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The

# GRID

The Kenya Electricity Transmission Company Newsletter

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**KETRACO**

Kenya Electricity Transmission Company Limited

*"Building a World Class National Grid"*

# Mombasa-Nairobi Transmission Line Launched

#EnergyGameChanger

*The new KETRACO line is a double circuit 400kV transmission line capable of evacuating a total 1,500MW (slightly below the current National demand of 1,656MW). The existing line built way back in 1961 is a single circuit 132kV transmission line with capacity to carry 80MW only. The new line is equivalent in capacity to about 20 lines similar to the old line (about 1,800% capacity increase in the Nairobi – Mombasa corridor).*



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*The Suswa - Isinya transmission line's special tower (6B/1).*



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**Editor's note**



First and foremost we apologize to you, our reader, for the delay in publishing this sixth issue of The Grid. We will endeavor to print it frequently henceforth.

In this issue, we welcome our third Chairman, Hon. Eng. James G. K. Rege, CBS. Karibu KETRACO!

Our Managing Director, FCPA Fernandes Barasa has a feature on page 23, be sure to read it.

As always we are excited to share with you the stories we have collected over the months. In this issue we take you through the towers in transmission lines as well as a conclusive feature on the first 400kV lines in the region; the

Mombasa – Nairobi and Suswa – Isinya transmission projects. These projects were commissioned by His Excellency the President. For the first time, a physical electricity transmission ring around Nairobi metropolis is a reality and Migori and Kisii counties are now connected with high voltage power.

We have also delved into the life of one of our officers, Oportuna who practices large scale farming as a hobby. Her story will indeed inspire you to pursue your passion.

The entire editorial team looks forward to hearing your feedback. Tell us what you like and do not like, tell us what you would want to see featured, and more importantly, tell us your stories. We love to cover your adventures, achievements and experiences.

Happy Reading!

*Raphael Mworia*  
**Editor**

# FROM THE CEO

**K**ETRACO has been in the forefront of advancing the energy system in Kenya. Through the commissioning of the Mombasa - Nairobi and Suswa - Isinya projects, we have advanced the geothermal energy in the country's grid. By utilizing this efficient and affordable geothermal power, we are saving about Kshs. 3.6 billion annually that will go directly to power consumers pockets. This is a significant saving to the nation keeping in mind that the Rabai - Malindi - Garsen - Lamu and Kindaruma - Mwingi - Garissa projects are saving approximately Kshs. 1 billion (250 million from Lamu and 750 million from Garissa) annually through switching off of the stand-alone generators.

What's more, the Company signed a new contract with the consortium of NARI Group Corporation and Power China Guizhou Engineering Company Limited for the completion of the Loiyangalani - Suswa transmission line. Once commissioned, the project will increase electricity supply, quality, reliability and most of all, reduce power cost as it will be evacuating the affordable wind power. In addition, rated at 1,200MW, the Loiyangalani - Suswa line will transmit approximately 15% of the country's current installed capacity and cater to future generation plants along the traversed areas. These will comprise of solar, geothermal and other wind farms from Northern Kenya.

In continuing efforts to contribute to improvements in energy efficiency and decoupling consumption from economic growth in the country, we commissioned the first 8km 220kV Athi River - Embakasi underground cable in the country. The underground cable will offer an alternative power route and additional capacity to Nairobi from Oklaria thus greatly improve the reliability and availability of power within Nairobi Metropolitan City. This will create an attractive climate for investors in the region thus spurring growth and employment in line with the government's Big Four Agenda.

With increase in demand for energy, the Company also commissioned the Kisii - Awendo project early this year. This will see Migori and Kisii counties as well as surrounding environs supplied with high



voltage power for the first time. Also with the ongoing Olkaria - Lessos - Kisumu line, residents in the western region will enjoy efficient and reliable power supply. The project will offer an evacuation route for the geothermal power from Olkaria to Western Kenya and also provide voltage support to the region.

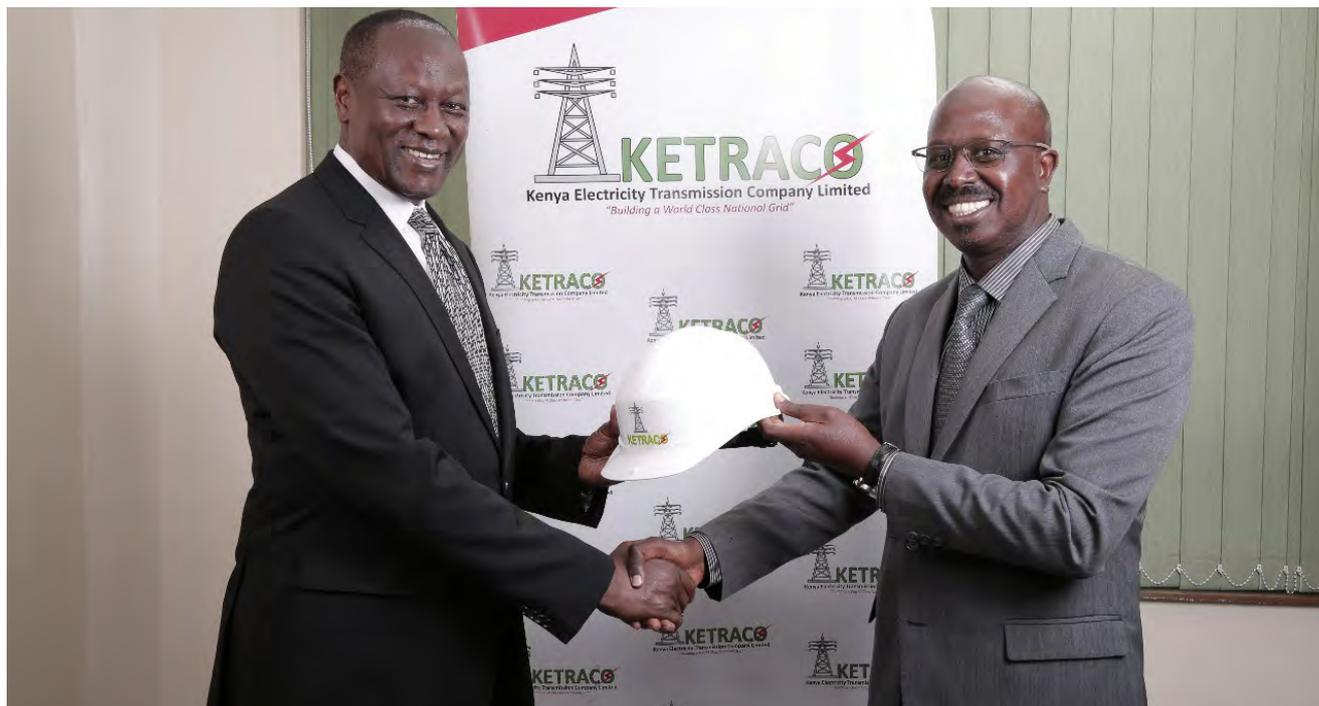
While on course to build a world class national grid, we are also engaging in corporate social and environmental responsibilities. Through the Kenya Tanzania interconnector, KETRACO will, for the first time, construct low voltage lines, transformers and link to individual

consumer houses as well as connection of meters to the identified households along the entire interconnector.

In conclusion, this issue will give you insights into the energy game changing transmission projects that we are implementing. As is the norm, we thank you for your continued support in enabling us implement our mandate and look forward to your continued support.

***FCPA Fernandes Barasa***  
***Managing Director***

# HON. ENG. REGE APPOINTED KETRACO'S 3<sup>RD</sup> CHAIR



(L) Hon. Eng. James G. K. Rege, CBS, KETRACO's incoming Chairman and (R) Dr. Kenneth K. Sigilai, HSC, KETRACO's outgoing Chairman pose for a symbolic handing over photo on 17<sup>th</sup> April 2018.

By Zaituni Asmani

**H**on. Eng. James G.K. Rege, CBS, joins the Kenya Electricity Transmission Company Limited (KETRACO) as its 3<sup>rd</sup> Chairman, replacing Dr. Kenneth K. Sigilai, HSC.

Eng. Rege holds a Master of Science in Electrical Engineering from the George Washington University, USA, prior to which he graduated Cum Laude with a Bachelor of Science Electrical Engineering degree in Electrical (Telecommunications) Engineering and Computer Science from the West Virginia University, USA.

With an impressive background in telecommunications and leadership, he comes in as an asset to KETRACO whose business interplays with telecommunications through the leasing of the fibre optic component of its transmission lines. In addition, for 5 years, he was the Chairperson of the Departmental Committee on Energy, Transport, Information, Communication and Public Works, a position that equipped him with a unique understanding of the energy sector.

Eng. Rege was the Permanent Secretary for the Ministry of Information and Communications in 2004. He was the Chairman of International Telecommunications Satellite Organization (INTELSAT), Washington, D.C. following over a decade of leadership positions in the Company. He has also worked in numerous top positions with the East African External Telecommunications Co. Ltd. (Central Training School), Express Telecommunications, Regional African Satellite Communications Organization (RASCOM), Iridium Satellite Corporation in Cape Town, London and later Washington, as well as Vodacom in Tanzania, among various other telecommunication companies.

Apart from his background as an electrical engineer, he was a lecturer at Kabete Central Training School where in the course of his duties was assigned to Siemens Training School in Munich, Germany and promoted to Acting Chief Training Officer.

In addition to the above he has won

numerous international awards including the Lifetime ICT Achievement Award by the Information Communication Technology Association of Kenya during the Kenya@50 Celebrations in 2013, and the Certificate of Induction into the ICT Hall of Fame in 2012.

He also enjoys a fruitful political career that has seen his election and re-election as a Member of Parliament for Karachuonyo Constituency. In addition to being a Member of the National Assembly's Departmental Committee on Energy, Information and Communications, Eng. Rege was also a Member of the Parliamentary Joint Committee on National Cohesion and Equal Opportunity and a Member of the National Assembly Liaison Committee.

Being a self-motivated professional engineer and an administrator committed to hard work and excellence, he aims to explore new ideas to propel KETRACO forward in building the national transmission grid.

## FIRST 400kV LINES IN THE REGION ENERGIZED



(2-R) H.E President Uhuru Kenyatta, C.G.H., clapping his hands after unveiling the plaque signifying the commissioning of the Mombasa - Nairobi and Suswa - Isinya transmission projects at Suswa substation on 4<sup>th</sup> August 2017. He was accompanied by his (2-L) Deputy President, Hon. William Ruto, E.G.H., (L) Energy Cabinet Secretary, Hon. Charles Keter, E.G.H., (R) KETRACO's Managing Director, FCPA Fernandes Barasa amongst other Ministry of Energy and KETRACO officials.

August 4<sup>th</sup> 2017: His Excellency President Uhuru Kenyatta energized the first 400kV transmission lines in Kenya and East Africa. President Kenyatta commissioned the Mombasa – Nairobi and Suswa – Isinya transmission projects at the Suswa substation.

The Mombasa – Nairobi project is the first 400kV flagship project to be initiated by the Kenya Electricity Transmission Company (KETRACO). At 482km and 440kV, the Mombasa–Nairobi transmission line is the longest and highest voltage line that East Africa has ever seen. It has a transfer capacity of 1,500MW, which is only 200MW less than the current national demand that stands at 1,700MW. Furthermore, the capacity of this line today is equivalent to 19 times the capacity of the old line built in 1969, whose capacity back then was 80MW. This is indeed a great

milestone for Kenya.

The Mombasa – Nairobi and Suswa – Isinya transmission projects will improve transfer capacity of electrical energy as well as address the challenge of low voltages, high transmission losses, unreliability of supply and network security. At the same time, the two lines will also strengthen the national grid system and enhance capacity.

For the first time in Kenya, a 220kV underground cable was constructed from the Nairobi National Park to Embakasi substation in order to avoid the flight path of the Jomo Kenyatta International Airport.

Speaking during the energization exercise, KETRACO's Managing Director FCPA Fernandes Barasa demonstrated how the Mombasa – Nairobi and the Suswa – Isinya transmission projects will provide accelerated opportunities for investors and

additional investment in power such as the generation of solar, wind, geothermal, coal and gas sources.

FCPA Barasa urged investors to take advantage of the 1,500MW that has been added to the national grid today.

“Because we have affordable, reliable and sufficient power, the country can now enjoy a 24 hour economy and enhanced security. These will enable large number of manufacturers in the county and more businesses will extend their working hours thereby creating new job opportunities as well as enabling institutions such as hospitals and learning centres to invest in top notch equipment that will provide state of the art health care to wanainchi producing bright students. All these will greatly contribute to the rise of a stable economy,” FCPA Barasa added

KETRACO's 2<sup>nd</sup> Chairman, Dr. Kenneth Sigilai, H.S.C, emphasized that KETRACO's interest is to ensure that the Government's promise of availing adequate power at an affordable tariff by the year 2030 and ensuring all Kenyans have access to electric power comes to fruition.

“In future the Suswa – Isinya transmission project will enable Kenya, Uganda, Tanzania, South Sudan, Rwanda, Democratic Republic of Congo and Burundi to harness economic power surplus available in different countries throughout the year. The line will also act as a major connection point of the wind power from Turkana which upon termination at Suswa will be transmitted to Nairobi thus offering an alternative to hydro and geothermal power during peak demands,” added Dr. Sigilai.

The successful infrastructural construction of the Mombasa – Nairobi line was achieved with the financial support of the Government of Kenya, the African Development Bank (AfDB), the French Development Agency (AFD) and the European Investment Bank (EIB). The total cost of this expansive project was Kshs. 20 Billion.

Funding for the Suswa – Isinya transmission line came from the Government of Kenya, the French Development Agency (AFD) and the European Investment Bank (EIB). The total cost of this project was Kshs.5.5 billion and the contractor was Jyoti Structures from India.

