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ELEVENTH PARLIAMENT

THIRD SESSION
2015

THE DEPARTMENTAL COMMITTEE ON ENERGY, COMMUNICATION
AND INFORMATION

REPORT ON THE VISIT TO THE ATOMIC ENERGY CORPORATION
(ROSATOM) IN MOSCOW, RUSSIA BETWEEN 7TH AND 13TH JULY, 2015

DIRECTORATE OF COMMITTEE SERVICES
CLERK'S CHAMBERS,
PARLIAMENT BUILDINGS
NAIROBI

28TH OCTOBER, 2015



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1.0 PREFACE

Hon. Speaker,

On behalf of the Members of the Departmental Committee on Energy, Communication and Information, and pursuant to the provisions of Standing Order No. 216 and 199, it is my pleasure to present to the House the Committee's Report on the visit to the State Atomic Energy Corporation (Rosatom) in Moscow, Russia from 7th to 13th July, 2015.

1.1 COMMITTEE MANDATE

The Departmental Committee on Energy, Information & Communication is one of the twelve Departmental Committees of the National Assembly established under *Standing Order 216* whose mandates pursuant to the *Standing Order 216 (5)* are as follows:

- a) To investigate, inquire into, and report on all matters relating to the mandate, management, activities, administration, operations and estimates of the assigned ministries and departments;
- b) To study the programme and policy objectives of ministries and departments and the effectiveness of their implementation;
- c) To study and review all the legislation referred to it;
- d) To study, access and analyse the relative success of the ministries and departments measured by the results obtained as compared with their stated objective;
- e) To investigate and inquire into all matters relating to the assigned ministries and departments as may be deemed necessary, and as may be referred to it by the House or a Cabinet Secretary;
- f) To vet and report on all appointments where the Constitution or any law requires the National Assembly to approve, except those under Standing Order No.204 (Committee on appointments); and
- g) To make reports and recommendations to the House as often as possible, including recommendations of proposed legislation.

In accordance with the Second Schedule of the Standing Orders, the Committee is mandated to consider:-

- a) Fossil fuels exploration
- b) Development of energy
- c) Production of energy
- d) Maintenance and regulation of energy

- e) Communication
- f) Information
- g) Broadcasting
- h) Information Communications Technology (ICT) development and management

1.2 COMMITTEE MEMBERSHIP

The Committee on Energy, Communication and Information was constituted by the House in May, 2013 and comprises of the following Members:-

1. The Hon. Jamleck Kamau, EGH, MP.....Chairperson
2. The Hon. Jackson Kiptanui, MPVice –Chairperson
3. The Hon. Mohammed Elmi, EGH, MP
4. The Hon. Edick Anyanga, MP
5. The Hon. (Eng.) James Rege, MP
6. The Hon. Mithika Linturi, MP
7. The Hon. Zebedeo Opore, MP
8. The Hon. Mary Mbugua, HSC, MP
9. The Hon. Aburi Mpuru, MP
10. The Hon. Aramat Lemanken, MP
11. The Hon. Arthur Odera, MP
12. The Hon. Banticha Abdullahi, MP
13. The Hon. Dan Kazungu, MP
14. The Hon. Esther Gathogo, MP
15. The Hon. Fathia Mahbub, MP
16. The Hon. James Lomenen, MP
17. The Hon. Joe Mutambu, MP
18. The Hon. John Munuve, MP
19. The Hon. Junet Sheikh, MP
20. The Hon. Cecily Mbarire, MP
21. The Hon. Nicholas Ngikor, MP
22. The Hon. Onesmus Njuki, MP
23. The Hon. Rachael Amolo, MP
24. The Hon. Roba Duba, MP
25. The Hon. Ndung'u Gethenji, MP
26. The Hon. (Eng.) Vincent Musau, MP
27. The Hon. William Kisang', MP
28. The Hon. Richard Tongi, MP
29. The Hon. Moses Kuria, MP

1.3 OBJECTIVES OF THE VISIT

The objectives of the visit were as follows:

- i. To study Russia's nuclear energy and establish the pros and cons of introducing nuclear energy in Kenya.
- ii. To analyse the benefits of increased power production in a country.
- iii. To compare Russia's energy sector to Kenya's and learn on best practise.
- iv. To share experiences in the energy sector.

