GENEWS

THE OFFICIAL NEWSLETTER OF UEGCL **Issue 5 | 2019**

Simon Peter KASYATE
HEAD OF COMMUNICATION
& CORPORATE AFFAIRS, UEGCL

Word from Editorial

The last time we met on these pages, the Isimba hydro power station was a project under construction. Now it is a fully operational hydro power station that has added 183MW to the nation's installed electricity generation capacity. In that edition also, we went to great lengths to demonstrate our readiness for the operation and maintenance (O&M) of not just Isimba but of all the projects we are currently building including the flagship 600 MW Karuma hydropower project. As you read this, Karuma is at more than 95 percent general progress. By the next edition, it too shall be a fully operational hydro power station – if the current bottlenecks are straightened out in time.

A quick check with the electricity Regulatory Authority (ERA) shows that current installed generation capacity is closing in on 1200MW although peak time demand is no more than 700MW. Simply put, we have more electricity available than we can consume. And yet, we are still building more electricity generation facilities like Karuma and others. The Hon. Minister of energy and Mineral Development Hon. Eng. Irene Muloni will put this into perspective – why a generation capacity surplus is not a bad thing for a rapidly industrializing economy. We are grateful that despite her very busy schedule in the last two quarters, she was able to afford us time for a Q&A interview.

In his state of the Nation address, H.E the President enumerated the 'state of electricity generation, transmission and distribution'. ***"Government took a strategic decision to prioritize the development of the energy infrastructure because it plays a crucial role as a major input for social and economic development,"*** *he opined. We are in total agreement. But beyond that, realising those goals falls back on us delivering our mandate. In this magazine, we share the strategic direction that is guiding us in meeting this noble and certainly not simple task.*

With every new edition, we make an effort to improve on our previous effort from all aspects like quality and diversity of content to presentation in terms of design and outlook. You are also bound to notice something new and pecuniary. We are eternally grateful to our various partners who have graced these pages with advertorial and editorial material. This strategic decision to partner with you this way was a deliberate move to hedge the taxpayer against paying to publish this magazine and to allow it to be self sustaining by joining the competitive market for adverts on its merit based on the key metrics of quality content and the wide reach of our readership.

We hope that you shall find this magazine a stimulating and informative source for industry news, opinion and facts – as always.

Good reading.

UEGCL
Generating for Generations

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Roadmap 1300

CEO's Word

Dr. Eng. Harrison .E. MUTIKANGA
Chief Executive Officer

From the late 1980s to 2011 when the 250MW Bujagali hydro power station came on line, the country witnessed a steady increase in electricity demand without attendant increase in generation capacity, transmission and distribution infrastructure. Nalubaale hydro power station, then known as Owen falls dam, had an installed capacity of 150MW. The station was refurbished in the 1990s to repair the accumulated wear from a decade of mismanagement partly occasioned by the civil disorder this country had plunged into. During the repairs, the output power of the generators was increased, bringing the Nalubaale Power Complex's generating capacity to 180 MW. The 30MW increase fell through like a drop in the ocean, considering that by the time of this refurbishment, some of the turbine units and sections of the physical structure of the Nalubaale dam powerhouse were staring obsolescence in the face.

In 2001, Kiira hydropowerstation, then know as Owen falls dam extension was commissioned with a 200MW installed capacity. By the end of 2007, the country was right in the middle of its biggest electricity crisis in generations with load shedding going for 24 hours in some places at some instances. The demand had outstripped supply. This is partly due to the unprecedented drought that drastically reduced the waters of Lake Victoria from which the River Nile picks its water. But until Bujagali was commissioned adding another 250MW, did the supply situation better in Uganda. Most industrialists, had closed shop and prospective ones decided against the idea of investing in Uganda, by the time this redemption came through. For example, in the 2000s despite having the best natural conditions, the cut flower industry shifted from Uganda to Ethiopia because we did not have a stable and competitively priced electricity supply and affordable airfreight out of Entebbe.

Today, the script is different. We have over 500 MW is excess installed generation capacity. But even then, there is little cause for celebration.

There is often the temptation to think that delivering electricity –from water to wire- takes a snap decision. No. The whole process from feasibility studies, Environmental impact Assessments, Resettlement and compensations, procuring a contractor to mobilization on site can take twice as long as it takes to actually build the facility from the day the first brick is laid.

On the other hand, changes in the economy can be sudden, sucking up capacity in an instance. For example oil production can trigger such a surge in industrial development that the current surplus can be overtaken in less than two years. Considering the rate of domestic connections and rural electrification efforts, what currently is being touted as excess installed generation capacity risks being mopped up in a snap, that's not to mention Government's quest for middle income status which has an attendant parameter regarding per capital electricity consumption.

Electricity access in Uganda is estimated at 22% implying that over 30 million Ugandans have no access to electricity. With an annual average electricity consumption of 80 kWh per capita, this translates into suppressed demand of over 500 MW. If this demand is un-locked through the new government electricity connection policy (2018-2027) with an annual target of providing 300,000 free on-grid connections, it is likely that the whole of Karuma (600MW) could be exhausted by 2028.

I have previously opined the following. From the electricity-consumption point of view, Uganda's situation is far below other developing countries. The NDP II provides a baseline figure of annual average electricity consumption of 80 kilowatt-hours per capita (kWh per capita) for the financial year 2012/13. This is one-tenth of the consumption in Zambia (767 kWh per capita) and just 2.6 per cent of the global average (3,026 kWh per capita) from the 2013 energy indicators provided by the International Energy Agency report of 2015 on key world energy statistics.

For Uganda to attain middle-income status by 2020, the NDP II has set targets for electricity access at 30 per cent and average consumption at 578 kWh per capita. The World Bank has categorised income status based on 2013 global average electricity consumption in five different groups: high income (9,084 kWh per capita), low and middle income (1,874 kWh per capita), lower middle income (745 kWh per capita), middle income (2,000 kWh per capita), and upper middle income (3,409 kWh per capita). From this categorisation, it is clear that Uganda aims to probably attain lower middle-income status by 2020.

In order to realise these targets, the NDP II projects power generation installed capacity to increase to 2,500 MW by 2020. With less than six months to 2020, It is unlikely that Uganda's electricity generation goals and consumption targets will be realized, but it is possible to achieve them by 2025 This could help Uganda align its Vision 2040 with the UN's Sustainable Development Goals, specifically Goal 7, with a target of ensuring universal access to affordable, reliable, and modern energy services by 2030.
Let's not mince our words about this, but it certainly does not come cheap and requires deliberate fore planning. Wealthy countries have invested heavily in electricity infrastructure. For example, South Africa with a population of about 56 million people has an installed generation capacity of 46,943MW with a per capita GDP of US$6,268 and per capita consumption of 4,198kWh. If Uganda is to sustain GDP growth, we need electricity – and lots of it.

> ***We have codenamed this operation 'Roadmap 1300' and is the bedrock of our 5-year strategic plan to add at least 1300MW by 2023***

Partly explains why, this edition of our biannual magazine is themed around this subject matter – Increased electricity generation capacity; driving industrialization. In this publication you will read about UEGCL's deliberate quest to meet this otherwise ambitious target. We have codenamed this operation 'Roadmap 1300' and is the bedrock of our 5-year strategic plan to add at least 1300MW by 2023. We know that to achieve this, we have to go beyond and explore having an energy mix to tap into the country's vast renewable energy potential (hydro, solar, geothermal, wind and nuclear) and non-renewable sources such as gas and oil fired thermal power plants to ensure energy security and reliability of supply. In this edition we share with you not just our views but our experiences in project supervision and development, our plans for Operation and maintenance of the available power plants, our strategic collaboration with both state and non state actors in the sector from the region and beyond AND a picturesque collage of pictures and illustrations of our activities in the last half year.

In a particularly special way, I wish to thank those partners and stakeholders who have contributed to the publication of this magazine in more ways than one. You will notice that this edition, for the first time in this magazine, has advertisement and advertorial material. This is one sure way of self-sustainability of this magazine which has first risen to industry information leader with only 5 edition in less than 3 years. GeNews has gained fame as the sector 'book of record' a fete that we are proud of. I also wish to thank those partners and stakeholders that provided us with information and interview opportunities. We remain eternally grateful for your time and insights. In thanking the editorial team, I wish to commend them for putting together this edition and we look forward to even more insightful and captivating editions in future.

Enjoy your reading.

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Roadmap 1300

600MW KARUMA HYDROPOWER PROJECT

Total overall completed work is at 94.9%

Implementing Agency	Uganda Electricity Generation Company Limited
Contractor	Sinohydro Corporation Limited
Project Duration	60 months
Project Cost	U.S.D 1.7 Billion Dollars Government of Uganda - 15% EXIM Bank (Loan China) - 85%
Funding Agency	The People's Republic of China
Owners Engineer	AF - Consult Switzerland Ltd
Capacity	600MW
Expected Completion Date	December 2019

Analyzing POWER PLANT ACCIDENTS

Catastrophic accidents in power plants rarely occur but if they do, their consequences are tragic as they include equipment damage and permanent harm to lives.

These accidents are much more likely to be the result of an accumulation of minor difficulties and seemingly trivial malfunctions.

One of the most famous accidents, for example, was in a Hydro Power plant in Uganda in 2013, this cost more than 1.5m USD to reinstate the plant, but what happened at the plant began as something far from dramatic.

The maintenance team at the plant requested the operations team for isolation of the big spillway gates to allow maintenance work on the gate, just like other power plants, the operations team used the available isolation procedures to ensure safety during the work, among other steps, the procedure stated dropping stop logs upstream (stop logs were 20 tones rectangular steel structures), then downstream stop logs both using gantry cranes then making the spillway gates inoperational from the control room, these isolation steps were followed by the operations coordinator (Allan) while doing the isolation, the Senior shift leader (Ken) on shift then was aware of the ongoing activity but went on annual leave a few days later.

The maintenance work took three weeks and on the Friday that the spillway gate was planned to be restored for operation, the procedure for restoration was initiated but not completed, the removing of the upstream stop logs was done, and as expected the crane operator was supposed to proceed with removing downstream stop logs but he decided to postpone the removal till Monday since it was almost 17:00hrs. Meanwhile, Allan had already restored operational mode of the spillway gate expecting to complete the restoration that evening with the crane operator, but on realizing that the crane operator wasn't willing, he agreed to proceed on Monday leaving the gate operational.

Just as fate would have it, Ken returned from leave for shift work on Sunday morning alone, he then requested that the shift assistant (Ronald) who had worked night continues working with him as his teammate could not make it to work which Ronald accepted. Ken then read in the logbook that the maintenance works on the big spillway gate were complete and that restoration had begun on Friday morning, he then checked the computer system and noticed that the big spillway gate was operation from the computer so he assumed that restoration was complete.

Ronald proceeded to carry out plant inspection as expected and at about 10:15 am returned to the control room where Ken was monitoring the plant from to write a report, Ronald noticed that there was another maintenance supervisor in the control room doing entirely unrelated work. A few minutes passed before Ken stating that the water weeds had accumulated too much upstream and he was going to operate the spillway gate to flush them downstream, unlike other shift workers who desire to open the small spillway gates, Ken always preferred the bigger spillway gates. Absentmindedly he turned the CCTV camera to check the physical state of the big gate but completely missed to see the very big stop log inserted right in front of the gate, he then proceeded to open the big spillway gate from the computer, in less than a minute, a phone call came to control from the security team working outside the plant, Ronald picked the call and security man stated that the manner in which water was gushing from the spillway area seemed abnormal, without hanging up the phone, Ronald relayed the information to Ken who trashed the statement saying the security team are not technical and have little idea of how the spillway gates operate, Ronald then told the security team that they will look into it.

One of the most famous accidents, for example, was in a Hydro Power plant in Uganda in 2013, this cost more than 1.5m USD

After hanging up, Ronald turned to the CCTV camera to confirm the situation, but even before focusing on the spillway area, the security team called again, this time shouting that there was water all over the transformer bay which was usually dry and water was destroying equipment. Ken now panicking attempted to close the big spillway gates but was not successful since the gate had to open up to 2 meters before it can accept a close command, he then waited a few more seconds before succeeding to initiate a closing command. Meanwhile Ronald rushed to physically observe what had happened and to assess a way forward, but by that time the damage was done, a significant part of the civil structure near the spillway gates had been destroyed, 2 stop logs kept near the spillway area had been washed to the river downstream, other stop logs were lying on the transformer bay, a catastrophic accident had occurred.

On investigating the accident, it was noted that no single big thing went wrong at the plant. Rather, five completely unrelated events occurred in sequence, each of which, had it happened in isolation, would have caused no more than a hiccup in the plant's ordinary operation. The mistakes included:

1. Not completing the stop log removal but making the spillway gate operational by anyone on the computer
2. Over accumulation of water weeds necessitating operation of the spillway gates
3. Ken ignoring the old instruction of getting permission from the managers to operate the big spillway gate
4. Not inspecting the spillway gate physically before operating it as always practiced
5. Ken not being vigilant as he checked with the CCTV camera
6. Ronald was probably tired and working with someone he does not usually work with, he was probably not comfortable double-checking his operations since Ken was the one in charge and was more experienced.
7. The computer system not accepting a close command before 2 meters of gate opening (system configuration and design)
8. The operations team taking the security teams phone calls lightly.

All in all, it is the combination of many errors that leads to disaster in power plant, the kinds of errors that cause these accidents are invariably errors of teamwork and communication.

ISIMBA COMMISSIONING


ISIMBA
HYDROPOWER
STATION
UEGCL


COMMISSIONING OF
NW ISIMBA HYDROPOWER PLANT
ISIMBA-BUJAGALI TRANSMISSION
NV
UEGCL

Impact of deemed energy policy on electricity supply growth in Uganda

James OTTO
Strategy and Business Development

What does the government's decision to remove deemed energy provisions from power purchase agreements (PPA's) for new power developers mean to the growth of the electricity sub-sector in Uganda? To understand the concept of deemed energy and its importance in a PPA, it's necessary to first appreciate the concept of electricity market structures, dispatchable vs non dispatchable technologies and tariff structures.

ELECTRICITY MARKET STRUCTURES

Electricity markets loosely fall into two groups - bulk power purchase market and retail purchase market. The distinction between the two is that in the bulk power purchase market, power is purchased in bulk by off-takers (such as UETCL - Uganda Electricity Transmission Company Limited in Uganda's case) from the power producer (UEGCL- Uganda Electricity Generation Company Limited) at or near the point of generation. This power is then transmitted through transmission lines and distribution systems to retail consumers and other end-users. It's noteworthy that the electricity market structures in different countries may not fit neatly into the above-mentioned categories. This entirely depends on the reform path that has been adopted, not excluding the fact that there are different stages in the development of a power market. It often starts with a single government off-taker such as UETCL, moving towards a greater role for independent power producers, investor-owned utilities and other private sector participants.

Eventually, a spot market is developed. In a spot market, the project company can sell power directly at the current market price,

without a fixed contract. In some jurisdictions, there may be hybrid market arrangements where producers with PPAs may still have the right or obligation to sell to the spot markets.

UNDERSTANDING PPA'S

A Power Purchase Agreement (PPA) is a contract between two parties, one who produces or generates power for sale (the seller/producer/project company) and one who seeks to purchase power (the buyer/off-taker). This contract is sometimes called the offtake agreement.

A standard PPA has got several clauses, however, the financial terms of the PPA are arguably the most important provisions since they address the question of, what exactly is being purchased, and at what price (tariff)?

DISPATCHABLE VS NONDISPATCHEABLE TECHNOLOGIES

To have a better understanding of the different tariff structures, it's fundamental to explore the concept of dispatchable and non-dispatchable technologies.

Dispatchable technologies refer to those technologies that can be dispatched by the off-taker. This means that the off-taker can (and indeed must) deliver instructions to the project company that directs it to generate a specific quantity of energy (or power) during each settlement period. Examples of dispatchable technologies include all types of thermal generation facilities plus hydroelectric facilities other than most run-of-river.

Non-dispatchable technologies refer to those technologies that cannot be dispatched by the off-taker, but are instead fed into the network as and when the energy is available. In general, all renewable technologies other than large (dam-based) hydroelectric are non-dispatchable. Examples of non-dis patchable technologies include wind and solar. The energy must be generated using the renewable resource when and to the extent that resource is available. As a result of this defining characteristic, very different tariff structures are used for dispatchable and non-dispatchable technologies.

TARIFF STRUCTURES FOR DISPATCHEABLE TECHNOLOGIES

Tariff structures for dispatchable technologies have evolved with greater efficiency in allocating energy resources and refining payment mechanisms to incentivize investment. The first tariffs combined the energy and capacity elements into a single energy charge (usually stated in Dollars per kWh). The next generation of tariffs added a take-or-pay requirement to essentially guarantee a floor to the level of expected dispatch.

The third generation of tariffs eliminated take-or-pay concepts from electricity tariffs (except to the extent required to reflect any take-or-pay obligations under the fuel supply agreement that must be passed through) and introduced capacity and energy payments to better protect producers against demand volatility and consumers against the need to pay for energy that is not needed (and is therefore not generated).

Capacity based tariffs were developed to address the drawbacks that are inherent in the energy-only and take or pay tariffs structures. These tariffs are structured to balance the interests of investors and consumers in an economically efficient manner. This is achieved by ensuring that the project company has a reasonable opportunity to earn revenues that are sufficient to (i) repay the capital invested plus a reasonable return to the project investors (ii) cover the fixed operating costs of the project, regardless of whether the off-taker dispatches the generation facility or not. The offtaker's interests are protected because the off-taker is only obligated to pay for the capacity that is made available to it, plus the energy that is dispatched by the offtaker and delivered to the delivery point.

TARIFF STRUCTURES FOR NON-DISPATCHEABLE TECHNOLOGIES (DEEMED ENERGY)

Typically, PPAs for non-dispatchable technologies (primarily renewables) require that the project company deliver and sell to the off-taker all of the energy generated by the generation facility. The price is stated in simple terms such as cents (or another currency unit) per kWh or Dollars (or another currency unit) per MWh generated and delivered. Different markets allocate the financial risk for curtailment losses differently. In emerging market PPAs, the off-taker will cover curtailment losses as part of the tariff. Often, this is limited to curtailment losses that go over a predetermined threshold. The curtailed energy is sometimes referred to as deemed energy.

WHY "DEEMED ENERGY" IS THE RESPONSIBILITY OF THE OFF-TAKER AND NOT THE DEVELOPER

Deemed energy payment can be viewed as a 'penalty' to the off-taker for curtailing production or failing to dispatch energy from non-dispatchable technologies. Curtailing production by the offtaker usually results in financial losses to investors who then demand to be compensated. The offtaker may curtail production due to several reasons including but not limited to;

- Constraints in the grid network (transmission and distribution)
- Lack of demand for the available energy
- System blackouts
- Emergencies
- System inefficiencies

The main reason why energy deemed is the responsibility of the off-taker and not the developer is because the risks are supposed to be allocated to the party that is best suited to address the risk. Asking an IPP to bear the risk of demand, the risk of grid failure and the risk of offtake does not conform to prudent risk allocation practices. IPPs are also afraid to bear the above risk because they have no control whatsoever over the causes of the risks. For example, IPPs can neither stimulate growth in electricity demand nor do they control the transmission and distribution network and substations. Therefore, they cannot be held responsible for inefficiencies and failures on the side of the off-taker and government

installed capacity of
1,182MW
& consumption per capita of
100 KWH
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&
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by 2040

IS UGANDA'S ENERGY MARKET READY FOR DEEMED ENERGY EXCLUSION?

It's possible for the 'Deemed energy risk' to be transferred from the offtaker/government to the IPPs. This is common in open and advanced energy market structures such as spot markets and energy derivatives markets. This is possible because electricity prices in such markets are set by the forces of demand and supply and therefore they are market reflective as they change by the day or even by the hour depending on the prevailing condition. These market structures also allow developers to choose where, to whom and at what price they want to sell their electricity. Uganda's energy market structure (single buyer model with long term PPA) is not favorable without deemed energy for non-dispatchable technologies. For deemed energy risk to be transferred to IPPs, Uganda must adopt an open market structure where IPPs are not 'forced' to sell power to one buyer. Rather, they must have the option to sell power to other potential buyers such as large consumers. This type of market structure is called a 'principal buyer' model. Future reforms from the principal buyer model to spot markets will also allow for the government to transfer the risk of deemed energy to IPPs.

WHAT IS THE IMPACT OF DEEMED ENERGY CLAUSE EXCLUSION ON ELECTRICITY SUPPLY GROWTH?

Simply put, all future PPA's for non-dispatcheable technologies in Uganda have been rendered 'unbankable'. This means these PPA's are no longer creditworthy to secure funding from financial institutions as there is a serious revenue risk.

Uganda will see a sharp decline in IPP interest in non-dispatchable technologies as long as the government policy on deemed energy remains in place. For a country with an installed capacity of 1,182MW and consumption per capita of 100 kWh against a planned target of 41, 738 MW and 3,668 kWh by 2040, the policy on deemed energy is a step in the wrong direction.

In 10-15 years, expect nuclear generated power for Uganda – Hon. Eng. Irene MULONI

"For a longtime, industrialisation for Uganda has been pegged to increasing electricity generation capacity as a major driver. GeNews sought out the Minister for Energy and Mineral Development to shade more light on government's medium and longterm plans and actions to achieve this. In this exclusive interview with Simon KASYATE, Hon. Eng. Irene Muloni candidly enumerates the hits and misses of this ambitious but apt government plan."

The theme for this edition of the Magazine edition UEGCL News is "Increased electricity generation capacity driving industrialization." Briefly, Hon. Minister what would you make out of that theme?

It really speaks for itself - increasing generation capacity to drive industrialization. As a country we have recognized that for us to move our people into the middle class, for us to expand our economy, for us to add value to the natural resources and what we produce, we must provide a supporting foundation to be able to carry out all those activities. Energy is so fundamental that if you are going to develop the country, nothing can happen without energy. I am happy that our President through his strategic leadership and foresight made investment in energy a priority and that is why every effort to increase the supply of electricity has been made through budget allocations and attraction of Foreign Direct Investment (FDI) into the energy sector. Besides fueling manufacturing, when we extend this electricity into the rural areas, other than extending industrial activity there, there other social services that better the lives of our people and so it becomes extremely important that you must provide adequate, reliable, affordable energy for the country.

In his recent State of the Nation addresses, H.E the president has talked about a target to increase our installed electricity generation capacity to 17,000 MW in the next ten years. How do you see the sector achieving this Herculean target?

When you look at our vision 2040, we will require over 40,000 MW. When we go into our NRM Manifesto, a target was given for the five-year term that we should be at least 3800 MW by the end of the term and of course all that is following on how many industries we expect to have within that period. It is good to have high targets because it then enables us to stretch out of our comfort zones. We are lucky that God that has endowed our country with a lot of hydro potential.
We are tapping the potential of the river Nile, but we also have many rivers in different parts of the country. We have plenty of sunshine because our country is astride the equator and so we are trying to tap into all these. But we also know that the potential along our section of the river Nile is 10,000 MW at the maximum. So we are also developing solar since we have plenty of sunshine. We are looking at all the renewable energy sources but we are also looking at energy for the future. Achieving 17,000 or 40,000 MW requires us to go beyond these renewable energy sources. In our energy mix we have hydro, solar, wind, geothermal, bio-mass and nuclear. We have already set up a nuclear energy unit in this ministry and we are working hand in hand with the International Atomic Energy Agency to develop nuclear energy for peaceful uses. So in the next 10-15 years we should be able to see our first nuclear energy power plant possibly generating 1000 MW or whatever we will have chosen. But meanwhile we are now looking at how to make the most of our hydro potential. We have just commissioned, 183MW at Isimba and at the end of this year we are looking at another 600MW from Karuma. Ayago will give us 840 MW, Oriang 400 MW, Kiba 300 MW, Uhuru 350 MW and then these small hydro's all aggregated together plus the other renewable energy resources make our targets achievable as long as we do proper planning.

