

# PROMOTION AND DEVELOPMENT OF NUCLEAR ENERGY

## NUCLEAR POWER INFRASTRUCTURE DEVELOPMENT.

The Nuclear Power Roadmap Development Strategy was approved by Cabinet on 22 April 2015. The strategy identifies key infrastructure issues for nuclear power development and proposes mechanisms to address them. As part of strategy implementation the following studies are being conducted with technical support from the International Atomic Energy Agency (IAEA):- site surveys, energy planning, financial and technology assessment, human resource needs assessment, and policy, legal and institutional review.

### 1(a) Survey of potential sites for nuclear power development

A survey of potential sites for nuclear power development was conducted by the Siting Working Group (SWG) comprising of experts from different MDAs.

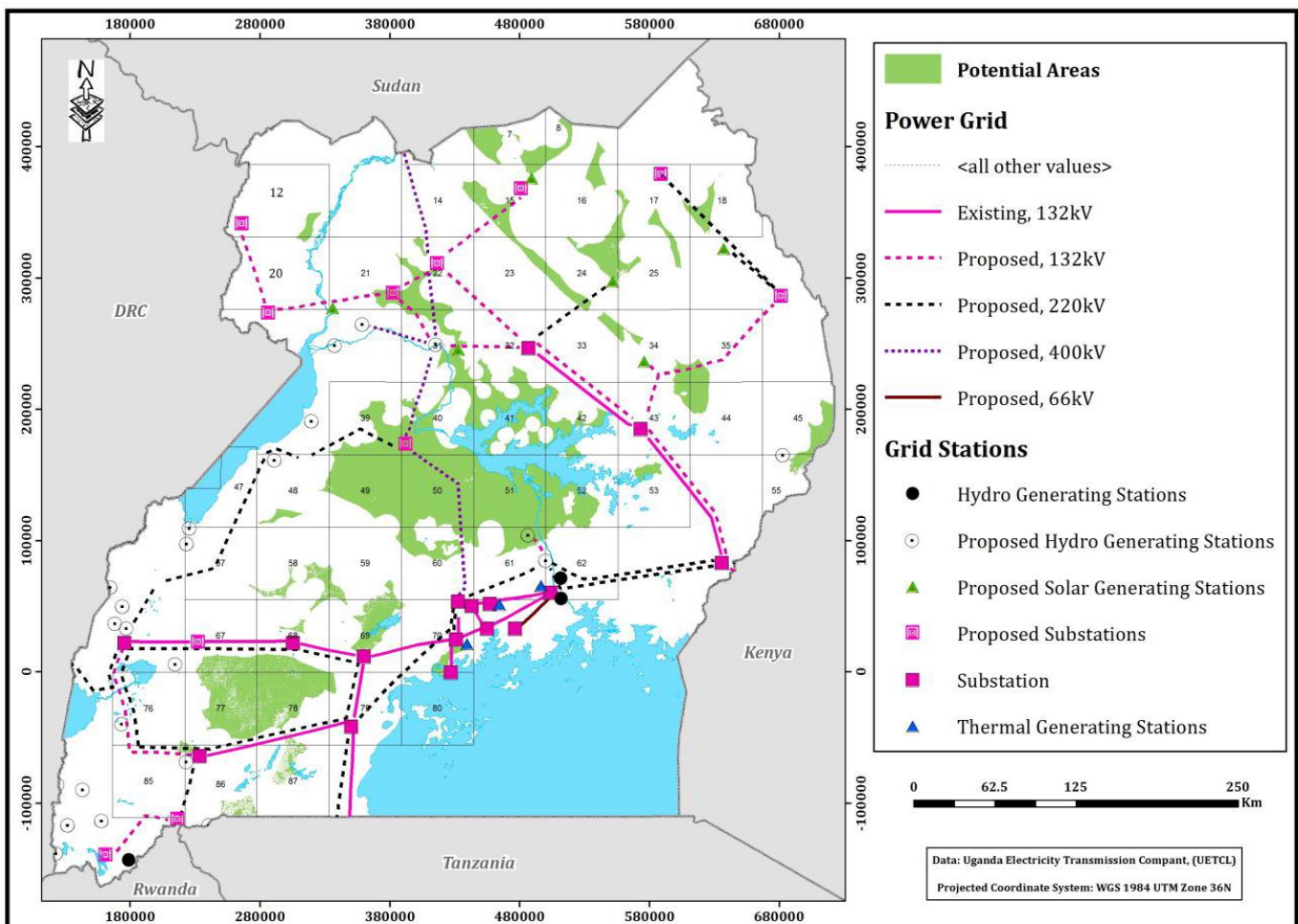


Figure 1: Map Showing Potential Areas for Nuclear Power Plant

Results indicate that the most suitable areas are found in the Kyoga, Kagera and Aswa regions. Ground follow-up will be conducted to identify potential sites in the regions.

**1(b) A study on integrating nuclear power into the generation capacity plan 2015 – 2040.**

The Ministry procured the services of AF-Consult Switzerland limited to work with Technology Deployment Working Group on a study on integrating nuclear power into the generation capacity plan 2015 – 2040. The study aimed at identifying the role of nuclear power in meeting anticipated future energy demand and guide nuclear power development in Uganda. The consultant performed the following tasks in seven months:

- Review of existing documents to identify relevant inputs (Such as Load Forecasts, investment plans) for the study
- Electricity demand forecasts were reviewed and updated
- Generation Planning 2015 -2040
- Nuclear Fuel Cycle Assessment
- Nuclear Power Generation Investment and Financing Planning
- Training and Capacity Building.
- Facilitation during Consultative Workshop and Meeting.

