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The GRID

The Kenya Electricity Transmission Company Newsletter

Understanding
transmission of electricity

KETRACO
brings brighter days

**We have come
a long way!**

In the few short years that KETRACO has been operating, the company has grown not only in numbers, but also in capabilities.



Vision

"To be a world-class electricity transmission company and the leading inter-connector in Africa."

Mission

"To build and operate a national electricity transmission network that is reliable, efficient, effective, safe and environment-friendly through innovative and best practices; and to promote regional power trade for socio-economic development."

Core Values

The guiding principles in the operations of the Company are:

CUSTOMER FOCUS

The Company commits itself to attaining the highest standards in service delivery to all stakeholders.

INTEGRITY, TRANSPARENCY AND ACCOUNTABILITY

The Company is committed to acting in an honest, transparent and responsible manner while implementing its programmes.

TEAMWORK

The Company employees will work in unison at all levels and embrace a participatory approach in implementing all programmes and activities.

CREATIVITY AND INNOVATION

The Company will be a learning organization that embraces and continuously introduces change in its business processes.

COMMITMENT

The Company will embrace self-drive and hard work in attaining the highest standards in service delivery to all stakeholders.

EQUITY

The Company will uphold the highest levels of impartiality by treating all stakeholders without any discrimination whatsoever.

PROFESSIONALISM

The Company's operations will be guided by professional ethics aimed at building an appropriate corporate culture and creating the right corporate image.

Editor's Note

It is our pleasure to welcome you to our first external newsletter, The Grid. This newsletter is one of various channels that we hope to keep open for purposes of communicating with our treasured publics spread countrywide and beyond.

This first issue will pave the way for many more to come, and we aim to improve with every new one. In light of this we welcome your feedback. Please feel free to reach us with your comments, criticism, compliments or any other information you may have for us to consider.

The editorial team has put together a package that includes industry news, commentaries, introductions to the Board and Management of KETRACO, introduction to power transmission, project news, introduction to different power market structures, interviews, leisure and a review of KETRACO's coverage in the media.

In the future copies, we intend to have comprehensive Project News featuring one project at a time. Further to the projects, we have established and enjoyed good working relationships with sister companies within the Energy Sector. We are pleased with these partnerships and in this issue we have articles from KPLC, KenGen, Nuclear Energy Board and Geothermal Development Company so as to appraise our readers on developments in the electricity sub-sector.

I hope that through this newsletter, KETRACO will communicate our zeal and values that include hard work, commitment and team spirit.

Happy reading.

Editor

Raphael Mworia

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Disclaimer: The views expressed in The Grid do not necessarily represent those of the Kenya Electricity Transmission Company Limited's Board of Directors or Management. Although The Grid Newsletter believes the information contained herein to be correct and attempt to keep the information current, we do not warrant the accuracy or completeness of any information.

Contents...

We have come a long way!	2
KETRACO's resume	3
Our Board of Directors	4-5
Pioneer Board of Directors	5
KETRACO management team	6-7
Understanding electricity transmission	8
KETRACO Signs Performance Contract	9
Engineers visit Chinese factory	10
Regional power networks	11
Largest transmission line	12
Turkana to host biggest wind power plant in the region	14
Kenya ventures into nuclear energy	15
PICTORIAL	16-17
Geothermal, the best source of sustainable electricity	28
World's biggest power failure hits India	19
Different structures of energy markets	20
Tracing the path	21
KETRACO unveils anti-vandalism campaign	22
All in a days work	23
Conducting effective meetings	24
Leisure	24-26
KETRACO in the press	27-28

We have come a long way!

Within the first 7 years since set-up, KETRACO will have doubled the current grid length.



It is with great joy that I welcome you to our first external newsletter, The Grid which comes at a very exciting time for the KETRACO family. We are excited that our company has had a very successful take-off and although we are still on the climb, the horizon and a comfortable cruise speed are not far off.

In the few short years that KETRACO has been operating, the Company has grown not only in numbers, but also in capabilities. This is evident in the track record we have set with our accomplishment of world class projects in record timings. Such accomplishments come with tales, and we are eager to share our stories with you.