Planning is one aspect but there is also the financing for these projects. There has been concern about government's ability to raise concessional loans to finance these projects on one hand and on the other attracting private capital that comes at a huge premium. What funding model are you looking at to finance this huge investment?

We have created a very conducive investment environment in the energy sector and in Africa region, I think Uganda is leading in attracting private capital. Very recently before Isimba came on board, 70 per cent of our electricity was being generated by the private sector. Now that Isimba is on line and Karuma which is also a public project is going to come on line, that concentration is going to be diluted significantly. Private capital will always remain at option in those situations where government is not able to borrow, or to generate its own funding internally. We have the enabling laws, policies, regulations and institutions that have really attracted the private sector and of course we also have our own company, UEGCL that we have structured and tried to support so that it can go into the generation of electricity bearing in mind the interest of the country at hand. I don't anticipate any challenges because we have liberalized the sector, put in place a regulator and a conducive investment climate. The only concern is that we want this energy to be as cheap as possible. We want it to be affordable for manufacturing so that industrialization can be accelerated. That is where you get a challenge if you are using private funding to develop generation. It comes at a cost because that

money is pricey and therefore the tariff is bound to go higher. So it is a balancing act in which we have to find the sweet spot between cost and availability.

Away from Generation, how you are you planning for the transmission and distribution of the additional power?

Because this electricity must reach the destination that it is designed for, as we are increasing generation capacity we are also mindful about the transmission. We have come up with policies that are enabling us to extend electricity up to the rural areas and also we have come up with a policy of a free connection to enable us reach the citizens doors so that they only pay for the electricity that they consume. All this requires investment and the approach is that we are doing it in conjunction with the private sector to extend the distribution lines. We have sub stations constructed, we have connection materials taking electricity to the doors of our people but also at the same time on the transmission side we have attracted the private sector. We are structuring the funding method such that they can come and construct transmission lines and own those lines for as long as we are still paying back the money that was used to construct them. Once the period of repayment is done, those lines revert to ownership of government again through one of our transmission companies.

Hon. Minister Let's turn to sustainable and efficient use of Electricity. Are there deliberate interventions in especially sensitizing the citizenry on efficient use of energy to stem losses and the prohibitively high bills arising from the same?

When you consider the key elements into the value chain for energy for industrialization you are looking at generation capacity, the transmission and access but then finally you are also looking at efficiency because energy saved is money saved. Along the entire value chain, the issue of efficiency is paramount, one, in terms of the equipment used so that you do not have a lot of energy wasted within the generating, transmitting or distributing equipment. But also at the consumer level one needs to sensitize the masses on how you do your operations as a company, in the equipment that you buy, in the methods that you use but also in the appliances that you use. As a ministry, we have one week during the year where promotion of energy efficiency takes lead. A customer is happy when the bill is affordable and now with pre-paid metering, we have carried out an assessment that for a simple house hold which has only 4 bulbs, if they use energy savers, in a month they should not buy electricity of more than Ugx 7,000. All that requires sensitization so that people do not steal electricity because it is affordable. When they steal electricity that is a loss, and it goes into the losses we are talking about and therefore the cost of electricity itself. So sensitizing the masses, to use energy efficient appliances feeds back into an affordable tariff.

We also carry out energy audits especially in factories to sensitize the consumers of huge volumes of electricity; the kind of equipment, mechanism and also the way the network is designed

and configured brings in elements of efficiency. How best do you design your network such that you minimize any losses? So we need to reduce the losses along the entire power train including losses associated with theft of power. Similarly it goes for those small-scale industries in the rural areas, again depending on how they have structured, figured and procured energy efficient machines, it reduces on the amount of electricity that they consume.

Access to right way of way has become contentious how are you resolving this since it has become a major obstacle to extending reach of the grid?

It is definitely a big challenge because the law right now gives the authority over land to the owner and there are so many misconceptions about the value of land, which has often led to contention. But our people need to be patriotic because this electricity is a good for our development as a country and our livelihoods. When government has a project where a high voltage line is going to be extended into a region for industries, we always have a consideration for the landowner. That is because you cannot have any settlement under that corridor which is acquired, because of the health hazards. When you live under very high voltage lines you risk developing Leukemia or cancer of the blood.

Now when it comes to government projects our people have the habit of overnight multiplying the price of land by 20 times, it doesn't help us at all as a country and that is the patriotism I have been talking about that needs to come. There will also be a need to amend the law so that people do not make it difficult for government to extend projects, which are for the good of this country.

Most folks want electricity but for the most, it's a consumable and NOT an enabler or driver of production or value addition in business. Is there a deliberate sector wide education drive on the most optimal uses of electricity?

It goes without saying or question that everyone wants electricity and I have seen how electricity has changed people's lives whenever the service has been extended to the rural areas. Overnight everything just mushrooms up and you see people's lives changing and so the local people up to the lowest person actually understand the value of electricity. My appeal to them is that when we extend this service to them, let them embrace it, take good care of it and not destroy it because it is also destructive if you tamper with it.

As the superintendent of the energy sector how do you rate the performance of the different agencies under the ministry such as UEGCL, UETCL, UEDGCL, REA, ERA?

I think we have done a fantastic job as a sector although there is still a lot more to be done. The need for electricity for industrialization is great, the pressure is on and so everyone must move. So working closely by ensuring that the plans we have set out for each of the agencies or the companies is achieved for me is extremely important. One big challenge that I have observed is the issue of land acquisition, it has really delayed completion of many projects, and we would be miles away but I have recognized land acquisition as really a big challenge to all

Our Values

Integrity, Excellence, Innovation, Responsiveness, Responsibility

Our Mission

Taking it further is our approach to doing business, serving our clients and achieving company objectives. It means demonstrating our expertise and commitment to our customers wherever they are, to deliver safe and successful energy and infrastructure projects.

Our Mission

Prioritize occupational health and safety in our business.
Contribute to the economic and social life of the local communities where we operate
Ensure our business respects the environment.
Build relationships with our clients based on quality service, transparency and innovation.
Develop local capacity and our employees' skills.

these companies, be transmission, generation or distribution. As government we will need to come up with a lasting solution and what we are thinking best is a change in the law. I think that is the way to move. We will definitely be able to move faster if we overcome that challenge. The other challenge I saw was vandalism, which can be very destructive. It is baffling that somebody can bring down a tower for its scrap value. It is very disappointing but it is my appeal to all Ugandan's to desist and also to watch over your neighbor and whatever is happening around you. Whoever is stealing and destroying infrastructure you are paying for it, because all this is aggregated into the requirements of the electricity sector. If we want to bring the tariffs down, it means we must protect whatever we have put in place and utilize it in the best way possible and then all of us will be able to pay for very cheap electricity that is going to help us brighten our lives.

Still on agencies there is that talk "you know the more agencies the more duplication, the more the high cost of Public Administration, the more government hemorrhage." Are you convinced that all these agencies are necessary?

The sector was restructured in the 90's because of the prevailing conditions and that is why liberalization and privatization took root in the sector. Initially it was a vertically integrated sector where you had generation, transmission, distribution and also regulation. Now if you were to invite the private sector you needed a level playing field, a referee. So that unbundling had to be done, with generation, transmission and distribution as standalone businesses. As a result generation and distribution took on concessions and also attracted private players. In generation alone, we have many IPPS and it is because of that restructuring which has worked very well for the country. That is how we are able to get the private sector into the generation, so I think the direction it took was perfect, no problem. You get into the distribution, it is the same thing, we have now had many distribution companies coming on board, and we are trying to spread out into the rural areas because our electrification rate is very low. You talk of 28 percent and I say my good Lord, which is why we have come up with these programs of the free connection policy of electrification to the sub count level so that in the next 10 years we can more than triple our current rate of electrification. We should be able to achieve that with this kind of structuring. Government looked at how best do we deliver a service at the least cost, how much money goes into management and maintenance of all these facilities and so in the rationalization that government is looking at it is saying, is there any way we can restructure our agencies, departments to make them more efficient and deliver a service to the government at a least cost? That is the thinking around this. If you look at the sector the thinking was okay, you have generation doing its business, transmission is the super high way for our electricity, and distribution takes the service to the consumer. Then you have Rural Electrification Agency, then you have the regulator. Now if you are to restructure this for efficiency, what are you looking at? Government was looking at having rural electrification merging with distribution because they are all in the distribution sector, it makes a lot of sense. The issue is the services will continue to be done and you know with the concession the distribution company has largely been administering the concession. It has not been much into the distribution business itself until recently when some of the operators collapsed and it moved in because all those are its assets. It only leaves the assets to the private operator to manage. Now whatever assets are being generated through rural electrification, they should go to the distribution because it is all government and if you want to manage it in the best way and more efficiently then maybe merge that.

THANKS HON. MINISTER

THE OUGHTNESS OF ORGANIZATIONAL ECOLOGICAL FOOTPRINT

Kepo Richard
Environment Officer
Karuma HPP

As Stewards of God's earth we should give due consideration to all areas of our work and life. That is because we all influence our surroundings in one way or the other. Often, this influence is negative, a good example being, exhausting resources or causing pollution. On the other hand, we can also take actions to ensure that our ways of life have a positive or minimal impact on the environment.

In the ecosystem, human organization involves interaction with the environment, whether directly or indirectly. For example, construction firms that are into building hydropower plants and roads require water, which is also needed by aquatic species and wildlife. If not well managed such activities can pose an environmental risk on soil, air, and water with negative consequences on both human and other forms of life.

Construction activity involves the movement of machinery, bush clearing, mining and quarrying of rock and sand, all of which can have negative ecological footprints.

Many people seek employment opportunities at work sites managed by construction companies and when offered jobs, the population increases leading to demand for resources such as energy and water. Noteworthy, in a country like Uganda, charcoal and firewood are the immediate affordable energy sources. Little do we know that they exert a lot of pressure on the biomass.

In the course of implementing mega infrastructural projects, consumption of food, beverages, associated poor waste, and toxic materials management can lead to environmental pollution unless strict control mechanisms are put in place.

Holistically, such organizations should not lose the environment battle because their existence depends on the environment and natural resources. This will call for organizations to put nature first in all their activities through innovative environmental conservation strategies to manage the ever-increasing risks associated with climate change.

ORGANIZATIONAL ENVIRONMENT FOOTPRINT

Contractor's or project production processes produce positive and negative outputs that impact on the ecological footprints. As we work, we interact with nature for human benefit, which can be exploitative and extractive to the environment. It is the noble duty of every employee in any project or organization to use the environment sustainably. This also calls for the development of an environmental conservation culture that is supported by governance structures that emphasize behavioral change and awareness to shift to proper natural resources use, with much emphasis on recycling waste. Research into the use of renewable energy should be strategic as opposed to using environmentally harmful fossil fuels like oil and gas products.

ORGANIZATIONAL STEWARDSHIP

Good organizational environmental stewardship generates benefits that can be realized by integrating the environment into organizational and donor programming and clean energy-saving practices such as solar power. Equally, organizations need to explore adaption of environmentally friendly habits such as a corporate practice to live in harmony with mother earth, which is possible through waste and pollution management, reducing the use of resources that will generate a lot of waste and adopting practices such as electronic correspondence instead of print. Also of significance, is renewable energy to cut down on greenhouse gases emissions thus having fresh air is better than using air condition facilities.

THE FUTURE OF ENVIRONMENT CONSERVATION

There are numerous options we can adopt to ensure that the environment is conserved for the present and future generations. These among other things include bio-diversity conservation and such practices like eco-san toilets and bio-digesters, improved cook stoves, investment into renewable energy technologies such as hydropower, solar and wind energy, boosted with better-insulated building that allows for natural cooling.

Conservation business where purchases are conducted with institutions that follow best practices like forest timber certification, sustainable harvesting of non-timber forest products to mention but a few.

Above all, people are central to these efforts through community participation for example tree planting; schools, religious institutions, companies (Public or private) and environment focused discussions and other environmental partnerships and advocacy for policy engagement and commitment..

CONCLUSION

As part of corporate social responsibility, organizations or companies should include an aspect of ecology in their work plan and budgets. Relatedly, environmental conservation initiatives such as tree planting, watershed management and creation of environmental management awareness could be among the many options for implementation. Promotion of environmentally friendly procurement, ensuring that rules and practices are in line with environmental provisions, for instance, avoiding the use of internationally prohibited chemicals and upholding safe disposal, recycling and re-use of packaging materials. Investment in creating and upgrading a suitable environmental information system can quickly lead to sound decisions by construction and other companies. All construction projects must be implemented with a compressive environmental and social impact assessment undertaken and information disseminated to the public. Finally, one of Africa's greatest leaders Nelson Madiba Mandela once said, "Nature can live without man but man cannot live without nature", end of quote.

Understanding the Nexus of Energy, Climate Change, Food and Natural Resources (Water)

Doreen ABAMURUNGI
Environment Officer

Energy, water, food, land, and climate are essential resources of our natural environment and support our quality of life. Competition between these resources is increasing globally and is made worse by climate change.

Water is a basic natural resource sustaining life and provides for countless socio-economic needs for development in Uganda. The major source of water for these resources is direct rainfall, which is recently experiencing variability that threatens the distribution of resources and water availability in Uganda.

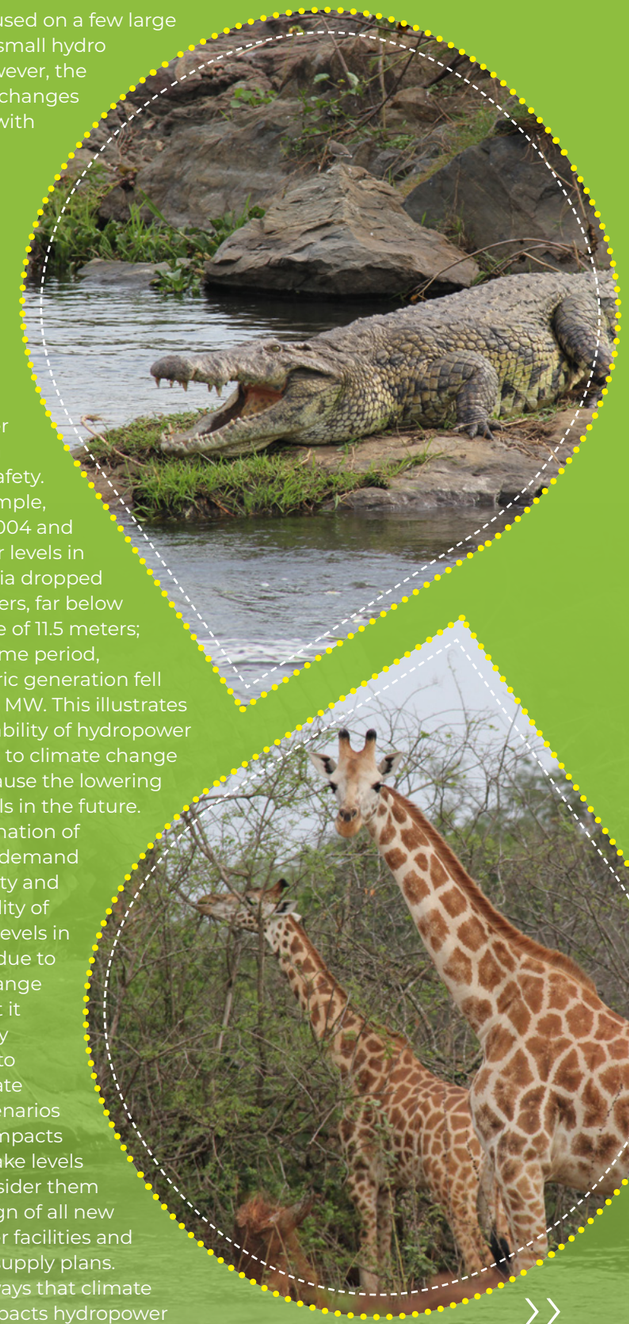
The Uganda Vision 2040 recognizes the critical role water resources play in the development of hydropower and the entire energy spectrum. There is however a hazy picture about the availability of water resources to meet the various needs including the full transformation of the energy sector in Uganda.

There are several issues and challenges surrounding water resources, which are aggravated by climate change and variability and population growth among others. The current water management practices in Uganda may not be robust to cope with these challenges which impact on water resources and increase water use requirements. With the rapidly growing population and improving living standards, the pressure on Uganda's water resources is increasing and per capita availability of water resources is reducing day by day. Climate change has altered the hydrological cycle in many ways including the warming of the atmosphere and oceans/lakes, which has changed major weather systems.

Energy, food and natural resources are interlinked.

- Energy is required to produce and distribute water and food: to pump water from groundwater or surface water sources to power tractors and irrigation machinery and to process and transport agricultural goods.
- Water is essential for agricultural production and along the entire agro-food supply chain and it is also a necessary input for industry, mining, energy/ hydropower generation, and tourism.
- Energy is required to cook food and boil water for drinking in households. In Uganda, the main source of energy is biomass, from forests.
- Food production requires both water and energy

The national demand for food, energy, and water is increasing with increasing population and these resources cannot be considered in isolation. Current efforts of improving electricity generation and access are now largely focused on a few large and many small hydro plants. However, the increasing changes in climate with extreme weather events e.g. severe droughts and heavy flooding have in the past seriously affected hydropower production and dam safety.



For example, between 2004 and 2006, water levels in Lake Victoria dropped to 10.4 meters, far below the average of 11.5 meters; over the same period, hydroelectric generation fell by over 100 MW. This illustrates the vulnerability of hydropower production to climate change should it cause the lowering of lake levels in the future. The combination of increasing demand for electricity and the possibility of lower lake levels in the future due to climate change means that it is extremely important to study climate change scenarios and their impacts on future lake levels and to consider them in the design of all new hydropower facilities and electricity supply plans.

Other ways that climate change impacts hydropower

BETWEEN 2004 AND 2006, WATER LEVELS IN LAKE VICTORIA DROPPED TO FAR BELOW THE AVERAGE OF **11.5 METERS**, OVER THE SAME PERIOD, HYDROELECTRIC GENERATION FELL BY OVER **100 MW**.

10.4 METERS

include damage to infrastructure and disruptions in service. Unless these risks are addressed, the intended hydropower benefits of improving energy access and security while reducing emissions relative to other power sources may fall short. This is particularly true if electricity grids must turn to traditional, carbon-intensive energy sources, such as coal-fired plants, when hydropower becomes constrained.

INTEGRATING CLIMATE RESILIENCE INTO HYDROPOWER INVESTMENTS AND BROADER POWER PLANNING AND INVESTMENTS

The risks of climate change to hydropower should be addressed by integrating climate resilience into short- and long-term hydropower and broader energy system project planning, development, and operations and maintenance.

Such planning should consider both climate risks and GHG reduction opportunities across the energy supply and demand chains, and the interrelationships and dependencies between variable renewable resources.

Planners and investors should also evaluate the trade-offs of different investments to promote the resilience of individual hydropower plants, as well as the power system as a whole.

A first step to enable this type of planning is raising awareness among energy planners/developers and plant managers and operators of evolving vulnerabilities.

Building this awareness means helping energy planners and investors understand the climate change risks to hydropower efficiency and reliability, as well as the cost-effective alternatives available to achieve resilient and low GHG emitting projects and energy systems. The right knowledge and skills, along with adequate resources and incentives, can help motivate investors/developers and energy planners to reduce climate vulnerabilities and harness potential opportunities that may arise from a changing climate. Since consideration of climate change is likely to be novel for many power sector planners/investors, concerted capacity-building investments, including training, may be required.

Similarly, plant managers and operators require technical assistance to make informed decisions for managing short-term and long-term changes. While the set of skills, knowledge, resources, and incentives needed is a high bar to achieve, some tools and resources should be developed to help planners and developers understand potential climate change impacts on hydropower and energy systems, as well as associated climate change adaptation measures available to manage risks. Once risk awareness is achieved, an adaptive management process should be adopted by energy planners/investors to integrate climate risk management into hydropower planning and power sector investments.

The following steps can be taken by project managers and power system planners/developers/investors to integrate climate change into decision making;

1 **Assessment of risks and vulnerabilities at the project and power system planning levels** to help managers determine how climate variability and change may affect an existing or planned power sector strategy or an individual project.

2 **Identification, evaluation, and prioritization of climate risk management options** at the project and power system level taking into consideration effectiveness, technical feasibility, and cost.

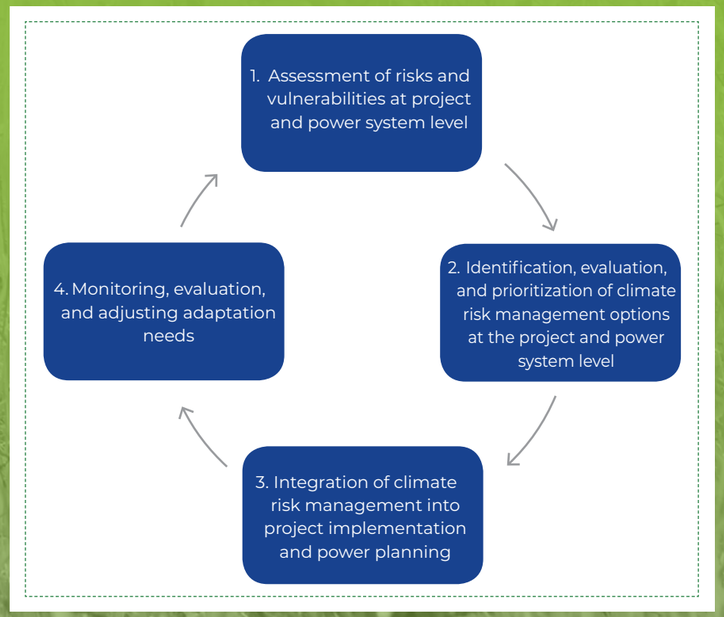
3 **Integration of climate risk management into project implementation and power planning** to build resilience and flexibility into projects and better direct and coordinate power sector investments so that "surprises" are anticipated and development objectives (e.g., lowering GHG emissions) are met over time.

4 **Monitoring, evaluating, and adjusting adaptation needs** is an ongoing process that supports managers in identifying, measuring and addressing possible risks, and in incorporating new information about conditions and performance to take steps to reduce risk and improve performance.

The International Hydropower Association (IHA) recently launched technical guidance to help the hydropower industry to become more resilient to the impacts of climate change. The Hydropower Sector Climate Resilience Guide will support investors, owners and developers to make informed decisions about how to plan, build, upgrade and operate hydropower systems in the face of increasingly variable climatic and hydrological conditions. This guide provides a practical framework for assessing the projected impacts of climate change on hydropower systems. This includes guidance for selecting appropriate measures and operational procedures that build climate resilience across a range of scenarios, and for the development of a climate risk management plan.