# BOARD OF DIRECTORS' TOUR PROJECTS



(M) Hon. Dr. Mathew Owili, Deputy Governor, Kisumu County receiving a plaque from (2-R) Dir. Philip Mongony and (R) Dir. Arch. Kariuki Muraya of KETRACO during a courtesy call to Kisumu County Government. Also present are (2-L) Ms. Alice Moraa, C.E.C Business and Energy and (L) Dr. C. Olang'o, County Secretary.

By Carol Tuimur

Following the 2017 general elections, the Kenya Electricity Transmission Company Limited (KETRACO) Board of Directors resolved to paying courtesy calls to the newly elected county government officials. This was necessitated by the fact that KETRACO projects traverse the entire country and support in implementing these projects is a success factor.

Visiting the county offices was not the only agenda, as they also inspected a number of the already commissioned projects as well as the ongoing ones. The tour began on April 9<sup>th</sup>, 2018 and was concluded on April 13<sup>th</sup>, 2018. In a bid to ensure that the goals were met in the time allocated, the team travelled in two separate groups.

The first team was accompanied by Dir. Philip Mongony and Dir. Arch. Kariuki Muraya among other senior managers. They toured the Olkaria – Lessos project, a tower erection site and yard in Chemelil and Miwani, Kibos substation and Sondu – Homabay – Awendo transmission line.

In addition, they also paid courtesy calls to the Kisumu Deputy Governor H.E. Dr. Mathews Owili and Nandi Governor H.E. Stephen Arap Sang.

The second team was led by the outgoing Chairman, Dr. Kenneth Sigilai, HSC, Dir. Grace Ndungu and Dir. Joakim Kamere. They were able to tour the Ethiopia – Kenya interconnector, Loiyangalani –Suswa line, Rumuruti yard, Kabarnet line and the Eldoret – Kitale line. A courtesy call to the West Pokot Governor H.E Prof. John Lonyangapuo was also in their itinerary.

During the project visits, the Board appreciated the wayleave challenges affecting the transmission lines and emphasized on the need for improved supervision of the projects. The team also acknowledged the completion of some of the transmission lines such as the Ndhwa-Awendo transmission line and the strides made in the construction of the converter station at Suswa substation.

During the courtesy calls, the teams shared

planned projects affecting the specific areas and requested for assistance from the county offices in sensitizing the people on the need to cooperate with KETRACO, to help in actualizing these projects. The feedback from the county officials across the board were similar. They requested for job creation, quick implementation of the projects, avoiding delay of compensations as well as provision of Corporate Social Responsibility projects to benefit the people of their respective communities.

In response to this, the KETRACO team had a number of requests of their own which included – cooperation and assistance from the county government and the community, respect and access to wayleave, encouragement of the community to avoid vandalism of transmission line infrastructure, assistance with security matters in some project areas and to rally the community to appreciate the advantages of having these projects in their communities.

## KETRACO ENERGIZES NDHIWA SUBSTATION

By Joy Ashioya

The Kenya Electricity Transmission Company Limited (KETRACO) energized its 132/33kV Ndhiwa substation located in Homabay County on 17<sup>th</sup> May, 2018. This substation, part of the 100km 132kV Sondu - Homabay - Awendo project, will convert the incoming high voltage power from Sondu hydropower generation station to low voltage power for distribution purposes. It aims at strengthening the existing power network in Southern Nyanza and increase electricity access. This power system will therefore improve power supply reliability and provide stable voltage profiles within Southern Nyanza region.

The energization team was led by Dr. Eng. Joseph Siror, KETRACO's General Manager, Technical Services, alongside other key engineers. Eng. Siror commented

on the benefits of the project which include; improvement of power supply in Homabay and Migori counties by increasing reliability, availability and quality of power in the region. He also touched on the fibre optic cables and how it is an integral part of KETRACO transmission lines, "We are delighted to be doing more than construction of power transmission lines. We are also improving internet connectivity as well as overall telecommunication systems to ensure that we serve the region with the fastest and most stable internet. As such, our youth will be able to operate businesses such as cyber cafes and many others."

In the recent past, Southern Nyanza region has been prone to power outages but a stable grid will create an enabling environment for conducting businesses. This is good news to residents of this region as the government

is committed to set an additional 1,000 Small and Medium Enterprises (SMEs). The availability of reliable quality power in this region will attract more investors thus spurring economic growth and creation of employment opportunities in line with the government's Big Four Agenda. In addition, the community will leverage on efficient power to engage in agribusiness, significantly contributing to economic growth and empowerment.

With a rating of 72MW, the Sondu-Homabay-Awendo project involves the construction of 106km 132kV single circuit transmission line and two new 132/33kV substations at Sondu and Homabay (Ndhiwa) as well as an extension bay at Awendo. The project is jointly funded by the Government of Kenya and the KBC bank of Belgium.

## NAIROBI GETS AFFORDABLE POWER



Cabinet Secretary, Ministry of Energy, Hon. Charles Keter, EGH energizes the 8km 220kV Athi River - Embakasi underground cable at the Embakasi substation. Behind him is KETRACO's Chairman Hon. Eng James Rege, CBS and to his right is KETRACO's Managing Director FCPA Fernandes Barasa. Also present was the Principal Secretary, State Department of Energy Dr. Eng. Joseph Njoroge, CBS.

By Carol Tuimur

The Energy Cabinet Secretary, Hon. Charles Keter, EGH, commissioned KETRACO's 220kV Athi River – Embakasi underground cable that passes through the Nairobi National Park on 7<sup>th</sup> May, 2018. The commissioning will ensure that Nairobi is supplied with geothermal power from Olkaria thus greatly improving the reliability and availability of power in the city.

As a result of achieving grid stability and reliability, we hope for less power outages in the country. The line will also provide

an alternative means of power supply to Nairobi and its surroundings as well as reduce the cost of power through reduction of transmission losses.

This is the first such cable in the region to be completed and for the first time a physical electricity transmission ring around Nairobi metropolis is a reality. The underground cable runs a total of 8km out of the 100km 220kV ring. This project will realize an N-1 contingency that will firm the supply of power within the Nairobi metropolitan area. N-1 refers to the ability of maintaining

the power supply in case of failure on one of the circuits in the ring, also known as, redundancy. This is different from the current situation where a fault on one line leads to a major blackout and power outages within the city thereby disrupting ongoing activities.

The underground cable was necessary because it falls within the Nairobi National Park as well as in the flight path area. It was also necessary to preserve the National Park's aesthetics.

For KETRACO and the power industry in the region, the completion, testing and energization of the underground cable was a landmark. The project faced numerous challenges including at least eight incidents of vandalism in the last four years causing unnecessary delays and escalated costs. Other challenges included the recent flooding and the extra care needed to minimize human-animal interaction.

Hon. Keter was accompanied by the Principal Secretary, Ministry of Energy, Dr. Eng. Joseph Njoroge, CBS, KETRACO's Chairman, Hon. Eng. James G.K Rege, CBS and MD, FCPA Fernandes Barasa amongst other Ministry of Energy and KETRACO officials.



(2L) Hon. Charles Keter, EGH. Cabinet Secretary, Ministry of Energy, (2R) KETRACO's Chairman Hon. Eng. James Rege, CBS, (R) Dr. Eng. Joseph K. Njoroge, MBS and (L) KETRACO's MD FCPA Fernandes Barasa addressing journalists at Embakasi substation during the energization of the 8km 220kV Athi River - Embakasi underground cable on 7<sup>th</sup> May 2018.



(L-R) Hon. Eng. James Rege, CBS, KETRACO's Chairman, Eng. Fanuel Tsuma, KETRACO's Manager, Operations and Maintenance, Eng. Moses Kerre, KETRACO's Electrical Engineer and Ms. Ruth Mburu, KETRACO's Civil Engineer looks over the plans for the Athi River substation during the chairman's visit of the Nairobi Ring and associated substations project on 17<sup>th</sup> May 2018.



The Energization team of the Ndihiwa substation, in the control room at the substation



(5-L) H.E the Deputy Governor of Marsabit County, Solomon Gubo takes a group photo with the KETRACO team during a courtesy call to Marsabit County Government on 2<sup>nd</sup> August 2018. KETRACO had just handed over the sites for construction for thirteen community development projects within the county that have been made possible by the compensation for right of way for the 641km 500kV HVDC Ethiopia Kenya Power Interconnector (Eastern Electricity Highway Project).



A group photo of the KETRACO staff football team, High Voltage FC



An aerial view of the Loiyangalani substation.

# KISII-AWENDO TRANSMISSION LINE ENERGIZED

By Calvin Nyagudi

The Kenya Electricity Transmission Company Limited (KETRACO)'s 44km 132kV Kisii-Awendo transmission line was energized on 22<sup>nd</sup> January 2018. The term energization refers to the act of supplying an electrical plant with power. This ensures that electrical power is transmitted from one point to another.

The energization of the 132kV Kisii-Awendo transmission line and the 132/33kV Awendo substation, means that the area will now be supplied with a 132kV line from existing Kegati substation that is within the environs of Kisii town. Previously, the area was being supplied by a 33kV line that was unreliable and resulted in losses.

With the replacement of the long 33kV line that was susceptible to faults which resulted in power outages, Kisii and Awendo will experience reduced power outages as well as improved quality of power. This line will increase the stability of the voltage with the

use of power transformer voltage regulation functionality coupled with reduced lengths of the feeders.

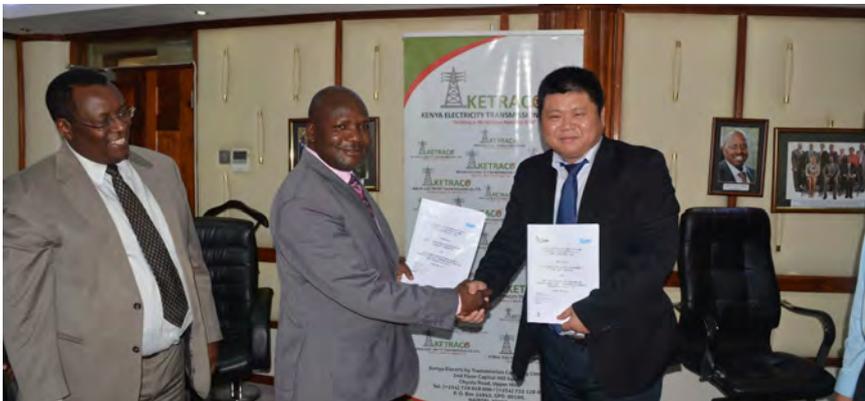
In addition, with the existence of both the old 33kV and the energized 132kV lines, there will be redundancy in terms of supply. What this means is that during the periods when the 132kV line is switched off for maintenance, the 33kV feeders will act as alternatives that will supply the areas with uninterrupted power.

On the economic front, KETRACO created employment opportunities for locals during the construction period. Further, with reliable electricity now having been achieved, this acts as an incentive for establishment of key industries. Not only establishment, but expansion of companies such South Nyanza Sugar Firm (SonySugar) which serves more than 25,000 cane farmers will be witnessed, thereby, increasing employment opportunities and growing our economy. SonySugar alone

serves cane farmers in cane growing zones of Homabay, Gucha, Transmara, Kuria, Migori, Uriri, Rongo, Kisii South, Ndhiwa and Awendo, a clear indication that with reliable electricity, many more Kenyans stand to benefit.

What's more, availability of reliable power will further improve food production in the lower Kuja Irrigation Scheme and will have a lasting impact on manufacturing and food security in South Nyanza. Hospitals stand to gain from uninterrupted power supply. Patients as well will now have access to pocket friendly healthcare, this partly brought about by inexpensive electricity. Thus KETRACO is on course to ensure the success of the four key pillars outlined by President Kenyatta as the instruments of Kenya's economic transformation. The pillars are food security, affordable housing, affordable healthcare and manufacturing.

# NEW LEASE OF LIFE FOR THE LOIYANGALANI-SUSWA TRANSMISSION LINE



FCPA Fernandes Barasa, MD KETRACO (M), Chen Chao, General Manager of Africa and Europe, NARI Group Corporation (R) and Duncan Macharia, KETRACO'S Company Secretary and Senior Manager, Legal Services (L) during the contract signing for the Loiyangalani - Suswa transmission line.

By Eva Kibicho

KETRACO signed a contract with the consortium of Nari Group Corporation and Power China Guizhou Engineering Company Limited on 30th January 2018, for the completion of the 435km 400kV Loiyangalani – Suswa transmission line. The move was brought about when the initial contractor, Isolux, went under receivership and had their contract terminated in August 2017. The project's expected completion date is August 2018. Speaking during the contract signing,

the Managing Director, FCPA Fernandes Barasa, assured Government's support to the contractors and appealed that they demonstrate commitment and teamwork as the project has strict timelines.

"Everything will be fast-tracked to ensure that the project is completed at the stipulated time and we assure facilitation of work permits to the foreigners and tight security to enable smooth delivery of the project," he concluded.

Mr. Chen Chao, the General Manager of NARI Group Corporation, confirmed that

he is aware of the significance and the urgency of the project and that they shall be hitting the ground running to ensure fast implementation of the project.

"We have outlined a methodology that will accelerate the process and I am confident that we will deliver as per the contract," Mr Chao affirmed.

The project was initiated out of a need to evacuate power in bulk generated at the distant remote areas at the northern part of Kenya. The line will contribute to evacuation of power generated by the committed plants (combined capacity of more than 400MW) and a number of other plants that are included in the country's generation expansion plan. Once completed, the project targets to increase electricity supply, quality, reliability and most of all reduced power cost as it will be evacuating the cheaper renewable energies.