Since inception we have embarked on about 35 projects traversing the whole country including some of a landmark nature like the 482 km 400kV double circuit Mombasa-Nairobi project which is the first 400kV line in the region. We are also about to embark on the first 500kV High Voltage Direct Current (HVDC) project in the region. Within the first 7 years since set-up, KETRACO will have doubled the current grid length.

As you will see in an interview herein, the early days of our organisation were not easy, but after putting together a wonderful and capable team of Directors, Managers, Engineers and other key professionals, we have had tremendous success beyond any reasonable expectations. What with 5 projects already completed and commissioned. These projects were inherited from Kenya Power and Lighting Company who had hitherto handled the transmission component before our establishment. We thank our colleagues in KPLC and KenGen for holding our hands in the process.

To achieve these milestones, we have received overwhelming support from our ministry in the form of policy guidance and a vision that we are happy to implement. In particular our Minister and Permanent Secretary have both been single-minded in the direction and role KETRACO should play. Others include our development partners who have not only supported in the financing of the projects, but also in building our organisations and sector's capacity. As you are aware, there is a scarcity of transmission engineers in the country and we have had to recruit fresh graduates and train them in-house to ensure that we deliver on our mandate. Other challenges we face include way leave acquisitions, vandalism and encroachment.

We welcome you to this issue of The Grid which we hope will be a window through which we can appraise our stakeholders on our various achievements and challenges we encounter on our journey towards providing a world class National Grid.

It is my hope that we have put together news and information that you will find enlightening, entertaining and informative in equal measure.

Karibu.

Eng. Joel Kiilu
CEO & MANAGING DIRECTOR- KETRACO

KETRACO's RESUME

The Company was incorporated on 2nd December 2008 and registered under the Companies Act, Cap 486 pursuant to Sessional paper No. 4 of 2004 on Energy. The Company is 100% Government owned. KETRACO's mandate is to design, construct, operate and maintain new high voltage electricity transmission infrastructure that will form the backbone of the National Transmission Grid. This lines include 132kV, 220kV, 400kV and 500kV HVDC. The Kenya Power and Lighting Company Limited (KPLC) will keep its current stock of existing 132kV and 220kV transmission lines.

The recurrent operations of the Company are funded by the Exchequer while development expenditure is funded by both the Exchequer and development partners. It is expected that the Company will be able to generate funds from wheeling activities through its own transmission system.

Upon establishment, KETRACO managed to set up its offices and formulated a five year strategic plan to align its objectives with Kenya Vision 2030. The company formulated several policy documents in order to guide its operating systems and procedures, and undertook recruitment of key staff in order to enhance its capacity.

The company has undertaken capacity building activities in liaison with development partners to equip its staff with adequate skills in order to realise its objectives. KETRACO has also facilitated Board of Directors and senior management attendance of benchmarking tours to overseas utilities in readiness for the tasks ahead.

In the past two and a half years, KETRACO has engaged in several turnkey power transmissions infrastructure projects in the country which are expected to improve reliability and enhance connectivity. Financing of these projects has been secured and consultancy services for design and preliminary works is on-going. The financiers for these projects are:-

The World Bank

- African Development Bank
- European Investment Bank
- Agencie Francaise du Developpment
- Government of Kenya
- Japan International Cooperation Agency
- Exim Bank – Government of China
- KBC Bank, Belgium

In carrying out its mandate, the company has identified the following objectives:

- To provide a reliable, efficient and effective electricity transmission infrastructure;
- To promote regional electricity trade in order to tap the great potential and enhance electricity supply;
- To mobilize financial resources to facilitate project implementation and meet operational requirements;
- To build and retain adequate capacity in order to facilitate provision of quality, efficient and effective services to all stakeholders and create a positive image with a view to realizing the Company's mandate; and

- To initiate and facilitate research and development in the electricity transmission sub-sector.

Arising from its mandate, the Company's core functions are:

- Planning the National Electricity Transmission Grid
- Design of power transmission infrastructure
- Financial resource mobilization for high voltage transmission infrastructure
- Building/construction of power transmission infrastructure
- Operationalization of the transmission infrastructure system
- Maintenance of high voltage power transmission network
- Regional power trade and Management of project contractors/consultants.

