

## Factors and Developments of Nuclear Power and Regulation in Kenya

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### 1. Introduction

KENYA is a developing country which has been eyeing nuclear power for the past decade. Nuclear power being thought as a propellant for industrialization, Kenya has embarked on ambitious plans to introduce it by 2027. Achievement of nuclear power goals requires a clear regulatory framework which at current lacks. This has prompted efforts to pass nuclear related laws, and has recently seen significant achievements [1]. This paper provides insights into factors and developments in nuclear power and regulation in Kenya and ways that can be adopted to better attain the goal of nuclearization.

### 2. Factors in Nuclear Power and Regulation

#### 2.1 Nuclear Regulation

Through an Act of parliament, Radiation Protection Act (cap 243), Laws of Kenya, the Radiation Protection Board (RPB) was established as a statutory body mandated by the Kenyan government to protect health and safety of people and the environment from the harmful effects of ionizing radiation. RPB, working under the Ministry of Public Health and Sanitation regulates the use of ionizing radiation, exportation, importation, distribution and possession of radiation sources.

RPB envisions to effectively, efficiently and sustainably regulate nuclear energy for its peaceful and safe usage. RPB also seeks to be a promoter of safety culture in an accelerated, regulated and expanded nuclear energy mandate for societal well-being and environmental protection [2].

#### 2.2 Nuclear Power

In 2010, the Nuclear Electricity Project Committee (NEPC) was established under the Ministry of Energy. NEPC was charged with fast tracking nuclear power development for enhanced production of affordable and reliable electricity to realize Kenya's vision 2030.

In 2012 under the State Corporation Act, NEPC was made a statutory body and was renamed the Kenya Nuclear Electricity Board (KNEB) with a similar mandate of fast tracking nuclear electricity developments in Kenya. KNEB envisions generation of nuclear electricity that is safe, efficient and reliable. It also is a

promoter of sustainable safe and secure utilization of nuclear technologies.

KNEB being a promoter of nuclear energy, it undertakes several other functions to realize its mandate. It includes; public education on matters nuclear, human resource capacity development in readiness for nuclear power, nuclear power plant siting, development of learning resources for nuclear science and technology, collaborations in nuclear research and development of legal and regulatory framework in collaboration with other government agencies [3].

#### 2.3. Energy

The Ministry of Energy (MoE) acting on behalf of the National Government is charged with energy policing and regulation of gas and electricity in Kenya. KNEB falls under MoE and in collaboration with other energy agencies is charged with nuclear power development.

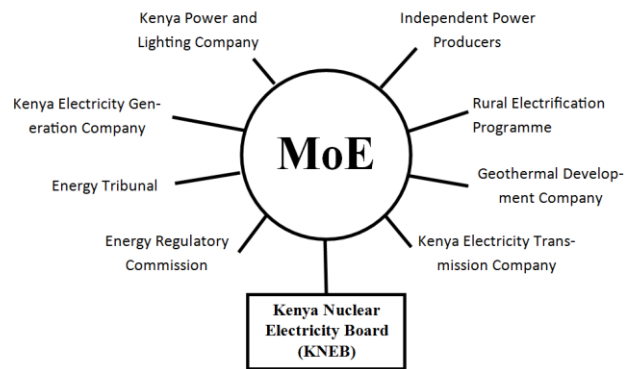


Fig. 1. Semi-autonomous agencies in Kenya

At 2200 MW installed capacity and 1700 MW demand, electricity in Kenya is at its infancy compared to developed countries. Electricity demand is low owing to high tariffs and a poor distribution network.

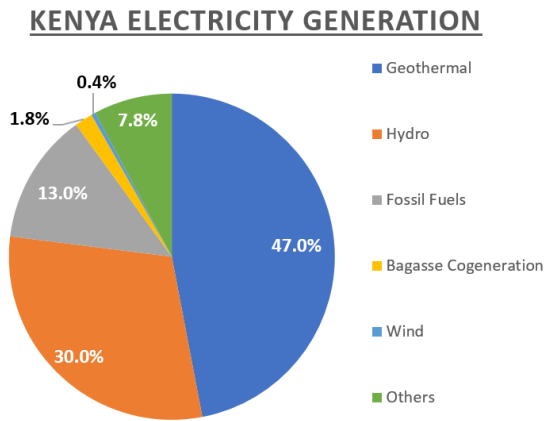


Fig. 2. Kenya's electricity generation by source

Electricity supply is set to increase due to undergoing coal power plant construction, hydro-power imports from Ethiopia and solar power in Turkana, Kenya [4].