Here are some of the challenges Uganda is facing at the moment;

- Lack of capacity to effectively predict the climate change impacts on the different energy infrastructure and to adequately improve the green energy standards through limiting the use of biomass especially in villages.
- The energy poverty in Uganda most especially at household level has also threatened conservation, social-economic development of Uganda's economy. Biomass energy source remains dominant mainly at household level through cooking. This calls for the supply side to be effectively managed.



> *While providing essential adaptation services, hydropower facilities are not immune to the changing climate. This guide offers new international good practice guidance to help project operators and developers identify, assess and manage climate risks to enhance the resilience of proposed and existing hydropower projects.*

(This could be the solution for us to achieve the above-mentioned steps to integrate climate change into decision making.)

Uganda can utilize the abundant energy resources, particularly solar, wind, geothermal, and biogas. It is only through the utilization of these energy sources that Uganda can achieve its target of having universal electrification by 2035.

THIS GUIDE CAN BE DOWNLOADED FROM **HTTPS://WWW.HYDROPOWER.ORG/CLIMATERESILIENCEGUIDE**

INSURANCE MADE SIMPLE

Alex MAKATA (Bstat , Dip CII)
General Manager, Clarkson Insurance Brokers Limited
amakata@clarkson-group.com

Insurance is perceived to be a difficult subject to comprehend and more so we get very little knowledge about the topic in our education life within the Uganda education Curriculum.

As individuals, companies and government amass assets, the exposure to different risks can be realized through operations and the nature of the environmental changes as seen through earthquakes, bush fires, hailstorms, increased heat and the like.

The entities mentioned above, may start realizing profits and as wealth is being created, calamities may arise and bring operations to closure, with insurance in place, operations can be revived and shareholders profits protected.

So what is insurance? That is the question we want to deliberate on, and given that the topic is wider in nature, we will try to make it simple for the readers of GeNews.

Insurance basically offers peace of mind and one would want to continue planning for their operations without worrying about questions like what if my factory catches fire, what if thieves break into the office, what if my driver was involved in an accident and a life plus the car is lost.

In brief, ***insurance as quoted from simple English Wikipedia , It is something people buy to protect themselves from losing money. People who buy insurance pay a "premium" (often paid every month or yearly) and promise to be careful (a "duty of care"). In exchange for this, if something bad happens to the person or thing that is insured, the company that sold the insurance will pay money back***. A premium is the cost of buying insurance and something bad refers to what was insured , say a fire , theft , a natural disaster etc. depending on how the insurance cover as has been structured.

Insurance is sold through many sources, the popular ones include approaching

Insurance cannot pay 100% for example under Motor insurance, a condition may be set say, 10% of the claim amount, with a minimum base of Ugx 100,000 to be managed by the affected entity, so any claim equal to and below Ugx 100,000 will not be taken up by the insurance company , however when the claim is big, the sharing is in a ratio of 90 (Insurance company) : 10 (claimant)

directly the Insurance Company, using a company registered agent or sales person, through a bank under a bancassurance agency arrangement and through a professional registered broker.

The latter (***professional Insurance broker***) is what I do and having worked with Clarkson Insurance brokers as General Manager in the last two years, have come to appreciate the role of a broker in managing the relationship between the client and the insurance company, a process that demystifies the subject and the broker makes the process of aligning and purchasing the cover in a simple way at no extra cost.

Think of either a building, a car, a machine or a person, these may face different risks, however the principle is the same, the risk of fire, theft/ robbery and accidental damage can affect any of these examples of risks mentioned, in addition consequential losses can happen say if the car was generating income, the owner may close business and this can affect the livelihood of the family, this risk of consequential loss can also embedded in insurance covers.

As you can notice, insurance can be tailored for individuals, family, Small and Medium Companies (SMEs), Corporate organisations including government agencies depending on the profile of the entity under review.

Purchasing an insurance product may now appear easy after appreciating a few basics mentioned above .However the claims process is always viewed as a challenge although this can be made easy if entities appreciate the process of making a claim. Even before the sale is closed, either your agent, insurer or broker should explicitly advise one on how to make the process of making a claim simple by understanding the basic requirements. Some incidences may warrant investigations to rule out any form of fraud depending on the circumstances the incidence happened.

As the economy grows, we are now seeing more infrastructure developments by private entities and government. This propels growth of insurance as it is key to protect Assets of National interest for example dams, Ferries, IT equipment and so on. Most of the assets have been acquired through loans and while a tax payer makes contribution towards the repayment loans, the insurance component should be considered as priority, as a fall-back position, in case the risk of any insurable event occurs. With this in mind, the economy would immensely grow and the same time promotion of insurance propels growth for both the government and its people as it facilitates wealth creation.

As I wind up, we are used to seeing people talk about Third Party Insurance for cars /bikes as a requirement for police while on the road. However this statutory cover is to protect people who get involved in accidents either as occupants or road users, say Taxi , boda boda . Though the limit is quite dismal, (set at Uganda Shillings **One Million** per person) for bodily injury /death and (Uganda Shillings **Ten Million** for one event involving many people). However, more coverage can be bought to enhance the statutory coverage.

Insurance cannot pay 100% more especially for short term coverage under property as an entity should carry some interest in the property. Therefore an excess is introduced which refers to the first amount of claim that the affected entity has to incur before the insurance company pays the difference in the claim amount. For example under Motor insurance, a condition may be set say, 10% of the claim amount, with a minimum base of Ugx 100,000 to be managed by the affected entity, so any claim equal to and below UGX 100,000 will not be taken up by the insurance company , however when the claim is big, the sharing is in a ratio of 90 (Insurance company) : 10 (claimant)

So the next time, you either think of or need insurance, you know how to approach an insurance company and the wise way would be to approach a professional Insurance broker , just like Clarkson Insurance Brokers Limited ***for advisory services that guarantee peace of Mind and Comfort***.

THANK YOU

NYAGAK (III) HYDROPOWER PROJECT – PUBLIC-PRIVATE PROJECTS FOR INCREASED ENERGY GENERATION.

Nicholas Agaba RUGABA
Project Manager - Nyagak III HPP

UEGCL, GENMAX, DOTT SERVICES LIMITED, TATA CONSULTING ENGINEERS AND GOPA INTEC AT THE PRE-COMMENCEMENT SITE MEETING/VISIT AT NYAGAK III HPP IN MARCH 2019

UEGCL PROJECTS TEAM, DOTT SERVICES LIMITED AND TATA CONSULTING ENGINEERS AT THE DAM/INTAKE SITE FOR NYAGAK III HPP IN MARCH 2019.

According to the **Africa Sustainable Development Report 2018 (** a product of joint studies *by the African Union, African Development Bank, United Nations Development Program),* hydropower generation, a renewable source of energy, is the single largest source of electricity in Africa, contributing just over 60 percent of the continent's supply. Hydropower will play a key role in improving rural access to modern energy to address rural-urban disparities. The report makes bold policy recommendations on the need for African governments, supported by partners, to provide incentives to drive investments in renewable energy that improve access to electricity and boost economic activity and growth.

The Government of Uganda is already on a firm path to supporting private investment in the energy sector, having passed the Public-Private Partnership Act (Uganda) in 2015. The law has paved the way for investment and development of Public-Private

PRELIMINARY EXCAVATION WORKS FOR THE PIPE CONDUIT FROM FORE BAY TO THE DAM/INTAKE AREA (MAY 2019)

Partnership energy projects to drive rural electrification and industrialization. The Nyagak III (6.6MW) Hydro Power Project is being developed as a Public-Private Partnership Project. The Public is represented by UEGCL on behalf of the Ministry of Energy and Mineral Development (MEMD).

The private partner is a consortium of two private companies/ firms namely Hydromax Limited and DOTT Services Limited. Together, as a consortium, they are the strategic partner on the development of the Nyagak (III) Hydro Power Project. The strategic partners were procured and selected according to the PPDA Act of Uganda which stipulates and guides on procurement of all services. UEGCL (the government agency) and the Strategic partner (Hydromax and DOTT Services Limited) formed a Special Purpose Vehicle (SPV) or Company to develop, own and operate the Nyagak Hydro Project. The Company was formed and is run in accordance with the Companies Act of Uganda.

The company's asset base has increased from concessioned Kiira (200MW) & Nalubale (180MW) to include the government flagship of the Isimba 183MW HPP.

It is anticipated that Nyagak III HPP shall have an annual maximum generation of 36.27 GigaWatt Hours (GWh).

LOCATION

The Nyagak III Small Hydropower Plant (SHPP) is located on the Nyagak River in Zombo District, North-Western Uganda (West Nile Region), approximately 7 km from Paidha Town Council, in Alindi village, Amei Parish, Paidha Sub County. The Nyagak River has a cascade of falls, making it ideal for the development of small hydropower schemes. Approximately 5Km upstream of Nyagak III, there is Nyagak I SHPP (3.5 MW) which is now operational.

CHARACTERISTICS

The project has the typical features of a small hydropower project namely a Dam/Weir, Intake, Pipe Conduit, Forebay, Penstock, Powerhouse, Substation/Switchyard, and Transmission Line. The Intake is a structure controlling the entry of water from the river into the water conductor system or from a canal into a flume or pipeline.

If you light 20 light bulbs each rated 50watts, 1 Unit of electricity (1KWh) shall be consumed. This is computed from 20bulbs x 50watts x 1hour = 1,000Watt hours (1KWh). Nyagak III Hydro Power Project shall generate at least 36Million Units of electricity per annum, thus with the capacity to power industrialization and electrification of homesteads in the West Nile Region.

Intakes can be if several types, notably; Lateral (or streamside intake), trench intake, tyrolean intake (a variation of trench intake for mountainous streams), penstock/ pipeline. Nyagak III HPP adopts the pipeline conduit type of intake structure.

From the Dam/Intake, Nyagak III HPP adopts a pipe conduit for the water conduit system. A water conductor system is a system of canals, aqueducts, pipelines, tunnels - etc. for transporting water from intake to turbine. This is sometimes termed as a "waterway". The pipe conduit from the Intake terminates at the fore-bay tank. A fore-bay tank is a storage tank for handling turbine flow changes due to load rejection/ acceptance. The forebay tank at Nyagak II HPP is connected to the powerhouse by a penstock. A penstock is a pressurized pipeline supplying water to the turbine from the fore-bay tank.

The powerhouse is the building that houses electric generating equipment (turbines) and related auxiliaries. The structure houses turbines, generators, and associated control equipment. The water (which is the fuel for hydropower generation) exits the powerhouse to the natural river course through the tailrace channel. The tailrace channel is located between a hydroelectric powerhouse and the river into which the water is discharged after passing through the turbines. The typical layout of a small hydropower plant with key salient features is shown below;

FIGURE 1: TYPICAL LAYOUT OF SMALL HYDRO POWER PROJECT. (SOURCE: INTERNET PHOTO)

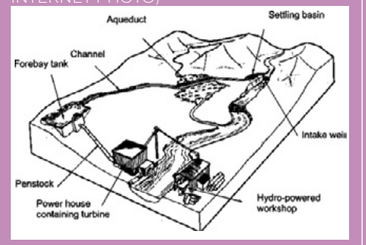


TABLE 1: SUMMARY OF PROJECT FEATURES AT NYAGAK III HYDRO POWER PROJECT

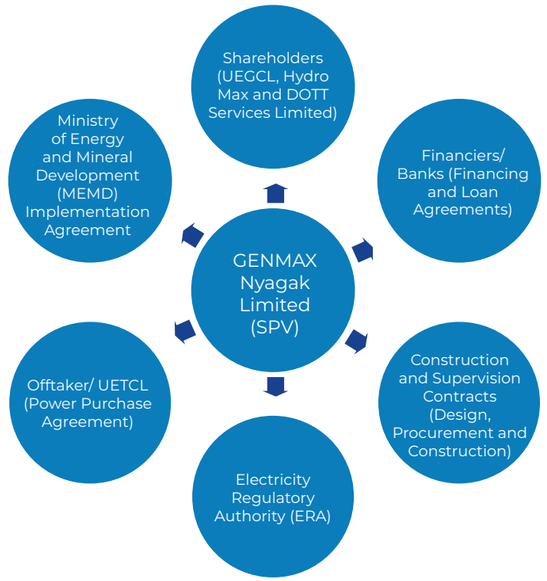
Feature	Value
Type of Power Plant	Run of River plant with a small reservoir
Dam/weir	7 m high concrete gravity dam
Reservoir active capacity	12,000 m^3
Net head (Hn)	112.2 m
Design Flow (Qd)	6.83 m^3/s
Installed capacity (Pturbine axis)	2 x 3.3 MW
Expected annual max generation	36.27 GWh

THE ROADMAP 1300- UEGCL'S STRATEGIC PLAN 2018-23

Electricity generation is the process of producing electric energy by transforming other forms of energy. Also, the amount of electric energy produced, usually is expressed in kilowatt-hours (kWh).

The Nyagak III HPP, when commissioned, will be one of the generation facilities under UEGCL's generation assets portfolio. The company's asset base has increased from concessioned Kiira (200 MW) and Nalubale (180 MW) to include the government flagship of the Isimba 183 MW HPP. It is anticipated that

FIGURE 2: TYPICAL PROJECT -STRUCTURING OF PUBLIC-PRIVATE PARTNERSHIP PROJECTS



Nyagak III HPP shall have an annual maximum generation of 36.27 GigaWatt Hours (GWh). That is equivalent to over 36.27 Million Units of Electricity generated annually. A unit of electricity is equivalent to 1KWh (1000 Watt-hours or a 100Watt bulb burning uninterrupted for ten hours. A unit of electricity is 1000 watts of energy consumed in one hour. If you light 20 light bulbs each rated 50 watts, for one hour, 1 Unit of electricity (1KWh) shall be consumed. This is computed from 20 bulbs x 50 watts x 1 hour = 1,000 Watt hours (1KWh). Nyagak III Hydro Power Project shall generate at least 36 Million Units of electricity per annum, thus with the capacity to power industrialization and electrification of homesteads in the West Nile Region. The Nyagak III HPP shall over the next 30 months take shape in the mountainous ranges of Alindi village, Amei Parish.

CURRENT STATUS OF THE NYAGAK III (6, 6 MW) HPP:

In April 2019, UEGCL, GENMAX, Tata Consulting Engineers (Consultant) and DOTT Services Limited (Contractor) held the Site Kick-Off Meeting after GENMAX had issued a notice for commencement of project works in accordance with the project contracts. The contractor has since completed the construction works of various temporary facilities namely the concrete batching plant and the worker's accommodation camp. The foundation works for the concrete batching plant works have since been completed. Regarding the permanent works, the contractor has completed preliminary excavation on the pipe conduit from the forebay to the dam/intake area. This has since paved way for excavation and foundation treatment plant for the dam and intake area.

The project outlook for the next three months includes UEGCL commencing key Resettlement Action Plan activities namely additional land acquisition, stakeholder engagement on Catchment Management Plan and Livelihood Restoration Plan. It is also anticipated that there shall be substantial progress engineering/ design of permanent structures, on excavation works for the pipe conduit, excavation and foundation treatment for the dam. Additionally, GENMAX will take key steps in securing debt financing from potential project financiers.

A unit of electricity is equivalent to 1KWh (1000 Watt-hours).

NYAGAK SPV

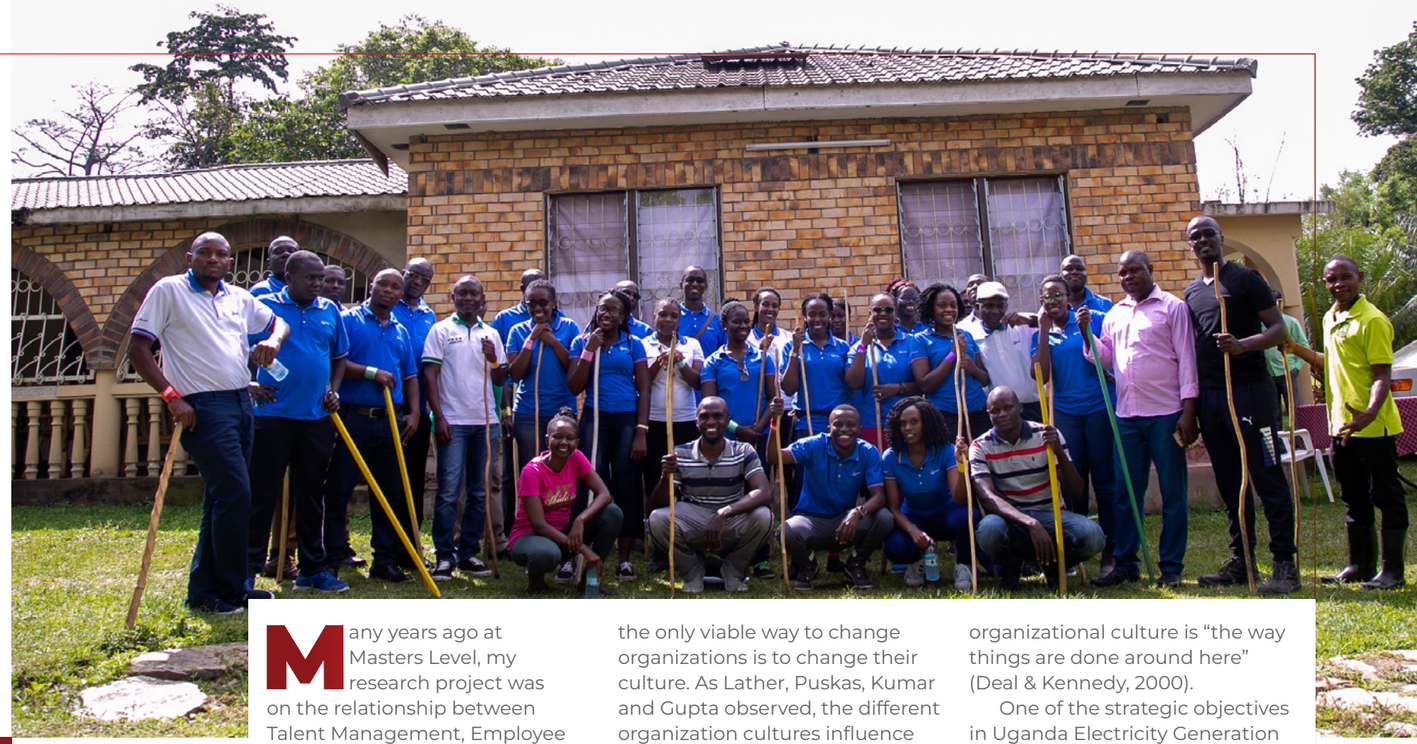
According to the United Nations, Economic and Social Commission for Asia and the Pacific (UNESCAP), a Special Purpose/Project Vehicle (SPV) is a legal entity that undertakes a project. All contractual agreements between the various parties are negotiated between themselves and the SPV. An SPV is a commercial company established under the relevant Act of a country through an agreement (also known as a memorandum of association) between the shareholders or sponsors. The shareholder's agreement sets out the basis on which a company is established, giving such details as to its name, ownership structure, management control, and corporate matters, authorized share capital and the extent of the liabilities of its members. The SPV for the Nyagak III Hydro Project is called GENMXA Nyagak Limited.

The Company is owned by UEGCL, Hydromax and DOTT Services Limited as shareholders. The project shall be funded by a mix of both equity (capital) and debt (loans) acquired by the Special Purpose Vehicle (GENMAX).

UEGCL ENGINEERS ENGAGING DOTT AND TATA CONSULTING ENGINEERS ON SITE INVESTIGATIONS.

Organisation CULTURE

Jackline Bahizi KAMBABAZI
Human Resources Manager-UEGCL



Many years ago at Masters Level, my research project was on the relationship between Talent Management, Employee Engagement, and Organisation Culture. The findings revealed that knowledge more especially that is engraved in research and publication does not die. One of my recommendations then was that organisations should have a "culture based on shared values and beliefs" if they are to achieve total staff engagement.

It is becoming complex every day for organizations seeking to build competitive advantage through engaged employees. They are often run into the challenges involved in engaging and mobilising an entire workforce of individuals with unique values, culture, interests, and needs towards a common goal. According to Eisenberg & Riley, any form of institution or organization has a culture and the only viable way to change organizations is to change their culture. As Lather, Puskas, Kumar and Gupta observed, the different organization cultures influence the attitudes, values, motivation, performance, and engagement of people.

WHAT IS CULTURE?

Simply defined, culture is the way of life of a group of people, community or society. Far from being static, it is also dynamic. Culture is important in ensuring employee engagement because it is the glue that holds the organization together (Kagaari, Munene & Ntayi, 2010), whereas according to Chernatony and Cottam (2008), organization's culture is a powerful driver of employee behavior. To some scholars in this discourse, culture includes the organization's vision, values, norms, systems, symbols, language, assumptions, beliefs, and habits (Needle, 2004). Other scholars conclude that organizational culture is "the way things are done around here" (Deal & Kennedy, 2000).

One of the strategic objectives in Uganda Electricity Generation Company Limited's (UEGCL) 2018-23 plan is to improve the organizational culture and also come up with a matrix that defines the same. This is an aspect that we at UEGCL have found challenging because each one keeps asking themselves, what is culture? How should the UEGCL culture be? Who should drive this culture?

During our recent strategy reviews with the UEGCL Board, the discussion on culture came up, the facilitator guided that the Board should take the lead in driving the organization's culture and the Chief Executive Officer should ensure implementation. In our earlier discussions on the same topic, it had been quoted that employees will always do what the leader is doing ('Monkey

See, Monkey Do').

Ignoring culture is disastrous; **'Culture Eats Strategy for Breakfast, Lunch, and Dinner'** a phrase that was originated by Peter Drucker and made famous by Mark Fields, President at Ford, is an absolute reality! Any company disconnecting the two is simply putting their success at risk.

Companies spend a lot of time thinking about Strategy meanwhile doing little or nothing about the organisation culture. There is, therefore, need to align strategy to an enabling culture. Leaders need to understand that culture evolves and should not be pushed too fast. Organization culture is complex and often times fails to meet expectations and is sometimes looked at as an 'HR thing'. The right choices, therefore, need to be made.

Leaders should also recognize that changing an organization's culture is not an easy undertaking; employees often resist change and can easily rally against a new culture. The leaders, therefore, should convince the employees of the benefits of the change and show that the new behaviour is the best way to operate and yield results.

Cummings & Worley (2004) proposed six guidelines for culture change:

01 **Formulate a clear strategic vision.** This vision gives the intention and direction for the future culture change (UEGCL already has this in place).

02 **Display top-management commitment.** The top of the organization must favor the culture change to implement the change in the rest of the organization (Just as mentioned earlier; 'Monkey see, Monkey do').

03 **Model culture change at the highest level.** The behavior of the management needs to symbolize the kinds of values and behaviors that should be realized in the rest of the company. **Change agents** are keys to the success of this cultural change process and important communicators of new values.

04 **Modify the organization to support organizational change.** This includes identifying what current systems, policies, procedures, and rules need to be changed so alignment with the new values and desired culture can be achieved.

05 **Select and socialize newcomers and terminate deviants.** Encouraging employee motivation and loyalty to the company will create a healthy culture. Training should be provided to all employees to help them understand the new processes, expectations, and systems.

