

EXPERIENCE IN THE DEVELOPMENT OF KENYA'S NUCLEAR POWER PROGRAMME



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VIENNA, 2014



Outline



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- Current power capacity
- Background to Kenya's NPP
- Justifications for NPP in Kenya
- Ongoing NEPP implementation strategies
- Challenges experienced in Kenya's NEPP programme
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- Conclusion



KENYA'S PROFILE



- Kenya is situated on the East Coast of Africa
- Population 40 Million (2009 census)
- GDP per capita: \$1617 (2014)
- Currency: Kshs. Kshs 86.8=1USD. (April. 2014)
- Installed capacity 1767MW
- 46% generated from Hydro
- Total Area 580,367 sq Km

Current Power Capacity in Kenya



Sources (MW)	Installed Capacity (MW)	Capacity % Share
Hydro	820	46.4%
Thermal	609	34.5%
Geothermal	250	14.2%
Cogeneration	26.0	1.5%
Wind	5.1	0.3%
Isolated grid	26	1.5%
Emergency	30	1.7%
Total	1,767	100%

Background



1.The National Economic and Social Council (NESAC), Kenya's top advisory body to the Government on policies recommended in April 2010 adoption of nuclear power programme as a national priority and as a solution to the escalating demand for electricity and energy to drive the country's development agenda .

3.In 2012, the Committee was elevated to a Board KNEB, and charged with the responsibility of fast tracking the development of Kenya's Nuclear power programmed



2.A Committee on Nuclear Energy was formed in 2010 in the then Ministry of Energy to explore the feasibility of electricity generation from nuclear resources.

4. KNEB assumed the role of a NEPIO and commenced a PFS on the Kenya's Nuclear Power programme.



Why nuclear power for Kenya?



Provision of adequate, clean base load power for the implementation of the country's development blue print

Increasing energy demand

Provide Security of Supply

Economics - Need for a lower cost of power, an economic alternative to fossil fuels

Environmental Concerns and need for clean energy

Availability of proven technologies

Technology is mature and proven

Ongoing NEPP implementation strategies



- Pre-feasibility study for Kenya's NPP completed – action points submitted to Government for implementation
- Strategic plan for implementation of Kenya's NPP finalized – execution of near term action points underway
- Grid study on the requirements of integration of NPP to the existing grid about to commence
- Nuclear policy and legislation under development
- Stakeholder engagement strategy has been prepared and is being implemented



Kenya's NPP Milestone Status



Currently, PFS has been completed

Milestone 1
Political Decision to go Nuclear,
Nuclear included in the energy Mix

Roadmap for Phase 2

- **Setting up a comprehensive legal & regulatory framework in progress**
- **Capacity building programs**
- **Implement PFS findings**

Milestone 2

Commissioning of the first NPP in Kenya



Status of HRD



- The Pre-Feasibility Study established that Kenya does not have adequate human resource capacity to implement the nuclear power programme
- The PFS further recommended that Kenya will need to train at least adequate specialized nuclear engineers and scientists gradually before the commissioning of the first unit of NPP
- Kenya has a strong education system and produces an average of 20,000 graduates annually in Sciences and Engineering, but with limited component of Nuclear Science
- Education and Training will incorporate both local and international institutions, but the foreign component is expected to be bigger
- KNEB has started various institutional and human resource capacity building efforts both locally and internationally
- The IAEA has been a major partner in Kenya's capacity building efforts through Fellowships, Scientific Visits, Trainings and workshops.

Established HRD Activities (1)



- IAEA Fellowships; Since 2012, more than 50 Kenyans have undergone a one-month fellowship at Texas A&M organized through collaboration between IAEA, Texas A&M University (USA) and the Government of Kenya
- IAEA remains a key partner in the HRD efforts
- Established relationship with the Kepco International Nuclear Graduate School (K-INGS) for post-graduate education in Nuclear Power Plant Engineering
- Diploma in International Nuclear Law at Montpellier, France;
- Steps to localize the training; Agreements in place to revamp the training at the Institute of Nuclear Sciences with support from Texas A&M University

Established HRD Activities (2)



- KNEB sponsors 15 students annually for Masters in Nuclear Science at the University of Nairobi.
- MoU's with various countries currently under review for collaboration on nuclear issues including capacity building;
- Other trainings have been carried out both locally and internationally covering various aspects of nuclear electricity including but not limited to Safety, Security and Safeguards of NPP, Nuclear Law, Legislative assistance and drafting and Regulation of nuclear electricity industry;

Challenges experienced in Kenya's NEPP programme



- Inadequate resources for HRD (Financial, Human, Institutional)
- Lack of adequate experience in Nuclear HRD and other related matters
- Weak Institutional Capacity to augment HRD efforts; e.g. no regulatory body in place, or a strong domestic academic foundation in nuclear engineering and other technical areas, especially at the university level
- Knowledge management issues and problems of brain drain
- Negative public perception to nuclear and limited public participation

NEPP Implementation Strategies



- Development and implementation of the Human Resource Development Plan;
- Training: Enhanced training in nuclear fields in both science and engineering in Universities, Research Institutes, Vendors, Regulatory bodies and Operators;
- Localization of Nuclear Education by establishing departments in local universities and technical training institutions and building their capacities;
- Equipping local institutions with requisite infrastructure for practical training in nuclear subjects;
- Enhanced stakeholder engagement and management;
- Ascension to all requisite international protocols and establishment of local nuclear policies and legislation.



- High level Government support has facilitated the establishment of a nuclear programme for the country;
- Kenya has embarked on human and institutional capacity development of local resources;
- Nuclear legislation, funding and financing and stakeholder support are major issues for the Kenyan programme, however, sustained support and progress has been experienced;



- **The End!**