The Loiyangalani - Suswa transmission line is the largest project of its kind to be implemented in Kenya and also in the region. It was conceived out of the need to evacuate power generated by the Lake Turkana Wind Power Plant that is rated at 310MW.

## KETRACO HOLDS STAKEHOLDER MEETING



(R-L) Hon. Irene Sinei, County Executive Committee (CEC) Lands, Samburu County, Eng. Justin Muna, KETRACO's Chief Civil Engineer and Yvonne Odhiambo, KETRACO's Social Economist at Boma Hotel on 22<sup>nd</sup> March 2018 during the consultation meeting for the preparation of Vulnerable and Marginalised Group Framework (VMGF), Environmental and Social Management Framework (ESMF) and Resettlement Policy Framework (RPF).

By Joy Ashioya

Every organization has individuals and groups that are interested in their activities and have a stake in its success. Keeping stakeholders informed is the best way to keep them engaged and up-to-date on topics having a potential impact on a Company's activities. By involving stakeholders in decision-making and communicating regularly through meetings and other channels, it becomes easier to get adoption and support for new ideas.

KETRACO intends to embark on the construction of the following transmission projects traversing various counties; 140km 132kV Rumuruti – Maralal, 70km 132kV Menengai – Olkalou - Rumuruti, 38km 132kV Kilgoris - Kehancha, 111km 132kV Kabarnet - Rumuruti, 80km 132kV Machakos – Mwala – Ekalakala and 60km 220kV Malindi – Kilifi.

As part of the pre-planning activities, a meeting was held on 22<sup>nd</sup> February 2018, to discuss how the execution and implementation of these projects will be undertaken. This meeting, held at the Boma Hotel, brought together a good number of our stakeholders to delve in and put across suggestions and provide feedback for a more effective plan. Apart from

the KETRACO team, members present included representatives from counties such as Baringo, Samburu, Laikipia as well as Kilifi. Also in attendance were companies such as National Environment Management Authority, National Lands Commission, Kenya Wildlife Service, Kenya Power and World Bank.

Projections indicate that among the people affected by these projects will include the Vulnerable and Marginalized Groups. This therefore provided the basis of the meeting as three documents initially drafted by KETRACO; Resettlement Action Plan, Vulnerable and Marginalized Groups Plan and Environmental and Social Management Plan, were tabled for discussion for further development in order to accommodate this group of people during the implementation of these projects.

After this successful consultative meeting, KETRACO further organized for a sit down on 23<sup>rd</sup> February, 2018, which comprised of representatives from various departments to discuss the feedback gathered. The members involved discussed how the feedback gathered can be incorporated to improve the already existing frameworks. The KETRACO team was represented by

Ahmed Sheikh, Engineer Justin Muna, Ramat Godana, Celestine Kaseve, Caleb Mango, Aida Churu, Nicholas Rotich, Purity Njau, Marine Luseka, Naomi Rotich, Beverlyne Kiprotich, Grace Nduta, Yvonne Odhiambo, Margaret Ndisha, Nancy Kataka, Linet Mbova, Constantine Ng'enh, Zaituni Asmani, Joy Ashioya and Sharon Sitienei.

This meeting acted as an appropriate avenue for the engagement of our stakeholders as it kept them informed on the important steps we are taking as a company to achieve our vision and accomplish our mission. Being the first meeting of this kind, KETRACO set a pace worth acknowledging.

## KETRACO STAFF SENSITIZED ON FINANCIAL MANAGEMENT



Amos Sampion, KETRACO's Human Resource Officer asking a question during the KCB sensitization forum that was held on 14<sup>th</sup> March 2018

By Carol Tuimur

“The philosophy of the rich and the poor is this; the rich invest their money and spend what is left, while the poor spend their money and invest on what is left,” Rich Dad, Poor Dad.

**W**e all have different ambitions and drives in life but at the end of the day, the goal is always to make money. However, money, like emotions, is something you must control to keep your life on track. In KETRACO, staff have access to various financial opportunities. This is why the management saw it fit to have Kenya Commercial Bank (KCB) conduct a sensitization on financial management.

This event was conducted at the KAWI auditorium by three representatives from KCB namely; Ms. Judy Limo (Branch Manager, Next Gen branch), Mr. James Kirwa (Regional Sales Manager, Nairobi Central) and Ms. Sharon Chelegat (Personal Banking, Next Gen branch) on March 14<sup>th</sup>, 2018.

Ms. Judy Limo kicked off the session by giving a brief introduction on financial management. “If one is able to manage their finances well, they will be able to avoid financial stress, set realistic goals, measure their achievements, acquire financial knowledge and be able to develop financial skills.”

She spoke on the benefits of good financial management, which included; being able to maximize wealth and earnings, achievement of financial security and promotion of inner peace as well as being able to set specific, measurable, attainable, recorded and trade off (SMART) financial goals.

She also specified on ways one can effectively manage their finances by mentioning issues such as shopping sensibly, controlling ones debt costs by managing their costs on loans, avoiding ‘get-rich-quick’ schemes such as Bitcoin, Lotto and SportPesa amongst others. She further echoed on the importance of paying oneself first by doing a standing order and sharing financial information with a trusted family member or friend.

This was quite an interactive session that was seemingly enlightening to the staff. Based on the number of questions asked, the staff appeared responsive to the information shared. The team highlighted many key issues that could have a direct or indirect impact. Having received a bucket load of information on managing finances, it is believed that KETRACO staff sharpened their already existing financial management skills.

## SUPPLIERS ENABLED ON HOW TO CONDUCT BUSINESS WITH KETRACO

By Eva Kibicho

**T**he Kenya Electricity Transmission Company Limited (KETRACO) held a two-day workshop on 22<sup>nd</sup> and 23<sup>rd</sup> February 2018 at the Boma Hotel. The suppliers sensitized were Access to Government Procurement Opportunities (AGPO) certified Youth, Women and Persons Living with Disability as well as Small Work Contractors’ categories in a bid to sensitize them on expectations and procedures to follow when engaging with KETRACO.

KETRACO has a database of all its suppliers, and the list keeps growing as more needs arise. To this end, the stakeholder engagements are often held to ensure that new suppliers are well informed in conducting any business and similarly keep the existing suppliers abreast with new developments. The suppliers are expected to uphold the company standards while conducting business. Key areas of focus during the workshop included: procurement procedures, payment procedures, branding and service delivery.

During his presentation, the Senior Manager, Supply Chain Management, Mr. Peter Njehia noted that procurement in government is guided by Public Procurement Act 2015. He continued to state that the Act provides procedures for efficient public procurement and assets disposal by public entities. In a bid to support our local manufacturers, the Act states that all public entities must support the Buy Kenya Build Kenya initiative. Manufacturing is among the pillars of the Big Four Agenda by President Uhuru Kenyatta, and the success of the agenda will lead to job creation and ultimately economic transformation. Mr. Njehia also noted that 30% of procurement is awarded to the youth under the Youth Access to Government Procurement Opportunities (YAGPO).

The engagement also covered issues on payment processes. This was a critical area as the suppliers raised concerns that were addressed accordingly. CPA Tom Imbo, Ag, General Manager, Finance and Strategy emphasized that for a prequalification, a supplier should submit the following documents; KRA pin, tax compliance certificate, AGPO certificate and company profile. He also noted that payment to a supplier should be within thirty (30) days of the receipt of the documents, provided the documents are in good order. The suppliers were urged to take note that KETRACO is required by law to deduct withholding VAT rate of 6%. In the case of suppliers delivering professional services, KETRACO is required to withhold 5%. In both cases, the suppliers receive a withholding tax certificate on their itax portal that they will use in filing income tax returns.

The suppliers were also sensitized on upholding KETRACO’s brand. They were urged to take note of KETRACO’s logo and brand standards.

Lastly, our customer service team gave a presentation on the service charter. The service charter outlines the standard of service that any stakeholder can expect from the organization. The suppliers were urged to communicate their issues clearly to enable KETRACO staff address the issues satisfactorily. Overall, KETRACO pledged to deliver quality services to all its customers and stakeholders.

## BOOSTING REGIONAL BUSINESS



Opening of the Expression of Interest tender documents for the implementation of the Ethiopia-Kenya interconnector on 31<sup>st</sup> January 2018

By Eva Kibicho

In an effort to facilitate regional power exchange, trade and ultimately make Kenya a business and investment hub, KETRACO kicked off the tendering process that will see a successful and eligible consulting firm implement the Ethiopia - Kenya Interconnector. The initial process of Request for Expression of Interest had been conducted, and a total of twenty firms submitted their bids, that were opened in their presence at KETRACO offices on 31<sup>st</sup> January 2018. The bids then through the evaluation process, shortlisting and successful bidders were notified.

The Ethiopia - Kenya Interconnector also known as the Eastern Electricity Highway Project involves construction of a 612km 500kV HVDC line from Ethiopia to Suswa substation and convertor stations at both ends. The line will have a capacity to transfer 2,000MW and will allow Kenya and Ethiopia as well as other neighbouring countries to exploit the diverse range

of energy resources available in power generation. The successful completion of the project will be a step closer to achieving Kenya's Vision 2030 that aims to transform Kenya into a newly -industrialized, middle-income country providing high quality of life to all its citizens in a clean and secure environment.

In order to ensure that Kenya remains competitive in the local and international markets, KETRACO continues to play its socio-economic transformative role in the economy, and has established strategic partnerships with development partners that provide funding to fast-track projects. To this end, the World Bank has funded this particular project to a tune of Ksh. 63.2 billion. The transmission line is expected to be complete by October 2019.

In the same spirit of enhancing regional power integration, KETRACO has set out to build other regional interconnectors with

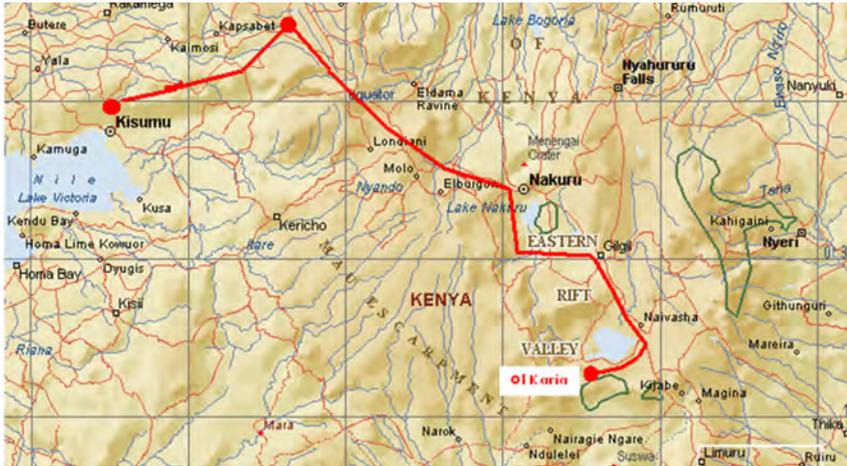
neighbouring countries that will open up Kenya to the global market share. In addition to the Ethiopia-Kenya Interconnector, other projects that are underway include 132.5km 400kV Lessos - Tororo line (Kenya - Uganda Interconnector) and 96km 400kV Kenya - Tanzania Interconnector.

“

Did you know the three interconnectors KETRACO is currently implementing will create the interconnector backbone for the region where Kenya will become the central node on the integrated system?

”

## MORE POWER TO WESTERN KENYA



The 300km 220kV Olkaria- Lessos- Kisumu transmission project map

By Sulea Naliaka

Counties in the western region will soon enjoy efficient and reliable power supply via the 300km 220kV Olkaria- Lessos-Kisumu line. The project that has three lots involve the construction of the 400kV Olkaria-Lessos line, 220kV Lessos-Kisumu project and substation works extension at Olkaria, Lessos and Kisumu (Mamboleo). The project will also see the construction of a new substation at Kibos. The total electricity generation at Olkaria II and II AU is 105MW.

The western region is currently served by Sondu and Turkwel generation plants and the supply is insufficient and unreliable. The project will therefore offer an evacuation route for the geothermal power from Olkaria to West Kenya and also provide voltage support to the region.

At Kibos substation, there shall be a link between Kisumu (Mamboleo) substation to the 220kV transmission line from Lessos substation. The station shall provide feeders to support Kisumu County with alternative supply. There is also provision for two future bays.

The project whose contractors are Kalpataru, NARI and Sieyuan is financed by JICA.

During the project's pre- construction activities, a feasibility study was done and it indicated the general economic capability of counties in the western region is slowed down because of insufficient and unreliable power supply in the region. The many factories like sugar factories in the region were not utilizing their maximum potential because of inadequate power. Upon the completion of the project therefore, the region will experience a spur in the economic growth.

Speaking during an interview, KETRACO's General Manager for Technical Services Dr. Eng. Joseph Siror noted that the project has motivated investors in the region and a number of industries are already being set up, with the promise of reliable electricity supply. "This will sprout and translate to employment opportunity during construction and operation of the same. For example, Kibos Group of Companies are already putting up a paper industry and another sugar refinery industry," Eng. Siror added. The project will also improve access to infrastructure

during construction and operation.

This is also in line with the country's long-term development blueprint, the Vision 2030 that aims at transforming Kenya into a globally competitive, newly industrialized, middle income and prosperous country. The growth objectives underpinning the Vision 2030 require a sustainable annual economic growth rate of more than 10% supported by industry, agriculture and services. Efficient, accessible and reliable infrastructure is identified as an enabler for achieving sustained economic growth, development and poverty reduction by lowering cost of doing business and improving the country's global competitiveness.