06 **Develop ethical and legal sensitivity.** This step can identify obstacles of change and resistant employees, and acknowledge and **reward employee improvement**, encouraging continued change and involvement.

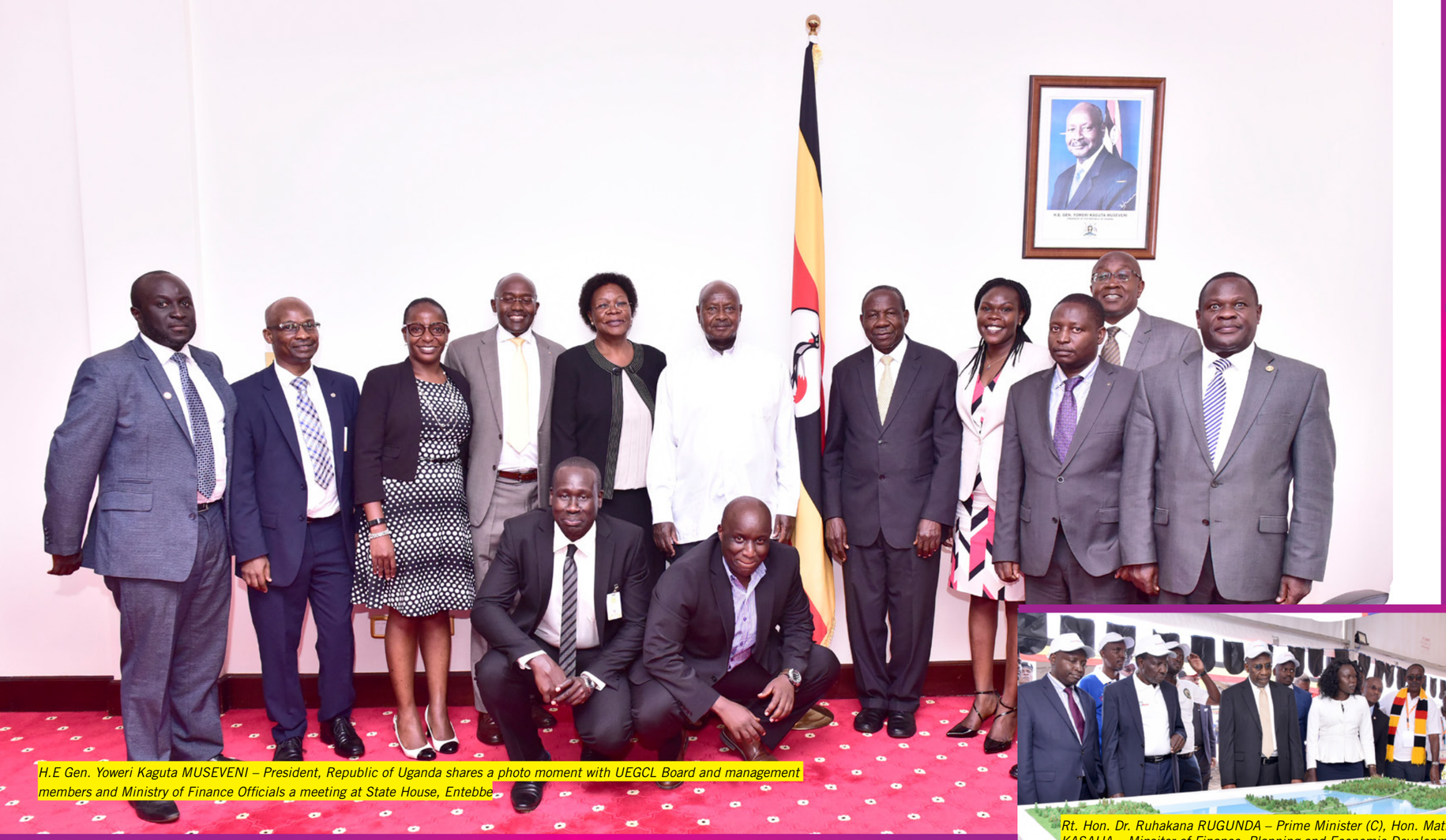
At UEGCL our culture is being developed based on our Vision which aims to make us "To be one of the Leading Power Producers in the Great Lakes Region". To achieve that vision, we also have core values on which our culture is being developed. These include:

- Integrity
- Accountability
- Safety
- Innovation
- Sustainability

Besides, there are some things we do at UEGCL in one way or another that are regarded as the UEGCL way. Examples include the following:

- Annual staff end of year parties where we have an item dubbed 'UEGCL has got Talent' during which Staff showcase the different talent they have besides the usual hardcore engineering routine.
- Annual Team building sessions.
- Friday breakfast (staff enjoy breakfast together every Friday morning)
- Monthly birthday cakes
- Wearing corporate wear on Fridays
- Send off parties
- Presentations to fellow staff after attending training
- 'Heavy' end of year Christmas vouchers' for all staff (same amount despite the level) among others.

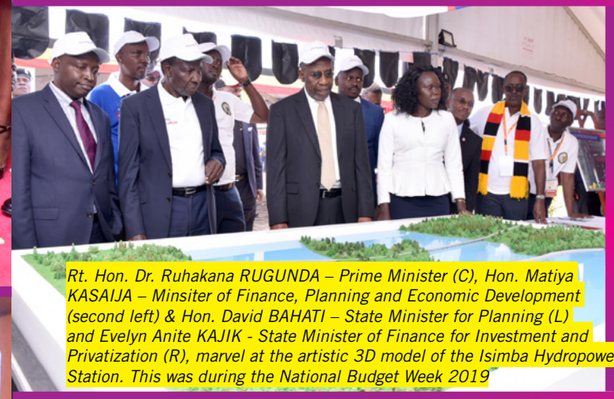
In conclusion, while there is widespread agreement that organizational culture do exist and it is a key driver in shaping organizational behavior, pinpointing an exact definition of the concept is a difficult undertaking. An absolute definition would allow not only for a more rigorous study of organizational culture, but also increase our understanding of how it influences other organizational outcomes such as productivity, employee engagement, and commitment. One thing is undoubtedly known about culture: It is constantly being created, changed, and splintered to ensure the success of its parent organization.



H.E Gen. Yoweri Kaguta MUSEVENI – President, Republic of Uganda shares a photo moment with UEGCL Board and management members and Ministry of Finance Officials a meeting at State House, Entebbe

Agreed: UEGCL and Tractebel sign a memorandum of understanding at the latter's office in Paris"

Members of Parliament of the Natural Resources Committee during a visit to the 18,000MW Datengxia Hydropower Project under construction by Power China and Sinohydro Corporation Ltd. Sinohydro is the contractor for the 600MW Karuma Hydropower Project.



Rt. Hon. Dr. Ruhakana RUGUNDA – Prime Minister (C), Hon. Matiya KASAIJA – Minsiter of Finance, Planning and Economic Development (second left) & Hon. David BAHATI – State Minister for Planning (L) and Evelyn Anite KAJIK - State Minister of Finance for Investment and Privatization (R), marvel at the artistic 3D model of the Isimba Hydropower Station. This was during the National Budget Week 2019

Members of the Government Communicators Forum during a site visit to Karuma HPP

Welcome to team UEGCL - Ms Joyce Nakalema, new CHRO recieving some UEGCL branded goodies during one of her first days at the office

Eng. Dr. Harrison E. MUTIKANGA - CEO, UEGCL sharing a light moment with stakeholders

Owobushobozi Bisaka, key stakeholder in the Muzizi projects interacts with Eng. Isaac Arinaitwe - Chief Projects Officer, UEGCL

Simon KASYATE shares a picture moment with the Sanyu FM Breakfast show host after an interview on matters electricity

UECGL's Quest for Sustainable Electricity to power industrialization

Allan OROMA
Sociologist Karuma HPP

While it is mandated to generate power for socio-economic development, Uganda Electricity Generation Company Limited (UEGCL) is expected to do this in a manner that is sustainable and delivers it an affordable cost. The supply must be reliable and of a quality that meets the diverse needs of the users.

In the context of power generation, sustainability means meeting the electricity needs of the current generation without compromising future generations' access to the same resource.

After some birth pangs, UEGCL finally delivered the state of the Art Isimba hydropower station to the nation in March. Upcoming power stations like the 600MW Karuma and its siblings like Muzizi and Nyagak 111 will over the course of time bring additional capacity to the grid.

The social fabric is a crucial component in ensuring the sustainability of UEGCL's investments so that current efforts last for generations to come. Strategically UEGCL in collaboration with its line ministries - Ministry of Energy and Mineral Development and Ministry of Finance, Planning and Economic Development; engages communities in the project area to make land available for power generation projects. This is done with care, ensuring that land is acquired and people are resettled without minimal disruption. Direct cash payments at current land values and in-kind compensations in form of housing for extremely vulnerable affected persons are made as a way of ensuring that communities continue to exist side by side with the electricity generation investments. Needless to say, the projects also create employment opportunities for youth and other members of project host communities. It is also noteworthy that, improved and long term spillover effects through youth gaining technical skills and experience in construction work, are tools for sustainable livelihoods in communities.

Worth noting is that the

main ingredient for generating power is river water, which is used by communities for fishing and cultural crafts mainly to produce papyrus reeds and mats. These have been core sources of income for community livelihoods and thus UEGCL ensures that even when electricity is being generated, existing water-based livelihoods are not compromised. This is achieved by creating an ecological flow system where fish production will continue, through designated fishing areas, and equipping fishing communities with improved fishing technologies. The organization also shares knowledge and through continuous constructive engagement of host communities creates awareness about the likely effects of some of the project milestones like river diversion and reservoir filling. In addition to key environment conservation considerations of water and wildlife in protected areas, continuity of community ethics in dam operations and maintenance have been held with high regard.

At Karuma, as a way of giving back to the community and consolidating sustainability in power generation, UEGCL through its contractor SINOHYDRO Corporation provides education support to needy and bright vulnerable girls for the entire ordinary level. This support has included school fees, personal effects like books, stationery and other personal effects that can make a girl child comfortable at school. Other activities have involved the refurbishment of schools as happened at Amaji Primary School in Oyam district. Consequently, the social welfare of beneficiaries improves due to enhanced access to education and thus enables the acquisition of requisite societal values necessary for conducive living. The amalgam of the above ripple benefits have made the project an integral and welcome member of the community.

UECGL is also cognizant of the fact that power generation projects attract a high influx of populations into the project area which can both alter and stretch the existing social services. UEGCL in partnership with health providers mitigates some of these impacts by supporting healthcare and other social services targeting migrant labour. There is a comprehensive Community Development Action Plan (CDAP) for the Karuma 600 MW HPP that will strengthen community systems to withstand project aftershocks. This will include the construction of schools and health infrastructure, provision of rural electrification and safe clean water, afforestation and enterprise development.

Follow up social interventions and benefits sharing throughout plant operations and maintenance have been operationalized to create a virtuous cycle of social engagement between the project and host community.

WHY IS IT IMPORTANT TO HAVE A ***BRAND*** IN AN ORGANISATION?

Rita BECHO
G.T PRO

BRAND IDENTITY.

Brand identity is how you want to portray your business to your customers and stakeholders. This includes how you choose your business name, the design of your logo, the colors and shapes or graphics you use, and the type of language you use. Brand identity is different to brand image, which is the result of these efforts. I.e. a successful brand identity translates into a positive brand image.

The strongest brand identities are instantly recognizable and immediately convey a message about that organization. Brand identity is tangible so it appeals to the senses, it is also what you can see. It fuels recognition, amplifies differentiation, and makes big ideas and meaning accessible. To put it simply: everything that you can see (the visual language) is brand identity. Starting with typography, colors, logo, identity system through layout, grid, composition, motion graphic to packaging (print design) and social media graphics, web design (digital design)

Everything what is visual about a brand – we call it brand identity (or corporate identity, if you wish).

How many elements a brand identity system consist of depends entirely on how many touch points (applications) needs to be designed for a brand.

BRIEF ABOUT UEGCL

Uganda Electricity Generation Company Limited ("UEGCL or the Company") was incorporated in 2001 initially with the main objective to take over the generation activities of the now-defunct Uganda Electricity Board (UEB) together with all or any part of the property, assets and liabilities associated with it as was transferred to the company in accordance with the Public Enterprise Reform and Divestiture Act. These assets transferred to the company from UEB were principally the 180 MW Nalubaale and 200 MW Kiira Hydro Power Stations located in Jinja. The objectives of UEGCL have since expanded to include project development including development of Hydro Power Stations and other renewable energy projects. In this regard, the company is the implementing agency of the Government of Uganda for the 183 MW Isimba and 600 MW Karuma Hydro Power Projects and associated transmission lines and sub stations with the mandate to deliver the projects within the cost, time and specified scope/quality.

UEGCL is also developing other small hydro power stations and renewable energy plants and plans to do more in the future. The main objective of UEGCL is the development, efficient operation and maintenance of power plants and the generation and sale of affordable electricity to consumers.

CORPORATE IDENTITY

All groups and subsidiaries within UEGCL apply Corporate Identity specifications as contained in the Corporate Identity Manual and no variations from these specifications are permitted. The UEGCL logo and logotype must appear on all written electronic messages mainly to the media that are intended for external target audiences. UEGCL's Communications policy influences the use of language on elements containing the Corporate Signature.

The goal of brand identity is to find artifacts that tell your story and engage people with who you are in a familiar way. Some of these items include logo, shape and tagline that create and appeal. As UEGCL our logo defines the most valuable elements in our business.

UEGCL
Generating for Generations

This is the Primary Logo for UEGCL. This distinctive version is used to uniquely identify UEGCL and services to consumers and distinguish us from other businesses in our energy fraternity. The first circle outside represents the earth, land and sky, the second represents the enclosed calm water source the red thunder like image represents the electricity bolt and spark of development. The logo therefore tells the story of UEGCL.

Our tagline "Generating for Generations" emphasizes the focus being on the words "Generating" and "Generations", allowing us to turn a part of our name into a call to action – building for generations, generating for generations.

Our Generating for Generations concept is further aligned to generating something for every generation. What we build is geared up not only to help the current generation but rather the generation after our generation, explaining the time and effort we put in execution of every project.

WHY IS IT IMPORTANT TO HAVE A BRAND IN AN ORGANISATION?

Developing a strong brand identity for your business is an extremely important factor in its success. Effective branding helps build your reputation, make you stand out from people who do not quite understand what your mandate as an entity is and project your values to attract your ideal stakeholders. Many times we have a number of people confusing UEGCL for UMEME, UEDCL or UETCL, amongst others, therefore, having your brand clearly defined helps stakeholders know who exactly to reach out to when they are having a problem that could need the help of UMEME say for example electricity tokens, issues to deal with electricity in rural areas among others.

Your brand is your business identity, i.e. the image you wish to portray to the world. This is one of your company's most valuable assets. Although your visual brand identity is important, your brand is more than your logo. Your brand communicates your business personality and shapes your stakeholders perceptions of who you are. Your brand should project the expectations and promises you extend to your customers in terms of quality, service, reliability and trustworthiness and create trust and loyalty from those who do business with you.

Most agencies neglect the most important focus of branding activity, the employee. A general consensus was done and it was found out that agencies tend to ignore the critical importance of their employees in shaping the way the public thinks of them this could be when meeting with different stakeholders, other government entities among others. Every time someone deals with a central employee, they reflect on the experience and form an image of the brand, or they tell somebody else about it, discussion ensues and a decision is made about what kind of place the agency is. Employees must play a critical role in brand identity. As UEGCL it is our culture to wear our corporate T-shirts every Friday for brand identity, however it is our duty to ensure employees have the corporate wear and follow the culture to keep up with the solidarity.

Branding is a legitimate government activity. Some government organizations do not understand the importance of brand identity. Over the past decade people have come to understand that branding is not only necessary for government but critical. You have to put money in the "trust bank" first, establishing a positive and distinct reputation for trustworthiness and a particular set of values.

Consistency is the most important aspect of branding and brand identity is what gives rise to consistency. Developing a consistent outward expression is important to be perceived in a way brand wants.

All in all brand identity is an important aspect of an organization for not only stakeholders but also employees that carry their brand. Employees ought to be proud of their brand and should be able to portray a good identity to the audience that is received.

My Success Story

IF I CAN YOU CAN

Charles BUSINGE *Aka Taxpert*

I Joined UEGCL's finance department in April 2017 after graduating with a first-class degree in Accounting and Finance. My love for numbers pushed me to the accounting profession and I could never be happier than I am today. Career advancement in the accounting profession begins from the point of certification by the different relevant accounting bodies; for this reason I enrolled for the CPA (Certified Public Accountant) professional course only two months after joining UEGCL.

The journey has been a tough but rewarding one; from juggling books with work assignments to getting family time and time for personal development in other spheres of life.

I believe that my employers support has contributed in no small measure to my exceptional performance, not only at the job but also in the CPA class.

In June 2018, I was recognised by the Institute of Certified Public Accountants of Uganda as the top student in CPA 9 Advanced Taxation paper on level 2. From that time, my colleagues at work nicknamed me, "taxpert" loosely meaning a "taxation expert".

In June 2019, by the grace of God, I was again recognised for topping the CPA 15 Business Policy & strategy paper-Level 3.

I attribute my success first to God and to second to my employers support towards my career development and to my colleagues who have always encouraged me to achieve excellence.

UEGCL presents numerous opportunities for staff career growth through its strategic plan under the theme of developing an engaged workforce that is fully empowered for productivity. On that account, I'm privileged to be a beneficiary of this. UEGCL surely is, an employer of choice!

Ready for the TASK- New Owner's Engineer at Karuma

Andre VOBONI, is the Senior Project Manager at AF Consult, the news Owners Engineer for the Karuma HPP. In this interview, Simon KASYATE, UEGCL's Head of Communication and Corporate Affairs explores the role of an OE and the task ahead for AF Consult. Excerpts:

You were recently announced as the new Owners Engineer (OE) for the flagship 600MW Karuma HPP. What does this mean for you as an individual but also as the company AF Consult.

Our contract is for 12 months until completion and the official completion date for the project as communicated everywhere is end of December this year. That means our contract is on until March 2020. Stepping in as O.E means having the full powers of managing the contract and putting it back on track. This is very challenging because we came in when the civil works were almost at the 100 percent completion point. So we now have three major tasks to oversee - Installation of the six power generation units and auxiliary equipment; connection to grid and transmission line and last but not least, to fix all the defects in the civil works. This is unfortunate for the project at this late stage but we do have defects basically everywhere in the massive concrete works. That means cracking, the spillway which is underground is a big problem because it is not within the tolerances expected of the hydraulic surfaces and that has to be fixed. We have not yet agreed on the methodology for fixing this and that is a big task at least in terms of getting the quality back to specifications in the contract where you can. It is going to be a big challenge to issue the final certificate to make sure that the contractor delivers the quality according to contract specifications which has not been the case up to now.

This to an ordinary ear may sound a Herculean task and perhaps bordering on impossible. Are you, AF Consult confident that you are going to fix all the defects on the already complete civil structure?

Its 12 months or less to completion and commissioning of the first unit so there is a window of time, for the contractor to fix the problems. Commissioning will take some time and we don't think that the full project will be commissioned by end of this year. Unit number one is the most important and we are taking a lot of care to ensure that the first unit is installed properly because if you do it right with the first unit you are likely to do it right with subsequent units 2, 3, 4, 5 and 6. So unit number one will take the most time to commission and you then still have time to fix the other problems during the liability period which is 5 years. The contractor will have to fix all those problems before they get the completion certificate. The next stage of the project is the post commissioning which falls within the liability period. You have to force the contractor to fix all the problems that show up within the five years.

We are talking about national engineers getting opportunity to participate in infrastructure projects – in their home country.

In many of these projects with huge civil structures, some problems never manifest themselves in the first 5 years indeed, so how do you deal with that risk?

Am not sure about the terms of this contract but under normal circumstances the contractor has to leave behind an adequate stock of critical spare parts which you can use if there are some electrical or mechanical parts that need replacement. This has to be part of the contract.

Is this the case with this particular contract?

I am not aware of the contract with the EPC.

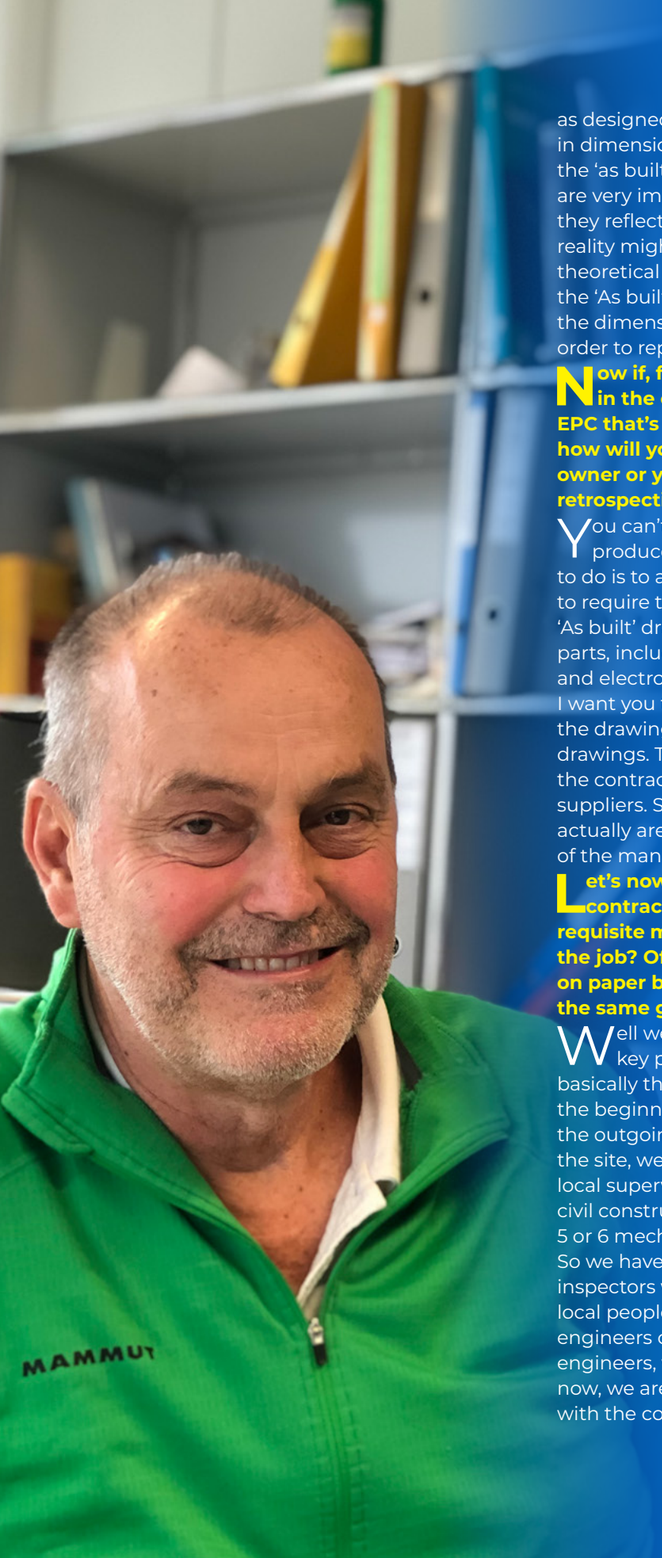
There is usually a challenge maybe after 20-30 years when some of the component parts become obsolete, the companies that made them have long closed shop and possibly the technology is non-existent. What does the operator do?

