D.R Congo-Uganda Power Interconnection

Update of Feasibility of Nkenda-Benni, Bunia, Butembo Transmission Line

NKENDA SUBSTATION IN UGANDA APRIL 2021. THREE SUBSTATIONS IN D. R CONGO, AT BENNI, BUNI AND BUTEMBO WILL BE CONSTRUCTED WHILE NKENDA SUBSTATION WILL BE UPGRADED.

PROJECT DETAILS

EXECUTING AGENCIES: The Nile Equatorial Lakes Subsidiary Action Program (NELSAP-CU) in consultation with Société Nationale d'Electricité (SNEL) of the D.R Congo and Uganda Electricity Transmission Company Limited (UETCL).

BUDGET: USD 0.925 Million from the African Development Bank (AfDB)/ NEPAD- IPPF and USD 0.065 million from the governments of D.R Congo and Uganda.

PROJECT DURATION: 14 months. The updated studies begun in March 2022 and will conclude in June 2023.

LOCATION: Eastern D.R Congo (Benni, Bunia and Butembo) and Western Uganda (Kasese region)

PARTICIPATING STATES: D.R Congo and Uganda

DEVELOPMENT PARTNERS: African Development Bank (AfDB/ NEPAD IPPF) for the Updated Study. Original studies of 2013 were financed by the Royal Norwegian Government through the Ministry of Foreign Affairs (MFA).

THE D.R CONGO-UGANDA POWER INTERCONNECTION PROJECT IN NUMBERS

352.2km

352.2 km of Overhead Transmission Lines (OHTL) of which 72.5km will be in Uganda and 279.7km in will be in DRC

220/400kV

The envisaged High Voltage Overhead Transmission Lines will be at 220kV / 400kV

9%

In DRC by 2019, 19% of urban population had electricity compared to 2% in rural areas. National average was 9%

3 substations

Three substations will be constructed in DRC at Benni, Bunia and Butembo. Nkenda (in Uganda) will be upgraded.

ABOUT THE D.R CONGO-UGANDA POWER INTERCONNECTION PROJECT

The updated feasibility of 352.2km 220k(400kV) D.R Congo-Uganda interconnection is being conducted by NELSAP-CU in consultation with Uganda Electricity Transmission Company Limited (UETCL) and Société Nationale d'Electricité (SNEL) of the D.R Congo. The project is funded by the African Development Bank (AfDB) NEPAD-IPPF to the tune of USD 0.925 Million and USD 0.065 million counterpart contributions from the D.R Congo and Uganda. This update of feasibility commenced in March 2022 and is expected to run for 14 months. It is composed of two consultancies: (i) Feasibility Study, Detailed Design and Preparation of Tender Documents and (ii) Environmental and Social Impact Assessment and Resettlement Action Plan (RAP). The two studies are being conducted in parallel and in a coordinated manner with the two consulting companies exchanging data. This High Voltage transmission line will be 352.2km with associated substations at Beni, Bunia, Butembo and Nkenda.

NEPAD-IPPF INFRASTRUCTURE PROJECT PREPARATION FACILITY

NELSAP-CU NILE BASIN INITIATIVE INITIATIVE DU BASSIN DU NIL

SEPT 2022

KEY COMPONENTS OF THE UPDATED INTERCONNECTION STUDY

a) Regional Power Market Analysis: NELSAP will study the role of this line in regional power exchange at 400kV, and the merits of phasing the investment with an initial operation at 220 kV.

b) Generation and Transmission Expansion Plan (GTEP): The study will assess available plans for development of generation and transmission system expansion, focusing on hydro capacities since hydro is predominant in both countries.

c) Supply-Demand Analysis: Based on updated load forecast and revised GTEP, NELSAP will analyze the supply-demand balance for energy and peak load in each country and determine the deficit or surplus that could be exchanged between the two countries.

d) Comprehensive Study of Line Routing Layout: NELSAP will assess different line routing highlighting advantages and disadvantages of each, consider environmental and social impacts with objective of minimizing them in the proposed route.

e) Power Line Layout: A power line layout will be selected. Maps and imagery shall be digitized with the latest ArcGIS software and alternative line alignments superimposed on resulting digital maps.

