Nuclear power in uk environmental sciences essay

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Nuclear Power in UK: Critical Analysis:

Nuclear power is the most significant source of energy generation and nuclear fission in the world. It contributes 5. 7% and 13% of world’s energy and electricity respectively. It is yet a powerful source of energy but also prejudiced strongly by various organizations such as Greenpeace International, NIRS, IAEA, World Nuclear Association and Environmentalist for its reduction of carbon and various radioactive gases. A research by IAEA indicated that there are almost 439 nuclear reactors operating in 31 countries for emission and power generation. The U. S takes the lead by generating approximately 19% of its electricity through nuclear energy while France generates 80% of its total electricity through nuclear power. France reportedly operates 16 multi-nuclear stations while its other European counterpart such as Italy, Austria and Ireland has no active plants. While US plans to expand its nuclear power plants, China have sanctioned 25 nuclear power reactors for energy generation. Japan recently faced a severe nuclear disaster in 2011 (Fukushima Daiichi) which resulted in significant downfall of approximately 4. 3% of nuclear output. It also reverted to strategically redefine its nuclear reactors policies (World Nuclear Association, 2012). The British nuclear power facility is also a significant energy generation market in the world and contributes 19% of its electricity through nuclear energy generation. A decade back, nuclear power generation contributes to 25% of electricity annually. The gradual decline in the capacity is evident due to deteriorating power plants and ageing of the machines. It has relied on import of the electricity from France for approximately 6. 2 million kWh. The

current capacity includes 16 operating nuclear reactors contributing towards 10 GWe capacities. It is likely that the last operating reactor will run of fuel by September, 2014 which indicated that it is dependent on 7 stations and 1 PWR all owned and operated by France (World Nuclear Association, 2012). The implementation of the plan is significant for the British nuclear power plants due to its ageing machines and foreign imports, but nevertheless it also accounts for its two integral stakeholders i. e. Government and the Community (World Nuclear Association, 2012). Source: Department of Energy and Climate Change, 2012.

1. 1 Pros and Cons of the Nuclear Power Plant:

It is critically analyzed through its huge demand all over the world and also has a significant impact on the environment as well as the technological development in the emerging economies. It doesn’t contribute towards a dangerous magnitude for global warming as uranium and petroleum doesn’t emit carbon dioxide. The other energy sources such as solar and wind power emits more solid waste and heat as compared to nuclear power plants. It enjoys a significant position over the other energy products due to its advanced technological development that facilitates larger industrial power plants. Wind and solar power usually requires larger government subsidies as compared to nuclear power generation. It can also be argued that horrific Chernobyl disaster, 30 years ago was the byproduct of Soviet mismanagement and abysmal crisis management. The nuclear waste can be reprocessed and used as a natural resource with the advanced technology (World Nuclear Association, 2012). According to the interest of government and the community, the establishment of the nuclear power plant can supply

the Britain a steady flow of energy security and electricity. It is also indicated that there is no public subsidy on the nuclear power generation as opposed by the solar and wind power energy consumption. The plan can be useful as nuclear power is a low emission technology and significant contribution in terms of British Supply chain and climate control. The financial sector sees a welcoming boom for nuclear power plants as it will be beneficial for the industrial development and capital injection in the British market, moreover it could create thousands of jobs for skilled, semi- skilled and highly skilled workers in the country (Department of Trade and Industry, 2007). The nuclear industry is sought to be financially stable with billions of pounds injecting in the process. It can also create a strong strategic alliance with Japan (Hitachi) and Germany (EON) for buying and building nuclear power plant in the country (World Nuclear Association, 2012). The most deadly and serious disadvantage of establishing nuclear power plant is its disastrous radioactive output which could not only be harmful for the mankind and environment but could also disrupt the greenhouse effect. The corporate sustainability is essential for nuclear power industry in wake of eco green footprints as witnessed in previous deadly nuclear disasters such as Japan (2011) nuclear disaster was the result of fundamental flaws in the reactors which resulted in deadly serious human lives (Department of Trade and Industry, 2007). The community can be at risk especially people living near the reactor for any flaws in the safety measures of the nuclear power plant as witnessed at Fukushima disaster. The natural disasters such as earthquakes and tsunami are also a serious factor in assessing the integrity of the nuclear reactors (World Nuclear Association, 2012). The most risky factor associated with nuclear power plant is the amount of radioactive

substances released in the environment which affects thousands of people living around or miles away and can also result in evacuation and inhabitance for decades. This was also witnessed both in the serious disasters of Chernobyl and Fukushima (2011). The most serious disadvantages of nuclear power plants is its vulnerability towards human errors, failure in assessment of design risk, terrorist activities and natural disasters which could not only affect the economy but also is a serious threat to the community as a whole (Department of Trade and Industry, 2007). Regulations are also a vital part of the nuclear reactors and safety litigations is necessary and it might also result in closing down its reactors due to any natural calamities or threats to the reactors. In 2007, the wake of earthquake calamities resulted in shutting down seven nuclear reactors and it took almost two years for the first reactor to become operational while other reactors are still not functional (Department of Trade and Industry, 2007). The social outburst is also evident when the risk of radioactive materials are higher and can compel the community to leave their homes, severe health issues, unemployment can also rise in the sector. The nuclear reactors also come with a severe high cost of decommissioning, cleaning up cost and compensation costs for the government and the private sector altogether (World Nuclear Association, 2012).

