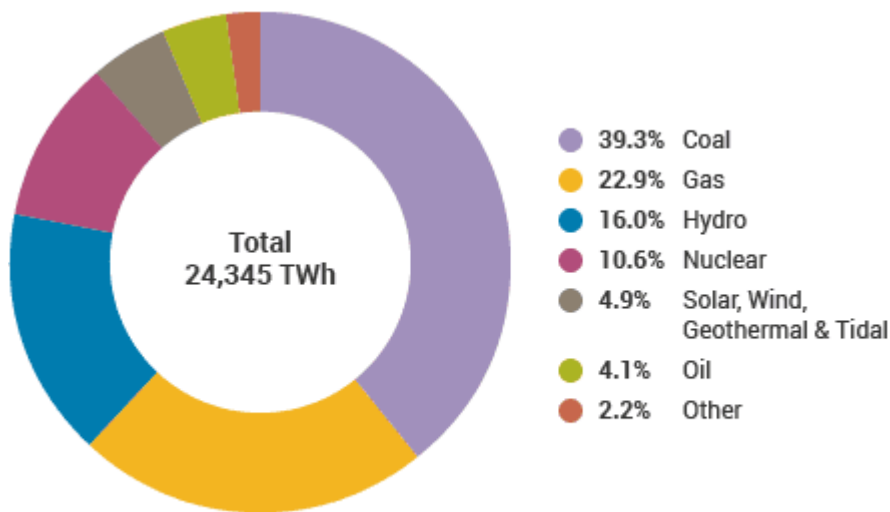
Figure 1: Countries depending on nuclear power for electricity

Cited: (Kato 53-57)

No greenhouse gas emissions:

According to a recent survey carried out, it has been found that global energy production depends mainly on coal. The production of electricity from coal is causing the emission of greenhouse gases ("Nuclear Power Today | Nuclear Energy - World Nuclear Association"). These gases are dangerous for the survival of human beings since many problems are being caused to the respiratory system of

human beings.



Source: IEA Electricity Information 2017

Figure 2: World Electricity Production by Source 2017

Cited: ("Nuclear – Energy Explained, Your Guide To Understanding Energy – Energy Information Administration")

In this case, the utilization of nuclear reactors for the generation of electricity is the best possible option. Nuclear reactor emits zero greenhouse gases. Nuclear reactors are developed with the help of uranium. In the process of mining and enrichment of uranium, some greenhouse gasses are emitted, but this amount is less than that of the gases emitted in the generation of electricity with the help of coal. Hence nuclear reactors are a good source of electricity generation as compared to Fossil Fuels. For a long period, France has been working on this concept to save their nation from different diseases (Morbee, Himpens and Proost 622-632).

Competitive cost:

In the 21st century, nuclear energy is amongst the most sustainable sources of energy. One of the reasons behind this statement is the competitive cost associated with nuclear energy. The cost of running nuclear power does not fluctuate often and thus provides greater stability. Electricity generated from the different kinds of fossil fuels is highly dependent on the current situation of the market.

When the oil price is good, the stability in the market price can be easily observed. However, when the market is volatile, there is an evident shoot-up in the price of the oil (Kessler 309-325). It shows that there is instability in the prices of power production by using fossil fuels and oil, whereas nuclear energy gives us stability and a cost that can make the economy of the country well-stable. The United States has been utilizing cost-competitive sources to make the economy of the country even stronger

than before.

Compactness:

Many researchers have stated that nuclear energy is a compact form of energy. The space occupied by the nuclear power station is compact. It mostly covers an area of a football stadium and some of the surroundings for the production of energy, whereas the production of energy from other sources needs a huge amount of space to carry on the production process (Shellenberger 17-58). Wind turbines, solar cells, and growing biomass all need a huge area of land. Compact nuclear energy plants are seen in the United States and France as well. Recently, the construction of a nuclear power stadium in France is a clear description of this compactness.