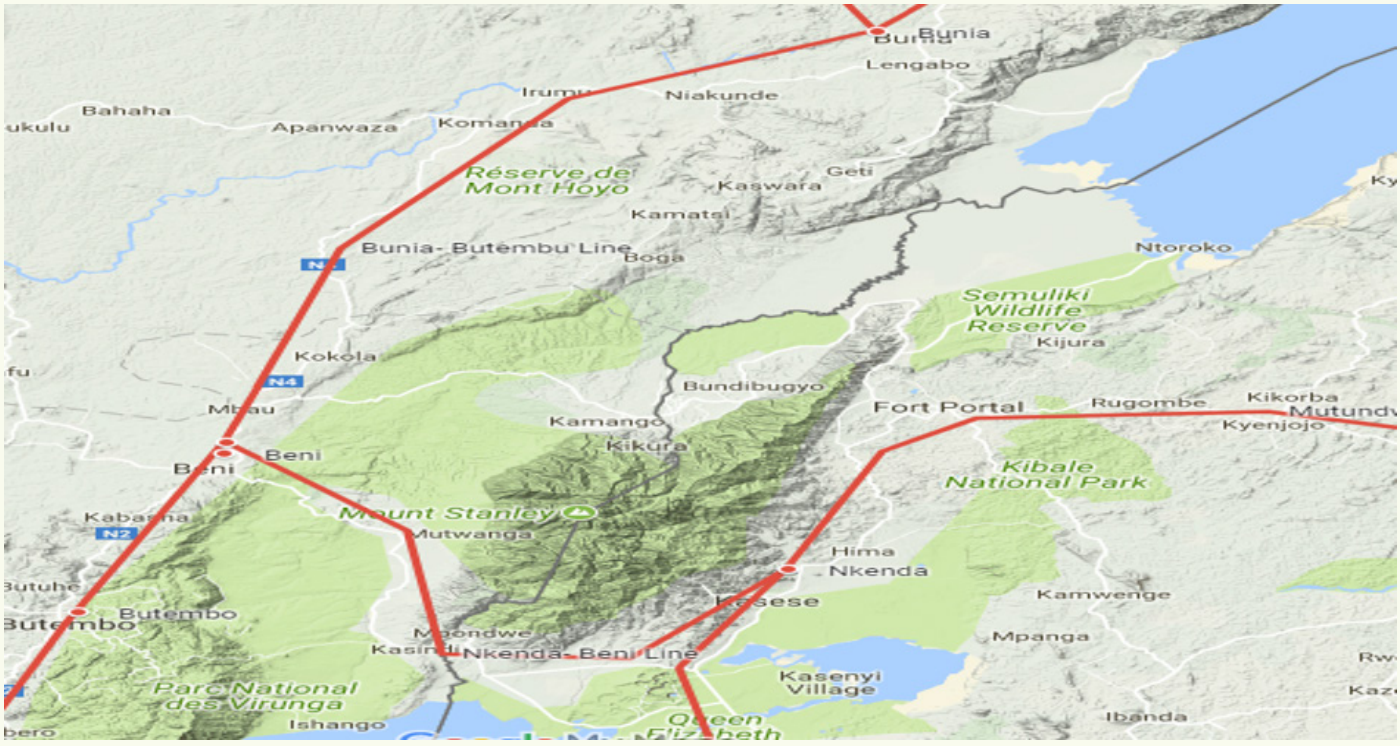
f) Geo Technical Investigations: Geo-technical and other relevant investigations for the selected route will be carried out.

g) Network Analysis: Based on the outcome of the comprehensive demand studies for 400kV and the detailed layout of power lines, technical analyses and operating simulations of grids will be carried out.

h) Load Flow Analysis: Load flow studies shall be performed to determine the power flows and voltage profile in normal and disturbed conditions (loss of generation). Result this analysis will be used to determine the system requirements.

