

Pros and cons of nuclear energy



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Introduction

This paper constitutes a comparison essay that critically appraises the advantages and disadvantages of nuclear power use and production. The essay simply reviews all the advantages and all the disadvantages in separate sections of the paper thus making two distinct sections for the entire comparison essay. This follows immediately after the brief introduction and are terminated by a concluding paragraph capturing the gist of the essay.

Basically, nuclear power is today generated in designated plants called nuclear reactors. Nuclear power is sourced from the heat collected from a regulated nuclear fission chain reaction, using either plutonium or uranium for the reaction. The nuclear fission reaction constitutes an element like plutonium or uranium being subjected to extreme pressures until its neutrons split. The splitting then produces a fission of the large atoms to create new and smaller neutrons and atoms as the byproducts of the reaction as well as radiation. The neutrons usually speed up due to heat and splits before striking other uranium/or plutonium atoms so as to create the chain reaction.

Neutron moderators such as graphite rods, water or such, depending on the reactor's design, keep the reaction under control. This help to capture the heat once the chain reaction has matured. The released heat produced converts the water into steam and the steam is projected towards turbines that run a power generator. This generator can then produce gigantic amounts of electricity in much the same way that thermal-based power

plants do. The heat converts water into steam, and the steam is used to turn the blades of a turbine, which runs the generator.

In modern day energy demand, nuclear energy has gained monumental support for several reasons including its low price and huge capacity, yet lost in this blind support, are a myriad of disadvantages that adversely affect the users and the environment to the extent that it is better to lose on the few appealing advantages but avoid, the dangerous side of nuclear energy. The following is a critical appraisal of this reality.

Advantages of Nuclear Energy

There is no denying the fact that nuclear energy may be the single most powerful energy source available today and which grossly outperforms all the other conventional fuels. The tremendous energy held within a radioactive nucleus and captured by atomic nuclear fission, has phenomenal potential that carbon-based fuels can never hope to match by their process of oxidation. A single nuclear plant can produce adequate energy to provide a small city with electricity, something an oil well cannot.

The greatest support for nuclear energy plants have resulted from the global warming fears currently gripping the globe. Unlike the fossil fuels, nuclear energy have no carbon emissions that could destroy the ozone layer and thus cause further climate change. In their search for low energy emissions, people are convinced that reviving nuclear power is the best mitigation available. The rising electricity demand around the globe means that pollution levels will soar if nations continue depending on fossil fuel-burning electric

generation. Coal, oil and gas has already caused wanton destruction of the environment and cannot be allowed to proceed with the destruction.

If electricity is sourced from fossil fuels for another decade, the carbon-triggered depletion of the ozone will have reached devastation levels. In this regard, nuclear energy becomes a solution to a burning environmental pollution concern. The fact is as seen above, a few nuclear reactors can grossly outperform tons of fossil fuels (such as coal, diesel, petroleum, natural gas etc) and reduce the carbon emissions considerably. The fact that nuclear energy production and use helps avoid or at least reduce greenhouse gases emissions is a great advantage of the energy source.

According to the US Nuclear Energy Institute, Nuclear energy production can help neutralize the oil industry insecurity and reduce the rising cost of energy since its production does not depend on the fossil fuels. Fluctuating prices of gas in the global market and its political unreliability helps cast nuclear energy in a very promising light. Nations can become energy dependent and unaffected by the mischievous oil market if they adopt nuclear energy. Nuclear energy plants are more reliable in their energy production and are not vulnerable to unwarranted shortages, political influence, religious inclinations, etc. That reliability is what the world is seeking at a time when oil producing nations are becoming unpredictable and unreliable.

Again, nuclear energy technology is today readily available and does not have to be further developed or redeveloped by nations before they can produce their own nuclear energy. It is a technology available and ready to

use without the need for further research as does most forms of alternative energy.

It must also be borne in mind that world's biggest reserves of fossil fuels when depleted cannot be replaced for another 500 million years. These deposits have already been confirmed as to be running out rapidly.

Estimates have placed their depletion dates at about 50 years from now. This means that nuclear energy, again becomes a solution to an impending global problem. This argument becomes even more credible after considering that the world's uranium reserves (needed for nuclear fusion) are too large and the new breed of reactors actually produce much more fuel than they can use. The soonest the world can run out of uranium and thorium feedstock, will be about a 1000 years from now.

Experts believe that nuclear fuel is way safer and beneficial than burning coal for energy. For instance when uranium is mined to produce nuclear energy, it removes chances of radon exposures from the ground that are disastrous to human settlement. On the other hand, burning coal leaves some carbon ashes that increase the chances of future radon exposures. Estimates confirm that it is way safer to exploit nuclear fuel than to burn coal. Mining uranium to fuel a nuclear plant for two years averts over 700 hundred deaths according to estimates while burning coal and producing carbon ashes causes 90 deaths in the same period.

Despite being lethal if a reactor core is compromised, the contemporary precautions adopted in nuclear energy production globally make nuclear power production the single safest energy production method today. Over

50, 000 Americans contract terminal respiratory diseases every year due to coal burning and 300 more are killed oil mining and accidents during transportation. For the last 10 years, no American has been injured or killed after a reactor accident, radiation exposure or any danger consequent from American nuclear plants. Highly reliable, error-proof measures have been adopted in modern nuclear plants, such as a thousand and one failure safes, 4-foot thick steel reinforced concrete domes and over 9-inch thick galvanizing steel vessels, makes it almost impossible to cause radiation even if the biggest earthquakes or bomb crashes occurred.

Disadvantages of Nuclear Energy

Despite the numerous advantages highlighted above, nuclear energy has a host of disadvantages. Waste produced by nuclear plants are extremely dangerous and takes up to 10, 000 years to treat according to the US Environmental Protection Agency standards. A single nuclear plant generates over 20 metric tons of waste nuclear fuel annually. This is a high-level radioactive waste that endangers every living thing in a 30-mile radius of the deposit site. Globally this waste accumulates to over 2, 000 metric tons annually. Additionally, the waste also emits heat and radiation that gradually corrodes the containers used to store it. Research has confirmed that it is impossible to prevent radiation to escape a nuclear power plant since even the equipment used has been radiated. Radiation remains lethal to life, all life.

The last few decades have seen very high security standard installed in nuclear plants, but as all things run by man, accidents still occur. It is

impossible to technically build a 100% secure plant. Any error, an accident, an omission has the probability to terminate life to extents that are simple unthinkable. It can take decades for such a mistake to occur, but nuclear reactors remain a great risk since if such one mistake occurs, the consequence will be devastating. This is especially worrying in today's political environment where nuclear plants can become targets of terrorism. Building many nuclear plants is like building many risk points.

Conclusion

From the above comparison, it is evident the modern day energy demand has pressed nations to look favorably upon nuclear energy. nuclear power production has gained monumental support for several reasons including its reliability, low price, huge capacity and prevention of carbon emissions. Yet it is important that nuclear energy be supported from an informed perspective rather than from ignorance. This is because it has a myriad of disadvantages that adversely affect the users and the environment. In the final analysis, nuclear energy comes out as more dangerous than beneficial. It is thus better to lose on the few appealing advantages as long as nations avoid the dangerous side of nuclear energy