Nuclear plants in UK – creating a bridge between government and community

The Great Britain’s mature nuclear reactors are supposed to be closed in the next decade are set to be open under the instruction of the industry regulations. Keeping in view of the government’s nuclear policy, the office

for Nuclear Regulation has classified that work is carried out within the country' dominant nuclear operator, the French originated company EDF, in order to extend the life span of its eight nuclear power stations in the United Kingdom to continue its operations by clearing the safety tests (Jowit, 2012). The government has kept focus on number of the current nuclear and coal, and gas powered stations that are supposed to be closed in the next few years. The steps have been taken to subside renewable energy technologies. The government has planned to publish white energy paper to introduce minimum price for energy produced by low carbon generators (Jowit, 2012). The first power stations were suppose to stay open by submitting another periodic safety review was Hinkley B in Somerset and Hunterston B in Ayrshire that was due to shut down during 2016. There is another plant named Sizewell B in Suffolk which is expected to remain open until 2035 (Jowit, 2012). The government's policy to open up new nuclear reactors to meet short term to medium term demand with energy like wind, solar, and tidal power on large scale. The government is also focusing on carbon and storage space technology to facilitate gas powered stations to keep burning fossil fuels without violating limitations on future carbon emissions (Jowit, 2012).

Research Proposal - ' Brownfield'

Strengths and Weaknesses of Deductive Research:

The deductive research approach is said to be the typical scientific method. This includes testing of hypothesis about the predictions of future and making assumptions from the results. Source: (Trochim, 2006)The deductive approach deals with set of observations gained from research informally. It is

used to predict the outcomes of future in a given situation. Such type of prediction is known as hypothesis. This approach involves forming a research process to investigate a hypothesis, whether the prediction is true or not. It can be a survey, case study, or an observation for evaluation and gathering of data. Through hypothesis testing, some more observations are being considered. If the theory is taken as it was predicted it can be used as a support. In case, where research is carried out meticulously, it is taken as a challenge and it is suggested that some other clarification is required. The recurring of deductive research indicates that data is frequently being collected, and theories are repeatedly being assessed as the body of observations increases (Trochim, 2006). The deductive approach does not necessitate observations for giving a sound conclusion. Distinct from the inductive approach, the deductive approach can offer a reliable rational fake conclusion. It is clear that an investigator can use a maxim to presume different conclusions, which can be false providing that concluding declaration resulting from such a saying false (McBurney & White, 2009). Deductive reasoning functions from general to specific grounds. It is rightly called top – down approach. The theory is narrowed down and being more specific hypothesis to be tested. It is further narrowed down to collect data to address the theory. Therefore, they are able to analyze hypothesis with specific data of the original work (Trochim, 2006).

Strengths and Weaknesses of Inductive Research:

The inductive research begins with collection of data in order to have a set of data to interpret and analyze. Usually psychologists imply their research on basis of data collection from raw situations and formulate theories on basis

of them. The process starts with data collection initially and later it uses the derived information to compile the theory (Trochim, 2006). It is useful when psychologists are working on new domain and it can provide hypothetical framework which can be explored by using deductive approach. Source: (Trochim, 2006). Inductive research method works on basis of specific observations to generalizations. It is commonly known as bottom up approach. Inductive research works on specific measures formation of tentative hypothesis that can be explored and end up developing general solutions (Trochim, 2006). The inductive and deductive approaches evolve a range of research methods for gathering the data, and a diversity of logical techniques, though most of them are more appropriate than others (Trochim, 2006).

Research Methodology

Keeping in view the spectrum of the research, the researchers are of the opinion that conducting a survey targeting on focus groups would be ideal for the study. It is considered to be most appropriate and effective way of gathering data from relevant population. It highlights the main features of the study while data collection making it easier for the researcher to figure out statistically significant outcomes (Trochim, 2006). The survey covers every single aspect of the research making it precise, comprehensive and informative. The questions should be understandable for the target population and should serve the purpose of the research (Bryman & Bell, 2007). Researchers use innovative techniques to assemble initial data, particularly when minimal information on a specific subject of significance is known. Focus groups potentially offer an investigative approach and could