You have to be aware of the effects of movement and vibration and it is normal that after 20-30 years some parts will need replacement. You will have to hire a good consultant to evaluate what exactly needs to be replaced and then enter a contract with new suppliers. But this is normal, what you don't want to get into is that you have to replace something after seven years because of poor quality because then the EPC contractor has gone.

You can't find him?

Well you can find him but he will not replace, he will not move his "finger" free of charge. So you must first ensure that he leaves a stack of spare parts and 'as built' drawings. 'As built' drawings are very important because typically what you have at the tendering stage are basic design drawings. However, during construction there are variations as you encounter geology, or run more excavation etc. That means as constructed is not the same

Ondrej, in a red cap, together with UEGCL during a visit to Ruppoldingen Hydro power plant in Baden owned and operated by Alpiq .



as designed. These changes in dimension, are captured in the 'as built' drawings which are very important because they reflect the reality and the reality might be different from theoretical design. And from the 'As built' drawings you get the dimensions that you need in order to replace some parts.

Now if, for arguments sake, in the contract with the EPC that's not envisaged, how will you the O.E help the owner or your client UEGCL in retrospective enforcement?

You can't force them to produce spares, all you have to do is to amend the contract to require them to hand over 'As built' drawings for several parts, including the deviations and electro mechanical parts. I want you to deliver to me the drawings and the shop drawings. The problem is that the contractor has many sub suppliers. So what you need actually are the shop drawings of the manufactures.

Let's now get down to your contract, do you have the requisite manpower on site for the job? Often this is promised on paper but mobilisation of the same gets difficult.

Well we have mobilised the key personnel which are basically the experts and since the beginning of May 2019 after the outgoing O.E had vacated the site, we have mobilised the local supervision comprising 12 civil construction inspectors and 5 or 6 mechanical inspectors. So we have about 18 local inspectors who are all qualified local people. Except for system engineers or electrical system engineers, who are not needed now, we are in full compliance with the contract at this point in time.

That is interesting because the buzz word in Uganda at the moment for huge projects infrastructure is local content.

It is very important and also in the key personnel it is very important you have a lot of bright young engineers for knowledge transfer. There is not much experience at the moment because if we remove Isimba and Kiira and Bujagali which was a private development, there were no new built large or medium sized hydro power plants. This means that the engineers coming out of the university had no opportunity to get the experience at a dam construction site. So it is important that you give the chance to the young, that's where you get shaped.

So you have decided as AF that you will pass this on to Ugandan young people?

Yes. As a young engineer I said I wanted to go somewhere to oversee a construction site. I went to the first opportunity which was a large dam in Honduras and I spent two years there and this is the best school, the school of experience. I learned Spanish and you have to learn foreign culture. So here we are talking about national engineers getting opportunity to participate in infrastructure projects – in their home country.

At a competitive remuneration I hope?

I was not in charge of contracting the local manpower. But of course they have expectations of higher salaries if they are sub contracted by a Swiss company than when you are working somewhere in the road side [laughter].

Usually the EPC contractor and the O.E have a relationship not different from Tom and Jerry, how are you getting along with the EPC contractor?

Some problems are normal and could be anticipated. For instance there are not many Chinese you can discuss with in English. One exception is their designers who are young men who are good at English. But what we try is not to just say okay because previously they had an easy life where almost everything was approved. There were few non-conformity reports so the easy life is now over and we are getting into some more serious work but our approach is that we are sitting in the same boat and all we are requesting them is to complete the works according to the required quality and to contractual standards and specifications. If they do so we have no problem. Just keep to the contract specification and to the quality that is required and we are all happy and we should look forward together to get the job done.

To what extent will you ensure that they complete the works not just in time, within agreed technical specification but also within budget?

I guess the budget is fixed and as long as there are no approved additional works and variations they must complete the works within budget. With time, time is the biggest cost involved. If you figure it out 600 MW, how many kWh per year at 5 cents? Whatever you figure out, what are the losses for the national economy if you are delayed by one year? The later you go into operations you are missing this year in revenue to pay back the credits, so in time, schedule is the big money.

Share a little more of your experience as a company dealing with the kind of EPC we have, a Chinese company?

You have to live with Chinese company nowadays because they are everywhere. They are in Asia, Africa, and they tried to start business in Europe. We were O.E for the first Chinese built EPC contract for a thermal plant in the Balkans. If you get a hold over them at the beginning you can do it right. But this was not the case in Karuma where they had a free hand. Every contractor, even a Swiss contractor is it for profit. If you do not supervise him and control him, he will try to benefit maybe with the materials or with anything. For instance here in Karuma they refused to bring a cooling plant so they poured concrete for 2 or 3 years at high temperature. You know placing temperature is not 27 degrees, it should be 18 degrees and below to avoid hydration and they just ignored it yet in the contract they have a cooling plant or ice plant because it cost money to bring it, they just didn't mobilise it. So as an O.E you can say after two months guys now bring the plant it's in your contract.

Finally, how do you see the project panning out?

We have an official extension of time EOT by 12 months which is a good move that at least the politicians know that everybody is trying their best. We are saying we commission at least the first unit by the end of 2019 but if you are realistic it will be very difficult to achieve. So we all have work to do and the contractor has to be cooperative on that and not just fight against the O.E and the O.E fighting against him. As I said before we are now in the same boat and now we should drive and bring the boat to its destination safely according to specifications according to owner's requirements

THE **POWER** OF AN **ENGAGED WORKFORCE.**

Muhammad LUBOGO
Public and Media Relations Officer Karuma HPP

Hilary Hinton "Zig" Ziglar an American author, salesman, and motivational speaker said 'You don't build a business, you build people and then people build the business.' These gems of wisdom are in line with one of UEGCL's strategic themes that look at having an engaged workforce. An engaged workforce produces better business results and more importantly is an ambassador of the organization at all points of contact and in time. This engagement is achieved when people consider the organization as their own, respect their work, their work contributes to the organization goals and more importantly, their aspirations of growth, rewards, and pay are met. *Employee engagement proposes a 'mutual gains' employment relationship, creating a win-win for employees and their employers.*

Organizations have come to realize that in today's constantly changing business scenario, the most valuable resource that needs to be leveraged is the human resource. This means not just attracting the crème-de-la-crème and retaining them but keeping them motivated and committed to achieving the organization goals.

In the digital era, today's workforce is more informed, connected, willing to work given learning opportunities. The primary driver is now personal growth, opportunities to learn and explore. Catering to the changing needs to foster engaged employees is the need of the hour. In return, understanding employee engagement drivers, measuring and enhancing engagement offers the promise of better business performance by ambassadors of the organization who work as entrepreneurs and help sustain organization growth through innovation and lower employee turnover.

Let's take an example of the maternity leave question that has been around for some time - 'to give more months or not to give'. In early June 2019, Uganda Breweries Limited broke the news as being the first Ugandan company to offer their female employees a fully paid 6 months maternity leave instead of the customary 3-months effective July 1, 2019. In the same policy, male employees will be entitled to a minimum of four weeks paternity leave. Safaricom, one of East Africa's telecom giants offers four months of maternity leave

and 6 months later, the mother gets Flexi hours and works 6 hours each day. This is necessary to keep employees spirits high and motivated to perform to their best. This is bound to amount to a breed of satisfied and dedicated employees.

The findings of the Gallup Study of 2008 show that while the engaged employees believe they can contribute to the company's growth, the disengaged employee believes otherwise, i.e. his job does not contribute to the organization. This belief of the disengaged employee creates a negative spiral that affects his work where the employee evades work and struggles to meet deadlines. It also affects co-workers and team morale. The effects also spread to the customers of the business because whether an organization likes it or not, every employee becomes its ambassador. Disengaged employees seldom push themselves to meet organizational goals let alone contribute to innovative practices at the workplace. The Gallup Study also shows that a disengaged workforce affects Company Performance by delayed completion of tasks and inability to improvise and innovate cost the company dearly. A disengaged employee is seldom able to shake off the lethargy and perform in the current organization or land a job of preference. This leads to pent up frustration which may ultimately affect his personal and family life. Finally, the Gallup study research showed that costs of the disengaged workforce in the United States was upwards of $300bn annually.

On the flipside, an engaged workforce forms an emotional connection with the organization that helps them to go the extra mile to achieve individual and company success. An engaged workforce also tends to be innovative at their places of work. Being brand ambassadors, they attract customers and also portray a positive organization picture to future employees/ business partners. In one way or another, they become preachers of the company, its product, and processes. Engaged employees inspire energy and positivity at the workplace among peers.

Employee Engagement has been broken down to the 3 C's - Career, Competence, and Care.

CAREER

After one successfully signs that job acceptance letter to join an organisation, they expect to build a career with it. If the top management and immediate managers spend dedicated time in carving out the careers of its employees, they will feel that they belong to the organisation. They feel engaged when they receive support from the management in growing their careers. An organisation can provide its employees with opportunities to grow professionally through job rotations, indulging them in significant tasks, challenging assignments and promotions. They should also be given a specific level of authority and autonomy to make their decisions on their own. The organisation must prepare an entirely new breed of employees if they genuinely invest in developing the careers of their people. This is currently being implemented at every appraisal cycle where every UEGCL employee fills in a Personal Development Plan (PDP).

> ***"when employees care about the business, they are more likely to go the extra mile."***

COMPETENCE

Is the ability to do something successfully or efficiently. An organization must hold regular workshops and training sessions to help employees acquire a higher level of skills and competencies with a key focus on marketable skills. Most employees after spending a few months go out to look for competence-boosting opportunities with the organisation so that they can grow and move to the next level of their careers. Whereas the career focuses on the actual growth in terms of designation, wages, perks and authority, competence is the ability to grow utilizing the opportunities.

CARE

The managers need to be empathetic and sensitive towards people and understand their problems. Care is regarded as the finest art of the managers by which they can make employees feel an indispensable part of their organisation. Showing small day-to-day caring gestures towards employees makes them feel that they belong to the organisation and organisation belongs to them. For example, Dr. Eng. Harrison E. MUTIKANGA – CEO, UEGCL started a culture where he holds a Staff Engagement meeting and let's staff air out their views, good or bad. Arising from this kind of engagement, he gets to understands what should be improved, maintained, changed or dropped.

Employee Engagement is not a onetime process that can quickly bring results; rather it is a continuous process that will go on throughout the life of an organisation. Lanphear further said on engaged workforce.

To France and Switzerland in under ten days

Simon KASYATE

UEGCL team at the Alpiq head office in Lausanne

There are as many legendary stories about the French capital Paris as the number of visitors it receives. When a team from UEGCL visited in May to attend the 7th World Hydro Power Congress (WHC), there was a lot more to see, explore, learn and share beyond the 4-day conference that brings together decision makers and experts from the global hydro power industry, government, academia, finance and civil society to set the priorities for the sector.

Organized by the International Hydropower Association (IHA), the conference's focus was on the role of Hydro Power in delivering the Paris Agreement and the Sustainable Development Goals under the theme "The Power of Water in a Sustainable Connected World". From a country whose total electricity installed capacity is predominantly generated from/by water, this was perhaps the best-fit and most aptly themed congress on matters electricity. UEGCL, led by the CEO Dr. Eng. Harrison Mutikanga, was well represented. Eng. Mutikanga, was a panelist on the Africa regional focus session themed, "How can hydro power solve new challenges in Africa?" His positing was as this edition of GeNews is themed. Revolving around how Africa's industrialization journey will only make quantum leaps with increased electricity generation – substantially from water sources considering our heavy endowment with this natural resource. The congress, like many such is always a perfect opportunity for networking, meeting and engaging new stakeholders and strategic partners.

Beyond taking in the picturesque and often alluring Paris skyline and attractions in the chilly winds of spring, the UEGCL team held some strategic engagements on the sidelines of the congress. Notably among these was the visit to Tractebel offices, meeting the management team and signing of a memorandum of understanding 'to foster cooperation in the areas of Consultancy services, training programs, best practice benchmarking, development of renewable energy projects, research and development as well as O&M support'. Tractebel Engineering S.A ranked second best for Hydro the Engineering News Record in its 2018 annual largest construction and engineering firms rankings, is a French registered company and part of the Tractebel Engineering Group whose capacity and experience has been steadily built over centuries. The Company offers services in several competence centers which include Energy, Water, Urban Engineering, Advisory and Advanced analytics, Research and Innovation as well as Nuclear. With an over 5000-employee workforce and projects in over 150 countries and 662 MEUR (Approximately Ugx 2.7 trillion) in turnover, that's a strategic partner to have on your roll.

From France, the UEGCL team travelled to neighboring Switzerland by Train and oh what a countryside scenery to behold! The stop was in the Swiss city of Lausanne, the head office of Alpiq.

Alpiq is a power company involved in electricity generation, energy trading, optimization, digitalization and smart energy solutions among others. The company has about 1600 employees in 30 European countries and a net turnover of CHF 5.5 billion (2017), that's approximately over Ugx 21 trillion! Alpiq Ltd was the first European utility to get certified with ISO 55000 for Asset Management. Considering that UEGCL is already knee deep into Operation and maintenance of Isimba (183MW) and gearing up for the same at the 600 MW Karuma hydro power stations, a benchmark on best industrial practices in asset management from a global leader like Alpiq was only natural. Beyond the head office, the UEGCL team also visited the Alpiq operated underground pump storage FHML power plant in Montreaux.

The team was to conclude their tour of duty with an engagement at AF consult, head office in Baden. AF consult is the new Owner's Engineer at Karuma hydro power station.

Many lessons learnt, stakeholders engaged and strategic partnerships forged; that's what can, at best, be described as a worthy excursion.

UEGCL delegation at the 7th World Hydropower Congress

Electricity Generation, Industrialisation and Trade in Uganda- A Mutually Beneficial Relationship

Naboth MUHAIRWE
Managing Partner Agaba Muhairwe & Co. Advocates

Agaba Muhairwe & Co Advocates is in the process of publishing a one of a kind business handbook titled "**Trade in Uganda**" that is destined to become an essential companion to anyone considering investment, or doing any business, in this burgeoning market.

Over the past three decades, Uganda has made giant strides towards restoring her productive capacity. The Global Entrepreneurship Index (GEI), ranks Uganda as the second most entrepreneurial country in the world. The government has implemented several policy initiatives to facilitate investment. The Capital Markets Authority and the Uganda Securities Exchange offer a vehicle for mobilising patient capital. SMEs can also access affordable credit through the Microfinance Support Centre. Red tape has been cut to improve bureaucratic efficiency while the armed forces have established the rule of law and security of person and property.

However, all the above efforts to improve the investment climate would come to nothing if there was not enough energy to power the country and ultimately the next industrial revolution in Uganda. Lack of adequate and affordable electricity has for long been a powerful disincentive to economic development in many developing countries. Other than being a major roadblock to industrialization, it affects everything from people's ability to innovate and develop enterprises, to the provision of public services like health care and education.

It is no surprise therefore that the Ugandan government has prioritized access to clean energy at the centre of its development agenda by investing heavily in generation capacity and in transmission and distribution networks to take energy where it is needed. Uganda Electricity Generation Company Limited's flagship projects at Isimba and Karuma whose combined capacity of 783MW will see the country nearly double its electricity generation to 1633MW, attest to this. Furthermore, there is a cluster of nine mini-hydropower projects for rural electrification being developed under the Uganda Energy Credit

Capitalisation Company (UECCC). Under this project, UECCC will be able inter alia to deliver at least 71,000 last-mile connections to members of the public by ensuring wider access for both household and commercial activities among communities that are currently off the main grid. This is in line with a global push for the development of cleaner power around the world that is likely to attract conscientious investors to the country.

Additionally, the government has consistently said that the increased electricity generation will ease electricity tariffs for consumers and business.This has already been reflected in the electricity tariffs levelled on large scale industrial actors, which have fallen from Shs 383.8 to Shs 375.5 per kWh. Furthermore, the increased electricity generation opens up opportunities to export any surplus to neighbouring countries, leading to an increase in consumption and a further reduction in tariffs.

Reliable power will contribute to reductions in the cost of doing business in the country, enabling the development of industrial parks and manufacturing centres in underserved areas of Uganda. In line with this, the government plans to establish 22 industrial parks across the country to mainly create jobs and add value to locally available raw materials. UMEME, Uganda's main electricity distribution company, also plans to contribute to these initiatives by building electricity substations in order to power these parks.

The missing link in the chain it would seem is a central source of information on these developments that gives potential investors, and those intending to explore other business opportunities in Uganda all the information they need to make an investment or business decision on Uganda. This information needs to be in one place, multi-sectoral and easily accessible which is the void ***"Trade in Uganda, A Business Handbook"*** has come to fill.

"**Trade in Uganda**" will provide critical information on key regulatory criteria necessary to doing business in Uganda. These range from business registration and licensing procedures and Uganda's taxation regime, to environmental compliance and employee retirement benefits. The handbook will draw from the vast experience that Agaba Muhairwe & Co. Advocates have amassed through operating as one of the leading commercial law firms in the region.

It is worth noting that many experts all over the world attach immense value to publications of this nature for they provide intricate details and invaluable guidance to them in their areas of interest and specialisation. Trade-in Uganda will be an international publication with a localized focus on Uganda. It will be modeled after similar reputable business handbooks covering the substantive and procedural aspects of doing business in foreign jurisdictions.

The publication will look beyond Uganda for marketing and seek to provide insights on the business and investment climate in Uganda. The handbook is slated to go into print in October 2019 and is set to have a wide distribution both nationally and internationally, with plans to circulate the publication in all ministries and government agencies, as well as major airports and Ugandan embassies abroad. The handbook will also be published online at www.agabamuhairwe.com and will further benefit from social media promotion.

Those interested in partnering with us or in booking advertising space in this grand publication can contact us at info@agabamuhairwe.com or on **+256 750 067 832.**

A SCHOOL FEES-LESS LIFE!

Alituha Rashida

S.2 Student at St. Andrea Kaahwa's College Hoima Municipality

Before Uganda Electricity Generation Company Limited (UEGCL) and Sinohydro Corporation came to my aid through their 'Take a Girl to School' campaign, my studies were often interrupted by the need to work in search of money for school fees and scholastic materials. Besides leaving me stressed, the hassle spared me little to no time for revision.

Thanks to UEGCL and Sinohydro's intervention, my days in school are now much better and you will always be part of my life story. School is now a positive experience because I am settled down and focused on my books since I have been provided with all the necessities. I say this out of sincere appreciation and I wish to congratulate UEGCL and Sinohydro Corporation for all the hard work you have put into building the 600MW Karuma Hydropower Station.

Because of your support I now to get to school in time and above all, my interest in school and faith in my abilities have been restored. The guidance, counseling, and encouragement by UEGCL & Sinohydro staff has been invaluable.

UEGCL and Sinohydro Corporation have put into building the 600MW Karuma Hydropower Station.

This scholarship has also boosted my self-esteem since many students are now friendly towards me. Because of this, I associate with them through discussion groups and consequently, I have greatly improved in my academic performance.

My parents are also proud of me and have hope in my education. I will be eternally indebted to you and promise to work harder and make the most of this rare opportunity.

The writer is a Senior 2 C, student at St. Andrea Kaahwa's College, Hoima. She is one of the beneficiaries of 'Take a Girl to School' Campaign by UEGCL & Sinohydro Corporation, the EPCC for Karuma Hydropower Project.

LONG LIVE SINOHYDRO & UEGCL

Generating for Generations.

MAIN IMAGE
AERIAL VIEW OF ISIMBA HPP (FROM UPSTREAM)

COMPLETION OF ISIMBA HYDROPOWER PROJECT DEEPENS UGANDA CHINA RELATIONS

The 183MW Isimba Hydropower Plant (HPP) is located at White Nile River 50km downstream of the outflow of Lake Victoria, about 90km northwest of Kampala City.

The dam has been constructed to reduce on power shortages currently experienced in some parts of Uganda, accelerate economic growth and improving the social life of Ugandans.

The Ministry of Energy and Mineral Development of Uganda awarded Isimba HPP as an Engineering, Procurement and Construction (EPC) contract to China International Water and Electric Corporation (CWE), a China State-owned corporation for completion in a period of 47 months.

The facility is a low-head run-of-the–river type, equipped with four Kaplan axial flow turbine generators, each with a generation capacity of 45.8 MW. Crossing the Koova Island towards both banks, the dam is 1599m long in crest length.

From left bank to right, the main structures are left clay-core rockfill dam section, powerhouse dam section, the bottom outlet spillway with three outlets, the surface outlet spillway with two outlets.

It is also composed of concrete gravity dam section, right clay-core rockfill dam section, associated hydromechanical and electromechanical equipment, the Isimba substation, the enhancement of Bujagali Substation and the 42km long 132 kV transmission line from Isimba HPP to Bujagali substation.

Having started the construction works on April 30, 2015, currently all the construction works are complete. The installation of the hydromechanical and electromechanical equipment have been completed and all the four units have been successfully commissioned.

CWE is to promote its recognition as an international clean energy construction and investment company. It focusses on encouraging localisation, promotion of economic development of project-host countries, benefitting local people, and creating a harmonious and eco-friendly world with projects of outstanding quality.

During construction, Isimba HPP followed Uganda environment requirements, under the supervision of the Environmental Impact Assessment (EIA) and Environmental Management Plan (ESMP), with the establishment of an effectively functioning environmental management system that covers the subjects of environmental impact assessment, environmental management plan, waste management, noise management, water quality management, soil erosion and restoration, environmental monitoring, biodiversity management.

The detailed measures undertaken under the environment management system include:

01 Build a waste holding facility. Sorting the waste at source according to the nature of material, such as per paper, plastic, construction waste and kitchen waste. The waste is delivered to the holding facility by a garbage truck, delivered to the designated landfill area by the licensed waste transporter on a weekly basis.

02 Noise management. Install the silencer at the source of noise generation; distribute ear plugs/earmuffs to the employee, carry out the occupational health training to the employee, noise level monitoring.

03 Environment management water quality. Set up a sewage treatment system for all the domestic effluent, set up sedimentation ponds system for all the industrial effluent; regular water sampling and quality analysis and ensure to comply with the national standard.

04 Environmental monitoring. Noise monitoring, water quality monitoring, air quality monitoring, vibration monitoring, dust control monitoring.

Isimba HPP is an important achievement in China-Uganda economic and trade cooperation. It will help to mitigate power shortage, promote the accelerated economic development, provides more job opportunities and improve people's livelihood.

During construction, the Isimba HPP also made great contribution to Uganda development.

1. LOCAL ECONOMY ENHANCEMENT THROUGH

a Improvement of National Power Supply: It is estimated that 1131MW will be required to meet the national electricity demand in 2020. Current installed capacity is only 822MW with 309 MW difference up to the required capacity without other main power supply available before Isimba HPP commissioning. Isimba HPP will contribute 183MW making up 60 per cent electricity shortage with production of 1039 Gwh per year.

b Goods purchased from local market and subcontracts signed with local companies, including cement , diesel/petrol/ lubricants, explosives, steel and steel product, vehicles, customs clearance and transportation, MTN communication system, construction equipment renting, work force, food supply

c The Isimba HPP has created more than 3000 jobs in various categories of technical disciplines, ranging from engaging ordinary labour to high skilled workforce and qualified technicians and engineers.

d The project has produced an active environment by engaging the local residents and from the surrounding locations for earning their living from different activities. Recognizing the future technical requirements and capacity building of the country, Isimba HPP has availed the local fresh graduates from the technical universities of Uganda with practical training on construction, installation, maintenance, supervision and operation of such a mega project. About 2500 people received training on site including welders, drivers and operators.