Part of the project, i.e the Lessos- Tororo line forms part of the Interconnection of Electric Grids of the Nile Equatorial Lakes Countries (NELSAP) Project. The NELSAP project consists of the construction and upgrading of interconnection lines of the grids of Nile Equatorial Lakes Countries to increase their cross-border exchange and trade energy and to improve the transient stability of the systems, safety and affordability of supply, as well as flexibility in the operation of the interconnected networks of these five Nile Basin Initiative Countries.

The Lessos - Tororo line will facilitate power interchange between Kenya and Uganda, increase access to electricity, reduce transmission technical losses and improve regional integration by enabling cross boundary energy trade that will in the long run facilitate power trade within the countries of the Eastern Africa Power Pool. The project will also see improvement in planning of energy infrastructure and reduce the cost of electricity to the consumers.

The Olkaria- Lessos lot will complete the 400kV Olkaria- Lessos- Tororo link and subsequently the greater Mariakani - Nairobi East - Gilgil - Lessos- Tororo 400kV line.

However, the project is experiencing some challenges that include; presence of a high water table in Kibos, contrary to what was captured in the geotechnical investigation. The contractor mitigating this is reviewing the designs with

more reinforcement. Another challenge being faced is right of way. This has proved to be the most difficult part in a transmission line project.

Delays in acquisition of way-leave usually leads to claims by contractors due to work stoppages and extensions of projects. However, the new Land Bill will ease right of way acquisition. Vandalism is also a challenge and the company is now seeking assistance from the Critical Infrastructure Protection Unit even as they sensitize the local communities on the dangers.

## A NEW DAWN FOR THE NATIONAL SYSTEM CONTROL CENTRE

KETRACO has been in existence for over TEN years now. In that period, a lot of ground has been covered towards achieving the company's mandate. In the same period the organization's foothold has increased from undertaking 3 projects to the current 30-plus projects all over the country and as the power system expands, plans are underway to construct a new, modern state of the art National System Control Centre (NSCC). The new NSCC will incorporate smart grid principles with wider system monitoring capability, planning, training, control and load dispatch functionalities. This will be critical in meeting the impending challenge of the bigger national grid within the Eastern Africa Power Pool (EAPP).

As the company sets out to put up a National System Control Centre, it is important to note that good maintenance regimes do not happen by accident: they need careful planning, proactive management and comprehensive communication and reporting. The tone for good system management is also established beforehand by effective communication during project design, construction and commissioning.

Upon completion and commissioning, the ultra- modern Control Center will provide more accurate load demand projection/forecast (planning), more coordinated, effective, efficient and economic generation dispatch/scheduling and unit commitment, more accurate and faster operational decisions, shorter supply interruption periods, more efficient coordination of regional transmission interconnectors and energy wheeling and an effective power system operator training.

The modern NSCC system will incorporate such functionalities as Automatic Generation Control, Power System Simulation, Fault Incidence Replay and Analysis, Load Forecast and Economic Load Dispatch, Unit Commitment, Import/Export Scheduling, among others.

In order to guarantee service continuity and quality, communications component is important in planning, real time/ control phase and in the operation analysis phase.

## ENABLING THE MANUFACTURING SECTOR



FCPA Fernandes Barasa, KETRACO's MD (M) and other guests follow the Nation Leadership Forum at the University of Nairobi Auditorium on 19<sup>th</sup> March 2018

By Carol Tuimur and Eva Kibicho

**K**ETRACO sponsored the Nation Leadership Forum that was held on 19<sup>th</sup> March 2018 at The University of Nairobi auditorium. The event was organized by Nation Media Group in conjunction with other partners namely; Kenya Association of Manufacturers (KAM), Coca Cola, Ministry of Trade, Industry and Cooperatives, Crown Paints, University of Nairobi among others. The quarterly event brought together thought leaders from diverse backgrounds to spotlight issues affecting Kenyans by provoking international, regional and local dialogue, shaping opinions and providing solutions to the critical issues in the development and growth of Kenya.

The forum themed 'Manufacturing 1 million jobs' delved deeper into challenges that affect the manufacturing sector such as industry competitiveness, access to markets and

sustainability. Manufacturing is among the Big Four Agenda for development by the current government. The government has committed to support growth of manufacturing through the blue economy, agro processing, textiles and leather which will contribute to GDP growth from 8% to 15%.

During the discussions, it was noted that energy stability, reliability and accessibility is key to the success of the manufacturing sector.

According to KETRACO's MD, FCPA Fernandes Barasa, KETRACO has invested in high voltage transmission lines to ensure that Kenya has stable and quality power. "Last year KETRACO energized the 400kV Mombasa – Nairobi transmission line that has enabled cement manufacturers to reap big," FCPA Fernandes said. KETRACO MD continued to note that the company has invested towards the 400kV

Olkaria - Lessos - Kisumu line that will transmit power from Olkaria to the western region where demand is fast growing. "The energization of high voltage transmission lines will encourage steel manufactures to invest in Kenya in an effort to boost industrialization," FCPA Fernandes added.

In his final remarks, he assured Kenyans that more people in every corner of the country will be connected to the national grid in the next four years. His assurance is aligned to KETRACO's strategic plan that focuses on deepening the development of new transmission infrastructure throughout the country.

In a bid to boost industrialization, the government has also committed to set up 1000 small and medium enterprises (SMEs) that will contribute to the growth of the manufacturing sector. To ensure that the SMEs are operational, KETRACO is making and continues to make great strides in enhancing connectivity through the electricity access projects. The 132kV transmission lines expand the access to electricity in the urban, peri-urban and rural areas. Furthermore, the SMEs will create job opportunities.

Electricity is ultimately a critical infrastructure for any economy to thrive. There is a growing demand for power in Kenya and KETRACO has been mandated to ensure that every part of the country has access to power to enhance reliability, reduce interruptions and always be ahead of the demand.

In Kenya, focus has been shifted to green energy that is reliable and affordable. KETRACO is playing a critical role in ensuring the success of the Big Four Agenda and Vision 2030 which are instrumental to Kenya's economic transformation.

## KETRACO TO CONNECT HOMES ALONG THE KENYA - TANZANIA TRANSMISSION LINE

By Calvin Nyagudi

**I**n today's world, engaging in any business with the sole agenda of making profit is not enough. Consumers indulge in commodities produced by companies that positively impact their communities. Around the globe, companies have divisions or foundations that have long practiced some form of corporate social and environmental responsibility. The specific purpose is to ensure contribution to the well-being of the communities they affect on whose goodwill their success depends.

Locally, KENGEN is an example of a company that runs its own foundation, the KENGEN Foundation. International examples include Coca Cola, Walmart and ExxonMobil Foundations. The Kenya Electricity Transmission Company (KETRACO) has not been left behind in this regard. With the numerous ongoing projects, the Company's operations are informed by

its Corporate Social Responsibility policy document.

This goes to show how critical and important CSR is to the organization. In the recent past, KETRACO has built many classrooms, toilets and administration blocks, and funded medical camps in various parts of the country that are affected by transmission infrastructure. Environmental conservation is equally at the heart of our operations. The company, in partnership with Kenya Forest Service, has been able to plant over 12,000 trees.

But with all these, we have had grievances from Project Affected Persons. They have complained of not being direct beneficiaries of KETRACO's electricity infrastructure. This informed the rural electrification component during the construction of the Kenya-Tanzania transmission line project. This will be carried out along the entire interconnector.

This component was created as a CSR project to the community members living along the entire transmission line. It will encompass the construction of low voltage lines (33kV and 11kV), installation of transformers and 415V links to consumer houses as well as connection of meters to the identified households. Thus despite the mandate of KETRACO being purely that of implementation and operation of high voltage transmission infrastructure, we will implement the rural electrification along the Kenya-Tanzania transmission line then hand over to Kenya Power.

Once completed, the community stands to gain in many ways. First, the businesses along the line will be able to achieve a 24-hour economy. Schools, hospitals and other amenities will smoothly run their operations that in the long run will benefit the community members. With electricity, natural security will also be enhanced.

## KETRACO SHINES IN THE ASK SHOWS

Last year, KETRACO participated in the Nakuru National Agriculture Show from 4<sup>th</sup> to 8<sup>th</sup> July, Mombasa International Show from 30<sup>th</sup> August to 3<sup>rd</sup> September and The Nairobi International Trade Fair (NITF) from 2<sup>nd</sup> to 8<sup>th</sup> October, 2017. The Company scooped first prizes for; Branch Chairman Commendation Trophy, the Government Stand that Best Interprets the Current Show Theme and the Best Energy Services and Conservation Sector stand respectively.

The Company also scooped the second and third positions in the Best Energy and Conservation Sector Stand and the Best Government Stand Interpreting this Year's Show Theme in Nakuru as well as the second prize in the Best Energy Services and Conservation Sector stand in Mombasa.

Organized by the Agriculture Society of Kenya (ASK), the trade fairs aim at bringing together various stakeholders and investors, both internationally and locally, to showcase their products and services that promote innovation and technology in agriculture and trade.



(L) H.E President Uhuru Kenyatta, C.G.H., presents (R) KETRACO's Managing Director, FCPA Fernandes Barasa with the prize for KETRACO emerging first in the Best Energy and Conservation Category during the Nairobi International Trade Fair on 6<sup>th</sup> October 2017. Looking on is (2-R) KETRACO's 2<sup>nd</sup> Chairman, Dr. Kenneth Sigilai, HSC.

By Ivy Nyangara

In addition to scooping various awards, various dignitaries paid courtesy visits to our stand including Dr. Richard Lesiyampe, the Principal Secretary Ministry of Agriculture, Livestock and Fisheries, Nairobi's Deputy Governor, Hon. Polycarp Igathe, KETRACO's Chairman Dr. Kenneth Sigilai, MD FCPA Fernandes Barasa among others, who were impressed by the level of our commitment to accomplish our mandate as well as our zeal to attain our vision.

Speaking during the official handing over of the trophies in Nairobi by the President, KETRACO's Chairman applauded the team for being consistent with the trophies and challenged them to retain them come next year. "Everybody is impressed by the general stand setup and the simplified presentations to guests," noted Dr. Sigilai.

## KETRACO'S SPECIAL TOWER; THE TALLEST TOWER IN EAST AFRICA



The Suswa – Isinya transmission line's special tower (6B/1). This tower is 94m high (10 m higher than Nyayo House) making it the tallest in Kenya.

By Sulea Naliaka

When you think about the tallest buildings in the world, what comes to your mind, Burj Khalifa? Shanghai Tower? One World Trade Center? How about in Kenya? Britam Towers (200m)? KICC (105m)? Well, KETRACO's special tower is 94 meters high, just 11 meters shorter than the KICC and more than two times the size of an average tower.

The tower falls along the 103km 400kV Suswa – Isinya transmission. The special tower (no. 6B/1) weighs 82 tons and occupies ground area of 32 meters squared. This tower is exceptionally high as it is in a valley and the adjacent tower is at the top of a high cliff. The additional height and weight enables it to support the conductors safely and at the predetermined ground clearance.

The world's highest transmission tower is currently under construction and will measure 380 metres. The tower is located in eastern China's Zhejiang Province. The 380-metre tall electricity pylon will be four times the height of London's Elizabeth Tower which houses the bell known as Big Ben. Furthermore, it will break the world record for the tallest power pylon, currently held by China's damaoshan pylon which stands at 370 metres according to gbtimes, an online infrastructure magazine.

The Suswa – Isinya transmission line is part of the Nairobi Ring and associated substation projects which also involves the construction of substations at Suswa, Isinya, Kimuka, Athi River and Komarock. It was commissioned on 4<sup>th</sup> August 2017 by H.E. President Uhuru Kenyatta.

The line from Suswa to Athi River substation through Isinya will provide alternative means of power supply to Athi River and its environs as well as address challenges of low voltage, high transmission losses, unreliable supply and network security. This line will also provide reliable and stable power operations at the Export Processing Zone (EPZ) in Athi River, cement factories, steel companies and learning institutions in the area.

# IMPROVING THE CUSTOMER EXPERIENCE AT KETRACO THROUGH IN HOUSE TRAININGS

By Elizabeth Oriago

Providing outstanding customer service experience for our visitors is a fundamental element in KETRACO. The customer service team undertakes a quarterly based in-house training with the aim of improving service delivery. Project clerks and reception point staff (security guards) have so far been enriched with best practices in customer service. This team engages with customers and stakeholders on a daily basis.

## The Benefits of Customer Service Training

### Increases motivation and engagement.

Customer service has a big impact on the success of an organisation. In-house trainings directly motivate and engage members of staff attending to visitors. This training creates an open forum to raise and iron out challenges that exist during service delivery.

**Improves knowledge and skill set.** Based on already published literature, it is safe to say that the main purpose of any training course is to improve the knowledge or

skill set of an individual. When it comes to customer service, this involves areas like enhancing communication, the importance of listening to the customer, problem-solving approaches and the need to be organised.

The customer service team conducts trainings that include the same set of competencies, which give the entire workforce a standard process to deal with a customer's issues or questions and creates a sense of team spirit at the same time.

### Boosts confidence and morale.

Confidence is an incredibly important trait when it comes to making a first impression. If an employee does not have faith in their ability to handle a customer or a stakeholder, customers will not think highly of the brand.

However, training boosts the morale for employees who will then be more eager to serve the customer and improve their experience. This can also transform the whole workplace environment and generate good vibes.

### Improves reputation and standing.

Word-of-mouth can seriously hurt an organisation's reputation, but it can also improve a company's image. So, if you manage to deliver an enjoyable experience, which comes about through well trained, motivated and knowledgeable staff, your visitors are sure to pass on favourable recommendations and reviews.

### Boost uniqueness and individuality.

On top of that, providing the best customer service can differentiate your business from industry rivals. Some sort of niche can be invaluable during tough economic times or in competitive marketplaces and having a team of exemplary customer service staff will give you much needed individuality.