be more effective in certain research processes than traditional methods (Greenbaum, 1993; Vaughn, et al., 1996). Focus groups are used to purify information formerly known about an issue or investigate intended new insight and information about an issue by analyzing it from a new angle and tactics. Focus groups can propose a suitable decorum for work at different steps of the research procedure, starting from hypothesis creation to testing (Krueger, 1994). More particularly, focus groups can be suitable for gathering information and data, forming research hypothesis, inspiring innovative ideas, concepts and tactics, analyzing problems and gathering information, providing jargons suitable for the research, and interpreting investigational outcomes (Stewart & Shamdasani, 1990). Focus groups can add-on quantitative or qualitative methods; or employ a self-contained practice, resulting in data that is useful and beneficial (Morgan, 1988; Vaughn, et al., 1996). Individual focus groups can be strained from explicit populations; a series of focus groups can provide to contrast the grouping reactions to the similar concept. In spotlight, the focus groups are combined with survey; therefore participants not only can assist to provide language suitable to their population, but also supplement pre-testing of a preface version of an instrument (Morgan, 1988).

Questionnaire – A tool of data collection

The information gathered act as a basis of forming the following questionnaire for the development of the nuclear plant. It elaborates the theme of the research, its strategic position, location and significance of coal station (Department of Energy and Climate change, 2012). The following questionnaire discusses the disadvantages and advantages of building the

nuclear power plant. The safety regulations in regard with the health and safety and design of the nuclear reactor. The detail analysis of nuclear waste is also investigated in comparison with other nuclear resources (Refer to Appendix).

Focus Group

The focus group is concentrated on the dos and don’ts of building the nuclear power plant which was the previous site for coal power plant (Department of Energy and Climate change, 2012). The aim of this proposal is to investigate the interest of its stakeholders i. e. the government and the community for the establishment of the power plant which could not only be beneficial for the British nuclear industry but could help in strategically alliance with its other European counterparts (Refer to Appendix).

Summary of the research

The summary of this research proposal is to strategically analyze the position of the coal power station and pros and cons associated with building a nuclear power plant on the site. The proposal also undermine the significance of the building the plan through strategically position in the industry, financial stability, government regulation and health safety hazards faced by its habitants. The extent of risk diversified and accepted by its stakeholders is also an integral part of the proposal (Department of Energy and Climate change, 2012). The community is one of the most important stakeholder and therefore the health and safety, employment and facilities are analyzed before implementing the nuclear power plant project. The methodology is based on qualitative data which focus on gathering primary and secondary data. The primary data is gathered through questionnaire

surveys and conducting focus group comprising the residents of the coal power station. The qualitative methods are more easily accessed and analyzed as compared to the quantitative methods which require statistical data analysis. It also analyzed the in depth analysis of the subject. It is an unstructured approach that is flexible and less time consuming. The detail analysis will be conducted on the data gathered from the respondents and basic tickers will be established while demonstrating the proposal for the nuclear power plant (Department of Energy and Climate change, 2012).

Appendix:

Interview- Questionnaire:

Questions

Strongly Agree

(5)

Agree

(4)

Neutral (3)

Disagree

(2)

Strongly Disagree

(1)

1The ideal site of extraction of coals and other mineral is coal powered station. 2The raw material is readily available in the market for the coal power station3The site of coal station is ideal for effective transportation for

the ever growing industry. 4The habitants of the site will not be affected by the coal mine. 5The location for building a nuclear power plant on coal mine will not affect the perception of people residing6Brownfield is the best location for establishing the nuclear plant7The health risk factor associated with the by-product of coal and radioactive can be harmful for the environment and the habitants. 8The employment in high skilled and skilled worker will increase by establishing the nuclear plant. 9Nuclear power is more environmental friendlier as compared to the coal power station. 10The nuclear by products can be reprocessed.

Focus Group questionnaire:

The focus group comprises of 6 to 10 people who give their insight on the survey conduct for establishing the nuclear power plant on the coal power station site. The following questions are asked to analyze the proposal in detail: Does the coal power station cater the national demand for producing the energy? Is it beneficial for the coal power plant to be operational at Brown field? Are people well aware of the pros and cons for living near the nuclear power plant? The waste material of coal power plant is much larger as compared to the nuclear radioactive emissions. Will the establishment of the nuclear plant can decrease the waste and by products harmful for the environment? What will be the benefits and pitfalls for establishing a nuclear power plant on the coal power station site? If the taxes are lower of nuclear power plant, what will be the government’s perspective for granting the permission of establishing the power plant? A thorough assessment in the design of the reactor can decrease the risk of automation or technical failures in the reactors? To what extent do you agree with the statement?

Does it decrease the chances of natural nuclear disasters? The health and safety of the humankind is important above all, are proper measures taken for mitigating the risk of severe nuclear disasters? What are the safety measures taken by the government in mitigating the risk emerging due to building the nuclear power plant? What financial factors could contribute positive towards establishing the nuclear power plant over the coal power station? (The Qualitative Report, 2002).