Multiple factors are changing and intensifying the demands on our aging grid infrastructure, including a projected 20+ percent growth in power demand over the next 20 years, a focus on bringing more renewable energy to market, and an ongoing effort to foster workable interstate power markets. The cost of reliability projects within a single utility or Country are usually recouped from ratepayers who are directly served by the utility. But in the absence of clear policy or agreed-upon methodologies, cost allocation debates have become barriers to development for lines that are built for economic purposes, are proposed to cross multiple systems or states and serve many markets, or are built to serve location-constrained renewable resources.

In the next three to four years the company is expected to construct over 4000km of high voltage transmission infrastructure at an estimated cost of US \$ 1,300Million.

These transmission line projects include:

- 132kV – 1500km
- 220kV – 700km
- 400kV – 1000km
- 500kV – 700km

Projects	Scope
Chemosit - Kisii Line	62km single circuit line, 23MVA sub-station, 132/33kV, 5 x 33kV 3 phase feeders
Kamburu - Meru Line	122km single circuit 132kV line, 23MVA sub-station, 132/33kV and 4x33kV feeders
Rabai - Galu Line	47km single circuit 132kV line, 23MVA sub-station, 132/33kV, 5x33kV feeder bays
Kilimambogo - Thika - Githambo	17km double circuit 132kV line, 50km 132kV line, 23MVA, 132kV single circuit and associated sub-stations
Githambo- Othaya-Kiganjo	70km 132kV line with a 132/33kV at Othaya and 132kV bay at Kiganjo
Mumias-Rang'ala	34km 132kV line, 2x23MVA, 132/33kV sub-station and 6x33kV feeder bays.
Eldoret-Kitale	60km 132kV line, with 23MVA tx at Kitale
Nanyuki - Nyahururu	79km,132kV line, 23MVA, 132/33kV tx at Nyahururu
Rabai - Malindi-Garsen - Lamu	320km 220kV line, 2 x 23 MVA sub-stations
Kindaruma-Mwingi - Garissa	250km 132kV Line, 23 MVA sub-station
Nanyuki - Nyahururu	79km,132kV line, 23MVA, 132/33kV tx at Nyahururu
Kisii - Awendo	44km 132kV line, 23 MVA sub-station
Olkaria - Lessos - Kisumu	300 km, 220kV double circuit line, 2 x 90MVA additional tx
Bomet-Sotik	33km, 132kv line, 23MVA substation
Olkaria-Narok	68km 132kv line, 23MVA sub-station
Ishara-Kieni-Embu	35km 132kV line, 23MVA Sub-station
Sultan Hamud -Wote	37km, 132kV Line, 2 x 5MVA sub-stations.
Meru-Isiolo-Nanyuki	75km 132kV line, 23MVA sub-station
Kisii - Sondu	50km 132kV line, 23MVA, 132/33kV sub-station
Olkaria-Narok	68km 132kv line, 23MVA sub-station
Lessos-Kabarnet	65km 132kV line, 15MVA, 132/33kV tx at Kabarnet

Current Board of Directors

Since KETRACO's inception in 2008, we have had two teams of Board of Directors with minimal changes. The pioneer/ founder board was chaired by Mr. Justus Kageenu who continued as chairman for the second term. Being the inaugural issue we have featured the current as well as the past Board of Directors.



Mr. Justus G. Kageenu, Chairman

Born in 1947, Mr. Justus Kageenu holds a Bachelor of Commerce degree from the University of Nairobi and is also a Certified Accountant. Justus has spent most of his working life in the Energy Sector particularly in the Petroleum Sub-sector where he has worked for Exxon, Kenya Petroleum Refineries Limited (KPRL) and Shell. He joined the Board of KPRL in 1997 and became Chairman in 2003 until February, 2009, when he was appointed the Chairman of the Board of KETRACO.



Eng. Joel M. Kiilu, Managing Director & CEO

Born in 1956, Eng. Joel Kiilu who is an Electrical Engineer holds a Masters Degree in Business Administration (MBA) from the University of Nairobi. He also holds a Bsc.degree in Electrical Engineering from the same University. Eng. Kiilu is a member of Institution of Engineers of Kenya (MIEK), and a member of the Institution of Electrical and Electronic Engineers (MIEEE). He joined KPLC Ltd. as a trainee engineer in 1977 and rose to the position of Chief Manager, Transmission from which he left to join KETRACO in the year 2009.



