



PUBLIC PERCEPTION ON INTEGRATING NUCLEAR POWER IN NIGERIA'S ENERGY MIX

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Abstract: - In twenty years, Nigeria's population is expected to double and aggregate energy demand will triple (NEP, Draft Revised Edition 2013), Conventional energy sources alone will not meet the challenges of an increasing population at affordable costs and in a flexible manner. To meet the rapidly growing demand for energy, and the challenges posed by climate change. There has to be a conscious effort to consider other sources to be integrated into the energy mix to meet this energy demand. Nuclear energy is seen as one of the sources that have the capacity to meet this increasing demand if effectively integrated into the nation's energy mix.

A survey was conducted to capture public opinions in the deployment of other energy options such as nuclear energy into the Nigeria energy mix. The result of the survey indicated a decline in support for nuclear energy as option in meeting Nigeria energy poverty compared to renewable energy which was most favoured by vast majority of the respondents. This is however attributable to the present security challenge in Nigeria and the Fukushima accident which occurred 2011 in Japan.

The opposition to nuclear power can be reversed if the peaceful applications, socio-economic and environmental case for its deployment is strong enough. This paper would help policy/decision makers in making proper decision as regards to nuclear power deployment and its review if barriers such as energy security, public's opposition are adequately addressed.

Keywords: Public opinion, Nuclear power, Policy, Energy, Nigeria

1.0 Introduction

In emerging and developing countries, energy

forms a major part in the socio-economic development of the area. In an effort to achieve a long term energy efficient systems and security, the need to diversify the nation's energy mix becomes crucial. As countries of the world are targeting a reduction of 80% in carbon and greenhouse gas emission by 2050 and to supply 100% decarbonised electricity for industrial and domestic use, every energy

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options is being considered (Adisa, A. O). Government of several countries have developed a strategy to make available clean and safer energy supply across the globe while delivering a secured energy supply at regulated prices (ANSTO, 2009).

In Nigeria, electricity plays a crucial role in the socio-economic and industrial development of the country as this is utilised for domestic and industrial purposes by individuals. Intermittent power supply has hampered the growth of the country in terms of development which has made several manufacturing industry in the country to run their daily activities through the use of generators. Based on the status of current electricity generation in the country, the demand capacity could surpass supply as population increases before 2020.

1.1 Background

According to World Bank report on electricity production in Nigeria in 2009, it was revealed that about 22.9% of electricity generated in Nigeria is gotten from hydroelectric sources(<http://www.tradingeconomics.com>).

With new hydro power plants being built across the country, it is expected that there would be an increment in the percentage of power being generated and added to the grid.

The power being generated in Nigeria is very low to meet the need of the growing population as the country's power sector is dependent on fossil fuel, hydro and gas. To meet the demand of the country's energy system, the need to add new energy system which includes renewable energy sources, clean coal technology, nuclear and tidal wave into the energy grid becomes imperative.

For Nigeria to meet its long term energy needs for domestic and industrial application, the nation's attitude to electricity generation needs to change. The perception of the public in relation to demand and supply in terms of acceptance of the building of a new power station coupled with the health related issues associated with it become imperative. In terms of the world's electricity being generated,

Nuclear power accounts for 13.5%(Yueh-Hua, L et al 2013). Several countries of the world have incorporated nuclear power and renewable energy sources into their energy mix due to the technology being tested and verified for years.

The perception of the public to nuclear energy varies for different individuals which is dependent on education, values and information. For individuals' decision making process in the use of nuclear energy to generate electricity the social, economic and environmental consideration are viewed. The general acceptance of nuclear energy is low despite the peaceful application of nuclear technology in agriculture, medicine and others. In terms of energy saving and friendliness to the environment, nuclear power is a good source for electricity generation as compared to other sources.

In 2005, the World Summit noted that sustainability is dependent on three important elements which are environmental, social and economic(Spring, 2011). According to the UK government, building new nuclear power station would be beneficial in providing security of supply and in the reduction of carbon emission.