KEY PROJECT DATES

- 2007 - NELSAP POWER STRATEGY FOR THE NEL RELEASED.
- 2013 - FIRST FEASIBILITY THAT SHOWED THE DRC-UG LINE IS FEASIBLE AT 200KV RELEASED
- 2014 - DRC GOVERNMENT LIBERALIZES THE COUNTRY'S POWER SECTOR
- 2017 - DRC AND UGANDA SIGN M.O.U IN KINSHASA (IN AUGUST) FOR THE TRANSMISSION LINE
- 2018 - ENERGY PERMANENT SECRETARIES OF BURUNDI, D.R CONGO, KENYA, RWANDA, AND UGANDA APPROVE NEL REGIONAL INTERCONNECTION ON 9TH NOVEMBER NAIROBI.
- 2020 - NELSAP RECEIVES FUNDING FOR THE PROJECT FROM AFDB / NEPAD-IPPF (IN MARCH)
- 2022 - NELSAP SIGNS CONTRACTS WITH THE TWO FIRMS TO CONDUCT UPDATED FEASIBILITY (IN FEB)
- 2022 - UPDATE OF THE FEASIBILITY BEGINS IN MARCH
- 2022 - INCEPTION REPORT WORKSHOP CONDUCTED, REPORT REVIEWED AND APPROVED IN MAY.
- 2022 - FINAL INCEPTION REPORT SUBMITTED TO DRC AND UGANDA FOR FINAL REVIEWS IN JULY
- 2023 - THE PROJECT IS EXPECTED TO CONCLUDE IN JUNE 2023



MAP FOR THE D.R CONGO (BENI-BUNIA-BUTEMBO) - UGANDA (NKENDA) POWER INTERCONNECTION

1MINISTERS RESPONSIBLE FOR ENERGY AFFAIRS OF THE DEMOCRATIC REPUBLIC OF CONGO HON. INGELE IFOTO AND HON. ENG. IRENE MULONI OF UGANDA SIGNING THE M.O.U FOR D.R CONGO (BENI-BUNIA-BUTEMBO) - UGANDA (NKENDA) INTERCONNECTION

"I would like to thank NELSAP-CU for resource mobilizing for the DRC-Uganda Power Transmission Line. When completed the line will spur development in Eastern Congo, and with economic development, it will be easier to bring peace to the troubled region - **Her Excellence Eve Bazaiba Masudi, the Vice Prime Minister of D.R Congo** (19.08.2022 in Dar es Salaam, Tanzania)

BACKGROUND INFO ON DRC AND UGANDA POWER SECTORS

A) DR CONGO POWER SECTOR

D.R Congo is a vast country (2,345,410 sq. km) with rich renewable energy potential, but substantial unmet electricity demand. The installed hydropower capacity is around 2,563 MW which is only 2.5 percent of its total hydropower potential of 100 Gigawatt (GW). By 2019 only 9% of the population had access to electricity - 19% in urban areas and 2% in rural areas (International Energy Agency 2019). Owing to the country's size and economic conditions, interconnection of the Kivu region in Northeastern D.R.C to the Inga network, located around 2,000km away will not be achieved in the foreseeable future.

Southern Kivu is connected to Burundi and Rwanda grids and is supplied by Ruzizi I and Ruzizi II hydropower plants. Since Gisenyi (Rwanda) – Goma (DRC) 220kV transmission line is already complete, it will connect with the Rwanda network once Goma substation, whose construction is on-going, is complete. The Main towns of North Kivu such as Butembo, Beni and Bunia are supplied by diesel generators. Ruzizi I and Ruzizi II supply Bukavu and Goma towns, however production of the two hydropower plants is not sufficient for the two towns. Therefore, the CPEGL (Economic Community of the Great Lakes Countries) is constructing Ruzizi III (145MW) and is preparing for construction of Ruzizi IV (280MW). Beni has about 800 kW installed capacity, Butembo has 5 kW and Bunia 13.2 kW hydro (from Soleniama I and II each 1.1 MW, Budana 10.3 MW Nzoro 11.05MW). The 2013 feasibility forecasted power demand in the Eastern Region of D.R.C to reach 100MW in 2025 and 133MW in 2030.

B) UGANDA POWER SECTOR

Uganda's Electricity Sector is now run under a liberalized set up, following the enactment of the Electricity Act, 1999 which created the Electricity Regulation Authority (ERA). The sector is in three segments: The Uganda Electricity Generation Company Limited (UEGCL), manages electricity generation, Uganda Electricity Transmission Company Limited (UETCL), manages electricity transmission together with grid operation while Uganda Electricity Distribution Company Limited (UEDCL) manages electricity distribution.