2. CONTRIBUTION TO LOCAL COMMUNITY

From the beginning of the Isimba HPP, the EPC contractor has recognized the importance of fulfilling their social responsibility towards the local society.

a Donated mosquito nets, footballs and other sports goods to the residents on both sides of the project in July 2013.

b Constructed special water fetching path and platform for the villagers in September 2014.

AERIAL VIEW OF ISIMBA HPP (FROM DOWNSTREAM)

CHINA INTERNATIONAL WATER & ELECTRIC CORPORATION
TEL:+256-777-420234; +256 772208271
ADDRESS: PLOT 2589,ZZIMWE ROAD, KISUGU, MUYENGA, KAMPALA, UGANDA.

c Constructed special business area in workers' canteen to support the local women to operate business and provide with free tables and stoves in November 2014.

d Donated stationery, such as notebooks, school bags, pencil boxes, to the pupils in Nurary School to promote the development of local education in November 2014.

e Sponsored the Proland Club to participate in the annual football games in Kayunga District in June 2014.

f Widened and repaired the road access to the bank of Nile River from Kiterede village for about 1000 people in June 2015.

g Repaired the road access to Nampanyi village, more than 1500 people benefited from the repaired road in June 2015.

h Provide free medical services to residents in Kayunga District and donated medicines to about 600 people in March 2015.

i Provide free medical services to residents in Kamuli District and donated medicines, about 700 people benefited from the activity in November 2015.

j Donated agricultural machinery and living goods worth $50,000 to Kamuli District in February 2015.

k Donated the agricultural machinery and living goods valued at $50,000 to Kayunga district in December 2015.

l Sponsored the Busaana Health Center to carry out community outreach programme for three days, more than 1000 people benefited from the activity in December 2016.

m Donated 20T cements to the Busaana subcounty government to repair schools and contributing to the development of local education in December 2016.

n Improved infrastructure for NAKAKANDWA RC Primary School, more than 900 existing students benefited in March 2017.

o Improved infrastructure for Mbulamuti Primary school in Kamuli District in May 2018.

The Project will connect Kamuli and Kayunga districts through a public bridge to be constructed downstream of the Power Station on River Nile.

It is pertinent to mention that the success of this project is attributed to the collective inputs and commitments from the employer, engineer and the contractor.

Today, as a contractor, we are pleased to hand-over the Isimba Hydropower Project to the Ministry of Energy and Mineral Development and Uganda Electricity Generation Company Limited and Uganda Electricity Transmission Company Limited.

The completion of the Project may be marked as not only a valuable achievement in the field of technology transfer and in alleviating the power shortage for common use and for industrialization of the country but will also serve in improving the life standard of the common locals. As per the plan hatched by the Government, the power generation from Isimba HPP shall also lead to a reduction in power tariffs for the local consumers.

The Isimba HPP has also strengthened the relations between China and Uganda and has helped the two countries to understand each other's cultures and behaviour.

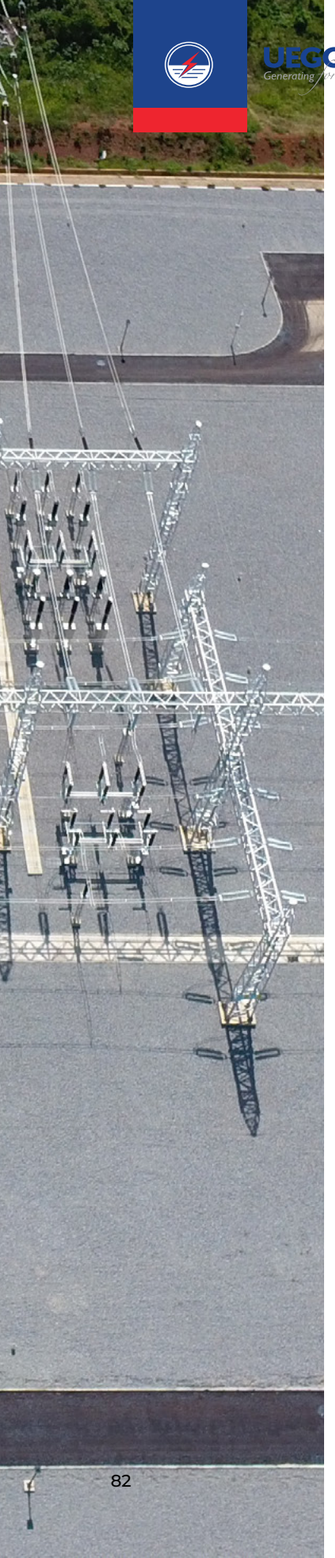
Isimba dam symbolizes **China-Uganda friendship**

PRESIDENT MUSEVENI WILL TODAY COMMISSION THE ISIMBA HYDROPOWER PLANT IN KAYUNGA DISTRICT. NEW VISION'S OWEN WAGABAZA TALKED TO JIANG SHOUGOU, THE VICE-PRESIDENT OF CHINA INTERNATIONAL WATER AND ELECTRIC CORP., THE EPC CONTRACTOR OF 183MW ISIMBA PLANT ON THE SUCCESSFUL COMPLETION OF THE PROJECT. BELOW ARE THE EXCEPTS.

TELL US ABOUT CHINA INTERNATIONAL WATER AND ELECTRIC CORP.

China International Water & Electric Corporation (abbreviated CWE) is a wholly-owned subsidiary of China Three Gorges Corporation (CTG). It is the first state-owned enterprise of the Chinese hydropower industry to take part in international economic cooperation initiatives.

Nowadays, CWE has been acknowledged as a famous brand in the fields of international contracting and small-to-medium energy and power investment. Many projects undertaken or developed by CWE have become world-renowned water and hydropower constructions, among which there are dams symbolizing friendships between nations, hydropower stations hailed local "Three Gorges" in project-host



countries, and large-scale hydraulic complexes and other infrastructure works considered beacons of international cooperation.

Having undertaken projects in over 80 countries and regions in Asia, Africa, Europe, and America and ran business units in 31 countries and regions, CWE has made prominent achievements in its main business of water and hydropower. Over the past decade, CWE has successfully completed the Merowe Dam Project in the Sudan, the Kaleta Hydroelectric Project in Guinea, the Nam Lik 1-2 Hydropower Station and the Nam Ngiep 2 Hydropower Station in Laos, the Kozjak Hydroelectric Project in Macedonia, the Moinak Hydropower Project in Kazakhstan, the Dam Complex of Upper Atbara Project in the Sudan, as well as many other hydropower and infrastructure projects.

CWE has been ranked an ENR TOP 250 International Contractor for 29 consecutive years, and an ENR TOP 225 International Design Firm for 18 consecutive years.

In the future, by adhering to the idea of healthy sustainable development, CWE is to build itself into an international clean energy construction and investment company. It aims to integrate “Investment-Construction-Operation-Management”, assume social responsibilities, focus on localization, promote the economic development of project-host countries, benefit local peoples, and enhance the vitality of global clean energy industry with more projects of outstanding quality, safety, technology, and effective measures for environmental protection.

WHAT DOES THE SUCCESSFUL COMPLETION OF ISIMBA DAM MEAN TO CWE?

We are proud that we have successfully completed Isimba dam and that the work is of high quality. This has been recognised by the Ministry of Energy, Uganda Electricity Generation Company Limited and the Owner’s Engineers - Artelia Eau and KKATT Consult Limited concur that our works are some of the best works in hydro-power dam construction.

The project was financed by China and Uganda and this makes it one of the many symbols of China –Uganda friendship.

Isimba dam completion means a lot to us and I am very proud of the team that worked day and night to see it through.

WHAT ARE SOME OF THE CHALLENGES THAT YOU ENCOUNTERED DURING THE CONSTRUCTION OF THE DAM?

As it happens with any big project, there were quite a number of challenges, but together with the client and consultant, we were able to overcome them. One of them was the installation of the turbine generators, with a diameter of 11.5m; it proved quite a challenge to install these turbines. This was because turbines of such sizes are not common. We had to bring in a professional team from our sister company who worked on the Three Gorges dam to help and they did it successfully.

But there were also challenges such as language barrier, but we finally overcame them and understood each other and everyone is now happy.

WHAT DO YOU HAVE TO SAY ABOUT THE RELATIONSHIP BETWEEN UGANDA AND CHINA?

Uganda is a strategic partner. As you may know, China has been supporting a number of infrastructural developments in Uganda because infrastructure, especially energy, is the base of economic development for any country.

With energy and good roads, you may attract investments leading to development of the entire country through taxes and availing jobs both directly and indirectly. The living

中国水利电力对外有限公司
CHINA INTERNATIONAL WATER & ELECTRIC CORP.

Proud contractor for the

183MW

Isimba Hydropower Project

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CHINA INTERNATIONAL WATER & ELECTRIC CORPORATION
Tel: +256771427513, +256771424379| Address: Plot 2589, Zzimwe Road, Kisugu, Muyenga, Kampala, Uganda.

standards also improve for the better, as well as the purchasing power.

That aside, Uganda spends a lot of foreign currency importing goods, but with industries manufacturing companies of its own being set up, Uganda will not only save on the foreign currency spent, but it will earn through exporting goods to other countries.

Being well aware of that, the Chinese government did not hesitated to support the Ugandan government in pursuing her goal of becoming a developed country. We are, therefore, both politically and economically strategic partners.

WHAT NEXT FOR CWE IN UGANDA?

I am reliably informed that as the country is developing rapidly, even with the addition of Isimba and Karuma to the national grid, in a few years less than expectation; the demand for power will exceed the supply. We are, therefore, looking at making investments in BOOT model. In BOOT model, you build, own, operate and transfer.

We therefore intend to invest in power sector by building hydropower dams with our own money and investment our money through competitive tariffs.

This will also relieve the government from getting loans to invest in power, and the beauty about it is that we transfer 100% ownership to the government after 25 years. We have done that in a number of countries, notably Brazil and Chile.

In Laos, we have three hydro power stations owned by CWE. We are also working in Nepal and many other countries.

Licensing For Electricity Generation – The Two Stage Process Explained

Julius WANDERA
Manager Communication, ERA

In the most recent past, there has been cry and hue over a Notice the Electricity Regulatory Authority published in one of the Dailies. The Notice was a call to the Public to partake in a hearing regarding a prospecting investor that had earmarked a location near the landmark Murchison falls for purposes of hydro electricity generation. The whirlwind narrative was and in some circles still is that Government has wantonly, without any due regard to law, process (that includes wide consultation with all stakeholders) and I hasten add, common sense; given away an iconic landmark famed far and wide, to be decimated and in ts place a hydro electricity dam erected. Oh how wrong this narrative is. Discussing the depth and breadth of its wrongness is for another day; today, let's share with you what it takes for an organisation –both state and private- to get a generation License from the electricity Regulatory Authority. Perhaps this will make a good foundation in our unending quest to allay fears that dams can will crop up whenever and wherever prospecting investors deem fit.

The Second National Development Plan (NDP II) (2015/16 to 2019/20) themed "Strengthening Uganda's Competitiveness for Sustainable Wealth Creation, Employment, and Inclusive Growth" has as one of its objectives, "to Increase the stock and quality of strategic infrastructure to accelerate the country's competitiveness." The Plan that was designed to support the realization of the Uganda Vision 2040 sets out targets for different performance parameters in the Energy Sector, including Electricity Generation that is expected to reach 2500 MW in the financial year 2019/20. On the other hand, the Vision 2040 in the longer-term targets production of 41,738 MW by the year 2040.
A pivotal process to the achievement of the National targets for Electricity Generation is the Licensing of players in the ESI, a function that is undertaken by the Authority in enactment of Section 10, sub-Sections (a), (b), (c), (d), and (e) of the Electricity Act, 1999.

The Electricity Regulatory Authority (ERA) discharges the Licensing process in two phases, namely:

(a) The Permitting stage for purposes of enabling an interested Developer to conduct detailed Feasibility Studies in respect of a proposed project; and,

(b) The Licensing stage to authorize the Developer to construct and operate the proposed project.

THE PERMIT STAGE

Section 29 (1) of the Electricity Act requires a person who intends to establish an Electricity project to notify the Authority about the project through submission of a Notice of Intended Application for a License. This Notice in essence is an Application for award of a Permit to undertake Feasibility Studies in respect of a project.

According to Section 30 of the Electricity Act, on receipt of an Application for Award of a Permit, ERA is required to publish the application in the Uganda Gazette and a national newspaper of wide circulation, for purposes of inviting directly affected parties and affected Public Agencies to make written comments in respect of the application within 30 (thirty) days. Any comments received by ERA are shared with the applicant for a response.
After the consultation process, the Authority is required to evaluate the application (considering the Legal, Technical, and Financial capacity of the applicant to undertake the proposed project) together with the comments received from the public and the lead Agencies in charge of managing the subject resource, before making a decision either to approve or reject an application. Further, the Authority considers the impact of a proposed project on Private and Public interests and the Environment, among others.

In the course of undertaking Technical Feasibility Studies, a potential Developer is expected to engage with the Project Affected Persons, Local Authorities and other relevant Government Agencies to establish the likely impact of a proposed project on Private and Public interests and establish whether or not the said impacts can be mitigated. The Developer is also required to submit Quarterly reports on the progress of the Feasibility Studies to the Electricity Regulatory Authority.

THE LICENSING STAGE

If the studies conducted establish that the proposed project is Technically Feasible and Financially Viable, the Developer may proceed to submit to ERA an Application for a License to Develop, Generate and Sell Electricity from the proposed project.

According to Section 33 of the Electricity Act, an Application for a License must stipulate the Legal, Technical and Financial capacity of the applicant to undertake the project; impact of the project on Public and Private interests and possible mitigation measures; results of Technical and Environmental assessments; and the required consents and permits under the Law, among others.

Examples of the required approvals include approval by NEMA of the project brief, approval by the Department of Water Resources Management (DWRM) in respect to water obstruction; approval by the Ministry of Defense for use of explosives in blasting stones; a no-objection from the Ministry of Energy and Mineral Development to develop a Large Hydropower Project, approval of Land Compensation costs by the Chief Government Valuer under the Ministry of Lands and Housing. Section 35 of the Act requires the Authority to publish an Application for a License for purposes of inviting directly affected parties and affected Public Agencies to make written comments in respect of the application within 30 (Thirty) days. Any comments received by ERA are shared with the applicant for a response.

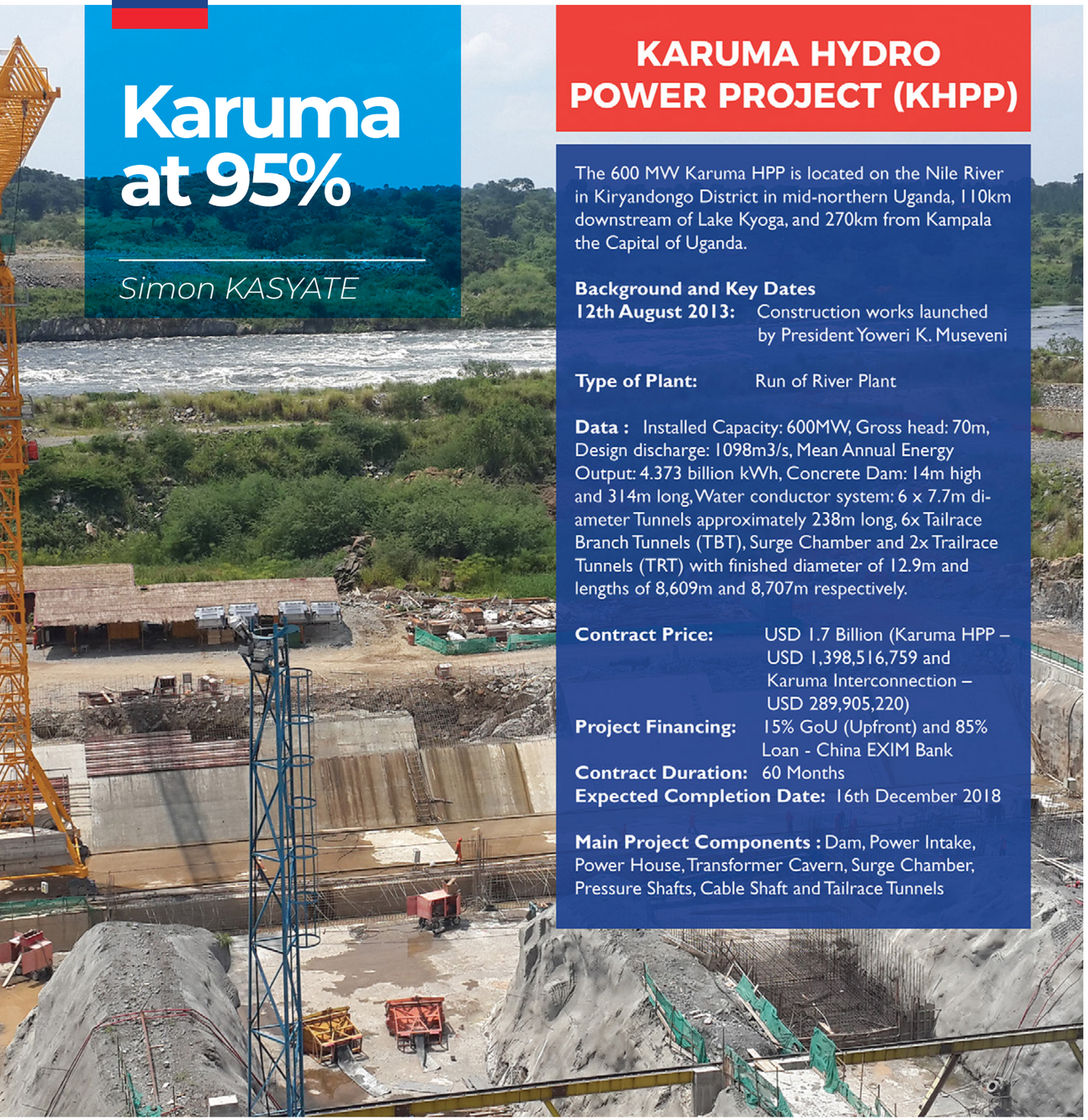
Further, the Authority undertakes a Public Hearing in the vicinity of the proposed location of the project to enable the Local Community and Local Authorities to participate in the decision-making process. At the Hearing, the applicant is provided with an opportunity to make a presentation in respect of the project and to address any questions from the public in respect to the application.
After the consultation process, the Authority is required to evaluate the application together with the comments received from stakeholders before making a final decision either to approve or reject the application. A decision to issue a License authorizes the applicant to proceed with financing arrangements and construction of the project.

ABOUT PUBLIC HEARINGS

- A Public Hearing is a strategic consultation tool that promotes Transparency, Fairness, and Objectivity and enables stakeholders to take part in decision-making processes pertaining to ERA's critical Regulatory functions.
- Public Hearings take place in the vicinity of the proposed projects to ensure optimal participation by the affected Local Communities and Local Authorities.
- All the participants at the Hearing are required to register their attendance. Similarly, all the individuals and organizations intending to make presentations or contributions are required to register on the list of speakers.
- At the Public Hearing, the Developer explains important aspects of the project and addresses any questions from the participants in respect to the application.
- Participants are required to express their support for a project by "show of hands".
- The decision of the Authority is NOT made at the Public Hearing, but at a formal meeting of the Authority, which takes into account the information and views made or expressed at the Public Hearing.

Karuma at 95%

Simon KASYATE



KARUMA HYDRO POWER PROJECT (KHPP)

The 600 MW Karuma HPP is located on the Nile River in Kiryandongo District in mid-northern Uganda, 110km downstream of Lake Kyoga, and 270km from Kampala the Capital of Uganda.

Background and Key Dates
12th August 2013: Construction works launched by President Yoweri K. Museveni

Type of Plant: Run of River Plant

Data : Installed Capacity: 600MW, Gross head: 70m, Design discharge: 1098m3/s, Mean Annual Energy Output: 4.373 billion kWh, Concrete Dam: 14m high and 314m long, Water conductor system: 6 x 7.7m diameter Tunnels approximately 238m long, 6x Tailrace Branch Tunnels (TBT), Surge Chamber and 2x Trailrace Tunnels (TRT) with finished diameter of 12.9m and lengths of 8,609m and 8,707m respectively.

Contract Price: USD 1.7 Billion (Karuma HPP – USD 1,398,516,759 and Karuma Interconnection – USD 289,905,220)
Project Financing: 15% GoU (Upfront) and 85% Loan - China EXIM Bank
Contract Duration: 60 Months
Expected Completion Date: 16th December 2018

Main Project Components : Dam, Power Intake, Power House, Transformer Cavern, Surge Chamber, Pressure Shafts, Cable Shaft and Tailrace Tunnels

A golden orangish shimmer reflects on the rumbling Nile as its waters playfully but ferociously make their way over the rocks that dot the stretch visible from the Karuma bridge to you left as you cross it towards the Gulu side. Further ahead on the horizon over the raving falls, the sun is setting leaving in its wake a golden oragish skyline and beads of perspiration on the faces of mostly the men workers just exiting the Karuma Hydro Power project gate (some 200 meters before the bridge, on the Kampala side) after their day's shift. In their thousands, these workers, all clad in their orange overalls, boots and some holding their helmets, others wearing them a top their heads make a picturesque mosaic of human traffic in the hitherto sleepy town of Karuma. In that mosaic is another group, looking fresh and cleaner in their orange overalls taking the opposite direction, with a faster pace. These are reporting for the night shift. To an observer watching this shift change evening hour from a vantage position anywhere in Karuma town, you appreciate the sheer magnitude of the sea of humanity that eke a living from this flagship infrastructure project everyday, seven days a week, over two twelve hourly shifts.

Musa Opio a 38-year-old man from neighbouring Oyam district works at the dam and intake section at Karuma. He has worked at this project since October 2017 and is one of the thousands exiting the gate to take that much deserved rest after a long day's work in the scorching sun. "From my earnings here at Karuma, I have been able to take care of my family and I have so far purchased two cows," he says with a smile and the pride of a winner. His next stop is the open air eatery by the taxi stage operated by some industrious ladies who sell millet porridge, sweetened with tamarind (chwa) and a boiled but cool potato as 'escort'. This is 'evening tea'. It will double as Opio's dinner before the routine for the next day's job starts – at sunrise.

27-year old Odongo Peter with whom they are walking re-echoes similar successes about his experience working at the electro-mechanical workshop since 2017. He too is fending for his family in ways better than he would if it were not for the project and has acquired some much-converted personal holdings like land. That is generally the individual success story of most of the thousands making their way in and out of the project site from and to work respectively.