The ability to walk into work and knowing that every department is on the same page, ready to help clients, proves the importance of corporate training.

All in all KETRACO endeavours to perform to the highest of standards to improve service delivery to all our customers and stakeholders.

# I BID WITH KETRACO, AND I WOULD DO IT AGAIN!

By Carol Tuimur

Recently, the Kenya Electricity Transmission Company Limited (KETRACO) invited sealed tenders from eligible candidates to purchase various equipment including vehicles, furniture items, tyres and assorted vehicle accessories, assorted wall partitioning material, printers, computers and their consumables.

This bid was made available to the external publics through an advert placed in the newspapers. Attended by a number of potential bidders, this annual event was conducted by the procurement team and it took place at the KETRACO office.

At the beginning of the year, the Disposal Committee requests for disposable items from each department and they are put in lots according to their categories. The purpose of this bid was to get rid of project

properties and have it re-absorbed into the system in form of money.

Among other participants, Mr. Kimeu was one of the bidders who won a motorcycle. We were able to get in touch with him and he commended KETRACO for the transparent, corrupt-free process by stating that, "I was lucky to bid and win a motorcycle from your organization. I have to say that the process is the most transparent that I have seen in the recent past, especially from a government body."

As much as the proud owner noted that the aftermath of exchanging the item to his name was unexpectedly longer than anticipated, he applauded KETRACO for being one of the few open, corrupt-free institutions. He acknowledged the honesty and transparency displayed by the whole procurement team during the process.

Having spoken to the Senior Manager Supply Chain, Mr. Peter Njehia, he reaffirmed that indeed the bidding process was transparent, successful and participative just like any other similar transactions done by KETRACO.

He further stated that the main goal of the procurement department at the beginning of every financial year is to have a procurement and disposal plan. The standard objective is to procure what is needed by various departments and dispose what is not needed which they have been able to accomplish.

With the ongoing state of corruption in the country, KETRACO aims to show that we are against corruption and are ready to work with other like-minded groups and individuals in support of a corrupt-free cause.

# Mombasa - Nairobi Transmission Project,

## Kenya's largest and longest transmission project to date

“About Kshs. 3.6 billion annually will be potentially saved by power consumers from the reduced fuel cost component in individual bills once we switch off thermal power generation plants in the Coast. This will add to the annual savings of Kshs. 1 billion (250 million from Lamu and 750 million from Garissa) that materialized when we connected Lamu and Garissa to the grid by switching off the stand-alone generators.”

“The Mombasa – Nairobi line is the first 400kV flagship project to be initiated by KETRACO. It is both the longest and highest voltage line that East Africa has seen. With a transfer capacity below 1,500MW, slightly below the current demand of 1,700MW, this line is equivalent to 19 times the old line built in 1961 that had a capacity to carry 80MW.”

### SCOPE

The 482km double circuit Mombasa – Nairobi transmission line commenced in December 2010. The line is constructed with two voltage level, 400kV and 220kV. The section between Mariakani and Isinya is rated at 400kV while the Rabai – Mariakani and Isinya – Embakasi sections are rated at 220kV. The project also involved the extension of Rabai and Embakasi substations. It has a capacity to evacuate 1,500MW.

### IMPLEMENTATION

The project was constructed in two phases.

**Phase 1** was constructed in three lots as follows:

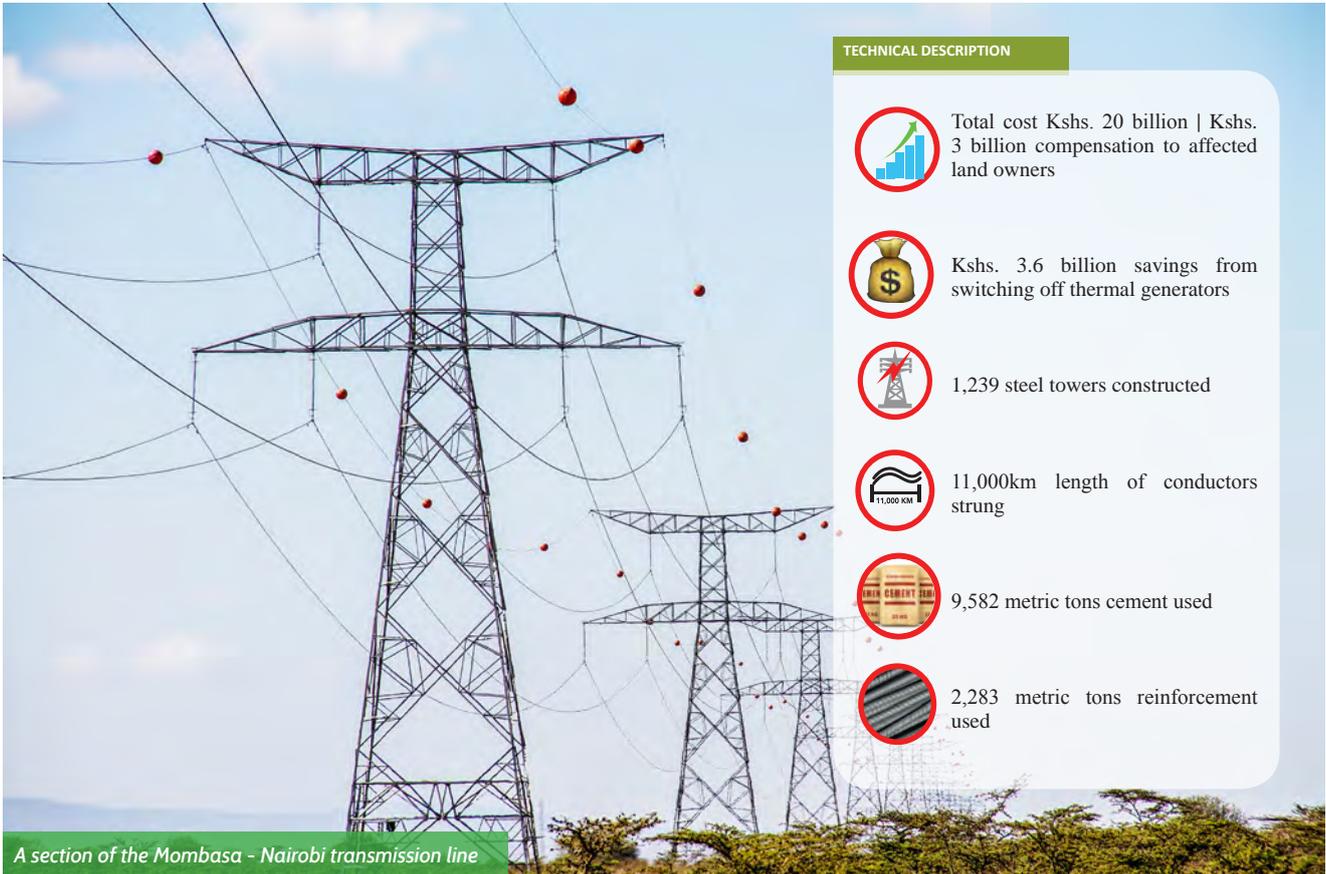
**Lot 1:** Construction of the 29km of 220kV double circuit overhead transmission line from Rabai substation to Mariakani substation and 163km of 400kV double circuit overhead transmission line from Mariakani substation to the

Tsavo River.

**Lot 2:** Construction of the 52km of 220kV double circuit overhead transmission line from Embakasi substation to Isinya substation and 230km of 400kV double circuit overhead transmission line from Isinya substation to the Tsavo River.

**Lot 3:** Extension and modification to the 220kV substations at Embakasi and Rabai to accommodate two new overhead transmission line circuits from Embakasi to Rabai, including 8km of 220kV cable from Embakasi substation to Nairobi National Park, the first of its kind in Kenya. This was done in order to avoid the flight path of the Jomo Kenyatta International Airport.

**Phase 2** Construction of the substations at Mariakani and Isinya. The Mariakani substation is essential part of this line as it steps up the power to ensure it is transmitted over long distances (over 400km) thus reducing transmission losses.



A section of the Mombasa - Nairobi transmission line

### TECHNICAL DESCRIPTION

-  Total cost Kshs. 20 billion | Kshs. 3 billion compensation to affected land owners
-  Kshs. 3.6 billion savings from switching off thermal generators
-  1,239 steel towers constructed
-  11,000km length of conductors strung
-  9,582 metric tons cement used
-  2,283 metric tons reinforcement used

# SUSWA - ISINYA TRANSMISSION PROJECT, to transfer 1,200 megawatts of electrical power



An aerial view of Suswa substation

## SCOPE

Commenced in October 2012, this line is part on the Nairobi Ring and Associated Substations project. The scope of the transmission line includes the construction of the 103km 400kV double circuit transmission line from from Suswa substation to Isinya substation. In addition to construction of this line with a capacity to evacuate 1,200MW, the project also involves the construction of two 400/200kV substations at Suswa and Isinya and 220/66kV substations at Kimuka, Athi River and Nairobi East (Koma Rock).

## TECHNICAL DESCRIPTION



Total cost Kshs. 3.5 billion



283 steel towers constructed



1,800km length of conductors strung



9,582 metric tons cement used



Average tower height is 40m  
Average tower weighs 19 to 25 tons (depending on the terrain). Tallest tower 94 meters high, weighing 82 tons. The special tower is exceptionally high in order to support the conductors safely and at the pre-determined ground clearance.

## BENEFITS OF THE MOMBASA - NAIROBI AND SUSWA – ISINYA TRANSMISSION PROJECTS

1. Utilization of the most efficient and cheaper geothermal power and wind energy from Olkaria's geothermal sources and later from Lake Turkana Wind Power Plant respectively, saving Kshs. 3.6 billion annually that will go directly to power consumer's pockets.
2. Boost power transfer capacity between Mombasa and Nairobi by replacing the existing 66kV power line which has been frequently subjected to various challenges including vandalism, marine pollution and scavenger birds causing short circuiting of the line.
3. Energization of the proposed Special Economic Zones in Mariakani and Voi areas with reliable power.
4. Stable and reliable power supply to the region that suffers frequent outages. This will, therefore, accelerate economic growth and development in the two cities and satellite towns in between like Isinya, Athi River, Kitengela and Kisaju
5. Powering the Standard Gauge Railway once it switches to electric power.
6. Industrialization through supply of quality power in the upcoming cement, oil refineries, steel and other industries within Machakos and Kajiado counties; creating more job opportunities for Kenyans.
7. Facilitate international power trade between Ethiopia, Kenya, Tanzania and Southern Africa. This will be achieved through creating a connection at Isinya that will supply Tanzania and the connection at Suswa to Ethiopia after completion of the Ethiopia-Kenya interconnector (Eastern Electricity Highway).
8. The Suswa – Isinya transmission line will act as a major connection point of the wind power from Turkana which upon termination at Suswa will be transmitted to Nairobi and other parts of Kenya such as Coast through the Mombasa

– Nairobi transmission line thus offering an alternative to hydro and geothermal power during peak demands.

9. In future, the fibre optic cable of the Mombasa – Nairobi and Suswa – Isinya transmission lines will be joined to the Eastern Electricity Highway Project (Ethiopia – Kenya interconnector) at Suswa, and the Kenya – Tanzania interconnector at Isinya and the Olkaria – Lessos – Tororo transmission line will be additional connection to the marine cables for Kenya, Tanzania, Ethiopia, Uganda, Rwanda, Burundi and Eastern Congo, thus providing secure redundancy in fibre optic communication.
10. The Suswa – Isinya transmission line will achieve grid stability by providing alternative means of power supply to Nairobi and further onto the Coast region through the Mombasa- Nairobi transmission line as well as reduce the cost of power through reduction of transmission losses and supply of geothermal power to the coast region enabling the reduction of thermal generation.
11. The fast growing ICT sector in the country will enjoy reliable connectivity at lower costs that will be provided by the fibre optic cable installed on transmission lines. This will in turn improve ICT services such as internet connectivity, secure e-banking among others. Countries like Djibouti were eagerly awaiting the completion of these lines as well as the on-going Ethiopia-Kenya line so that they will be able to create another line from the Indian Ocean to Djibouti via Ethiopia for redundancy purposes. Such a connection would have offered an alternate route, as witnessed when the Seacom cable was cut in the Red Sea.

Currently, the Coast region is supplied power via three thermal generators using Heavy Fuel Oil (HFO):-

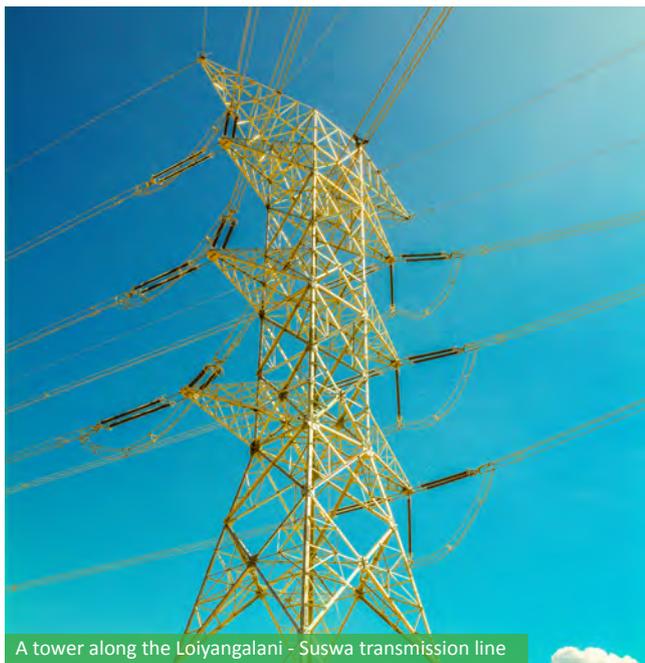
1. Rabai Power Limited – 90MW
2. Tsavo Thermal Power Station – 75MW
3. Kipevu I Thermal Power Station – 73.5MW
4. Kipevu III Thermal Power Station, 120MW operated by Kenya Electricity Generating Company (KenGen) and the largest in East Africa.

