Free argumentative essay on nuclear energy as an alternate power source

Environment, Plants

Since the discovery that fossil fuels have a great impact to the issue of global warming throughout the globe, experts and governments have tried and tested several “ possible” alternative energy sources that can sustain the global demand. From solar power to biofuels, the argument continued on as to which of these alternatives would benefit the globe the most and have lesser impact to the environment. One of the hot topics in terms of the best alternative power source is the use of nuclear energy as a power source. Opposition to its use have already been raised with the capacity of nuclear power to be a viable source due to its possible use of being a nuclear weapon and a contaminant that can cause many diseases and further environmental degradation. Nonetheless, while opposition is still active against nuclear power, nuclear power is a viable and efficient power source as it is cleaner and safer to the environment, as well as a beneficial energy source for a nation’s development.

Three arguments have been raised to prove that nuclear power is indeed beneficial, implicating that the alternative source can be the key in solving both the power demand and the issue of global warming, returning sustainability and safety to the public. The first argument raised by experts is that nuclear power can generate cheaper and excess energy to cover a nation’s energy requirement. Currently, nuclear power plants sustain 20% of a nation’s energy requirement and it continues to increase in capacity each year. In the United States, the country hosts 104 nuclear reactors and has recorded that it generates more than 806, 000, 000, 000 kilowatt-hour since 2008, which is 7% higher from its record in 2000. With the amount of power generated from the 104 nuclear reactors in the country, the power is enough

to generate electricity for more than 67, 000, 000 homes with an average use of 1, 000 KWh per month. The reason for such high output from nuclear power is that the nuclear energy industry strives to make nuclear reactors efficient, require less maintenance for refueling and outages, and further improve nuclear power capacity in sites with the new technologies created to improve output ratios and smoother transmission of energy. As a result of the improved performance of nuclear power generators, nuclear plants online for more than 91% each time, generating more power or electricity to sustain demand as compared to the 20% online time of solar photovoltaic plants and wind turbines.

In addition to the high production power of nuclear plants in comparison to other alternative energy, nuclear energy’s capacity to sustain the demand enables governments to charge only 1. 87 cents per kilowatt-hour in comparison to other energy sources. In the US, for the 2008 records, US nuclear plants had recorded the lowest production costs as compared to other major generation sources: coal’s production costs to 2. 75 cents, natural gas costs to 8. 09 cents, and petroleum costs 17. 26 cents. The computation does not include the capital investment used by investors to build the power plants, however, the computation is affected by the fact that most fuels are affected by a period of fuel volatility that requires fuel companies to continuously replace their supplies. Fuel volatility means that fuel begins to release vapor in high temperatures, making the fuel hazardous due to the vapor’s quality of easily triggering ignition. Nuclear power does not experience such volatility, enabling it to continue providing electricity and decreasing production costs .

With the high production power of nuclear plants, as well as the low production and charging costs, nuclear energy is a viable alternative energy source for developing nations that do not have easy access to other alternative energy sources. For the past few years upon its introduction as a viable alternate energy source, many nations have expressed intent on trying out nuclear power due to the scarcity of energy supplies in their territories. In Africa, for example, 10 African nations, like Egypt, Libya and Namibia, wish to adopt nuclear power in their territories because it would be a safer energy source that would allow nations to reduce chances of under-electrification or power outages as their power production capacity is only limited into selected areas and limited to companies such as the Southern African Power Pool that is connected to almost all African countries in its scope. In the Middle East, developing nations like Israel, Syria, and Iran had argued that nuclear power can provide the power demand required and at the same time, it would allow them to remove reliance over fossil fuels. In the Asian and Oceania regions, developing nations, like Indonesia, argue that nuclear power would prevent the chances of under-electrification as only 54% of households have access to the electric grid. In Europe and in the Americas, some nations like Armenia, Italy, Chile and Venezuela, are lamenting on trying out nuclear power as their grids would benefit with the addition of nuclear power to sustain their overall power demand that other alternative energies may not be able to sustain completely .