1.4 THE COMMITTEE DELEGATION

The Committee nominated the following Members undertake the visit on its behalf:-

- 1) Hon. Jamleck Kamau, EGH, MP –Leader of Delegation
- 2) Hon. Joe Mutambu, MP
- 3) Hon. Aramat Lemanken, MP
- 4) Hon. Onesmus Njuki, MP
- 5) Ms. Laureen Wesonga – Delegation secretary

1.5 ACKNOWLEDGMENT

The delegation is grateful to the Honourable Speaker and the Liaison Committee for authorizing the visit, as well as the office of the Clerk for providing the necessary logistical and technical support.

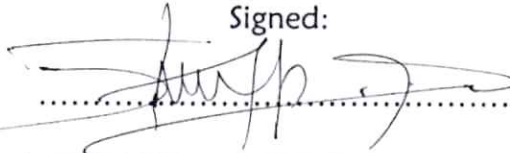
The delegation also wishes to express its appreciation to the Kenya Embassy in Russia especially Ambassador H.E. Dr. Paul Kurgat for all the assistance given during the visit.

The delegation also acknowledges Ms. Ekaterina Dyachenko, M.Sc, Eng., African Regional Head, RusHydro International/Power Machines for the support given before and during the visit.

Hon. Speaker,

It is my pleasant duty and privilege, on behalf of the Committee to table this report pursuant to provisions of the National Assembly Standing Order 199.

Signed:


.....

for THE HON. JAMLECK KAMAU, EGH, MP
Chairperson, Departmental Committee on Energy, Communication and
Information

Date

28/15/2015
.....

2.0 A VISIT TO THE ATOMIC ENERGY CORPORATION (ROSATOM)

2.1 DELEGATION FROM KENYA

The delegation from Kenya included:-

- | | | |
|--------------------------------|---|--|
| 1. Hon. Jamleck Kamau, EGH, MP | - | Chairman, Parliamentary Committee on Energy, Communication and Information and head of delegation. |
| 2. Hon. Onesmus Njuki, MP | - | Member, Parliamentary Committee on Energy, Communication and Information |
| 3. Hon. Aramat Lemanken, MP | - | Member, Parliamentary Committee on Energy, Communication and Information |
| 4. Hon. Joe Mutambu, MP | - | Member, Parliamentary Committee on Energy, Communication and Information |
| 5. H.E. Dr. Paul Kurgat | - | Ambassador, Kenya Embassy in Moscow, Russia |
| 6. Mr. Richard Mutwota | - | Second Secretary, Kenya Embassy in Moscow, Russia |
| 7. Ms. Lauren Wesonga | - | Clerk Assistant, Parliamentary Committee on Energy, Communication and Information. |

2.2 INTRODUCTION

As a follow up on Kenya Nuclear Electricity Board's (KNEB) visit to Moscow International "AtomExpo" 2015 from 1st – 3rd July, 2015, the Parliamentary Committee on Energy, Communication and Information visited the Atomic Energy Corporation (Rosatom).

The leader of delegation informed the participants that the purpose of the visit was to seek to address concerns raised by Kenyans especially on safety and decommissioning of nuclear plants and localization of nuclear waste processing. He added that the Kenya Nuclear Electricity Board (KNEB) was established through a Parliamentary Act.

In addition the Committee sought to get a better understanding on the operations of nuclear plants noting that nuclear power was originally introduced as a death bomb hence the need to avail all details to stakeholders who include, government policy makers, legislative, experts/scholars, local communities, environmentalists e.t.c to change the perceived dangers of nuclear energy.

The Chairman further stated that recently in the Kenyan Parliament a motion was presented urging the Government not to invest in nuclear power projects because of its real and perceived dangers as was informed by Fukushima Nuclear Plant accident in 2011. He reiterated that the safety of both mankind and nature in terms of

operations and decommissioning was critical to any future decisions on nuclear energy by the Kenyan Government.

In response to the Chairman's queries, Rosatom representatives said that a post-Fukushima era has seen increased nuclear project requests. They noted that Fukushima plant was a very old project but lessons have been learnt from the accident. The International Scale of Nuclear Accidents (INS) uses a rating scale of 1-7 with 7 being the highest. Chernobyl (Ukraine) was at 7 while Fukushima was at 6. Russian developed projects do not appear anywhere in the accidents map meaning that they are safe. Rosatom added that Russia cares very much for its reputation thus they work very closely with IAEA and Russian Safety Standards.

The delegation was informed that even in the Federal Republic of Germany where public resistance is high, 80% of electricity is imported from France which is generated by nuclear plants.