55% of demand is concentrated around Nairobi environs and with more transmission lines spreading around the country, it is expected that a demand will increase and be even across the regions.

By switching off the two KenGen thermal generation plants, about Kshs. 3.6 billion will be saved by all power consumers by reducing the fuel cost component in individual bills.

When Lamu and Garissa were connected to the grid and their stand-alone generators were switched off, it led to savings of Kshs. 1 billion (250 million from Lamu and 750 million from Garissa) annually.

# TOWERS IN TRANSMISSION LINES



A tower along the Loiyangalani - Suswa transmission line

By Taddeo Mwaura

## Why do we need Towers?

Simply put, towers are structures in a transmission line (TL) that supports the conductors through which power is transmitted. If the conductors were buried on the ground through trenches, like water supply and waste water systems, towers would be unnecessary. But that would not be without a huge cost of underground cables.

With the increased research in the area of wireless power transmission, probably one day transmission lines will be an obsolete technology. This is a futuristic thought which is pegged on the success of development of the rather nascent wireless technology.

## Tower Types

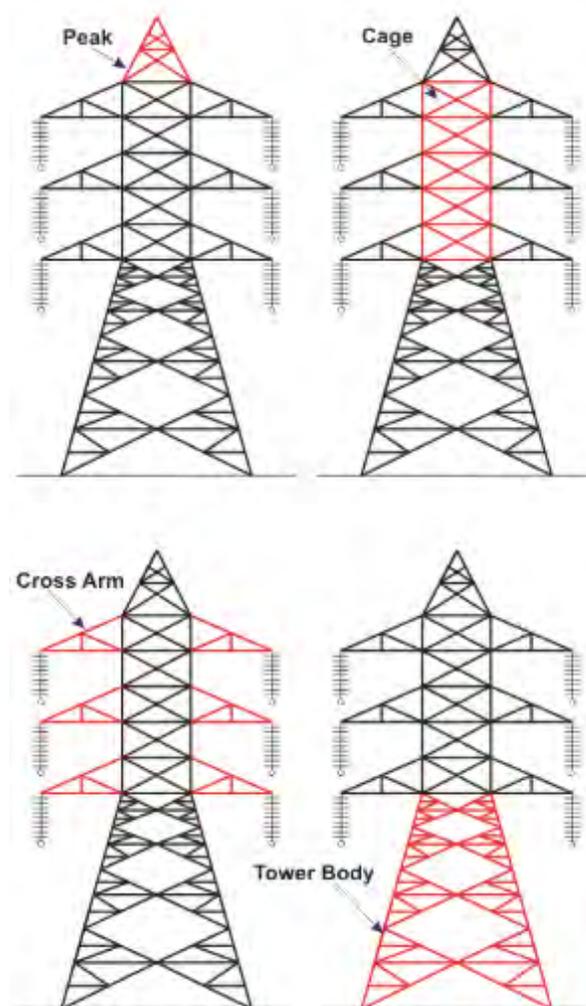
Depending on the electrical requirements, tower configurations are categorized as, single circuit, double-circuit and multi-circuits. Voltage level difference also introduces yet another classification; 132kV, 220kV, 400kV etc. Current type informs the towers will either be high voltage alternate current (three phase scheme) or high voltage direct current (two phase scheme) type. Some other classifications are vertical and horizontal types, based on arrangement of circuits on the arms of the tower. Depending on ground support mechanism, there are guyed towers and self-supporting towers. Examples of self-supporting towers are lattice or monopoles. There are architecturally appealing towers like delta (cat-head) and even those that imitate shapes of living things.

Functionality also makes the towers in a TL be classified as either suspension, angle or dead end tower. There are special towers, transposition towers, inserted on long distance lines to switch the position of conductors for technical reasons. Towers could also be categorized by material used; timber, steel or concrete. In Kenya, the material of choice for transmission towers is steel.

## Tower Geometry

The general configuration of a tower is usually governed by the electrical requirements. To fix the geometry of the tower, parameters such as ground electrical clearance at mid-span (sag), conductor to conductor and conductor to tower clearances are strictly adhered to. Insulator string length is also factored in.

A typical tower will have peak(s), cage, cross-arms and the tower body. Electrical shielding will determine the geometry of the peak(s). Present also are the leg and body extensions which are attached to the basic tower body due to the unevenness of the ground. The base width of the tower at the foundation level may be arrived at using empirical relationships and experience.



Transmission Tower parts

Image credits: electrical4u.com

## Tower Design

Similar to design of any structure, towers are designed to support self-weight, imposed weight and environmental loads. High voltage transmission steel towers are designed to resist the weight of steel, the weight of conductors and ground wire/ OPGW together with all

Cont from page 20

accessories. Furthermore, the towers should resist wind loading to the structure and conductors. Tens of load combinations are developed from the various load cases. The selection of load cases is carefully done to capture different loading scenarios under normal loading and broken wire conditions. The matrix of these loading combinations is judiciously chosen to guarantee safety, reliability and constructability of the towers during construction phase, stringing and eventually during operation.

Individual tower members are sized including the bolts and connecting plates. In addition, full scale prototype tower is tested as part of design. Foundations are also designed for the various soil types anticipated along the line.

### Tower Testing

Testing entails assembly of a prototype tower on a test bed and applying loads to the tower via an electro-mechanical loading process, to simulate the anticipated conditions on the ground. The process involves attaching pulling ropes at preconceived positions on the tower and strain gauges (load cells) to measure the applied strains. Thereafter, the strains are applied by pulling away the ropes. Deflections are monitored as loading is gradually increased in stages following an internationally accepted protocol from selected load cases. Sometimes towers are tested to destruction in order to assess the strength above the design limits. That makes the towers some of the few structures that are tested on a scale of 1:1.

### Tower Manufacture

Upon successfully testing of the towers, tests may fail and redesign carried out, clearance for mass manufacture is issued. As part of quality control, the tower parts are tested at the factory before shipment. The tests seeks to ascertain mechanical strength, integrity of steel used for fabrication as well as the veracity of galvanization. Once again the testing follows an agreed protocol. Clearance for shipment is issued at this stage, when the tests are satisfactory.

# KEEPING YOUNG WORKERS SAFE FROM WORKPLACE HAZARDS

By Winstone Audi

**J**oshua Ruto (not his real name), a 16-year-old farm hand lost his right hand in a chaff cutter accident. The accident occurred on his first day of using the machine. The chaff cutter was electric driven and was used for chopping maize stalks for use as animal feed. As Ruto was feeding the chaff cutter he pushed his hand too far with the feed. His colleague heard him scream in pain and shut off the machine. He had to be amputated at the wrist. This scenario is repeated over and over again all over the world resulting to disabilities and fatalities among young workers.

A young worker is defined as a person at work who is at least thirteen years but below eighteen years of age. The minimum age of work is 13 years. The Kenyan Employment Act, 2007, indicates that a child of between thirteen and sixteen years of age may be employed to perform light work which is not likely to be harmful to the child's health or development and not such as to prejudice the child's attendance at school, his participation in vocational orientation or training programmes or his capacity to benefit from the instructions received.

Young workers are a heterogeneous group of workers and many factors affect the risk of occupational accidents and diseases to which they are exposed. These include; stage of physical, psychosocial and emotional development, level of education, job skills, and work experience. While young workers' increased occupational safety and health (OSH) risks are often associated with these individual factors, the workplace culture can also play a role in hindering their ability or readiness to speak out about OSH issues, it can also provide an enabling environment that leads to better health outcomes for young workers. Young workers are often unaware of their rights as employees and of their OSH responsibilities as young employers, and may be particularly reluctant to report OSH risks. Young workers also lack the bargaining power that more experienced workers may have. This can lead to their accepting dangerous work tasks, poor working conditions, or other conditions associated with precarious employment. Their presence in hazardous economic sectors and their exposure to the hazards found in these sectors further increase their risk of sustaining occupational injury and disease.

To protect young workers, employers must know

the range of hazards in their workplace, and they must apply the necessary controls to ensure that people are not injured or made ill because of their work. They must give young workers the information they need to undertake their work safely. There is no substitute for thorough training and careful supervision until the new worker is competent to do the tasks required.

Mainstreaming occupational safety and health into education in Kenya can be a good idea of creating and naturing a safe work culture from an early age. This could involve combining risk education and the management of safety and health in schools for both pupils and staff; actively involving staff and pupils in school safety management; training and involving teachers in OSH management in their schools; developing students' understanding of OSH and its importance; involving pupils in hazard spotting and in proposing solutions; and integrating risk education and school safety and health into all the school's activities and systems, so that they become part of school life rather than something extra that is brought in.

The Occupational Safety and Health Act, 2007 is very clear about the need to protect people from injury or illness at work. Under this Act employers must: provide and maintain systems of work that are safe and without risk to health; have arrangements for ensuring safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances; provide the information, instruction, training and supervision necessary to ensure the health and safety of all workers; and maintain the working environment and workers' facilities in a safe condition and without risks to health.

The International Labour Organization marks the World Day for Safety and Health at Work annually on the 28th of April, to promote the prevention of occupational accidents and diseases globally. It is an awareness-raising campaign intended to focus international attention on emerging trends in the field of occupational safety and health and on the magnitude of work-related injuries, diseases and fatalities worldwide. The theme for the 2018 World Day for Safety and Health at Work was "OSH vulnerability of young workers." Let us therefore pay special attention to the safety of young persons at work and encourage conversations on the need to improve their safety and health.

# A NEW ERA FOR OCCUPATIONAL HEALTH AND SAFETY: ISO 45001:2018 IS PUBLISHED!

By Winstone Audi

It can be argued that things of significance often take time. The development of an ISO standard for Occupational Health and Safety Management System (OHSMS) is a perfect example. The movement for an international OHSMS began in the mid-1990s. Since then, there have seen tremendous growth in country-specific OSH management system standards. According to a 2005 survey by the OHSAS project group, which developed the groundbreaking Occupational Health and Safety Assessment Series (OHSAS) 18001 standard, more than 100,000 organizations around the world have obtained certification to OHSMS standards. Many more, including KETRACO self-declare or use the OHSMS principles to manage their safety and health risks.

The world's much anticipated International Standard for occupational health and safety (OH&S) was published on 12th March 2018 and is set to transform workplace practices globally. It is perhaps one of the most significant developments in safety in the past 50 years. ISO 45001:2018, Occupational Health and Safety Management Systems - Requirements with guidance for use, provides a robust and effective set of processes for improving work safety globally. Designed to help organizations of all sizes and industries, the new International Standard is expected to reduce workplace injuries and illnesses around the world. ISO 45001 will replace OHSAS 18001. Organizations already certified to OHSAS 18001 will have three years to comply with the new ISO 45001 standard, although certification of conformity to ISO 45001 is not a requirement of the standard.

## Why is an ISO standard on occupational health and safety needed?

Two major thoughts provide some insight. First, far too many injuries, illnesses and work-related fatalities continue to occur. According to 2017 calculations by the

International Labour Organization (ILO), 2.78 million fatal accidents occur at work yearly. This means that, every day, almost 7 700 persons die of work-related diseases or injuries. Additionally, there are some 374 million non-fatal work-related injuries and illnesses each year, many of these resulting in extended absences from work. This paints a sober picture of the modern workplace – one where workers can suffer serious consequences as a result of simply “doing their job”. Second, work has changed immensely in the past 2 decades. Business is more globally connected. Organizations are more integrated than ever with worldwide operations, including some in areas that present differing levels of risks and controls. Even organizations without international operations are affected by the products they buy from other countries.

## ISO 45001: Its Significance

Why is this standard so significant? It is the first true global consensus standard developed by ISO member countries with important contributions from key liaison organizations including ILO. While a standard such as OHSAS 18001 may be used globally, this development carries the key ingredient of globally diverse groups coming together to establish what will be the foundation for managing safety and health performance around the world. Furthermore, this standard may well change how OSH professionals manage safety and health within an organization by integrating these practices with an organization's goals, objectives and processes as a part of (not separate from) the fabric of business operations and plans. It is intended as a framework for the organization's management system for OSH, not as a programme administered and implemented solely by the safety and health department.

The standard has all the right components, many of which are found in existing management system standards or those

programmes implemented by high-performing organizations. The standard calls for leadership with participation from workers at all levels who are engaged in work or work activities controlled by the organization.

Risks and opportunities (for improvement) are identified and assessed via strategic, tactical and operational plans with objectives for maintaining and improving OSH performance. This includes contingency planning for changes and emergencies.

It also contains the necessary requirements for supporting the system, such as allocation of human and financial resources, competencies and documentation that helps ensure continuity of process. Records are required to allow for the assessment of performance against the standards' requirements and other requirements that the organization voluntarily adopts. This assessment enhances the ability to identify areas of risk and opportunities. Top management reviews, help ensure that potential changes in business strategies and the assessment of OSH performance deliver the desired results in addition to identifying areas for continuous improvements.

While many of these concepts exist in current practices, what makes this standard special is that it reflects a diversity of opinions and methods from around the world regarding the best ways to construct an OSH management system. This standard will move the bar and establish minimum requirements for managing safety risks.

It is worthwhile noting that operations and maintenance of high voltage infrastructure has scaled up KETRACO's risk portfolio, therefore calling for the setting up of a robust safety and health management system whose implementation will involve the entire organization. The integrity of the system will then be tested from time to time to ensure continual improvement.