The state-owned Uganda Electricity Transmission Company, Ltd (UETCL) is the Transmission System Operator for Uganda, acting as single buyer and seller to the distribution companies. UETCL owns, operates, develops, and maintains the high voltage transmission grid. The grid connects power generation plants to load centers throughout the country as well as interconnection with neighboring countries. The bulk power transmission network in Uganda has been at 132 kV, but due to regional integration and preparation for cross border exchange and trade transmission voltages now include 220 kV, 132 kV, 88 kV and 66 kV. The Government of Uganda targets power generation capacity to increase to 41,738 MW by 2040 (Vision 2040) with a percentage population access to electricity from 14% in 2013 to 80% by 2040 (National Development Plan (NDP) II. On the electricity consumption side, the Government of Uganda targeted the per capita electricity consumption to increase from 80 kWh to 3668 kWh by 2040.

MAP FOR THE D.R CONGO (BENI-BUNIA-BUTEMBO) - UGANDA (NKENDA) POWER INTERCONNECTION PS OF ENERGY FOR BURUNDI, D.R CONGO, KENYA, RWANDA AND UGANDA CONCLUDE REGIONAL POWER CONNECTION MEETING IN NAIROBI COORDINATED BY NELSAP ON 9TH NOV 2018

PROJECT BACKGROUND

The Governments of D.R Congo and Uganda under the auspices of NELSAP-CU in 2013 carried out studies for the interconnection of the electric grids of D.R Congo and Uganda through a 352.2 km 220kV Overhead Transmission Line (OHTL) that runs from Nkenda (in Uganda) to Beni-Bunia-Butembo (in DRC). The study was funded by the Royal Norwegian Government through the Ministry of Foreign Affairs (MFA) and the Norwegian Embassy in Kampala. The study was recommended by the NELSAP Strategic Sectoral, Social and Environmental Assessment (SSEA) of Power Development options in the NEL region 2007. It was to build on the Interconnection of the NEL countries project that seeks to interconnect the power grids of DR Congo (Eastern part), Burundi, Kenya Rwanda, and Uganda as well as Kenya-Tanzania-Zambia (ZTK) transmission that will link the Eastern African Power Pool with the Southern African Power Pool (SAPP).

Findings from the 2013 study showed that the project was promising and feasible at 220kV. However, funding for full project development was not forthcoming. Presently however several agencies have shown great interest in financing this project. Due to time lapse of close to nine (9) years and the developments that have taken place in the region since 2013, the two governments found it necessary to validate the studies by conducting updated studies. As a precursor to this updated feasibility, NELSAP facilitated signing of an M.O.U between the Ministers in charge of Energy affairs of D.R Congo and Uganda in August 2017 in Kinshasa for this transmission line and for future energy projects. Through the M.O.U the countries mandated NELSAP-CU to mobilize funds and coordinate physical implementation of the interconnection on behalf of the countries and facilitate other future cross-border investments in the energy sector

COMPLETED SO FAR

The consulting companies updating the D.R Congo Uganda Feasibility had by May 2022 prepared the Inception report describing the information to be collected, field work that needs to be carried out. Kit had also provided comments on the TORs, and an updated methodology and work plan. The Inception Report was submitted electronically and in a physical meeting in May 2022. The Report was reviewed by the Countries, NELSAP and the development partner AfDB and revised as agreed in the contract.

ABOUT NILE EQUATORIAL LAKES SUBSIDIARY ACTION PROGRAM

The Nile Equatorial Lakes Subsidiary Action Program Coordination Unit (NELSAP-CU) headquartered in Kigali, Rwanda, is one of the two investment programs of the Nile Basin Initiative (NBI), the other being the Eastern Nile Subsidiary Action Program (ENSAP) headquartered in Addis Ababa, Ethiopia known as Eastern Nile Technical Regional Office (ENTRO).

NELSAP-CU was established in December 1999 by the Council of Ministers for Water Affairs in the Nile River Basin, with a mission to "contribute to the eradication of poverty, promote economic growth, and reverse environmental degradation in the Nile Equatorial Lakes (NEL) region, within the overall NBI's shared Vision of sustainable socioeconomic development and the equitable use of and benefit from Nile Basin water resources". NELSAP-CU is governed and reports to the Council of Water Ministers from 10 Nile Basin membership states of Burundi, DR Congo, Egypt, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Tanzania and Uganda.

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