**Summary of the Nuclear Generation Plan (Source: Consultant report).**

<b>Scenario</b>	<b>Number of Units</b>	<b>Installed Capacity (MW)</b>	<b>Year for Commissioning First Unit</b>
Base Case	2	2,000	2031
High Case	2	2,300	2028
Low Case	1	1,000	2034
GDevP Case	3	3,030	2027
Vision 2040	20	30,000	2026

**Cost implications of nuclear programme 2020 to 2040 (Source: Consultant report)**

<b>Scenario</b>	<b>Total installed capacity (MWe)</b>	<b>Capital expenditure (million USD)</b>	<b>Operating expenditure including fuel (million USD)</b>	<b>Total expenditure needs (million USD)</b>
Base Case	2,000	9,800	2,231	12,031
Low Case	1,000	4,900	1,107	6,007

High Case	2,300	11,270	2,920	14,190
Grid Development Plan 2013 - 2029	3,030	15,577	3,037	18,614
Uganda Vision 2040	30,000	147,000	58,238	205,238

### **1(c) Establishment of a Nuclear Assessment Laboratory.**

A Nuclear Laboratory was established in Amber House to support Pre-Feasibility Studies for Launching the First Nuclear Power Plant in Uganda.

### **1(d) A study to review policy, legal and institutional framework relevant to nuclear power development**

Expressions of interest to a study to review policy, legal and institutional framework relevant to nuclear power development were received and evaluated. Request for proposals from the shortlisted firms has been issued.

## **1. STRENGTHENING MANAGEMENT OF RADIOACTIVE WASTE**

Assessing the status of radioactive waste management from existing applications of ionizing radiation in the country was concluded and draft status report prepared. The major radioactive waste are sealed sources mainly from hospitals and industries. Consultation with stakeholders is ongoing.

In addition, a nuclear fuel cycle assessment was conducted by AF-Consult Switzerland Limited as part of the Study on Integrating Nuclear Power into the Generation Capacity Plan 2015 -2040. It identified, among others options for Management of Radioactive Waste from the planned nuclear power plants.