Mr. Patrick M. Nyoike, PS, Energy- Director

Mr. Patrick M. Nyoike was born on 30th September 1947. He holds a Bachelor of Science degree in Mathematics and Physics from University of Ghana and a degree in Economics from the University of Nairobi. He is currently the Permanent Secretary, Ministry of Energy. Mr. Nyoike is a Director of all the state corporations within the Ministry of Energy.



Mr. Joseph Kinyua, PS, Treasury - Director

Mr. Kinyua is the Permanent Secretary, Ministry of Finance. He is a career economist having served in various capacities in the Treasury and Central Bank. He has also been involved in several projects with the International Monetary Fund both within Kenya and abroad. He holds MA and BA degrees in Economics both from the University of Nairobi (UoN).



Mr. Daniel K. Mwaura, Director

Born in 1966, Mr. Daniel Karuru Mwaura is an Advocate of the High Court of Kenya in private practice and has practised Law for more than 13 years. Mr. Mwaura is also a Commissioner for Oaths, Notary Public and holds a Bachelor of Laws degree, Bachelor of Arts (Econ) both from Indore University and a post graduate diploma in Laws from the Kenya School of Law.



Fedisius Nyaga, Director

Mr. Nyaga was born in 1944 & holds a BA degree in Accounting and Economics. He is a CPA and Secretary with over 30 years of experience in financial management. He joined the Board of Directors of KPLC in 1997 until early 2013, when he became a director in KETRACO. He is also a director in Thika Holdings Limited and Fide Registers Limited.



Mrs. Patience K. Nyagoga, Director

Born in 1968, Patience Nyagoga holds a Bachelor of International Business Administration (IBA) from United States International University (USIU) and a Master of Business Administration, (MBA) Marketing Major from the University of Nairobi.

She is a member of Inter Alia, Kenya Association of Women Business Owners, Organisation of Women in Trade; Marketing Society of Kenya and Institute of Directors, Kenya.



Ms. Esther N. M'ithiria, Director

Born in 1974, Esther Nkatha is pursuing a PhD in Business Administration (Finance Option) from the University of Nairobi. She holds a B. Com (Accounting Option) from the same University. She is also a Certified Public Accountant, CPA (K). Esther has worked as a consultant, a financial and credit analyst in various institutions in Italy and Kenya. She currently works at Catholic University of Eastern Africa.

She is a Fellow of the Higher Education Academy, a Board member and Trustee of Cardinal Otunga High School and Charitable Trust, respectively.



Mrs. Elizabeth W. Maina, Diector

Born in 1962, Elizabeth is the holder of Masters in Education (Planning & Administration), from the University of Nairobi and Bachelor of Education degree from Kenyatta University. She is currently pursuing a Diploma in Human Resource Management.

She has served in leadership positions as principal of various secondary schools, and as chairman of community based empowerment programmes and is a member of Mathira Constituency Development Fund and Secretary of the Bursary Committee.



Eng. Julius Mwathani, (Alternate Director to Mr. P. Nyoike)

Eng. Julius Mwathani was born in 1960. He holds a Bachelor of Science degree in Mechanical Engineering and an Executive Master of Business Administration degree. Eng. Mwathani is registered by Engineers Registration Board of Kenya and is a member of the Institution of Engineers of Kenya. He has wide experience in public sector management, having worked for more than 20 years in various senior positions in Government.



Mrs. Felister S. Kivisi, (Alternate Director to Mr. J. Kinyua)

Born in 1967, Felister Saliku Kivisi, serves as Senior Assistant Director in the Ministry of Finance, Debt Management Department. She holds a Bachelor of Arts degree from the University of Nairobi (1990) and a Master of Arts degree in International Relations from the University of Leeds (1992). Felister who serves as Alternate Director to Mr. Joseph Kinyua, PS, Treasury has a wealth of experience having worked in the Ministry of Finance from 1994 to date.