#### 2.4 Economics

According to the World Bank, Kenya's economy is one of the fastest growing in Sub-Saharan Africa and has steadily been growing since 2015 owing to stabilized macroeconomic environment, lower oil prices, tourism, remittance inflows and government backed infrastructure developments. Economic projections (2018-2020) indicate a growth rate of more than 5% adjusted for completion of infrastructure projects, credit growth and stronger global economy and tourism.

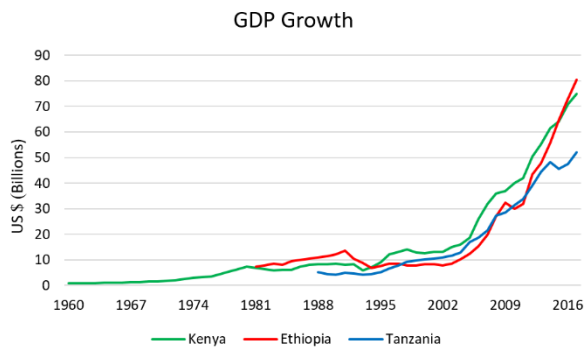


Fig. 3. Comparative gross domestic product (GDP) growth among Kenya, Ethiopia and Tanzania

Long term development agenda, political stability, youthful population, skilled workforce, constitutional changes, infrastructure and a dynamic private sector is steadily setting Kenya as an economic powerhouse in Africa [6].

### 3. Developments in Nuclear Power and Regulation

In pursuit to introduce nuclear power in Kenya's energy mix, the government has shown great interest by

putting up relevant structures to see it through. Through the various organs aforementioned, a clear commitment reflects in recent developments stated below.

#### 3.1. Approval of Nuclear Regulatory Bill 2017

In a bold step, the proposed Nuclear Regulatory Bill of 2017 was on 14<sup>th</sup> August, 2018 approved by the cabinet in a meeting chaired by the president of the Republic of Kenya. The bill having been in development since 2012 only awaits parliament's scrutiny and passage before assent into law by the presidency. This brings Kenya closer to actualizing nuclear energy as an alternative in the country's energy mix.

The proposed Nuclear Regulatory Bill seeks among other things to streamline the current regulation in readiness for nuclear power through formation of Kenya Nuclear Regulatory Commission (KNRC). KNRC will take on unique functions of radiation protection, emergency response, inspection, radioactive sources regulation, decommissioning, safety of nuclear facilities, transport and storage of nuclear waste [5].

#### 3.2. Education, Research and Training

Academia is the fundamental pathway to sustaining and developing a nuclear power and regulation framework. Both RPB and KNEB have been very instrumental in developing human resources through academics.

The Institute of Nuclear Science and Technology (INST- University of Nairobi) offers a master of science degree course in Nuclear Science. Each year (since 2012) KNEB has offered over 60 scholarships for the programme at INST. Though a very small fraction has graduated, absorption into the workforce is limited owing to lack of funds among other factors.

Through MoUs, the governments of Kenya and Korea have been delivering on the promise to promote cooperation in electric power and nuclear energy development of both countries. KEPSCO International Nuclear Graduate School (KINGS), Korea Institute of Nuclear Safety (KINS), Korea Atomic Energy Research Institute (KAERI) and Korea Nuclear Association (KNA) have been continuously cooperating with MoE, KNEB and RPB. With affiliations to all organizations, IAEA has been instrumental through facilitation and sponsorship of regular training of academics and professionals. The results of this cooperation have led to significant transformations in the journey to nuclear power and better regulation [1].

#### 3.3. Nuclear Technology Awareness

Public awareness has been identified as key to nuclearization. Regular engagement of both public and private sectors has been well underway by KNEB and RPB on matters sensitization on nuclear power and

regulation. This would prove a good strategy to disseminate knowledge to the whole populace [1].

#### **4. Conclusion**

Nuclear regulation is achieved through collaboration of different stakeholders; industry professionals, environmental agencies, government bodies, emergency actors, researchers, power producers and consumers, and more. Through the proposed nuclear regulatory bill, Kenya has shown a deeper engagement of stakeholders in realizing nuclear power. Although Kenya is endowed with plenty of geothermal, solar, wind, and hydro sources of power, its nuclear journey is undeterred even as major nuclear power countries are shutting down plants and focusing more on coal and renewable sources. The negative sentiment shared against nuclear power is however changing owing to recent climatic extremes and grid power instability. Governments economic development agenda promises a brighter near and long-term future for nuclear power due to increases in demand. Government's education initiatives have enhanced skills of the workforce and will play a very important role as nuclear power programme is rolled out.

#### **Acknowledgment**

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