2.3 ROSATOM'S NUCLEAR PLANTS

Mr. Evgeny, Head Specialist, Government Business Enterprise, Rosatom began by informing the meeting that he was in charge of Latin America and Sub-Saharan Africa at Rosatom. He stressed that Russia has one of the most advanced technologies in nuclear energy and this could be proven by various projects they are undertaking all over the world and particularly in Africa; South Africa – 8 plants, Nigeria – 2 plants, Egypt – 4 plants and Ghana (negotiations ongoing). He further informed the delegation as follows:

- i. The construction and operation of the nuclear plants is done as per the International Atomic Energy Agency (IAEA) guidelines. Nuclear plants are usually located near a source of water for cooling.
- ii. Each nuclear plant can produce between 1000 – 1200 MW and would cost approximately 5 billion dollars including the cost of decommissioning.
- iii. There is possibility of Intergovernmental financing of up to 85%.
- iv. Period of construction can take between 6 – 8 years depending on a country's localization level (what a country can provide in terms of raw materials and heavy construction machinery and appropriate legislation).
- v. Decommissioning takes a long time (about 5 years) for safety reasons and the need to ensure that the land is ecologically safe.
- vi. Some of the known advantages of Nuclear energy are:
 - a) Assurance of energy security for 100 years
 - b) Stable cost of energy over a long period of time
 - c) Creates employment – direct employment of up to 5,000 people.
 - d) Can lead to technology transfer in Medicine, Agriculture and Ecology.

A nuclear plant project can be implemented either under Engineering Procurement Construction Model (EPC) or under Build Own Operate Model (BOO).

2.3.1 Main features of a nuclear plant

1. Unit electric power is 1200MW
2. Efficiency factor (gross) 35.9%
3. Equipment service life 60-100 years
4. Use of up-to-date fuel cycles 12-24 months

2.4 KENYA'S NATIONAL GRID SYSTEM

1. Kenya's grid presents a picture of energy crisis.
2. 81% (32,400,000) of Kenya's population of 40 million plus people depend on wood fuel while the forest cover is only 7%. The other 19% depend on electricity and liquefied gas.
3. Kenya's African competitors have more superior national grids i.e.
 - i. South Africa 44,000 MW and sells its energy at 6US cents
 - ii. Egypt 29,000 MW and sells at 5 US cents
 - iii. Tunisia 29,000 MW and sells at 6 US cents
 - iv. Nigeria 6,000 MW and sells at 6 US cents
 - v. Ethiopia 6,000 MW and sells at 6 US cents
 - vi. Kenya 2,400 MW and sells at 24 US cents
4. What is available is extremely expensive.
5. Kenya is looking forward to generating 19,000 MW by 2030 (in less than 15 years to come) to bring electricity cost to about 4 – 5 US cents and attract investors to the Counties.
6. Most likely sources will be:
 - a. Geothermal – 10,000 MW
 - b. Coal fired – 5,000 MW
 - c. Gas – 3,000 MW
 - d. Nuclear reactor – 4,000 MW

2.5 ROSATOM'S PROJECTS

Russia is currently negotiating or tendering to build in Africa several nuclear plants e.g. South Africa 8 plants, Nigeria 2 plants, Egypt 2 plants, Ghana 1 plant. Outside Africa, Russia is building nuclear plants as follows:

1. United Kingdom – 4 plants
2. Turkey – 4 plants
3. Vietnam – 2 plants
4. Malaysia – 2 plants
5. Indonesia – 2 plants

6. India	–	15 plants
7. China	–	6 plants
8. Finland	–	1 plant
9. Brazil	–	4 plants
10. Argentina	–	2 plants
11. Czech Republic	–	2 plants
12. Slovakia	–	1 plant
13. Hungary	–	2 plants
14. Jordan	–	2 plants
15. Saudi Arabia	–	2 plants