The controversy surrounding the intent to stop or decrease the development of nuclear power in many countries is largely caused by the Fukushima Daiichi nuclear power plant incident that occurred in Japan as a result of the tsunami and earthquake. In a bid to reduce the dependence on nuclear power, the Japanese and Germany government have set aside some modalities in implementing new policies that would transform their nation's energy and reduce the use of nuclear power(Antony, F.etal 2012). A key driver to implementing a new energy policy in the country is public's opinion which is dependent on support for or against it.

This paper documents and reports the finding of public perception in relation to integrating nuclear power into Nigeria's energy mix. The aim of this paper is to verify the extent to which people oppose or support the integration of nuclear power into the nation's energy mix,

while investigating the reasons surrounding these attitudes, and to establish how public attitudes relate to these factors.

Objectives

To develop a decision framework for assessing the sustainability of nuclear power and the formulation of policy for the establishment of nuclear power as an important energy mix in the nation's electricity reform.

- To enable sustainability comparisons of nuclear power relative to fossil fuels and renewables.
- To engage and communicate with relevant decision makers and stakeholders

2.0 Methodology

With the challenging energy situation in the country, it becomes imperative to diversify the energy mix of the nation by integrating nuclear power to make the economy stable and viable for development. The Fukushima nuclear accident that occurred in 2011 has made the entire populace to question the integrity and safety of using nuclear energy to generate electricity. In line with this, a survey that looks at public perception with the risk and benefits of integrating nuclear power into the Nigeria's energy mix was sampled and administered to 900 respondents. These respondents were subdivided into 6 representatives from the FCT, Abuja environs with various team leaders.

Several methods can be used to sample the opinion of the public such as e-survey, telephone, and one-on-one questionnaire approach. The one-on-one questionnaire method was adopted because it gives a true perception of the public as their behavioural pattern and technical know-how of individuals are seen.

Hence a survey of public perception on integrating Nuclear Power in Nigeria's Energy Mix was conducted using the one on one questionnaire approach method. The questionnaire is made up of two sections; the first section addressed energy and its related issues while the second section contained questions requesting the personal details of the

respondents such as gender, age and educational background. The methodology explores people's answers with reference to varying questions where respondents are required to choose from a list of statements to answer open-ended questions, or asked to select answers to probing questions with "yes" or "no", "agree" or "disagree"...statements.

In-depth interview of correspondents was conducted with a focus on their understanding of nuclear energy. Issues relating to cost, climate change, maintenance, benefit, and construction of nuclear power plant were addressed.

2.1 Coverage Area

In a bid to get the view of public's perception on nuclear power, the survey area was structured to cover Asokoro/Maitama, Lugbe, Kubwa, Nyanya/Karu, Wuse/Garki, and Gwarinpa/Jabi all in the Federal Capital Territory, Nigeria. One Hundred and Fifty (150) questionnaires were administered in each of these six locations, making a total of Nine Hundred (900) (ECN, 2013). The respondents were randomly selected from individuals cutting across different walks of life.

2.2 Questionnaire

Seven main sections were viewed in the questionnaire. The first section assesses the support for the various energy options in solving Nigeria's energy problem while the second section views the support for any of the power plants being built in their village. The third section looks at ways of improving and meeting Nigeria's electricity demand in 25 years using any of the available energy options through its start, reduce or expand form. Opinion about the risk and benefits of nuclear energy was accessed in the fourth section. Section five looks at the attitude of the public towards the construction of a nuclear power plant in Nigeria in terms of support or opposition. General views on nuclear energy and power plant was looked at in section six where standardized questions were examined. The final section examines the view on environmental impact of various power

plants. The findings after the conduct of the survey are reported in the results and discussion section.

