Karuma to switch on two 100MW turbines next year

By Taddeo Bwambale

Thirty-five-year-old Jane Namukwaya, a mother of two, runs a small retail shop that doubles as a restaurant at Karuma, a settlement in the western district of Kiryandongo.

She spends sh4,000 on a litre of paraffin daily, to power her single-door refrigerator so she can serve her customers cold soft drinks on a hot afternoon. Every evening, she pays sh2,000 to light three bulbs around her house through a connection to a neighbour's generator.

"The cost of power is way too high for a small business, such as mine," Namukwaya narrates.

Namukwaya's hopes for lower power tariffs may lie just 500 metres away from her shop, where hundreds of labourers and engineers are at work on the 600-megawatt (MW) Karuma hydropower dam.

About 60% of the work on the dam has been completed, According to Hou Fuqiang, the chief engineer of Sinohydro, the firm contracted to build the dam.

The dam will be powered by six turbines, each producing 100MW. Two of the turbines are due to be switched on in December next year. The country's current installed capacity is 822MW.

Thereafter, one more turbine will be switched on every subsequent month, until the project is handed over to the Government. Karuma will be the largest power-generating installation in Uganda.

The project consists of a dam, an intake, underground power station and two power transmission lines. The contractor will hand over the project to the Uganda Electricity Generation Company Ltd (UEGCL).

Power from the dam will be connected to the national grid at three substations of Kawanda in Wakiso, Olwiyo in Gulu and Lira districts.

The $1.8b (sh6 trillion) hydropower project is being financed by a loan from China Exim Bank, with counterpart funding from the Government.

Karuma is one of the big hydropower projects under construction by the Government that are envisaged to help meet the country's power needs for industrialisation and domestic consumption by 2030.

Complex engineering

Karuma hydropower project taps into the Victoria Nile at the lower end of Karuma Falls, about 2.5km from the Masindi-Gulu highway.

According to the design of the project, water from the river will be diverted to the power station through six inlets to power the six turbines to be fixed at an underground station.

The water will then be channelled back to join the river at its lower reaches. An embankment dam, one of the four core features under construction, will control flooding and water level through a sluice gate on the river bank.

Underground power station

The most amazing feature about the Karuma project is the construction of an expansive underground power station, about 100 metres beneath the surface.

Engineers chose to construct the power station deep underground after studying the complex terrain of the location and the water flow rate at the section of the Nile River.

"If we were to build the power station on the surface, it would lead to flooding and relocation of the people," Fuqiang says.

The idea of building the power station beneath the ground turned out to be a daunting prospect when it was discovered that much of the area stretching several kilometres consists of a large hard rock.

Rather than opt for an alternative location, engineers decided to carve their way into the hard rock, creating a wonder of engineering believed to be one of the few of its kind in Africa.

First, they had to blast portions of the rock in phases and excavate the stones to create room for both the water and turbine chambers 100 metres further below.

To reach the underground station, we drive about 1km through the main access tunnel into the base, where the powerhouse and turbines will sit.

The interior is as high as a two-storey building and as wide as a three-lane road. It could have been pitch-black inside the tunnel, but the lighting system is all around on either side.

At this section, a sea of men wearing orange hard hats and reflector jackets welding giant steel structures and fastening steel bars on top of a concrete base that will house generators and a transformer chamber.

Before setting off on our journey underground, we were warned not to wander from the group because the likelihood of getting lost in the multitude of tunnels is high. If one got lost, rescuing them would be extremely difficult because there are no mobile telephone signals underground.

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Workers drilling water drainage holes into the rocks to prevent the weakening and breaking of the concrete. Photos by Richard Sanya

Employment opportunities abound

Twenty-two-year-old Sharon Atimango is one of at least 6,000 workers who toil day and night around different sites at the hydropower project. Of these, over 5,000 are Ugandans, 500 Chinese, while the rest are of other nationalities.

Thirty-three-year-old Solomon Acaye left his hometown in Gulu district to work as a mason at Karuma in 2014. He was earning sh300,000, but now takes home three times as much, including allowances for his work overtime. He has acquired new skills, too.

Out of his earnings, he takes care of his family of three and hopes to start his own business when the project ends around April next year.

Acaye knows he must hold onto his job since next to the main checkpoint at the entrance to the site, about 200 youth are camping in a shelter, waiting patiently for a chance to get a job.

The workers and managers are accommodated inside six modern settlements that were built at the site, although one can choose to live outside the camps. With power and water, the camps are decent and employees who choose to live there pay sh50,000 in rent fee.

The meals are provided and workers who opt to multi-task (across more than one sections: masonry, steel fixing or cleaning) earn an extra sh150,000, Qu Jinwei, the Karuma hydropower plant project head of administration, explains.

The expansive compound has a recreational facility, where workers can do aerobics or play a range of games, including basketball and table tennis.

The project has also opportunities for local businesses to supply raw materials for construction.

Why Karuma Is Important

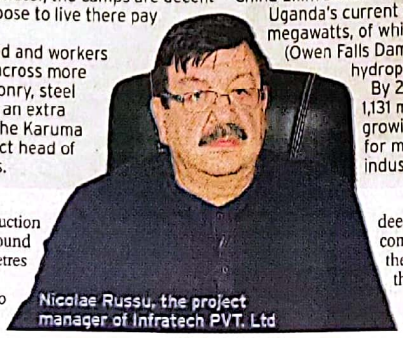
Karuma is one of the country's biggest hydropower projects that are envisaged to help significantly lower the unit cost of electricity within the next three years.

Unlike the 250MW Bujagali hydropower dam, which is producing power at an average of 11 US cents per unit, the completion of Karuma and Isimba dams is expected to bring down the cost to about 5 US cents. It is hoped that the cost of power will decline even more over the years.

While Bujagali was built and is currently managed by a private investor, Karuma and Isimba are being funded by the Government, through loans from China Exim Bank.

Uganda's current total installed capacity is 822 megawatts, of which Nalubaale Power Station (Owen Falls Dam), the country's first major hydropower dam, produces 180MW.

By 2020, Uganda will need 1,131 megawatts to meet the growing energy demands for manufacturing and industrialisation.



Nicolae Russu, the project manager of Infratech PVT. Ltd

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