Mr. Duncan K. Macharia, Company Secretary/ Head of Legal Services

Mr. Duncan Macharia was born in 1960. He holds a Masters of Business Administration degree from the University of Nairobi and a Bachelor of Commerce (Business Administration Option) degree from the same university. Duncan is a Certified Public Secretary of Kenya (CPS)K and previously worked as Deputy Company Secretary in The Kenya Power & Lighting Company Limited before he left after serving the Company for over 18 years to join KETRACO. He is also a member of the Institute of Directors, (IOD) Kenya.

Past Board Members



Hon. Jimmy O. Ang'wenyi

Born in 1945, Hon. Jimmy Ang'wenyi holds a Bachelor of Commerce degree from Washington & Lee University & an MBA degree from Duke University, both in USA. Hon. Ang'wenyi served as the Member of Parliament for Kitutu Chache and as an Asst. Minister in the Office of the President. He also served as a member of several Parliamentary Committees, including the Energy Committee. He is widely travelled and has participated in trade, anti-corruption, infrastructure and educational conferences. He is a member of ACCA. He served the KETRACO board between 16th January 2009 and 16th January 2012.



Rev. (Dr.) Jessie W. Mutura

Born in 1948, Rev. (Dr) Jessie Mutura holds an honorary Doctorate of Humanities and Good Governance from the United Graduate College & Seminary (USA). She started her career in banking before venturing into business both local and international where she also served in various civic bodies. Rev. (Dr) Jessie has also served in voluntary activities and was appointed President of the Federation of National Associations of Women in Business, Comesa and served as Chairperson in Child Welfare Society of Kenya for over 20 years. She served the KETRACO board between 16th January 2009 and 16th January 2012.

She is now a Director at NOCK



Mr. Domiciano L. Maingi

Born in 1949, Mr. Domiciano Maingi holds a Master of Arts in International Studies and Bachelor of Psychology degrees both from the University of Nairobi, and an Executive Management Diploma from the University of Nevada, USA. Mr. Maingi is also an auditor and accountant, and has worked in the civil service as an auditor in charge of several ministries and served as Chief Internal Auditor of Nairobi City Council and on the Board of Local Government Provident Fund. He is a leading fish farmer and current Chairman of the Aqua Cultural Association of Kenya. He served the KETRACO board between 16th January 2009 and 16th January 2012.



Hon. Jaafar Mohamed Sheikh

Hon. Jaafar Mohammed was born in 1953 and has a Diploma in Business Administration and a good accountancy background. He served in the 4th and 5th parliament as a member for Mandera West Constituency in the Republic of Kenya. Hon. Jaafar is a prominent businessman. He is in the transport business and as a farmer, is also engaged in wheat seed propagation. He served the KETRACO board between 16th January 2009 and 18th December 2012. Hon. Jaafar is currently a board member of National Oil Corporation of Kenya.(NOCK)

Meet the KETRACO



Eng. Joel Kiilu
Managing Director & CEO

Born in 1956, Eng. Joel Kiilu is an Electrical Engineer and holds a Master's Degree in Business Administration (MBA) from the University of Nairobi. He also holds a Bachelor of Science (Bsc.) degree in Electrical Engineering from the same University. Eng. Kiilu is a member of Institution of Engineers of Kenya (MIEK), and a member of the Institution of Electrical and Electronic Engineers (MIEEE). He joined The Kenya Power & Lighting Company Limited as a trainee engineer in 1977 and rose to the position of Chief Manager, Energy Transmission from which he left to join KETRACO in the year 2009 to date.



Mr. Duncan K. Macharia

Company Secretary/
Head of Legal Services

Mr. Duncan Macharia was born in 1960. He holds a Masters of Business Administration degree from the University of Nairobi and a Bachelor of Commerce (Business Administration Option) degree from the same university. Duncan is a Certified Public Secretary of Kenya (CPS) K and previously worked as Deputy Company Secretary in The Kenya Power Company Limited before he left after serving the company for over 18 years to join KETRACO. He is also a member of the Institute of Directors, (IOD) Kenya.



Mr. Joe O. Ager

General Manager-
International Business

Born in 1949, Joe Ager holds a Master of Business Administration degree (MBA) and a Bachelor of Science (BSc) in Marketing from the University of South Africa. Prior to joining KETRACO Ager worked as a Customer Relations and Marketing Manager with Kenya Power & Lighting Company Limited. He also worked as Managing Consultant with Sparrow and Barlow Associates, Head of Operations with British Telecoms— UK, Head of Strategy and Business Development with Caudwell Group Ltd. and Head of Group Sales with British Airways Plc (UK).



