

Example of term paper on production of nuclear energy

[Environment](#), [Disaster](#)



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Introduction:

The report seeks to explore the production and utilization of nuclear energy, a form of energy that is produced through a series of chemical reactions involving the atomic nuclei. In 1896, three scientists, Henrie Becquerel, Pierre Currie and Marie Curie, discovered the radioactivity in uranium salts and further pursued the experiments, and they separated radium, the highly radioactive component (Healey 37).

With advanced research, the atom came to be well defined. The terms alpha, beta and gamma decay, came into existence; that is, the release of energy when the nucleus releases neutrons and electrons in the form of electromagnetic radiation. The resulting radiation released was measured to be of very high frequency, and thus energy.

Science has documented that the ultimate source of the bulk of terrestrial

energy is nuclear, either from the sun's radiation resulting from the stellar thermonuclear reactions or the radioactivity decay of uranium within the earth. The radioactivity decay has been the prime source of geothermal energy (OECD 57).

Through the process of nuclear fission, the nucleus of radioactive elements such as uranium-235 or plutonium-239 is split to release energy and neutrons. The fission products are mainly: free neutrons, gamma radiation and kinetic energy. The resultant neutrons may be absorbed by other fissile atoms and induce subsequent fission events, thus releasing more neutrons and the process continues. The repeated series of reactions is termed as nuclear chain reaction (Healey 42).

The reaction is controlled within specialized devices known as nuclear reactors. The kinetic energy released from the fission process is further converted into thermal energy. The generated heat is then directed to running water or gas, thus generating steam that runs through turbines. With the turning of the turbines, the power generated is utilized in moving propellers or turning electrical generators, which yield electrical energy. Presently, there are about 450 nuclear reactors that are employed in electricity generation across 30 countries in the world (OECD 61)

Uses of nuclear energy:

It is estimated that about 17. 5 percent of the world energy requirements is synthesized from nuclear reactions. The energy is channeled into many uses, such as industrial radiography, which is the making of images inside solid objects, testing and inspection. The evolution of nuclear power has been

made manifest in a variety of fields, such as agriculture, food preservation, medicinal research, weaponry and munition, water desalination and in space exploration. (Healey 47)

Medical applications:

The medical utilizations of nuclear energy can be categorized into diagnostics and use of radiation in treatment procedures such as the destruction of cancerous and malignant cells and tissues. In diagnostics, the technology is used in imaging techniques, mainly to show internal body defects and reveal diseased tissues and organs. The use of x-rays is the most dominant and largest use of nuclear on humans. Radiation is also employed in the treatment of diseases in the process termed as radiation therapy (Healey 49).

Agricultural applications:

The damaging effect in fertilizers, especially from fertilizers labelled nitrogen-15 and phosphorus-32 have been made from radioactive components generated through the nuclear chain reactions. Therefore, it is essential to handle fertilizers carefully and minimize their uses where possible. (OECD 71).

Pest control:

In addition, nuclear technology has been employed in the control of highly resistant crop pests and insects. Research has shown that some insects have become resistant to the majority of pesticides. In this regard, gamma radiation is used in irradiating the eggs of such insects before hatching, thus

making them sterile (Healey 51). Moreover, the process of ionizing radiation, damage to the DNA, is widely used in food preservation by heating food to high degrees that cannot be attained through mere heating.

Oil and gas exploration:

Nuclear technology is applied in well logging and in predicting the viability of the new and existing wells.

Energy distribution:

Global energy sustainability:

In the recent years, from 2000, there has been an increased demand for more energy, especially the liquid fuels. The surging demand has mainly been attributed from industrial development and population increase.

Consequently, the world has been experiencing pronounced energy crises across the years, which has been marked by pronounced shortages and inflation in world oil prices (OECD 81).

With the increasing energy demand for the large number of automobiles produced annually as well as to the large number of global industries, this has given way to excessive and useless use of fuels (Koerth 75).

While oil accounts for about 37 percent of the energy needs, coal provides for up to 25 percent and natural gas yields about 23 percent of the energy demands. It is clear that the world relies on oil for most its energy requirements. However, there are concerns that the oil reserves are getting depleted, and the available reserves might only sustain the world energy demand for the next 42 years. Comparatively, the remaining gas reservoirs is expected to last for 61 years while coal has been estimated at 133 more

years (Newman 103).

As Newman highlights, research provides credibility that most of the richest fossil fuel reservoirs, across Middle East, are on the verge of depletion. It is clear that the close of the oil phase is inevitable considering that among the bulk consumers of oil, nearly all the oil is imported. For instance, the United States consumes about 25 percent of the world oil, and 70 percent of this is imported. In addition, despite the massive use, the country affords to produce 2. 4 percent, an insignificant amount compared to consumption rates. United States depicts the status prevailing in most of the countries globally, where oil is utilized but barely produced, and a sure cause to an acute energy crisis in the near future.

Tackling energy crisis:

Adopting renewable energy sources such as the tapping of solar energy and wind energy will serve to complement fossil fuels and limit their uses where inevitable. Therefore, there is an urgency to enact national and regional policies that advocate renewable energy technologies, such as the solar cells and wind turbines (Newman 105).

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