3.0 Results and Discussion

Based on the questions being asked in the questionnaire, the findings are reported as follows;

Question 1: How would you assess your support for each of the following sources of energy as one of the ways in solving Nigeria's energy problem? Please tick only one option for each source of energy

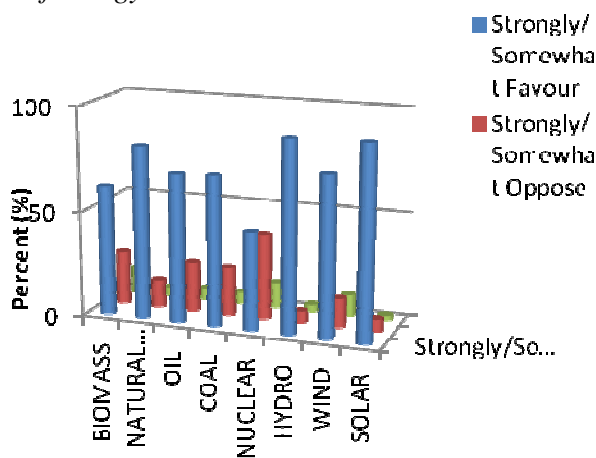


Figure 3.1: Opinion of respondents on energy options

Discussion

Based on the above figure, it was gathered that a large percentage of the public were in support of increasing the use of the renewable energy as compared to fossil fuel. Nuclear energy received the highest opposition based on the threat it poses in meeting the nation's energy crisis as determined by the public. Some factors that led to this include the wrong perception people have about nuclear energy in terms of safety. In terms of health and environmental issue 40.9% of the people are of the opinion that nuclear energy wouldn't solve Nigeria's energy problem in terms of demand and supply.

Question 2: How would you feel if any of the following power plants were to be built in your village?

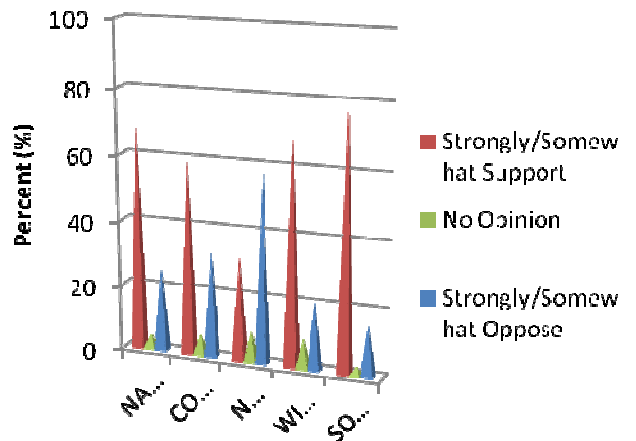


Figure 3.2: Respondents' attitude towards locating a power plant in their village

DISCUSSION

From fig 3.2, it was gathered that a total number of 503 out of the 852 valid responses, representing about 58.4% of the respondents opposed siting a nuclear power plant in their village, while 9.5% had no opinion. Some respondents felt that if a nuclear power plant was sited in their villages, the land in such areas would become unfit for habitation and cultivation of farm products if nuclear waste were not properly disposed. Hence the siting of nuclear power plant was kicked against. The belief of people was instrumental in the selection of answers in terms of the risk involved in siting the power plant in their villages.

Question 3: In your opinion, how should Nigeria meet its electricity demand in the next 25 years? For each power source indicate whether Nigeria should start, expand or reduce its use