## What will be the benefits of KETRACO using ISO 45001?

An ISO 45001 based OH&S management system will enable our company to improve its OH&S performance by:

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- Developing and implementing an OH&S policy and OH&S objectives;
- Establishing systematic processes which consider its “context” and which take into account its risks and opportunities, and its legal and other requirements;
- Determining the hazards and OH&S risks associated with its activities; seeking to eliminate them, or putting in controls to minimize their potential effects;
- Establishing operational controls to manage its OH&S risks and its legal and other requirements;
- Increasing awareness of its OH&S risks;
- Evaluating its OH&S performance and seeking to improve it, through taking appropriate actions; and
- Ensuring workers take an active role in OH&S matters.

**In combination these measures will ensure that an organization’s reputation as a safe place to work will be promoted, and can have more direct benefits, such as:**

- Improving its ability to respond to regulatory compliance issues;
- Reducing the overall costs of incidents;
- Reducing downtime and the costs of disruption to operations;
- Reducing the cost of insurance premiums;
- Reducing absenteeism and employee turnover rates;
- Recognition for having achieved an international benchmark (which may in turn influence customers who are concerned about their social responsibilities).

KETRACO has already commenced the journey towards ISO 45001:2018 certification. Our ISO Management Representative, the Occupational Safety and Health Committee and the department responsible for Occupational Safety and Health welcome all staff to walk this incredible journey. There is everything to gain in this venture. Remember, safety doesn’t happen by accident.

## KETRACO TO ELECTRIFY SGR



A section of the 482km 400kV Mombasa-Nairobi transmission line running parallel to the Standard Gauge Railway (SGR)

By FCPA Fernandes Barasa

The Kenya Electricity Transmission Company Limited (KETRACO) signed a contract worth \$240M with China Electric Power Equipment and Technology Company Limited (CET) on the 25<sup>th</sup> of January, 2018. This contract will result in the electrification of the SGR rail line that is currently powered by diesel. The project involves construction of 14 substations between Mombasa and Nairobi. The main purpose of this venture is to ensure that when the SGR switches to clean energy power source, the supply will be reliable and sufficient for not only the train but other facilities along the Mombasa-Nairobi economic belt including train stations, planned industries, factories and businesses near the railway. This will create more major power customers and consumers and bring other opportunities to the locals.

The design of the SGR railway, initially run by diesel-powered locomotives, allows for the addition of a single electric line that will be connected to KETRACO’s 482km 400kV Mombasa-Nairobi transmission line (MNTL) that was energized by President Uhuru Kenyatta on the 4<sup>th</sup> of August, 2017. MNTL, the longest and highest voltage transmission infrastructure in East Africa, has a transfer capacity of 1,500MW which is 200MW shy of the current national demand of 1,700MW. The line was constructed to address the challenges of low voltages, high transmission losses, unreliable supply including strengthening of network security and the national grid system. Its energization therefore debunks as flawed the myth that

Kenya does not have a dependable source of electricity, most importantly one that can power the electric train network.

A little history on electric trains would suffice. At the turn of the 20<sup>th</sup> century, diesel trains replaced steam engines as a cleaner and efficient means of transport for commuters and commodities. Afterwards, engineers worldwide developed electric-diesel “hybrid” trains. With the advent of environmental-friendly wheeled vehicles in the 21<sup>st</sup> century, coupled with technological innovations in the field of energy production, Kenya will soon join the mosaic of countries with electric trains motorized by clean energy sources.

The transport sector, in many parts of the world, presents real environmental challenges, and as a people, we have a duty to safeguard a more ecofriendly future. As we make long term decisions that will affect the future of generations to come, it is prudent to consult accurate data. In 2015, while addressing 150 Heads of States and Governments at the Conference of Parties (COP21) Global Climate Summit in Paris, President Uhuru Kenyatta highlighted Kenya’s “introduction and management of low carbon and efficient transportation systems.” He further noted that “greenhouse gas emissions have reached the threshold with the net effect of causing irreversible global warming.”

World Bank reports that “the Paris Agreement targets require reducing transport related emissions from the current 7.7 Gt (gigatons) CO<sub>2</sub> equivalent to reach a

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goal of 2–3 Gt CO<sub>2</sub> by 2050.” It further notes that currently “the entire transport sector – the mobility of people and transportation of goods – accounts for approximately 23% of CO<sub>2</sub> emissions from fossil fuels or 15% of global greenhouse gas emissions. Moving from a high to a low-carbon transport sector requires combining tested success strategies that focus on urban integrated multi-modal transport and transit systems.”

According to a joint report by International Union of Railways and Community of European Railway and Infrastructure Companies, travelling by rail is on average 3 to 10 times less CO<sub>2</sub> intensive compared to road or air transport. Rail transportation emits about 0.2 pounds of CO<sub>2</sub> per passenger mile. This number is much lower than those of air transportation, PSVs and personal cars.

Association of American Railroads report dubbed “Green from the Start” indicates that “estimates have shown that if just 10% of long-distance freight that is currently moving by truck were to be moved instead by diesel trains, the resulting carbon emission reduction would be the equivalent of taking 2 million cars off the road.” Mind boggling would be the results once the diesel trains are replaced by electric ones. Kenya’s case would be more dramatic as with KETRACO’s geothermal powered transmission line that will electrify the SGR, a zero CO<sub>2</sub> emission could be achieved. This then calls for stronger partnerships amongst the key players for the ultimate success of this project that will reduce the carbon footprint of our country and that of the world.

Additionally, our Country’s geographical position is quite unique and gives us great economic advantages that makes it perfect for strategic partnerships with the focus of improving regional and global market share. Our infrastructure, in specific the SGR, is a gateway to the vibrant East and Central Africa region. It is of supreme significance to our economy and the economies of landlocked countries in East Africa including Uganda, Rwanda, South Sudan and Burundi. Starting from the port of Mombasa, the electric line will in the near future cope with increased trade between Kenya and our East African counterparts including the landlocked neighbors as it will be faster and more efficient. In the words of Hon. Chirau Ali Mwakwere, the former Transport Minister, “by 2030 Mombasa is expected to handle more than 30 million tons of cargo annually.” This necessitates the electrification of the rail line that is a requisite for faster movement of bigger containers and passengers in the quest to boost EA’s competitiveness as an investment hub.

As I conclude, the electrification of SGR has had its fair share of criticism with its opponents questioning its economic viability to the Country. However, I do believe that in the long run the benefits will far outstrip the costs of construction. From a further reduction in transport/travel costs thanks to cheaper more reliable energy sources to the creation of new jobs during the 28 month electrification phase. With increased speeds, the number of trips will double if not triple and result in opening the access to rail transport for millions of Kenyans. Urbanization along the SGR route cannot be ignored. A faster more efficient transport system will cut costs of food transport and that will lead to reduced prices of commodities for the common mwananchi. The regional growth expected in future due to the electrified line will significantly cut journey intervals between Kenya, Uganda and Rwanda for both goods and passengers: this will fortify ties between the countries creating a network of links between ports and cities in East Africa.

## ELECTRICITY AS A CONTRIBUTOR TO KENYA'S ECONOMIC GROWTH



An aerial view of Nairobi City skyline by night

Photo by [tarasuites.com](http://tarasuites.com)

The electricity supply sector grew by 6.9% in 2017 compared to 9.5% growth in 2016, a decline that was attributed to adverse effects of weather conditions and prolonged electioneering period, a survey released by Kenya National Bureau of Statistics (KNBS) shows.

Kenya has for a long time relied on hydro-generated power, which is affordable compared to other sources of power such as diesel. However, the scarcity of rain in Kenya has caused the water levels in the water bodies to reduce drastically. In 2017, hydro electricity output experienced a drop to 3000GWh from 4000GWh in 2016.

It is for this reason that Kenya is shifting to clean energy. By clean energy, we mean electricity that does not pollute the atmosphere when generated or used. It is also renewable which means it can be used over and over again. Kenya is advantageously located where wind, solar and geothermal sources are available.

As such, KETRACO, in partnership with various sector players within the Ministry of Energy, is embarking on numerous projects that will be used in the transmission of high voltage clean energy, nationwide and regionally.

There are various green energy projects in Kenya, for example, wind in Ngong, Isiolo, Lamu, geothermal in Olkaria and solar in many parts of the country. In particular, electricity generated from geothermal increased to 4756.3GWh in 2017 from 4500GWh in 2016, the KNBS survey further states. Currently, geothermal generation is taking the lead at 45.9%. This means that power evacuated from the geothermal sites will be injected into the national grid.

As a result, more people around the country will have quality and reliable power for home consumption and for business operations. Overall, renewable energy sources accounted for approximately 75% of the total electricity generation in 2017. This is an impressive upward trajectory as Kenya aligns herself to achieving universal access to electricity by 2030 and meeting the global target of limiting global warming to below 2°C.

Kenya’s outlook is bright. With the government’s ongoing investments in electricity transmission infrastructure, KETRACO is on track to play its socio-economic transformative role in the economy by making electricity accessible, reliable and affordable.

## MY EXPERIENCE WITH KETRACO'S ENERGIZATION TEAM



(L) Salim Wanyande, KETRACO's Electrical Engineer explains to (R) Eva Kibicho, Communication Assistant, the energization process on paper during the energization of the Ndhiwa substation on 17<sup>th</sup> March 2018

By Eva Kibicho

I recently had the opportunity to experience the powering of Ndhiwa substation in HomaBay County. When we arrived at Ndhiwa, it was a week before the substation was subjected to voltage, in other words what we call energization. What I realized is that there is so much more that happens before a substation or a transmission line becomes operational. Actually, energization is the final stage of the project. That means work was already ongoing. Talking to the teams on the ground, they confirmed that the process had started three weeks prior to our arrival.

Our agenda for this trip was to have a first hand experience of the energization process. By energization I mean the process through which transmission infrastructure (substation and transmission line) is subjected to voltage after a successful construction, testing and commissioning processes. It also means that an electrical plant is supplied with power and serving its purpose of transmitting power from one point to another.

The control room was full of people; a beehive of activities. On inquiring as to what was going on, Salim Wanyande, KETRACO's electrical engineer, confirmed

that the various teams in the room were conducting commissioning exercise. This entails a step by step check of the operation of the substation equipment to ensure that they operate in line with the intended purpose. It can also be described as the point to point testing of the individual equipment that are procured from different suppliers across the world so that they work systematically.

What I gathered is that the commissioning process is not a one-man-show. Team work is of utmost importance. There was a lot of coordination involved internally and externally.

The engineers who were involved in commissioning included primary testing engineers who ensured high voltage equipment such as transformers, circuit breakers are working accordingly, control and protection engineers who ensured the low voltage equipment such as system protection relays work as planned and designed and Supervisory Control and Data Acquisition (SCADA) and Telecom engineers who ensured the remote supervision and control of the substation from the substation level is possible. The SCADA team was working closely with the National Control Centre. In

cases where a transmission line is being energized, overhead line engineers are involved to inspect the line to ensure there are no construction anomalies such as loose bolts. The commissioning process is done by KETRACO engineers as well as National Control Centre staff from Kenya Power (KPLC).

What caught my attention was the loud bangs that emanated from the switchyard. The bang was from the circuit breakers. The circuit breakers are either closed to allow current flow or opened to stop current flow. The loud bangs are as a result of loose or slow connection when closing the circuit breakers. Thus the contact has to be very fast to avoid sparking. However, in case the commissioning team experiences such incidences, it is mitigated immediately to avoid further damage.

The project engineer noted that commissioning process time varies from project to project, depending on the size of the project. Mostly, engineers plan for between one to two months to commission. Some projects take more time due to the complexity of the works required.

While at the substation, the engineers spent their time testing the equipment with only a few minutes to spare for lunch. "The process is engaging," Jane Njoki, KETRACO's SCADA engineer mentioned.

After successful commissioning, the substation was finally subjected to voltage. You could see the fulfilment the engineers had when the substation was lit with minimal hitches. Their goal was met.

The transformer was soaked for twelve hours to heat the oil, a procedure that increases efficiency before the feeders are connected for distribution. South Nyanza region was connected to the national grid with reliable and stable power thus providing a conducive environment for conducting businesses.

Without a doubt, I appreciated the work that goes into powering a region. Comprised of long working days; the job was done efficiently and effectively.



(L) Hon. Eng. James Rege, CBS, KETRACO's Chairman explains to the Governor of Siaya County, Hon. Cornel Rasanga the importance of the fibre component in the Company's transmission lines during Kisumu Regional Show that was held from 24<sup>th</sup> to 28<sup>th</sup> July, 2018.



(2-L) Dir. Philip Mongony, (3-L) Dir. Arch. Kariuki Stephen Muraya and (L) Eng. Samson Akuto, Project Manager, Olkaria - Lessos - Kisumu line listen to a contractor during the board's tour of the Kibos substation on 9<sup>th</sup> April, 2018



(M) FCPA Fernandes Barasa, KETRACO's Managing Director at a panel discussion during the Great Energy Debate that was held on 15<sup>th</sup> August 2018



Bidders registration process during the tender opening of consultancy services for the 132/400kV Makindu substation and the National System Control Centre on 9<sup>th</sup> August 2018.



The KETRACO team that participated in the Standard Chartered Nairobi Marathon that was held on 28<sup>th</sup> October 2018



A group photograph of KETRACO and the suppliers in small contractor works category during the stakeholder's engagement workshop that was held on 23<sup>rd</sup> February, 2018.

## OPORTUNA GRAPPLES WITH CHALLENGES IN PURSUIT OF PASSION IN FARMING



*Oportuna Wangari (right) explains to farmers who had a field tour of her farm to learn how she manages capsicum farming at Korompoi area of Isinya in Kajiado County*

By Standard Digital

**H**er mother's commitment to hard work and deep love for agriculture was a great inspiration as she grew up from a humble background.