The second argument raised by supporters regarding nuclear power is that nuclear power use is capable of opening opportunities for nations as it would improve their economy, job creation and image to their fellow nations. First

and foremost, due to the efficiency and power capacity of nuclear power to sustain power demand, countries could save to almost $41 billion per year for oil imports and infrastructure programs. With most nations utilizing fossil fuels to create energy and to power up their plants, the savings acquired from using nuclear power can be used for improving nuclear power research, create new nuclear power plants and increase nuclear capacity factors per plants to further improve their capacity. In addition to this, rural and urban areas in either developing or developed nations can benefit with nuclear energy as it can open further industrial development and electricity use. For developing nations, utilizing nuclear power to power many of its households and industries can open up further contact with other nations and develop its economy. Countries such as the Iran and Jordan showcased both willingness to further improve their nuclear competitiveness to improve their electric capacity and open up further industrialization in their territories. In the case of Iran, they have made their nuclear project a national priority to ensure that they can improve their technologies and compete with the world market. In the case of Jordan, nuclear power would improve their current installed capacity of 2 gigawatts and gain technical support from other nuclear countries. In Vietnam, utilizing nuclear power would further boost electricity use to the growing household counts throughout the country as the population demands for electricity for the economy .

Finally, having nuclear power can open job opportunities and economic improvement as it would open up to 700 full-time jobs and generate income for the community and the country. Like other alternative power source, nuclear power cannot sustain the energy demand without a dedicated staff

in each reactor plant to ensure that the nuclear power plant would perform smoothly and operational to sustain the required power demand from each subscriber. From plant construction, at least 2, 400 workers are required to complete it, especially in peak construction periods wherein the reactors are installed. Some would be retained to serve as the maintenance personnel on site and once the system is up and running, the plant would need 400 to 700 full-time positions that can be filled from maintenance, technical support, and nuclear research to waste management. These jobs alone pay more than the average jobs that can be received and these jobs would not require workers to be brought overseas. With a home staff, nuclear plants would be able to generate $430 million a year, benefiting not just its people but also the community it is placed .

The last argument raised by supporters of nuclear power is that like other alternative energies, nuclear power is environment friendly and safer. Research shows that nuclear energy as a power source produces no pollutants and greenhouse gases, which can reduce carbon emissions of over 1. 8 billion metric tons each year. From its 1990 baseline of total greenhouse gas emissions of over 6113 million metric tons, the US currently has a 7147 million metric tons worth of emissions in 2005. In this end, experts from known institutions such as the Massachusetts Institute of Technology had studied that if 1000-1500 nuclear power plants with 1000 MW capacity are to be built to replace coal-fired power plants in the next few years, it is likely that the emissions would be completely removed. The reason as to why nuclear power does not create CO2 is the fact that nuclear reactors use nuclear reactions to create steam, powering turbines to generate electricity:

CO_2 is mostly created through chemical reactions, which does not take place in nuclear power generation. Research also shows that by 2006, the US nuclear industry had been able to reduce the country's overall emissions by 3 million tons worth of sulfur dioxide and one million tons of nitrogen oxide that also contributes to global warming .

Nuclear power technologies can incorporate other alternative energies to further improve energy production and foster energy sustainability. As research still continues to make nuclear energy sustainable and safer, nuclear energy can be a viable support for energy systems to sustain demand. In comparison with other electricity generation sources, nuclear power can work on its own or with others, generating lesser pollution than other systems. Adding nuclear power to electric grids from other alternative energy sources can also aid in lessening the atmospheric GHG burden of the globe, improving economic growth, electricity use and even safer energy. Utilizing other energy frameworks to generate energy can also allow nuclear power to prosper and become sustainable as it would be able to redesign the nuclear power production grid, making it appealing to nations that has yet to begin nuclear power use .

