

Could Nuclear Energy be an Important Component of a Clean Energy Future?

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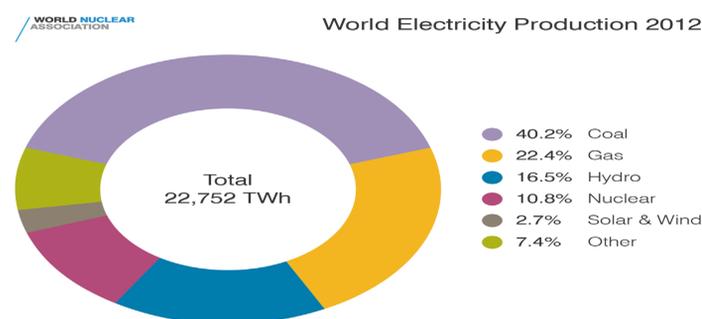
Abstract

Clean energy production has become a contentious debatable issue regarding the topics of the environment and economics for businessmen, scientists, engineers as well as politicians. Solar, hydroelectric, geothermal, tidal, and wind are clean energy sources with nuclear being one of them. Compared to other energy sources, nuclear energy is considered as a clean energy source because of its minor carbon footprint production. For better policy making and the public at large, the whole production chain and associated impacts needs to be considered including environmental and economic decisions. Minimum carbon footprint will lead to reduced pollution and decreased production of greenhouse gases such as carbon monoxide, carbon dioxide, sulfur dioxide in check.

Why Nuclear Energy?

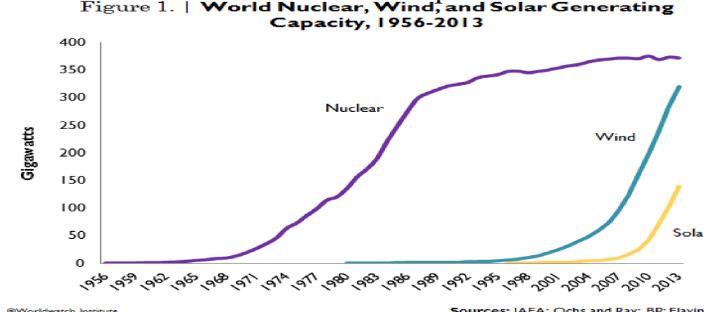
Due to the rapid depletion of fossil fuel reserves, the demand of alternative energy sources like solar, hydro, wind, biodiesel, CNG and nuclear have increased over the last decade. These sources have gained a large demand over time as they provide large amount of energy and are sustainable and greener at the same time.

Nuclear energy seems to be the best alternative source of energy as only a little fuel, typically Uranium-235 or Plutonium-239, is used to produce large kilowatts of energy over a long period of time. The energy produced from this fuel has little or no carbon footprint as 96% of the used fuel can be reprocessed and reused again. The production of nuclear energy takes place in a nuclear reactor. In the reactor, the nuclear fuels undergo nuclear fission and hence, energy is produced.



Since 1945, attention was given to harness this energy in a controlled fashion for electricity production and since 1956, the prime focus has been on technological evolution of reliable nuclear power plants. Currently, nuclear power generates roughly 11% of the world's energy although several socio-economic and political issues hinders its usage. A survey conducted in 2014, in the United States shows that the 20% of the power generated in the country is by nuclear energy.

There are few drawbacks of using nuclear energy which are yet to be resolved. These include the cost of production, exothermic heat release, production, recycling spent fuel and radiation leaks, but the potential for a clean, continuous energy source outweighs the drawbacks and should be more heavily considered for future developments.



Nuclear energy vs Renewable Energy Sources and Biodiesel

Energy produced from renewable sources are limited as they are affected by several factors. Factors such as hours of daylight, constant wind velocity and flow of water affect the production of solar, wind, and hydroelectricity respectively. Ethanol, soy and algae are sources of biodiesel, but to meet the annual gas demand of the U.S., large amount of land is wasted, which can be used for other purposes. As nuclear energy is produced from small amount of nuclear fuel, the energy produced is large and continuous. The cost of construction of nuclear power plants is expensive and hence, they aim to produce continuous but cheap energy from a small amount of fuel source. Hence, they are more beneficial to the consumer.

Nuclear energy vs Non-renewable Energy sources

Non-renewable resources such as coal or petroleum produce by-products such as carbon dioxide, sulfur dioxide, and Nitrogen oxide, which are pollutants and has an adverse affect on the environment. Acid rain and global warming are examples of it. On the other hand, nuclear energy is pollution free and produces little or no carbon footprints.

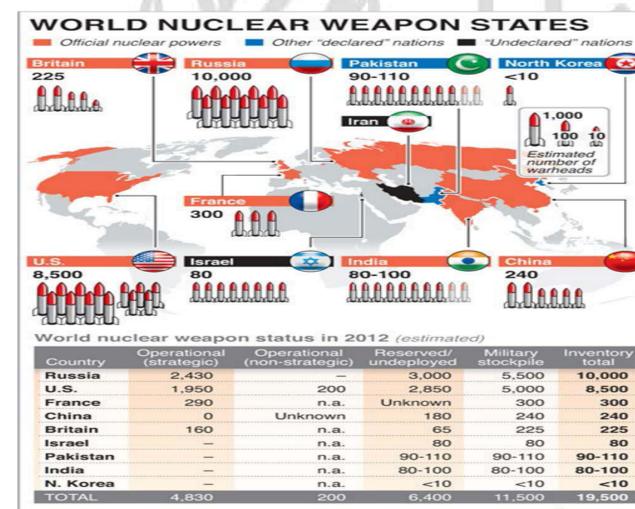
Coal and petroleum are limited sources as their reserves are depleting on a massive scale. To further add to the problem, large amounts of raw coal or petroleum is required to produce large amount of energy. This is not the case with nuclear energy, as a little nuclear fuel is required to continuously produce energy.

Issues to consider for better policy making...

Unlike the coal, the nuclear fuel and the waste both produce radiations. In order to get exposed to the radiation, the person does not need to be close to the surface of the fuel or the waste. This is mainly because of the certain radiation type produced from the fuel and the waste known as gamma radiation.

Although nuclear energy can be used for life supporting domestic purposes, there are times where nuclear energy is used to produce weapons. One of the major incident of caused by nuclear weapon is the disaster in Hiroshima, Japan in 1945, when an American bomber named 'the Enola Gay' sends out the world's first atom bomb toward the Hiroshima, a bustling urban city. This incident caused a major explosion in the city, causing death of about 140,000 people.

Although certain issues need to be taken into consideration before a powerplant is constructed, the production is usually safe, contained and beneficial. It is disturbing to know that the media only covers the negative aspects of it.



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U.S. energy consumption by energy source, 2014