2.6 ADVANTAGES AND DISADVANTAGES OF NUCLEAR ENERGY

2.6.1 Advantages of nuclear energy

- i) **Low Pollution:** Nuclear power has fewer greenhouse emissions. Nuclear energy has the least effect on nature since it doesn't discharge any gases like methane and carbon dioxide, which are the primary "greenhouse gases." There is no unfavorable impact on water, land or any territories because of the utilization of nuclear power, except in times where transportation is utilized.
- ii) **Low Operating Costs:** Nuclear power produces very inexpensive electricity. The cost of the uranium, which is utilized as a fuel in this process, is low even though the expense of setting up nuclear power plants is moderately high; the expense of running them is quite low. The normal life of nuclear reactor is anywhere from 40-60 years, depending on how often it is used and how it is being used. These variables, when consolidated, make the expense of delivering power low.
- iii) **Reliability:** It is estimated that with the current rate of consumption of uranium, we have enough uranium for another 70-80 years. A nuclear power plant when in the mode of producing energy can run uninterrupted for even a year. As solar and wind energy are dependent upon weather conditions, nuclear power plant has no such constraints and can run without disruption in any climatic condition.
- iv) **More proficient than fossil fuels:** The other primary point of interest of utilizing nuclear energy is that it is more compelling and more proficient than other energy sources. The amount of fuel required by nuclear power plant is comparatively less than what is required by other power plants as energy released by nuclear fission is approximately ten million times greater than the amount of energy released by fossil fuel atom.

- v) **Renewable:** Nuclear energy is not a renewable resource. Uranium, the nuclear fuel that is used to produce nuclear energy is limited and cannot be produced again and again on demand however, by using breeder and fusion reactors; we can produce other fissionable element. One such element is called plutonium that is produced by the by-products of chain-reaction. Also, if we know how to control atomic fusion, the same reactions that fuel the sun, we can have almost unlimited energy.

2.6.2 Disadvantages of Nuclear Energy

- i) **Environmental Impact:** The process of mining and refining uranium hasn't been a clean one, transporting nuclear fuel to and from plants represents a pollution hazard. Once the fuel is used, you can't simply take it to the landfill – it is radioactive and dangerous.
- ii) **Radioactive Waste Disposal:** As a rule, a nuclear power plant creates 20 metric tons of nuclear fuel per year, and with that comes a lot of nuclear waste. When you consider each nuclear plant on Earth, you will find that the number jumps to approximately 2,000 metric tons a year. The greater part of this waste transmits radiation and high temperature, implying that it will inevitably consume any compartment that holds it. It can also cause damage to living things in and around the plants.
- iii) **Nuclear Accidents:** The radioactive waste produced can pose serious health effects on the lives of people as well as the environment
- iv) **High Cost:** At present, the nuclear business let waste cool for a considerable length of time before blending it with glass and putting it away in enormous cooled, solid structures. This waste must be kept up, observed and watched to keep the materials from falling into the wrong hands and causing problems. These administrations and included materials cost cash – on top of the high expenses needed to put together a plant, which may make it less desirable to invest in. It requires permission from several international authorities and it is normally opposed by the people who live in that region.
- v) **Uranium is Finite:** Just like other sources of fuel, uranium is also finite and exists in few of the countries. It produces considerable amount of waste during all these activities and can result in environmental contamination and serious health effects, if not handled properly.
- vi) **Hot Target for Militants:** Nuclear energy has immense power. Today, nuclear energy is used to make weapons. If these weapons go into the wrong hands, that could be the end of this world. Nuclear power plants are prime target for terrorism activities. Little lax in security can be brutal for humankind.

3.0 WAY FORWARD

After the discussions, it was agreed that there was need to organize a seminar with experts from Rosatom geared at changing the perception that nuclear energy is dangerous and countries are moving away from it. The dates for the seminar will be agreed at a future date after consultations. It was further agreed that the seminar should be held in Nairobi. Details of all plans regarding the seminar will be shared with the Embassy for onward transmission to the Parliamentary Committee.

4.0 COMMITTEE OBSERVATIONS AND RECOMMENDATIONS

4.1 OBSERVATIONS

The delegation observed that:

1. Most countries in the world are embracing nuclear energy.
2. For Kenya to compete with the rest of the world in terms of development, the amount of power in the country's grid has to increase. This will attract more investors in the country due to the availability, stability and reduced cost of power.
3. Stable power can make it possible for Kenya to improve its infrastructure e.g. transport through electric trains, communication e.t.c.
4. Nuclear energy is not as bad as it has been portrayed by those against it.

4.2 RECOMMENDATIONS

The Committee recommended that:

1. The Kenya Nuclear Electricity Board should begin demystifying the public perception on nuclear energy. This can be done through outreach programs to the stakeholders.
2. The Government in conjunction with Rosatom should schedule visits/seminars/conferences in Russia and Kenya for the stakeholders to be able to make informed decisions.
3. There should be human resource training and capacity building in the nuclear sector.