Figure 3: one of the stills from the nuclear power station in France

Cited: (Shellenberger 17-58)

More proficient than the use of fossil fuels:

It has been found that the use of nuclear energy is more proficient than that of fossil fuels due to so many competitive advantages (Morbee, Himpens and Proost 622-632). The recent nuclear innovations and the other already existing are making this form of energy more feasible in comparison to others. The energy density of the energy made from the nuclear reaction is more than the density of energy produced by fossil fuels. Moreover, these reactors, once developed, are available for a large span of

time. The amount of energy produced by the fission reactions is millions of times greater than that produced by conventional sources; therefore, the amount of fuel needed to run a nuclear power plant is comparatively low. (Morbee, Himpens and Proost 622-632). It is the reason for investment in this form of energy. Every nation is deciding to utilize nuclear energy as the major source of energy and for the production of electricity as well.

Safe nuclear power plants at the present time:

Nuclear power plants of the present day are considered to be safe and better for the production of energy from different perspectives. All those countries developing nuclear power plants have a lot to learn from the past experiences or incidents that happened in the past like that of Japan. Countries like the United States and France are making nuclear power plants in such a way that these accidents from the past are avoided. All precautionary measures are taken along with the remedies for future problems that can be encountered in any case. One of the precautions taken is independence from external electricity (Shellenberger 17-58).

Underground installation of reactors in modern power plants:

The latest nuclear power plants are not dependent on external supplies for their normal operations. For cooling, no external supplies of water are being used in modern nuclear power plants. Instead of an external water supply, water is fed from natural sources like oceans, convection heat exchangers and also from pressurized water tanks having certain gases in them. Such systems are referred to as passive safety systems ("Nuclear Power Today | Nuclear Energy - World Nuclear Association"). The passive safety systems have an underground installation of reactors. This installation offers more insulation in comparison to other power plants. The reactors are now safe from unauthorized access, which directly saves the wrong use of the reactors. Besides this, all external hazards are contained in this case. The United States is implementing this system currently in all the power plants of the country.

Substantially low cost of operations:

Although setting up nuclear power plants is costly since it involves a lot of new technological equipment, once the power plant is operational, the country is ready to enjoy the perks of relatively low-cost energy. The electricity produced after setting up a nuclear power plant is relatively cheap. The raw material used in the production of nuclear energy is uranium (Pomfret, Nash and Woollam²). It is one of the cheap radioactive materials used in the production of nuclear energy.

Once the set-up of the power plant is done, the maintenance charges are extremely low since the plant is set up with every kind of underground installation which makes the technology safe and reliable for further use. Since uranium and other radioactive materials are not traded in the local

market like other commodities, price fluctuations are extremely rare. (Pomfret, Nash and Woollam2). The power plants in the United States are using cheap uranium for the production of electricity which has given cost-effective electricity production.

Widely accepted power source:

The utilization of nuclear energy for the production of electricity is being accepted with every passing day. This source of energy is efficient as compared to the alternative forms of energy available (Shellenberger 17-58). The developed countries have benefited a great deal from nuclear energy. These benefits are in almost every field. From power generation to medical purposes, nuclear energy is being adopted. Some of the underdeveloped countries are also looking to use nuclear energy for peaceful purposes. Such purposes include power generation, scientific research, medical purposes, and the treatment of cancer. Nuclear energy is specially used in the treatment of cancers, and it has been found to be very effective.

Because there is not much development work to be done ahead, nuclear energy is easy to avail (Shellenberger 17-58). The development of other means of technology has made nuclear power a viable source in comparison to other forms of energy. Its reliability and readily available technology are making many countries like the United States and France invite this technology in large amounts. Currently, a significant amount of global electricity requirement is being met by nuclear energy.

Conclusion

To sum up, one of the major scientific developments of the present time is observed in the form of nuclear energy. Nuclear energy, which is obtained by the splitting up of the components of an atom, has gained much popularity in recent times. Although there are many bad incidents associated with this technology, this technology is changing lives, economic conditions, and health conditions in many countries like the United States and France. Many compact power plants are installed in both countries.

The reason why these countries are making a huge investment in this form of energy is the low-cost electricity being generated from nuclear energy. Nuclear energy has reduced the problems for the population because of zero emission of greenhouse gases. Its competitive cost is helping in making cheap electricity. The time is not far when electricity will be accessible to every person at cheap rates.

External hazards associated with nuclear power plants are overcome in modern power plants where the reactors are installed underground. Nuclear reactors can produce power 90 percent of the time making this source of energy base-load electricity. This is the reason nuclear energy is turning into a reliable source of energy utilization. However, this form of energy is still not renewable.

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