Ms. Agnes Ongadi

Head of Human Resources
and Administration

Born in 1970 Agnes holds a Bachelor of Commerce degree from the University of Nairobi, an Executive MBA from Moi University and a Post-Graduate Diploma in Human Resource Management from Kenya Institute of Management. Agnes is a full member of both the Kenya Institute of Management (AMKIM) and Institute of Human Resource Management. Prior to joining KETRACO she worked with the First American Bank and Kenol/Kobil Petroleum Company.



Dr. (Eng.) John Mativo

Head of Technical
Services

Born in 1968, John Mativo is a Civil Engineer and holds a Doctorate degree from Tokyo Metropolitan University (Japan), a Master's degree from Tongji University (China) and a Bachelor's degree from the University of Nairobi. John is a Registered Engineer (Kenya Engineers Registration Board) and a Corporate Member of the Institution of Engineers of Kenya. Before joining KETRACO as Head of Technical Services, he previously worked as a Consultant for European Union funded projects in the Local Government and as an Engineer in the Ministry of Roads and Public Works.



Mr. Fernandes O. Barasa

Head of Finance

Born in 1973, Mr. Barasa holds a Bachelor of Commerce (Accounting) and MBA Finance Degrees from Kenyatta University. He is also a Certified Public Accountant of Kenya (CPA-K). Prior to joining KETRACO, Mr. Barasa worked as Treasury Manager and later Head of Factories Accounts at Kenya Tea Development Agency Limited. He also worked for Kenya Airways and East Africa Re in senior management positions. He has a wealth of experience in Accounting and Financial Management and serves on various committees of ICPAK.



Ms. Mumbua Giati
Head of ICT

Born in 1960, Ms. Mumbua Giati holds a Bachelor of Commerce degree (Management Science option) from the University of Nairobi. Mumbua has a wealth of training and experience in IT, having worked for the Kenya Power & Lighting Company Ltd. for 30 years and seen the Company's ICT transition from proprietary legacy systems to modern ERP solutions. She previously held the position of Chief Systems Analyst, SAP at Kenya Power before joining KETRACO as Head of ICT in December 2009. She is a member of the Computer Society of Kenya.

management team



Raphael Mworia

Head of Corporate Communications

Mr. Mworia has over 17 years of experience in both private and public sector organizations in Kenya. He holds a Master's degree in Journalism and Mass Communications, a Bachelor's degree in Journalism from Banars University and a Bachelor of Arts degree from Lucknow University.

He started his career with a brief stint at Standard Newspapers before joining Kenya Tea Development Agency (KTDA) as a graduate trainee where he rose through the ranks to the position of PR Coordinator. He left to join the Kenya Forest Service as Head of Corporate Communications, a task that involved starting the PR function from scratch. After this he joined KETRACO as Head of Corporate Communication in 2011. He is a member of Public Relations Society Of Kenya (PRSK).



Peter Njehia

Head of Supply Chain Management

Mr. Njehia has 15 years experience in the Supply Chain Management. He holds a Bachelor of Arts Degree and a Master of Business Administration (MBA) both from Egerton University, and a Post Graduate Diploma in Supply Chain Management. He has previously worked at Egerton University and at The National Environment Management Authority (NEMA) as Head of Supply Chain Management. He was instrumental in the preparation and launch of the curriculum for the Supply Chain Management Course at Laikipia University College, a constituent college of Egerton University. He is a certified ISO 9001 Auditor, and a full member of the Kenya Institute of Supply Management (KISM) and The Chartered Institute of Purchasing and Supply (CIPS).