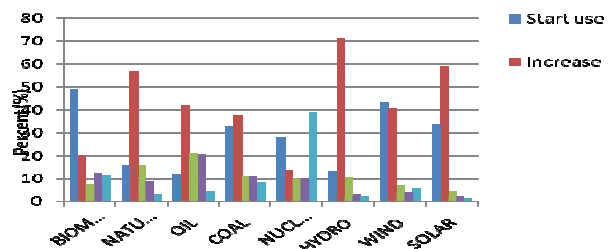


Figure 3.3: Meeting Nigeria's electricity demand in the next 25 years

Discussion

28.1% of the respondent supported the start use of nuclear power to meet the energy demand in the next 25 years while 38.6% opposed the use of it at all based on the tsunami/earthquake incident that occurred in the Fukushima Daiichi nuclear power plant. The respondent pointed to the fact that Japan with innovative technology and good maintenance culture has not been able to curtail the challenges posed by the power plant accident. If Nigeria with poor maintenance culture starts the use of nuclear power, a small accident could result to the destruction of lives and properties, hence they strongly oppose it use in meeting the country's energy demand.

About 71.2% advocates for the increase in hydroelectric power generation to meet this target in 25 years because Nigeria is blessed with vast hydro potential, while 59% supports the increase in the use of solar energy.

Question 4: Which of the following statements best expresses your opinion about nuclear energy? Please choose only one option

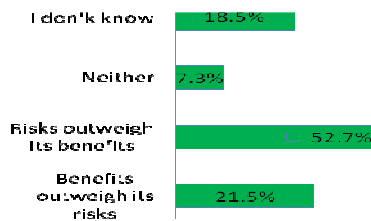


Figure 3.4: Respondents' view on nuclear energy

Discussion

In terms of the benefit/risk analysis on the use of nuclear energy, about 52.7% of the respondent believes that the risks outweighs its benefit which is a strong indicator of the public opposing the use of nuclear power to generate electricity in solving our energy crisis. To researchers and academia, the benefits of nuclear energy are more if the threats are addressed.

Question 5: Would you support or oppose the construction of a nuclear power plant in Nigeria? Please choose only one option

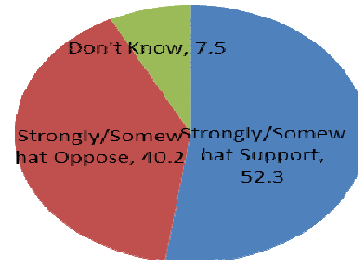


Figure 3.5: View on the construction of nuclear power plant in Nigeria

Discussion

As shown in figure 3.5, 40.2% strongly/somewhat oppose the construction of nuclear power in their villages due to the aftermath of the oil spillages that occurred in villages where oil is being explored while 52.3% strongly/somewhat supports the construction.

Question 6: General views on nuclear energy and power plant

DISCUSSION

68% of the respondent totally agreed that Nigeria has a poor maintenance culture, hence cannot maintain a nuclear power plant. It was agreed by 59.8% that the cost of building a nuclear power plant is very expensive and that if the plant was eventually built that the quality of work with the acceptable standards would be compromised as shown by 54.1% of the respondent.

Question 7: Some ways of generating electricity may be harmful to the environment. How harmful do you think each of these power sources is?

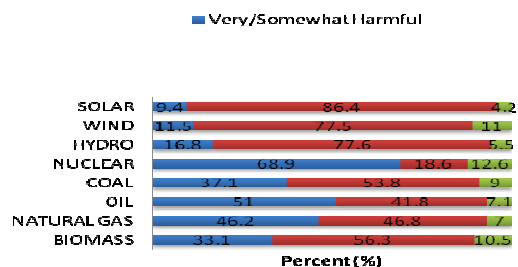


Figure 3.6: View on environmental impact of various power plants

STATEMENT	Totally agree (%)	Tend to agree (%)	Tend to disagree (%)	Totally disagree (%)	Don't know (%)
Nuclear power plant are expensive to build	59.8	16.6	2.9	5.5	15.2
Quality and standards will be compromised during construction of nuclear power plant in Nigeria	54.1	24.3	7.2	6.5	7.9
Nigeria has poor maintenance culture and so cannot maintain a nuclear power plant	68	15.8	6.1	6.6	3.5
Most people in Nigeria do not support building nuclear power plant	38.7	22	11.4	9.1	18.8
Nigeria can meet its energy demand without nuclear energy	56.6	20	8	7.9	7.6
Nuclear energy helps to limit climate change	24.7	24.1	15.2	12.6	23.3
Nuclear energy will help us in ending power problem in Nigeria	25.4	27.5	17	19.3	10.8
Nuclear energy will help in providing more competitive and more stable energy prices	30.4	29	13.1	12.3	15.2