The final point raised is that government policies and technological developments to improve nuclear energy use can further ensure the safe utilization of nuclear power as an alternative energy source. Since nuclear power can help in the fight against global warming and the possible benefit it has over one's economy appeals to many nations, governments and experts team up to ensure that their nuclear industries are on excellent record for both safety and performance. Ensuring nuclear power's benefit to the

country, the nations and the experts themselves must be active in ensuring its safety and sustainability. In the United States, both the Congress and the Senate have proposed energy bills to include provisions that will discuss the use of nuclear energy and how to successfully propagate nuclear power as a power source and a key economic benefit. Construction of new nuclear energy plants are also growing with newer technologies that can even improve nuclear energy production and merge with the national electric grid. The government and experts also state that while it may take a while for nuclear plants to be active, mechanisms can be created to ensure that nuclear power remains stable for us .

Despite its capacity to sustain clean and safer energy and improve economic opportunities for nations, critics argue that nuclear power can present insurmountable damage if handled without caution. Two major arguments have been raised by opponents and environmentalists: its capacity to be a hazard to the public, environment and sustainability, and its tedious need for continuous maintenance. For the first argument, opponents state that nuclear power, as well as its components and wastes, can be dangerous if left alone as it may affect public safety, sustainability, and the environment. Several factors have been identified by opponents in terms of nuclear power’s presence in each country. The first factor they raised is in terms of where the plant will be built. Given the span of land needed to create nuclear plants that can handle several reactors, cooling facilities and waste treatment facilities, there is a concern as to how it would affect the land around the plant and the water sources near it due to radiation or contamination. The second concern raised is the radioactive waste that can

come from nuclear reactors. There is a high possibility of radioactive leakage into groundwater and into the earth itself, which may contaminate both land and water sources for the ecosystem. Another concern raised is with the accident rates involving nuclear reactors, ranging from core meltdown to total radiation. Concern is also pointed over the possible use of nuclear sources as nuclear weapons. Opponents have pointed out that there is a high possibility that both nuclear fuels and products can be utilized to make a dirty bomb capable of immense destruction similar to a regular nuclear bomb. Elemental diversity is also affected by nuclear power use as minerals used in nuclear vessels become radioactive for further use and some of them may also be reduced such as hafnium, beryllium and zirconium .

Finally, the second most valuable argument opponents to nuclear power raised is that nuclear plants are very tedious to maintain and become dangerous overtime. First and foremost, nuclear plants are very expensive to build, especially the reactors. For investors, investing on a nuclear plant involves both risk and reward, mostly at risk especially if the plant does not click in the local market. It is also very difficult to get permits to build plants due to licensing and reviews, leaving investors spending money to maintain their works and pay for the long proceedings. Nuclear plants are also very costly, especially when it is disabled or in need of repairs. As long as the damage is not fixed, outages would be twice as hard to stop and to ensure further use of the plants, preventing the accidents like Chernobyl from happening. It is also quite big to fail, with the sigma of older nuclear accidents still in the minds of people. If the plant is not sustained to top form, it is likely a repeat of Chernobyl or Fukushima may be repeated and

endanger the public and the environment all together .

Today, nuclear power remains to be a usable power source for some nations capable of harnessing such technology and further study still continues towards its safety, production capacity, and benefit. On the one hand, the capacity of nuclear power can serve as a powerful alternative to sustain the power demand, improve economies and aid in removing the environmental impacts caused by other alternative energy sources. However, the very fact that nuclear power still is seen as a viable source for environmental degradation, health risk, and overall safety of the planet if left unattended to by those assigned to handle such volatile technology. As the debate continues pertaining the safety and capacity of nuclear power as an alternative energy source, it is essential for governments to understand the implications of utilizing such power source to the public and the environment as further analysis and recognition of its capacity may enable each nation to change its energy preferences and cope up with environmentally-friendly energy programs that can also benefit the country’s development.

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