The Karuma hydro power project was, by end of the 2nd quarter of 2019, at 94.9% overall progress. For a project that started in August 2013, this progress maybe far from what was planned then but it certainly is worth every description as sterling. The project is divided into three key components in the generation aspect namely, civil works which constitute over two thirds of the entire project; the Electro-mechanical works and Hydro-mechanical works making up 19 per cent and 2 per cent of the entire project respectively.

The civil works include the physical built components like the dam, intake section, the tunneling, the caverns and cofferdams among others. The hydro mechanical components include the turbines, draft tubes and all such elements that are more directly related to water while the electro-mechanical components are the smallest in proportion but require almost pin-point precision to maneuver though the 'spaghetti connection' of cables, wires and circuit boards to have everything in place and working. That includes the transformers and their respective component parts. Save for Turbine units 5 and 6, all the others have been sunk into position and all components fitted. The underground powerhouse, located about 80 meters beneath the Karuma earth surface, shall be fitted with six turbines each with an installed capacity of 100 MW, making the total installed capacity of this hydro power project 600MW. Upon completion and commissioning, Karuma will be the largest hydro power station in the country by size, scale and generation capacity.

The project has had its fair share of bottlenecks; some as major as a change in the supervising engineers, but in spite all, the progress remains on an upward trajectory. In May, 2019, Energy Infratech of India ceased to be supervising Engineers on the project and handed over to AF consult of Switzerland. Other challenges included issues of quality assurance, a destroyed key component for turbine unit 6 during transit to site and delays in land acquisition for Karuma interconnection (transmission) component as well as Resettlement and compensation of folks in areas to be affected by the reservoir expansion.

Although from scientific modeling these and other bottlenecks may occasion a 2-3 months delay, every effort is being made from all stakeholders on site from the Supervising Government agency Uganda Electricity Generation Company Limited (UEGCL), the contractor, the Owner's Engineer (supervising consultant) etc to ensure the project is complete sooner than later.

During their most recent routine progress check visits on July 5, 2019, the UEGCL Board was cognizant of the challenges but impressed by the progress generally. "We believe that despite the hitches, the project is progressing generally well and we are impressed by the quality of works," said Eng. Proscovia M. Njuki, the UEGCL Board chairperson. "We implore all you parties on site to mutually reinforce each other's actions so that we deliver this project to the country soon," she added.

Of great concern at such mega project sites is the sticky issue of Health, safety and environment (HSE). Albert Byaruhanga, the project manager UEGCL noted however that significant improvement had been registered as a result of proactive supervision by joint UEGCL and supervising consultant's teams. "In case of severe bleaches," he told the 7-member Board, "the works are stopped until remedial measures are implemented."

In the recent past, one of the major challenges for the project was theft and or vandalism of especially metallic items and installations from the site for sell

UEGCL Generating for Generations | KARUMA HYDROPOWER STATION

PROJECT OVERVIEW:

Karuma HPP with a planned installed capacity of (6x100 MW) is located on the Kyoga Nile River inKiryandongo District of Uganda. The Tailrace Outfall is situated within the Karuma Wildlife Reserve and is about 7 km downstream of the Karuma Bridge. It is a run-of-the-river (ROR) scheme and will utilize a gross head of 70.0m and design discharge of 1,098 cumecs to generate 4.073 billion kWhof energy on average yearly. The project features a 14m high and 314m long concrete Dam, an underground Power House, Transformer Cavern and Surge Chamber. The Water Conductor System comprises ~25Km network of tunnels including 6x 7.7m diameter headrace tunnels, 6x 7.7m diameter tailrace branch tunnels, a Tailrace Surge Chamber and 2x tailrace tunnels (TRT) with finished diameter of 12.9m and lengths of 8,609m and 8,707m respectively. The total duration of the project construction is 60 months.

CONSTRUCTION PROGRESS

Physical progress of Works

The overall physical progress of works is estimated at 94.58% against the time spent of 90.2%. The breakdown is presented below.

Progress Summary

#	Key Component	Design (%)	Estimated Overall Progress
1	Civil Works	79.10	76.33
2	E-M Works	18.79	16.47
3	H-M Works	2.11	1.78

Dam, Spillways, and Intake structures

Dam and Intake concrete works stand at 100% for dam blocks 1 ~ 16. Preparation for diversion works by joint inspections were carried out for structures prior to diversion. Removal of the upstream second stage cofferdam was completed and construction of both the upstream and downstream 3rd stage cofferdams was completed. Dewatering of the diversion channel was completed and preliminary excavation works commenced on the 31st/05/2019. Construction works for the buried oil tank at the dam and backfilling works are ongoing at the intake.

WATER CONVEYANCE SYSTEM
HRT, Powerhouse, Surge Chamber, TBT
Hoists and draft tube maintenance gates #4~#6 installed

Tail Branch Tunnels (TBT)
Major works included concrete defects repairs, joint inspections, and pull-off tests for the concrete overlays in TBTs #4~#6.

Tailrace Surge Chamber (TSC)
Overall concrete works in the tailrace surge chamber (TSC) stand at 98.1%. The major works included installation of the draft tube maintenance gates #4~#6, defect repairs of the right TSC sidewalls and joint inspections in the right TSC.

Headrace Tunnels (HRT)
Joint inspections concluded for HRT 3# invert and overt. Defects crack repair and final accepted inspection still ongoing for HRTs 4# ~ 6#.

Powerhouse
Painting works have commenced and are ongoing at Unit 3# El.942 of the Powerhouse and in BDT 3#.

Main Transformer Cavern (MTC)
First stage finishing works (plaster repair works) completion has been delayed in the Main Transformer Hall. GIS Floor was handed over to the civil works team to conduct repairs on the cracked plaster – and EPCC actively engaged to ensure the protection of EM/HM equipment against damage and dust ingress.

EVT
Construction of the masonry wall in the EVT section has commenced and is currently on-going.

Tailrace Tunnels (TRT)
Final inspection for all TRT 1 works and repairs was completed and the ongoing works include; Plastering and masonry construction of the operation room and concreting of the Adit 8 and 9

Hydro-Mechanical/ Electromechanical (HM/EM) Works
The major EM-HM works in the powerhouse included the lifting, lowering and installation of the unit #5 rotor, testing of Gas Insulated Switch Gear (GIS), and Assembly of unit6 rotor. There were no major EM-HM works at Dam &Intake. Recently concluded HM/EM works include;

- Assembly, lifting, lowering and installation of the unit#5 rotor.
- Testing of the GIS circuit breakers, Circuit breaker Operating mechanism and Main GIS circuit DC resistance.
- Unit #6 lower bracket assembly.

to scrap dealers. The Police, army and private security on the site continue high vigilance and the results are clear and positive. Scarp collecting centers in Karuma town have also been closed.

Besides its high installed capacity, the Karuma hydropower project remains unique in more ways than this. It's powerhouse and other major installations are underground, making it an architectural marvel and its construction an avid case of extreme engineering. The over 26 kilometers of underground tunnel 'road' network, huge caverns and ducts make it a unique installation. The good news is that all these underground works are almost 100 per cent complete only being fitted with the other auxiliary amenities and installations.

When the project is complete and commissioned, UEGCL shall Operate and Maintain it – on behalf of government of Uganda. "We were deliberate in employing a nucleus team of operators more than three years before the project completion so that they are here as part of the building and installation team, attend to factory acceptance tests and get as much exposure to the facility," said Dr. Eng. Harrison E. Mutikanga, adding, "This team is the core of our bigger Operation and maintenance team that will join upon commissioning." Fears of UEGCL's capacity to Operate and maintain a hydro power plant have been allayed. It's been three months since the UEGCL operation and maintenance team took over the 183 MW Isimba hydro power station upon commissioning on March 21, 2019. There has been no incidence whatsoever on this plant to speak to the contrary.

Also taking shape at Karuma is the employer's camp, which will comprise of the UEGCL office block, the visitor's centre, and canteen, Clubhouse and accommodation units for staff. The construction of these was sub-contracted to local contractors, in the spirit of Build Uganda, Buy Uganda (BUBU). Occupancy to these facilities awaits completion of auxiliary support works in water supply and treatment systems as well as electricity.

The small transit town of Karuma has now grown by leaps and bounds, thanks to this project. The Kiryandongo local Government is overwhelmed by the need for social services, while the Town remains in dire need of physical planning and grapples with elements of sanitation. To subsidize the local government in solving some of these social challenges, the project through government financing, will bestow what is termed as Community Development Action Plan CDAP. This programme is supposed to subsidize the local government's effort in social transformation of the adjoining community and Project affected persons. CDAP projects will include provision of good water and sanitation facilities, economic empowerment and financial literacy to the local business class, social services initiatives such as in Education and Health. A delay in financing this plan, has occasioned its late start, but funds have been made available in this financial year 2019/2020.

The Corporate Social responsibility footprint of the project is by every measure substantial. It just has to get 'off the ground'. Aside the disbursement of USD 400,000 for the bursary scheme of brilliant but needy students in the project affected districts if Oyam, Kiryandongo and Nwoya; the civilian and military hospitals are yet to be constructed, so is the refurbishment and expansion of Amaji Primary School. In specifics, the drawings for both the military and civilian hospitals have been checked by the directorate of heath services in the UPDF and Ministry of Health respectively. Mobilization of contractors remains the next step of action before these projects can commence. The contracting process for a local contractor for the primary school is ongoing and shall be concluded soon.

While the country is in anticipatory mood for the commissioning of the project, to the bulk of the workers, it means jobs lost but certainly not skills. "My life will never be the same after here," said Obwoch Gerald Sylvester, an administrator, "The skills I have acquired here and the contacts made, will enable me fit in very well when I leave this place." Same applies to those who have acquired skills in welding, woodworks, building and the like. Many have saved up to buy equipment upon exiting to start their own businesses in the construction industry. Others will start own workshops in engineering and repair works.

For Karuma, the once small transit town that served as night parking for long haulage truckers and their much coverted 'ladies of the night', is staring city status in the face and there is no turning back. Jinja, after the 1954 commissioning of the then Owen falls dam transformed a fishing village into the second largest city and industrial hub in Uganda. The precedent for Karuma has been set and that's what Transformation literally means. That' what electricity does - to places, polities and I hasten add, individuals.

3D artistic impression of the Karuma HPP dam and the in-take section.

3D Artistic impression of the Karuma HPP Powerhouse.

MY EXPERIENCE AT THE KARUMA HYDRO POWER PROJECT

Victoria Namutebi WAMALA

Its days after my visit to the 600MW Karuma Hydro Power project and am still in awe.

I doubt this 'awe' will go away anytime soon, may be if I see another MEGA project in Uganda, that is as well executed as this one!
By MEGA project I mean worth that is above 1.7 billion US Dollars, because that's the worth of Karuma Hydro Power project.

Upon arrival at the site on the Nile River in Kiryandongo district, one sees the obvious; a dam, hydro-power lines and a few wild animals given that it has some thick vegetation around it. All this is obvious, until one is taken to the UNDERGROUND powerhouse! My oh my! I cannot count the number of times my jaw dropped as I gazed at the UNDER GROUND powerhouse;

First of all, the fact that we were about 100 metres (The length of a football field) underground left me wondering how much land or soil was taken out to create all this HUGE space. It is here that the Head of Communications confirmed that it was not soil. It was actually ROCK, huge enough to fill 15 Namboole stadiums.The rock was blasted using explosives and removed to create the space that can house heights of Mapeera house, underground. WOW! At least I recall this as one of the jaw dropping moments.

The engineering down there, was more than extreme! I remember more jaw dropping moments as I gazed at the huge turbine unit that was being assembled, the associate parts like the bottom ring, head cover and many more.

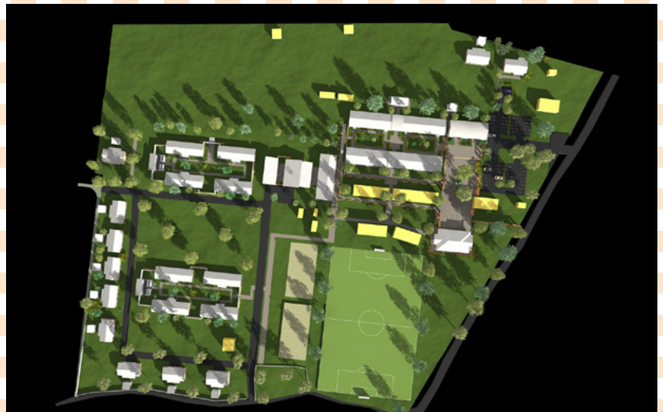
A good percentage of my fellow Ugandan youth were at work on this project, that was undertaken by a Chinese Contractor, Sinohydro Corporation Limited. I thought to myself, 'Oh yes, at least some percentage of the once unemployed youth is at work, earning.' No power project in East Africa is as big as this one will be, when completed. In Africa, it will bring the number of mega power projects to two, given that one is in Namibia.

The works that were financed by the Ugandan government (15%) and a loan contract from Exim bank of China (85%), started on 12th August 2013 and are expected to conclude at the end of 2019. This means that in the near future, you and I will pay cheaper rates for power, Uganda will earn more money from exporting more power to neighbouring countries and there will be enough power to run factories of investors who would want to open shop in Uganda.

My only wish is that every Ugandan gets a chance to visit the 600MW Karuma Hydro Power project and get their own feel of the works there, because, not all can be written down. Unfortunately, all I can do is wish; if wishes were horses...

Uganda Electricity Generation Company Limited (UEGCL), KUDOS! The works are promising. All I can say is; Surely you are on the right path to be one of the leading power producers in the Great Lakes region and once you are there, sustainably generate reliable, quality and affordable electricity for socio-economic development.

The writer is a Public Relations Officer at Uganda National Bureau of Standards.




AMAJI
PRIMARY
SCHOOL

> ***I implore you the engineering students to add drift, hard work, discipline, and character to all you have learnt***
>
> **Dr. Eng. Harrison .E. MUTIKANGA**
> Chief Executive Officer

UEGCL AND THE MAKERERE ENGINEERING SOCIETY DINNER, 2019

Saxon SSEKITOOLEKO,
BSc. Electrical Engineering, Makerere University

On Friday, April 26, 2019, Makerere Engineering Society gathered for a sumptuous annual dinner in the airy ambiance of the Sheraton Kampala's Victoria Hall. The dinner was organized by the newly elected Makerere Engineering Society (MES) committee, headed by its President, Jude Kisekka Francis. The theme for 2019 was ***'The Role of Engineers in the National, Economic Growth and Development of Uganda.'*** The event attracted an impressive roll of practicing engineering personalities and students dressed in dazzling party wear. They exuded confidence, stylishness, and enthusiasm.

The Chief Guest, was the accomplished hydrology engineer, **Hon. Hillary Onek**, the Minister for Relief, Disaster Preparedness and Refugees in Uganda. The Keynote Speaker was **Dr. Eng. Harrison E. Mutikanga**- the Chief Executive Officer of Uganda Electricity Generation Company Limited (UEGCL).

Among many other Guest speakers of the day were; Dr. Eng. Michael M.Odong, who is the Executive Director of the Uganda Road Fund and Chairman of the Engineers Registration Board, Eng. Justus Akankwasa - the Acting Director Directorate of Engineering and Technical Services, Kampala Capital City Authority (KCCA), Dr. Eng. Anania Mbabazi, Chief Executive Officer ILISO Consulting (Pty) Limited, and Eng. Ronald Namugera, Registrar of the Engineers Registration Board.

Dr. Mutikanga's ably explored the theme of the dinner. He described exactly how engineering has played a key role in supporting the growth and development of our country's economy, as well as improving the lives of its citizens. He described the extent to which engineering can aid development. He further underscored the role of government and its commitment to finance infrastructure such as hydroelectric power projects that provide a cheap source of energy to the economy. Electricity is a key driver to both industrial investment, environmental conservation, and improved livelihood. He further noted that roads, designed by engineers, connect different parts of the country facilitating the transportation of imports and exports hence developing a favorable and conducive environment for business.

Mutikanga further drew attention to the Engineering Index that compares countries based on factors such as engineering wages, employment, graduates, businesses, infrastructure quality and gender balance giving comparisons to countries such as Sweden, Denmark, and the United Kingdom. " I implore you the engineering students to add drift, hard work, discipline, and character to all you have learnt over the years of the course so that you contribute to the social-economic transformation of our country" said, the UEGCL Chief Executive adding that, the potential for the country to catch up with the advanced economies in Europe and Asia in engineering strength is through increasing the number of engineering graduates, raising the number of women in the engineering industry and improving the quality of infrastructure.

I am thankful for the continued support the Uganda Electricity Generation Company Limited has shown towards the Makerere Engineering fraternity in its endeavors to shape and equip the great men and women with indispensable skills and interpersonal connections in the development of their respective careers. This partnership can even get greater through:

- Organizing trips through the MES committee and other student leaders to project sites like Karuma and Isimba Hydro Power Plants,
- Inviting representatives from the company to give guest lectures at the College of Engineering, Design, Art, and Technology (CEDAT) on issues about electric power generation highlighting the theoretical knowledge that is continuously applied.
- Organizing UEGCL MES afternoons intended on providing suitable career guidance and mentorship for engineering students intending to practice as well as join the job market today,
- Placements for internship and graduate training for engineering students.
- Promotion and funding of student activities and projects such as the CEDAT Open Day where students showcase technological ideas and possible innovations for the industry.

The Makerere Engineering Society, needless to say, will continue to sit and boast of its rich vein of well-placed engineers and professors both in UEGCL and in the country thus far.

We build for the future!.

SUCCESS *Profile*

Peace Ingabire: your ordinary girl-next-door. But wait, not quite. Let's put the pips on the shoulders; she is a trained Engineer, a qualified and certified Accountant and now working as the Risk Officer at UEGCL. Rich profile? Oh yes and with the demeanour and work ethic to match, Ms Ingabire is one of the new crop of young proffessionals on whose shoulders the future of the company is hinged. *GeNews* had a quick chat with her...here goes.

Q What is your professional calling?

A Hahaha, I am an Electrical Engineer & Accountant

Q 12 months at UEGCL, what's the journey been like?

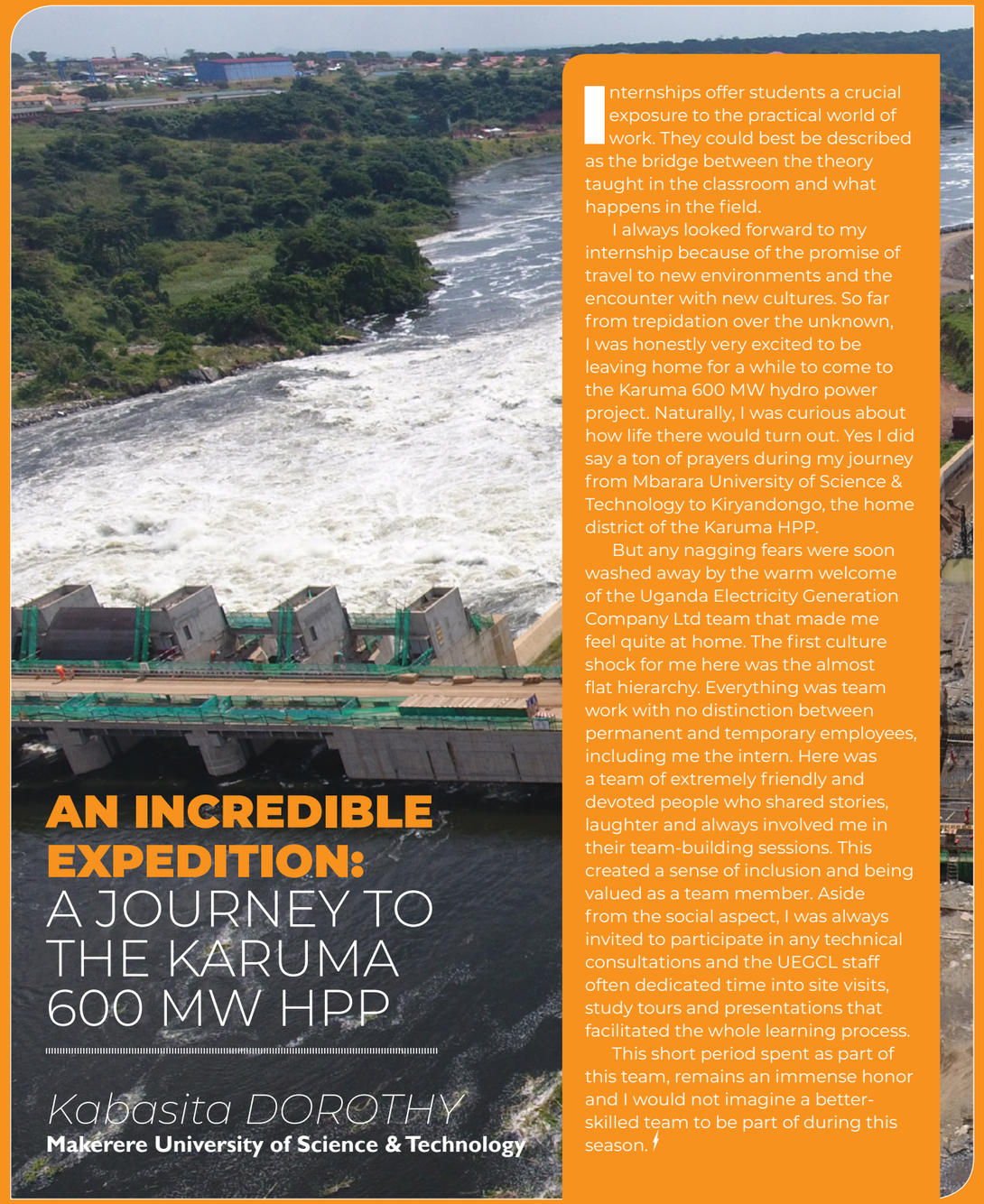
A I started my career as an electrical engineer (graduate trainee) resident at Karuma 600 MW HPP. When an opportunity was announced in the newly created Risk department, I gave it a shot. Here I am, from a graduate trainee to a risk officer.

Q Quite intriguing, an electrical engineer cum risk officer and while at it, you qualified as an accountant. Super brain, not so?

A [Laughter] I attribute this success to prayer and hardwork. For the record, I hold a First Class Hons Degree in Electrical Engineering from Makerere University and recently in March 2019 was pronounced as the Second Best ACCA Affiliate in Uganda and number 38th in the world.

Q One word of encouragement to your colleagues and ladies who consider you as a role model:

A All I can say, what the mind of man can conceive and believe, he can achieve! Thank you.



AN INCREDIBLE EXPEDITION: A JOURNEY TO THE KARUMA 600 MW HPP

Kabasita DOROTHY
Makerere University of Science & Technology

Internships offer students a crucial exposure to the practical world of work. They could best be described as the bridge between the theory taught in the classroom and what happens in the field.

I always looked forward to my internship because of the promise of travel to new environments and the encounter with new cultures. So far from trepidation over the unknown, I was honestly very excited to be leaving home for a while to come to the Karuma 600 MW hydro power project. Naturally, I was curious about how life there would turn out. Yes I did say a ton of prayers during my journey from Mbarara University of Science & Technology to Kiryandongo, the home district of the Karuma HPP.