The young Oportuna Wangari would occasionally join her mother in tilling their tiny piece of land to grow vegetables for their consumption and sale to cover other requirements of the family.

She has fond memories of her mother toiling in the farms where she worked as a casual laborer to fend for her family.

Her mother, she says, would supplement her income from casual labor through farming of vegetable such as kales (sukuma wiki), spinach and tomatoes in her small parcel of land in Limuru. She would sell the proceeds from her farm at the local market to subsidize her paltry income.

This state of affairs did not however deter the young lady born and bred in Limuru from pursuing her dreams of becoming a procurement and supply chains officer. She is currently a procurement and supply chain officer at Kenya Electricity Transmission Company (KETRACO) where her responsibilities entail providing functional support of SAP implementations in all projects.

Oportuna also has her eyes fixed on making it to the list of women under 40 years making great and remarkable industrial statement in project management that support national development.

In her resolve to blend professional work life with a passion in agriculture, Oportuna took the farming initiative a notch higher and is eking a living through farming as a key alternative.

She leased a larger chunk of land from a neighbor where she invested in green house farming. From her savings, she managed to kick-start the project by injecting Kshs. 200,000. It turned out to be a lucrative deal, though had to undergo traumatizing challenges to keep afloat.

"That year, tomatoes did so well and I made good money but in a surprise turn of events my landlady changed her mind midstream and kicked me out of her land," she recalls.

"I was shocked...completely taken aback and the sky just turned grey on me. I could not understand what she was up to because she had large chunks of idle land she could use or lease out to earn money. I had to leave in the middle of harvest," she adds.

The land was later leased out to another farmer who ventured into

capsicum farming. The preceding sunny weather did not favor tomato farming.

Oportuna later opted for a large scale open field farming – injecting a further Kshs 500,000 in putting the required infrastructure and buying farm inputs.

"My experience confirmed that there was no much difference between greenhouse farming and open field option. One only needs to take care of the crops as stipulated. Greenhouse farming is more expensive as compared to the open field one," says Oportuna.

To ensure constant water supply she sunk a borehole and engaged the services of an agronomist who gives her weekly advice to ensure the progress of the crops.

In spite of the myriad of challenges, Oportuna still managed to harvest 200kg of tomato every week and with time it has grown to 300 kg per week.

A kilogram of capsicum goes for Kshs. 50. She has established reliable, readily available market and the demand is growing by the day.

Her farm also provides a forum for use as a demonstration plot as witnessed recently for training farmers on horticultural farming. This has led to the promotion of onions, watermelon and capsicum farming in Korompoi area of Isinya in Kajiado County.

"I came here to get tips on land preparation, seed selection, crop protection, nutrition and marketing," she said when the Grid caught up with her while attending the training hosted within the proximity of her farm.

The training was conducted near her farm to enable the farmers to tour her farm and get practical tips from her.

## Not another weight loss diet...



Photo by Joshua Resnick

By Carol Tuimur

**O**kay, okay people, I think I just might 'lose it' if I hear of another weight loss diet. See what I did there...

There are literally thousands and thousands of diets out there. X- Factor diet, Traffic Light diet, Paleo Diet, you name it and you still wonder why there is a middle-aged scientist, sitting somewhere with no life, racking his brains on the causes of cancer. Recently, some research came out from Peking University in Beijing, China, which found that the temperature at which tea is consumed could affect one's health; particularly in certain groups already at risk of negative health outcomes. TEA people!! It is never that serious, because we all have to meet our maker sometime, in whatever shape or form.

Coming from a huge believer in being well-toned and fit, I think these diets are simply and plainly overrated. Speaking from experience, during my 'I can conquer the world, one muscle at a time phase' and inspired by the confident and authentic Viola Davis' ultra-toned arms, I dragged my dearest mother into attempting one of these so called 'weight loss diets'; particularly, the 'Jane Mukami diet'. We were both very excited you would think I was going to fit into a couture wedding gown at the end of it. Being a 10-day-diet, it seemed pretty easy but I must admit, it was not, at least for the last 7 days. This means literally drinking kale / spinach juice for nearly two weeks and snacking on egg whites and unsalted nuts.

I, however, have mixed feelings about this and here is why I consider this a catch 22 situation. My mum and I lost 10 and 8 kilos respectively. However, after day six, I had no energy and was completely unproductive. As much as I could easily slide in to my size 10 pair of jeans and could rock a crop top without being very conscious of my 'recently non-existent muffin top', the huge smile I had on my face did not last long. This is because three weeks later, I was back where I started and on the internet searching for a new weight loss diet. This made me miss the days when I would squat 80kgs and go home to a good plate of proteins and vegetables.

Okay, I think by now you get that I am definitely rooting for exercise over some over-hyped, unsustainable weight loss diet. Research has shown that most weight loss diets are not sustainable because when you deprive yourself of whole foods, you deny your body the essential nutrients that it requires.

So, what am I saying? Eat clean and hit the gym. When you cannot, you have my permission to go online and check for a sustainable body weights exercise programme. 15 minutes to half an hour a day is all you need to give Wilbroda, Jane Mukami or even Halle Berry a run for their money.

Now relax and go get yourself that double scoop of ice cream. But hey, don't take my word for it.

## How to prepare fried potato balls

Preparation: 5 minutes

Cooking time: 1 hour 20 mins

### Ingridients

- 1 cup cooking oil
- $\frac{1}{2}$  a litre water
- 5 - 10 peeled potatoes
- 1 tablespoon of butter
- 1teaspoon of salt
- $\frac{1}{2}$  a cup wheat flour
- $\frac{1}{2}$  a cup bread crumbs
- 4 eggs
- Black pepper

### Preparation

1. Bring water to boil then dip in the peeled potatoes. Let them boil for 20 mins.
2. Drain them and let cool.
3. Empty them into a bowl.
4. Add butter, a pinch of salt and black pepper.
5. Mash and mix with a fork.
6. Add two egg yolks and mix further.
7. Cover and let the mixture cool in the refrigerator for around 30 mins.
8. After cooling, take the mashed potatoes and mould it into ball shapes.
9. Cover the balls with wheat flour.
10. Dip them into beaten eggs with a pinch of salt.
11. Sprinkle bread crumbs all over as you shape it further.
12. Heat the cooking oil then deep in the potato balls.
13. Let them fry until they become brown in colour.
14. Remove from oil and place on paper towel to absorb excess oil as they cool off.
15. Serve with stew of choice.

Image: Google



# HAVE YOU TRIED BUNGEE JUMPING YET?



Image: Downhill Adventures

By Joy Ashioya

Life begins out of your comfort zone. Once in a while, take the risks that seem worth taking. The best things in life are always waiting for you at the exit of the ramp of your comfort zone. You are only confined by the walls you build yourself so try something new, challenge yourself, and live a little!

Now let's talk bungee jumping. Imagine jumping from a high bridge, cliff or building (up to 60 meters high) secured by only a rubber cord attached to your back and ankles. Yes... that is bungee jumping for you. The thought of it is scary but the experience itself is breathtaking, it is a lifetime achievement. The thrill comes as much from the free falling as from the rebound giving you a totally adrenaline-charged feeling.

Although it may seem like a dangerous sport, there is little to worry about in relation to bungee jumping. Outfitters usually work heavily on providing a safe environment in which this exercise is undertaken. The elastic rope tied to the ankles and back is

actually for the purpose of stopping the jumper from hitting the ground. The rope is designed to stretch, not break. When the rope has stretched all the way, the jumper bounces back up. Furthermore, when people engage in this sport, they wear safety equipment like helmets and a harness.

However, just to emphasize more on further safety measures, one should ensure that the equipment provided for the same are modern, proper safety techniques are applied and that the personnel available is well trained. It is also advised that you as a person take additional responsibility on the same in the following ways: ask the right questions, find out if the staff is well trained and experienced, find out if the medical services are available and easily accessible in case of an accident, examine the harness and make sure it is padded so it doesn't hurt your ankle or cause rope burn, if you notice the equipment provided are old and uncared for, do not agree to carry on with the procedure, ensure that you are okay health wise before undertaking this exercise.

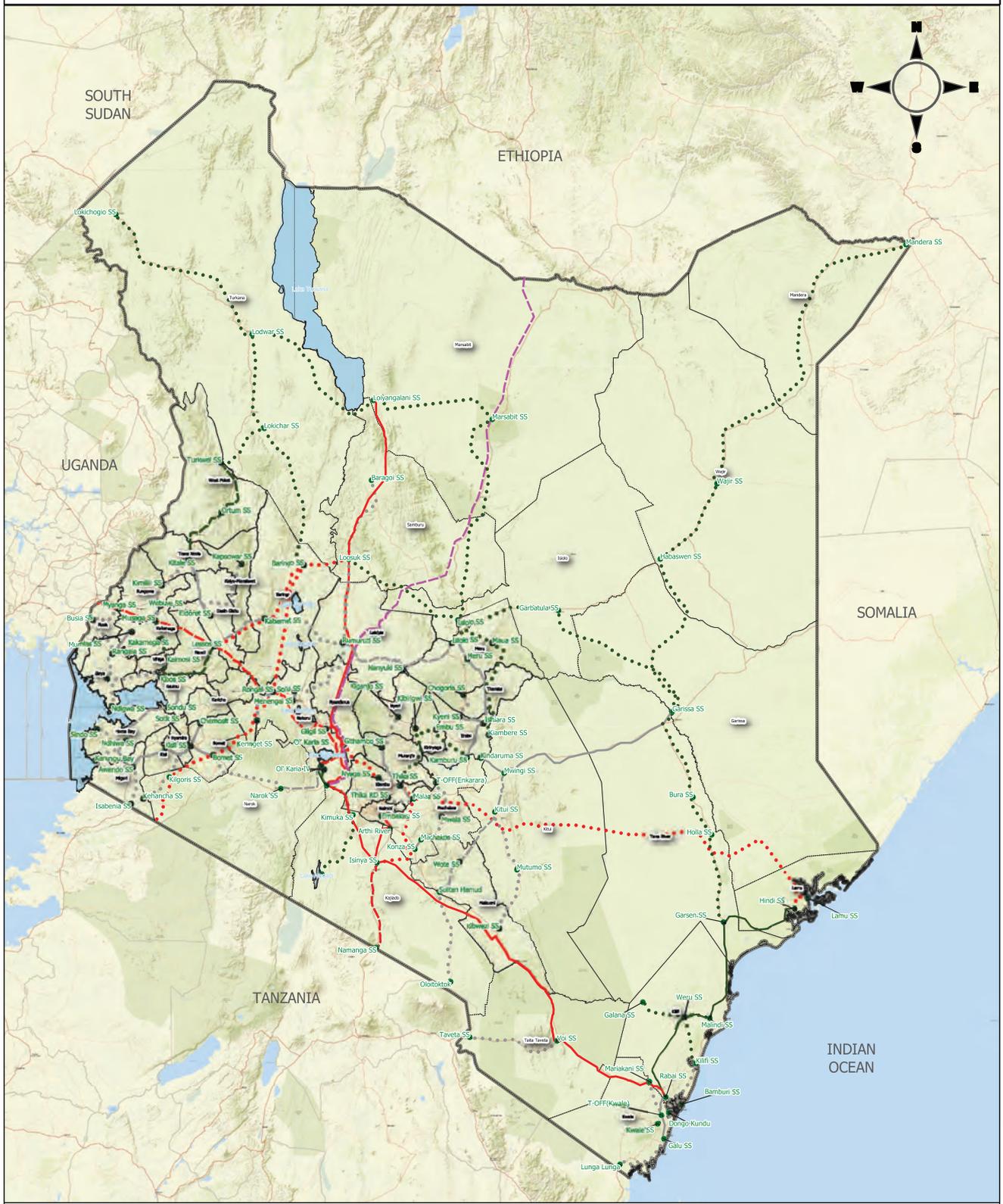
Get clearance from the doctor if you have issues such as high/low blood pressure, back problems, difficulty in breathing, circulatory disease, heart problems etc.

In addition to this, it should be noted that bungee jumping shouldn't be an option in a very rainy or sunny day. Undertaking this activity during this kind of weather can be risky health wise. It is important to be aware of that.

The feeling of adrenalin and accomplishment after doing this jump is phenomenal. You will be glad you tried it. One advice though, don't think about it, just jump on the first countdown, the longer you wait the harder it gets!

To be part of this unforgettable life experience in Kenya, you can visit Sagana – Savage Waters at an affordable fee of **Kshs. 5000.**

**132kV – 500kV KETRACO COMPLETED, ONGOING AND PLANNED TRANSMISSION PROJECTS**

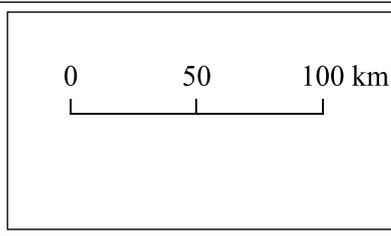


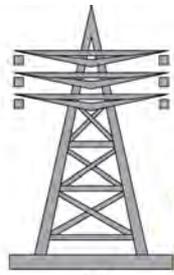
**Legend**

● KETRACO SUBSTATIONS

**KETRACO LINES**

COMPLETED	UNDER CONSTRUCTION	PROPOSED	VOLTAGE
			132kV
			220kV
			400kV
			500kV/DC





**KETRACO**

Kenya Electricity Transmission Company Limited

*"Building a World Class National Grid"*

# TRANSFORMING THE NATION'S ECONOMY



**Building and maintaining the national grid to ensure  
sustainable development for Kenya**