## **2. SUSTAINABLE DEVELOPMENT OF NUCLEAR FUEL RESOURCES**

One of the functions of NEU as provided for by Atomic Energy Act, 2008, is to develop a programme for sustainable supply of nuclear fuel. The Unit is currently conducting studies to identify options for sustainable supply of nuclear fuel for the planned nuclear power plants and supporting uranium exploration and evaluation.

### **3 (a) Nuclear fuel cycle assessment study**

A nuclear fuel cycle assessment was conducted by AF-Consult Switzerland Limited as part of the Study on Integrating Nuclear Power into the Generation Capacity Plan 2015 -2040 to identify, among others options for supply of nuclear fuel for the planned nuclear power plants.

The consultant recommended that utilising international suppliers of nuclear fuel and their nuclear fuel cycle services will be the most cost effective approach for the first nuclear power project and domestic resources will become financially attractive as nuclear generation programme grows.

Based on the above recommendation, development of nuclear fuel supply strategy is planned.

### **3(b) Support to the development of local Uranium Resources**

Nuclear Energy Unit coordinates the technical support by IAEA to Geological survey and mines As part of the Technical Cooperation Project: UGA2002: *Strengthening National Capacity for Uranium Exploration and Evaluation*. The Unit has managed to secure the following assistance towards Uranium exploration and evaluation from the IAEA,

- i) Acquisition of exploration equipment including 4 GPS, 2 Spectrometers, 2 Cs-137 Stabilization buttons and 10 Electronic Personal Dosimeter (EPD).
- ii) A Training workshop on “Legal, Policy and Regulatory requirements for uranium exploration and mining” for the technical team of GSMD was conducted from 2<sup>3rd</sup> to 2<sup>7th</sup> February 2015

### **3. CAPACITY BUILDING FOR NUCLEAR ENERGY PROJECTS PLANNING AND MANAGEMENT**

The following capacity building initiatives were undertaken:

- (i) A study tour on siting activities for nuclear power plant in Turkey (Turkish Atomic Energy Authority) was conducted. Two other study tours are planned:-Study tour to S. Korea on Nuclear Technology and study tour to USA on nuclear power infrastructure development are planned.

- (ii) Two (2) National Training Courses on IAEA Energy planning models; MAED in August 2014 and MESSAGE November 2014 were conducted. In addition, a National Training Course on Leadership and Management for Safety and Safety Culture was conducted.
- (iii) The Ugandan Delegation comprising of four officers participated in the 3rd African Conference on Energy Planning and Nuclear Power from 13 -15 April 2015, Mombasa Kenya.

#### **4. PUBLIC AWARENESS CAMPAIGNS ON NUCLEAR ENERGY.**

- i) Documentary on Peaceful Applications of Nuclear Energy in Uganda was
- ii) Information Booklets, Brochures, Posters and Stickers were developed and produced. Dissemination of posters took place only at the Joint Sector Review and dissemination plan for all awareness materials is being developed

#### **5. TECHNICAL SUPPORT TO OTHER PEACEFUL APPLICATIONS OF NUCLEAR ENERGY**

NEU provided the following technical support:

- (i) An IAEA expert to UCI during review of expression of interests for design and construction of Radiotherapy and Nuclear Medicine Facility at Uganda Cancer Institute.
- (ii) Participated in the organisation of AFRA Food Safety workshop on Role of Nuclear and Complementary Tools under RAF5067 was hosted by Uganda from 13-17 April 2015 that was hosted by Uganda National Bureau of Studies (UNBS)
- (iv) Technical support to Uganda cancer Institute, Ministry of Agriculture, Uganda National Bureau of Standards and Atomic Energy Council in preparation of five (5) new project concepts which have been approved by the IAEA to proceed to Project design phase on 24 July 2014. Currently, NEU is providing support to the project counterparts to finalize project designs.
- (v) NEU facilitated the following institutions to get experts to train the local staff in form of expert missions, facilitated abroad training for Ugandans in form of scientific visits and fellowships. Scientific visits are for management level and fellowships are for fresh graduates. The table shows the capacity building that was facilitated by NEU from IAEA