Discussion

Energy experts in the world believes that in reducing the emission of greenhouse gases and sustaining the use of clean energy, nuclear energy should be used in generating electricity to meet the world’s energy demand but the respondent from the survey conducted are of the opinion that nuclear energy is very harmful to the environment but will limit climatic change as shown in question 6 and figure 3.6. Concerns

for global warming and climatic change are on the rise with a large percentage of people having little or no information about the cause and solution to it.

3.1 PROFILE OF THE RESPONDENTS

The profiles of all the respondents involved in this survey are presented below:

Gender

Male 64.5%
Female 35.5%

Age

18 – 24 12.7%
25 – 34 47.1%
35 – 44 27.2%
45 – 54 10.8%
55 – 64 2%
65 + 0.2%

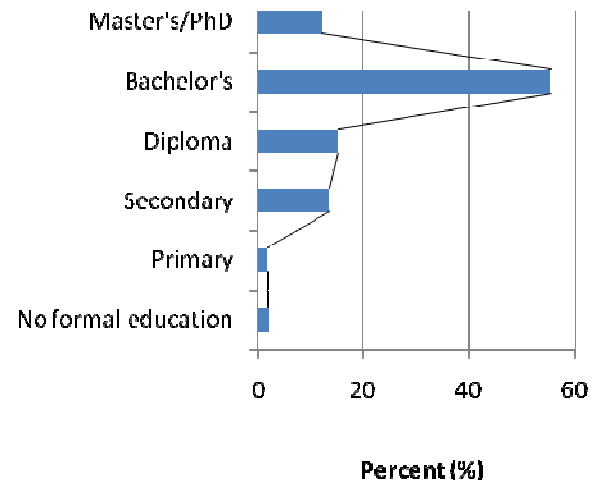


Figure 3.7: Educational qualification of respondents

From the details of the respondent of the survey, its shows that majority of them are highly educated with the highest percentage being from a bachelor’s degree thus accounting for the various response gotten during the survey. This shows that the respondents are current with the relevant and new technologies happening in the world.

4.0 Recommendation

From the foregoing study, it is seen that for Nigeria to integrate nuclear power into its energy mix, the nation must address the following issues:

- Safety of the power plants and the workers when constructed should be guaranteed at all times by following stringent conditions.
- Prove to the public that the nation's has the capacity and requisite skill to maintain a nuclear power plant.
- See nuclear energy as a means to address the issue of electricity supply mechanism.
- Learn from the Fukushima impacts on the Japanese energy sector by studying the nuclear waste management process.
- Create an enabling environment for the acquisition of relevant skills and education for nuclear workers through participation in hands on training programme.
- Increase the budget allocated to research and development.
- Develop a roadmap for integrating nuclear energy, which takes into account new technologies.

5.0 Conclusion

The understanding of the public as it's relates to the peaceful application of nuclear energy is limited. It is imperative to look at ways of addressing the impact of nuclear accident and safety when trying to integrate nuclear power into a nation's energy mix

Now is a crucial time to look at modalities to addressing the risk and benefit of nuclear power by involving the academic community and necessary government bodies on the role they have to play in changing the perception of the public on the use of nuclear energy.

A boost in public confidence in nuclear matters is a prerequisite to making good policies and would help to boost investment in the energy sector. The benefits of nuclear energy in terms of friendliness to the environment with regards to carbon emissions reductions, energy security

should be showcased to the public rather than propagating the risk involved in using nuclear energy to meet the growing electricity demand.

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