But any nagging fears were soon washed away by the warm welcome of the Uganda Electricity Generation Company Ltd team that made me feel quite at home. The first culture shock for me here was the almost flat hierarchy. Everything was team work with no distinction between permanent and temporary employees, including me the intern. Here was a team of extremely friendly and devoted people who shared stories, laughter and always involved me in their team-building sessions. This created a sense of inclusion and being valued as a team member. Aside from the social aspect, I was always invited to participate in any technical consultations and the UEGCL staff often dedicated time into site visits, study tours and presentations that facilitated the whole learning process.

This short period spent as part of this team, remains an immense honor and I would not imagine a better-skilled team to be part of during this season.

My Experience at the Karuma 600 MW HPP

Nabaasa Agatha

Electrical and Electronics Engineer Internee 2019 Mbarara University of Science and Technology (MUST)

What could be a better experience for me in 2019 than getting deep into the guts of the 600 MW Karuma Hydro Power Station? Nothing could have been further from my mind than the idea that my academic life could one day bring me to the westerly extremes of the River Nile, but here I was, 520km from Mbarara University of Science & Technology thanks to the hunger for knowledge and skills.

I took the decision to embark on this journey to a land I had never been to after deep soul searching and consultation. That was partly to prepare for the practical and cultural challenges that would come with a first time encounter with what to my mind was alien territory. Ever since I got here however, I don't regret my decision because the experience has not only been positive but the opportunity is rare in the life of an African engineer. From the singing elephants, to splashing waters at the intake, the architectural wonder beneath the rock where the powerhouse and transformer cavern seat, to the multi-cultural experience of working with great people from all parts of the world, I can only sum this experience as a gift to my career.

I arrived to a warm welcome in Karuma by Eng. Sammy Sekatawa on Monday June 10, 2019. Later in the day I was taken through a safety induction by Mr. Salim, the Risk Manager Officer from Sinohydro Corporation, the EPC contractor. Karuma being the largest and first power project of its kind in East Africa, the safety of people on the project site is top priority to all the implementing stakeholders. I was briefed about the layout of the plant and the acceptable behavior as well as the do's and don'ts while at the project site. He then led me to Mr. Apollo Sempanyi UEGCL's Health Safety & Environment Officer who gave me all required personal protection elements (PPE's) to help me while on-site.

Mr. Karisa Donart (my field supervisor) gave me a brief background of the company to help align me with, its vision, mission and core values.

The following day, during a tour of the project site, I was surprised to learn that the plant covers a distance of 8.9 Km from intake to outfall. The main parts of the plant are; the dam, penstock, powerhouse, outfall.

The site for the plant was chosen because it provided the most optimal combination of high generation capacity and low cost of production. I learned about the whole process that makes it possible for the Karuma power plant to generate a very high output.

Every morning, I attend the daily site focus (DSF) meeting with all other employees to which helps us to keep track of the progress of work both at the site and in office. This meeting also updates is on any health safety and environment concerns thus minimizing the chances of accidents and causalities. It is during this meeting that we also get updates from the operation & maintenance team.

Site visits have helped me to appreciate the different machines and equipment being used at this mega construction site. These include; the generator which is made up of the rotor and the stator. The Rotor is the rotating part of a generating unit, while the stator is a stationary. These two are critical equipment in the process of forming the electromotive force (EMF). The rotor of the Karuma generator has got 42 poles and the stator is in three phases and it is star connected.

Their plant also has several motors to help in the movement of heavy movable equipment like, stator, rotor and generator brackets.

The GSU (generator step-up) is the main transformer. This transformer steps up the 11KV terminal voltage produced by the generator to 400KV. This high voltage is transmitted through GIS to the switch yard for transmission.

This practical encounter with the construction phase of a power station, helped me appreciate how the different components such as the generator, stator and windings are assembled at the site.

Different cranes here are used to lift and move a variety of really heavy components to different parts of the plant. These cranes are electric powered overhead type.

Before commissioning of any equipment, tests are done to ensure that the equipment are fit for purpose and thus work as expected.

Participating in all this work has helped me relate the theory from class and its application in the field. I have never been happier than I am at Karuma 600 MW HPP.

It is said that you will never really know your blessing until you have lost one. I consider myself lucky that I did not have to lose anything to come to the Karuma HPP which I consider one of the biggest blessings in my life.

This training was a great opportunity in the development of my career. And for UEGCL, MEMD, AF consults, Sinohydro Corporation, UETCL, the implementing stakeholders, this is real history for the country.

The rotor of the Karuma generator has got 42 poles

Skills For Electricty Generation

Affable yet knowledgeable, Joyce Nakalema, UEGCL is UEGCL's new Chief Human Resource Officer. Her style and passion for people always impresses with out her shoving any credentials into your face.

Q Power generation is mainly about concrete and noisy machines. Where does HR fit into this mix?

A It is true that when one thinks about electricity generation, the first images that come to mind are about rushing water generators, powerhouses and alignment with the transmission of the generated electricity. Pretty much the same happens when it comes to deliberations on asset quality, we always look at the generators and other plant equipment. People are the masters and minders of the machines. We need to look at people as the masters that they are. Masters are brought to the fore not the rear.

Q How should people and machines be aligned for sustainable operations?

A People are important in the sustainable operations. We have put in place maintenance schedules and asset management standards, however, rarely do we think about people maintenance or people in terms of asset management. When we talk about asset management, we imply efforts put in place to ensure the asset lasts longer. Although in most cases when it comes to people, we never think about the people in the electricity generation sector fifty years ahead.

We usually have medium term or short term; as long term ranges are never thought about regarding people. As a result of that omission, we soon run short of supply of skilled people to manage our huge investments after some years. We need to propel the sector in terms of people for the years to come.

Q What factors encourage focus short term on people ?

A It cannot be assigned to a single factor. Something unique to the energy sector and other specialized professions is that you tend to have low rates of manpower turnover because people in there are generally highly specialized, associate with similar professional peers, paid very well, with a good number of benefits sealed with relatively higher job security. Because of a system where people feel secure, you don't see much occupational mobility we only realize that particular skills are missing as the staff are about to retire or have suddenly exited the work place.

Q Risks associated with skills?

A For an organization like UEGCL with a big mandate that is growing as our investments expand, the risk of running short of human resource is real. As the sector liberalizes, this can become acute.

Q How can this be mitigated?

A We We need a coordinated approach to staff development with in the sector. If one organization is going to invest in training its people and another does not, this will create imbalances that destabilize everybody. As we get more utilities coming on board, you find that they're going to start pulling from the one that has invested in its staff. That means you're going to cause a short supply in another entity. It also implies that the cost of employment is going to go high as entities strive to retain their developed staff.

And on the other way of managing our skills, we should be able to pass on the skills to other firms that do similar work. And then we should also have optimum numbers of people. This means for you to achieve efficiency for today and tomorrow, you need to make sure that the people you have in the system are ready to deal with now and future requirements.

Managing skills may also involve creating synergies with similar institutions and our stakeholders include training institutions, universities, plus others not in the sector but whom we need to learn from. We have to recruit the right person for the job from day one. However much you want to grow someone when they were the wrong person for the job, it will not work.

And then also other skills some people may not anticipate because as the plants grow old, we require emergent skills. We need to take that into account so that we develop relevant skills in time. Soft skills include people to learn negotiation, crisis management and patriotism. You can't work in the power plant when you're not patriotic.

We need leaders who are ready to inspire the staff.

We also need to focus on diversity and inclusion where men and women have equal opportunities to excel. People with disabilities should be thought about in the sector as well.

Q What is your strategy for steering UEGCL through such turbulence?

A We have instituted a robust graduate trainee program. This creates a skills pipeline for the sector. The sector has not had a reasonable labour pool to draw upon in terms of electricity generation.

Continuous staff development has given our staff mastery in their respective specialties. Although it is an expensive undertaking, the organization has endeavored to give its staff the necessary professional exposure locally and internationally. A better way to sustainably reduce the skills gap in the sector would be to have our own training centers.

These training centres will focus on all skills not just the technical skills alone, but complementary skill sets as well. Currently the focus has been so much on engineers, artisans and technicians, leaving a gap in the soft skills segment. There is need for balance and UEGCL has already adopted an optimal skills development approach.

Q Do we have standards of training for the energy sector?

A The electricity generation sector should have industry approved standards. This implies that as we develop skills for our employees, we should be aiming at a certain standard which must be tested for success.

We also need to innovate on how to care for our young workforce. The sector needs to create a pool of advisers. These can be people who have worked with the sector and have retired or have taken on other interests outside the sector . These can be adopted as consultants in the different areas of specialties.

Q Who is Joyce Nakalema?

A I am a mother, an organizational psychologist, a human resource consultant and a community development person. I strongly believe that each person where ever they are based have untapped potential that needs to be brought to the fore. I have intentionally committed myself to learn.

Q Do you have mentors?

A Yes I have many mentors from all spheres of life, spiritual, parenting and professional. My mentors have walked with me for some time. Each of the mentors has come up during a critical season of my life.

Q Secret of your success?

A I have always taken on opportunities as they are presented and sometimes I have had to look for them. As an individual, I celebrate each of my successes be it small or big. I believe in building legacies for the future generation.

Hydroelectric Power: From water to wire

Noella NSABA
PR Assistant

It is difficult to imagine a life without water. From washing, cooking, personal hygiene and even lighting up our beautiful homes water is central to life as we know it. The issue of water lighting up our homes may catch some by surprise and many might ask how this is even possible?

I will answer this by first giving an example of how sometimes we seat by the lakeside and leisurely watch as the waves bring different objects ashore. This alone demonstrates that water has energy in it and this form of energy, also known as Kinetic energy, is the result of motion.

This is what inspired Benoit Fourneyron, James Francis and Viktor Kaplan to develop the first hydroelectric power plants during the late 19th and early 20th century.

The Innovations of using water as a source of power predates hydroelectricity however. The Chinese and Greeks used water wheels to grind grain and later in the middle ages that very technology was spread across the European continent in factories to power machines like saws in lumber mills. By harnessing the potential energy in water, hydropower was used to create electricity. After the invention of the turbine in the early 1800's and the generator in the late 1800s, the first-ever hydroelectric plant was built in the United States at the Niagara Falls.

Hydropower is the world's most widely used **renewable** source of energy, also known as a clean energy. The sun heats the oceans turning it into water vapor. This is called evaporation. When the water vapor rises it turns into clouds. The cold air above the earth mixes with the clouds and releases rain or snow called precipitation. This water cycle goes on infinitely making this a renewable energy source.

Now in a country like Uganda that is slowly embracing clean energy specifically hydropower, the idea of more electricity brings joy to many but the step by step detail of how the electricity reaches one's home remains confusing. This article *"From Water to Wire,"* attempts to break down this process in non-engineering terms.

Hydroelectric power, or hydroelectricity, is generated by the force of falling water. (*Hydro* comes from the Greek word for water) and the harnessing of the power of moving water. This is the sole purpose for which hydropower plants are built. In simple terms, hydropower plants are built to convert the energy flowing from the water into electrons called electricity, the very electricity that powers thousands of homes.

It must be noted that most hydropower plants use water developed from the natural drop of rivers such as rapids and even waterfalls or a dam is built across a river to raise the water level (head) and provide the needed drop for a driving force to push for an electromotive force that is later transformed into electricity.

Hydro power plants consist of six main components - the Dam, Gates, Penstock, Turbine, Generator and Transformer.

DAM

Dams are built to hold back water from the reservoir that is also an artificial lake created while constructing the hydropower plant. Gravity causes water from the reservoir on higher ground to fall to the lower ground over the dam.

GATES

Gates are used to letting water in and out. The flood gates are specifically opened with a small outlet to allow reservoir build very high water pressure as it flows through the penstock.

PENSTOCK

That is a pipeline that leads to the turbine and is designed in such a way that the gravitational force pulls water down to a turbine which produces kinetic energy.

TURBINE

In the turbine, there is a water wheel that allows the water pressure to increase as it flows down from the penstock. The pressure and force flow drives the turbine connected to the generator.

GENERATOR

Inside the generator is the rotor spun by the turbine which is driven by a spindle that enables the rotor to rotate once water strikes.

Large electromagnets are also embedded in the rotor located with coils of copper wire called the stator. As the generator rotor spins the magnets allow the flow of electrons, created in the coils of the stator that eventually produce electricity.

TRANSFORMER

The transformer helps to step up the voltage of electricity and later sent across transmission lines that are connected to people's home and BINGO electricity.

The flowing water which has served its purpose exits the generating station to the tailrace tunnels where it rejoins the mainstream of the river to continue the cycle of creating clean renewable energy.

Newly commissioned
183 MW Isimba HPP, Karuma
600 MW HPP, Nyagak III
6.6 MW and the forthcoming Muzizi
48 MW.

The case of Isimba which has put 183 Megawatts (MW) to the national grid is a run-off hydro plant. It uses the Kaplan turbines simply because they are the perfect turbines for low water heads like the one of Isimba being at 15.1 Metres.

That is how electricity reaches our homes. It is noteworthy that UEGCL is a GoU agency in charge of electricity generation. Assets under its docket include the Nalubale-Kiira Complex (380 MW), newly commissioned 183 MW Isimba HPP, Karuma 600 MW HPP, Nyagak III 6.6 MW and the forthcoming Muzizi 48 MW.

All these developments of hydropower plants and dams specifically contribute to one thing; the generation of electricity that is used in homes, factories, hospitals, and schools.

Hydroelectric power represents about 40percent of the total electricity around the globe with China being the biggest producer followed by Canada, Brazil, and the United States according to the Energy Information Administration (EIA).

Understanding the process of hydroelectricity is not rocket science but as simple as explained in the **Water to Wire cycle.**

Increasing Uganda's Electricity Demand Requires a Multi-Sectoral Approach

Jonan KIIZA

Public & Media Relations Officer-UEGCL

From a past of biting power shortages that stunted economic growth, Uganda is now dealing with a good problem. Installed capacity has increased from just over 320MW in the early 2000s, to 1,200 MW today. Around about 670 MW of this is consumed at peak leaving a huge surplus.

This is good news for the country that envisages industrialization as the pathway lifting the economy to middle-income status. Electricity is an indispensable prerequisite for enhancing economic activity and improving the quality of life. It supports all forms of production - agricultural and industrial- to create efficiency. Households too need electricity for many purposes, including cooking, lighting, refrigeration, study and home-based economic activity while essential facilities, such institutional consumers such as hospitals etc also require electricity.

In his State of nation address early this year 2019, His. Excellency Yoweri Kaguta Museveni termed this state of affairs as "a good problem" for the country to have surplus electricity. Critics lambasted this statement, describing the state of affairs as being precarious. A factor that is often overlooked in this debate is that more than 75percent of the Ugandan population is not connected to the grid. On the other hand, demand for electricity has been growing at 10pecent per annum since 2010.

Relatedly, the situation in East Africa is not any better as the region which accounts for 3.6% of the world's population has only 1.5% of the total global primary energy consumption according to the, World Bank. The African continent currently has got 147 GW of installed capacity, a level comparable to the capacity China installs in one or two years. Nearly 600 million people in Africa lack access to electricity. Electricity blackouts occur daily in many African countries. World over, 650 million people are likely to go without access to electricity come the year 2030 according to UN SDG report May 2019.

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President Museveni commissioned the 183 MW Isimba HPP on March 21, 2019

President Museveni commissioned the 183 MW Isimba HPP on March 21, 2019. Given the procurement cycle of this and its sister 600MW Karuma power plant which lasted around seven years, one appreciates the need for the country should have excess installed electricity capacity than wait to plan when demand raises. The Uganda's current population is estimated 40 million with 3-percent increase per annum. According to the current statistics, only 3 million Ugandans are estimated to have access to electricity. This outs immense pressure on our biomass reflected in rapidly disappearing forest cover. If all this pent up demand were to be moved to the grid, then Uganda would be in a deficit position as far as generation capacity is concerned.

The GoU has gazetted 26 Industrial parks across the country to support industrialization and create jobs. Notable progress has been made in the Kapeeka Industrial Park where manufacturing of tiles and other products is already ongoing. So far, there are 284 new factories already in the Industrial Park at Namanve; 11 in Luzira industrial and Business Park; 10 in Bweyogerere industrial estate; 8 in Jinja Industrial and Business Park; 10 in Soroti industrial and Business Park; 16 in Kasese industrial and Business Park; and 42 in Mbarara SME Park. The total factories in Uganda are today 4,900 and this is surely an incredible milestone towards the industrialization of the economy which feeds in the country's vision 2040. I also recall when UEGCL hosted the president of Uganda at Karuma HPP in August 2019, he requested the Kiryandongo district leadership to give GoU one square mile to act as an industrial park. We have several mini hydro's coming on board in the coming future, how about operationalizing this for areas with hydro installations?

Much as this looks like a sure way to deal with the surplus installed capacity, it does not answer the 76% of Ugandans who cannot access electricity. The Government of Uganda rolled out Electricity Connection Programme (ECP) in November 2018 to increase access to electricity from 24 per cent to 60 per cent come the year 2027. Realization of this requires undivided political will and participation of key government agencies that deal with the quality of goods entering the country. In this, the respective GoU agencies have to ensure the quality of electrical equipment bearing in mind the aspect of time for people not to lose trust in the scheme arising from unnecessary delays.

In terms of planning, generation, transmission and distribution must have visions each feeding into the other for the sector to have great output. One fact is clear that it is very costly to establish a transmission network in the whole country and this also takes time. Therefore, the regulatory environment should allow for communities that are near small hydro's to have off-grid connections as an interim measure to increase access to electricity. The United Nations ❯❯

recommends this approach as it notes that following a decade of steady progress, the global electrification rate had reached 89 per cent and 153 million people have gained access to electricity each year.

The GoU besides is investing in other infrastructure like road networks across the country. The development of such must be done strategically to also address the issue of low demand for electricity. Imagine if, on all new road networks, there was a transmission and distribution network? It would have simplified the implementation of the GoU ECP scheme that targets the inclusion of rural communities to the grid network. Relatedly, the marketing strategies to increase demand for electricity must be amplified by the energy sector players. Much as there is an energy sector planning committee, this might have its predicaments as its composition is not autonomous. Consideration of making this committee an authority with help in ensuring strategic planning for the energy targets of 1,7000MW by 2028. If Uganda is to realize the sustainable goal number 7: Affordable and clean energy, benchmarking on countries like China that have its population estimated to 1.39 Billion people with its installed power capacity rising by 7.6% per annum to more than 1,800 GW in (2017) would be perfect.

UEGCL
Generating for Generations

PURPOSE STATEMENT:

To sustainably generate reliable, quality, and affordable electricity for socio-economic transformation

STRATEGIC THEMES

- Operational Excellence
- Stakeholder & Reputational Management
- Sustainable Growth
- Engaged Work-force

CORE VALUES

Integrity
We embrace honesty in everything we do & we are determined to adhere to ethical business principles and good corporate governance at all times.

Innovation
We continuously develop and apply creative solutions towards-improved service delivery.

Accountability
We are committed to a performance-based culture & teamwork where all of us are accountable for our actions and results

Safety
We collectively embrace a safety culture in all our projects & operations

Sustainability
We commit to generate electricity that meets the needs of the present without compromising the future. This also caters for the concerns of the environment.

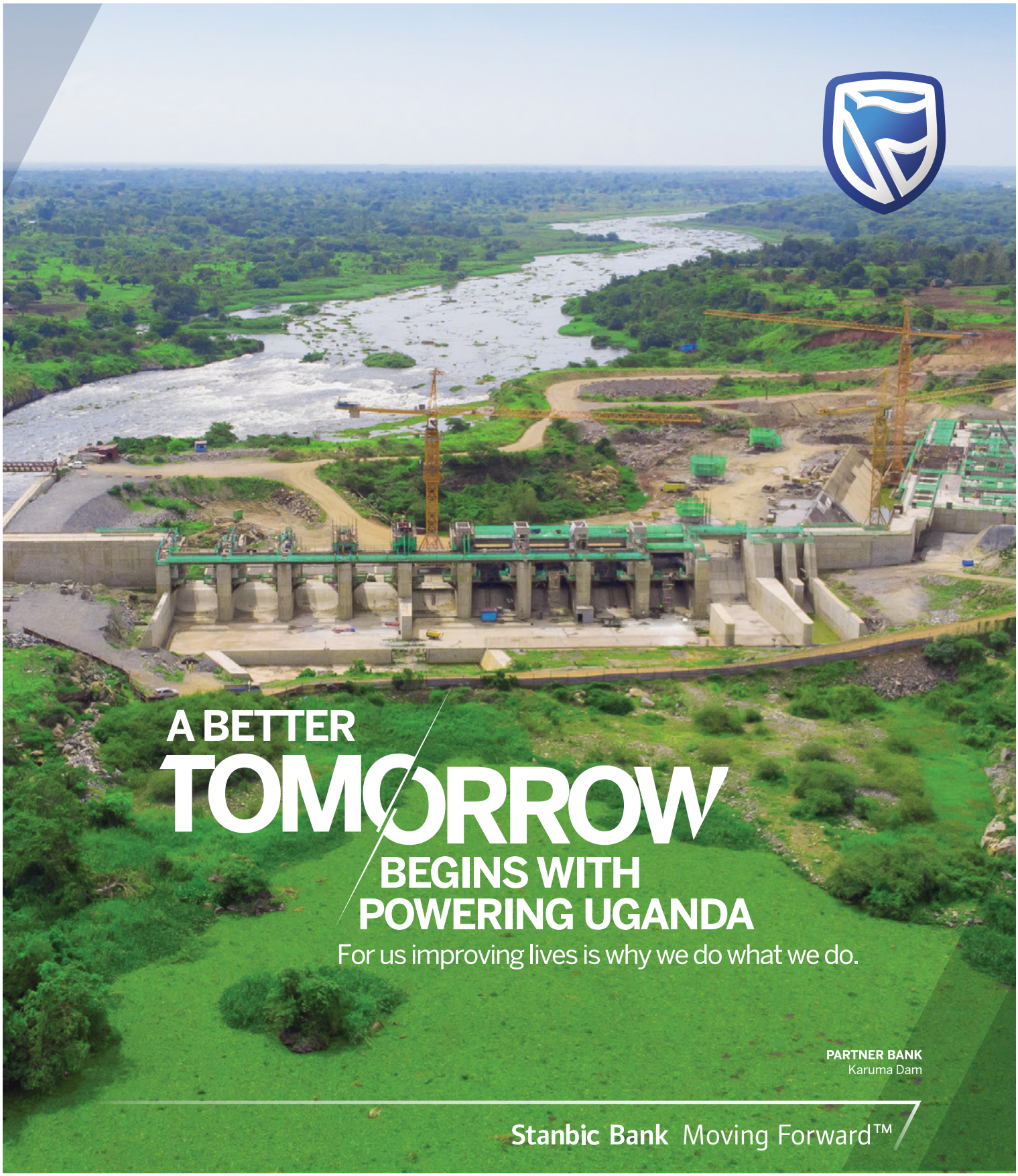
KEY ENTERPRISE LEVEL INITIATIVES

- Stakeholder Relationship building
- Resourcing Strategy
- Business Sustainability Business Process Re-engineering
- Asset Care
- Human Capital Focus

Roadmap 1300

Long Term Strategic Goals 2023

* *80% Stakeholder Satisfaction*
* *1300 MW Installed Capacity*
* *97% Plant Availability*
* *99% Plant Reliability*
* *Achieve Profitability*
* *ISO 55000 & ISO 45001 Certification*
* *Engaged Staff*



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