Erick Audi

Head of Internal Audit & Risk Management

Born in 1974, Mr. Audi holds a Bachelor of Commerce Degree in Accounting from the University of Nairobi, and is currently pursuing an MBA from the same University. He is also a Certified Public Accountant (CPAK), a Certified Internal Auditor (CIA) and a Certified Information Systems Auditor (CISA). Mr. Audi started his Internal Auditing career at Avinash and Co. , immediately after graduating in 1999, rising to the position of Audit Senior. Thereafter, he joined Kenya Revenue Authority as an internal auditor and later rose to Senior Assistant Commissioner (Audit Manager Equivalent). In 2009 he joined Kenya Rural Roads Authority (KeRRA) as an Audit Manager, and in March 2010 joined KETRACO as the Head of Internal Audit with responsibilities on internal controls, risk management and ethics and governance issues. He is an active member of ICPAK, IIA and ISACA.



Godfrey Kariuki

Head of Planning, Performance Monitoring & Research

Mr. Godfrey Kariuki holds a Masters in Economics and Bachelor's degrees in Economics & Mathematics, both from the University of Nairobi. He has also undertaken several on-the-job trainings in Projects Planning, Monitoring & Evaluation, Economic Modelling, Strategic Planning and Research Methods. He started his working career in 1996 as a Research Assistant with FeKaGi Investment Consultants. He later worked as an Economist/ Statistician with the Ministries of Agriculture and Cooperative Development. There after he joined the Ministry of Planning, National Development and Vision 2030 as a Senior Economist/ Statistician. Before joining KETRACO, Mr. Kariuki was a Macroeconomic Researcher/ Analyst with The Kenya Institute for Public Policy Research and Analysis (KIPPRA).



Godfrey K. Imanene - HSC

Head of Security Services

Born in 1970, Mr. Imanene holds a Bachelor of Arts degree from Kenyatta University where he majored in Sociology. Mr. Imanene started his career in security in 1995 when he was enlisted in the Kenya Police and later posted to North Eastern province, CID Office. After Inspectorate training, he was posted to Anti-Narcotics Unit as the Officer in Charge Busia and later Malindi before joining Kenya Airways in 2005 as the Security Investigation and Technical Protection Manager. He held several positions in Kenya Airways before joining Kenya Forest Service as an Assistant Commandant Heading Investigations and Prosecution. After KFS he joined KETRACO in 2011 as Head of Security Services.

Understanding transmission of electricity

Electricity transmission is the process by which large amounts of electricity produced at power plants (such as hydro, geothermal, thermal and wind), is transferred over long distances for eventual use by consumers. Due to the large amount of power involved, and the properties of electricity, transmission normally takes place at high voltage (132-kilovolt or above) to reduce losses that occur over long distances.

Electricity is usually transmitted to a substation near a populated area. At the substation, the high voltage electricity is converted to lower voltages suitable for consumer use, and then distributed to end users through relatively low-voltage electricity distribution lines that are owned and operated by the Kenya Power and Lighting Company. The construction, operation, and maintenance of new high-voltage transmission lines and associated facilities create a range of environmental impacts. The type and magnitude of the impacts associated with transmission line construction, operation and maintenance varies depending on voltage levels, as well as the length of the transmission line, and a variety of other site-specific factors which have to be mitigated.

The main components of high-voltage electricity transmission lines and associated facilities include the following:

- Transmission Pylons (Towers)
- Conductors (Transmission lines)
- Right-of-Way (Way leaves)
- Insulators and other accessories

Transmission Pylons (Towers)

Transmission pylons are the most visible component of the electricity transmission system. Pylons support high-voltage conductors (cables that transmit the electricity, otherwise known as lines) above the ground and separate them from other lines, buildings, and people. Pylons vary in design and dimensions. The transmission pylons are lattice steel between 30 and 46 metres tall. A minimum of 30-metre right-of-way is needed for the area around the pylons and the spans between the pylons.

Conductors (Transmission lines)

Conductors are the cables on the transmission pylons that carry the electricity to substations. KETRACO will have varying designs of pylons and lines depending mainly on the voltage being carried. Conductors are constructed primarily of twisted metal strands, but newer conductors may incorporate ceramic fibres in a matrix of

aluminium for added strength with lighter weight.

Right-of-way (Way Leaves)

The right-of-way for a transmission corridor includes the land set aside for the transmission line and associated facilities, and land set aside for a safety margin between the line and nearby structures and vegetation. Having the safety margin helps avoid the risk of fire and other accidents. The right-of-way width needed for transmission lines ranges from 30 metres to 60 metres. The right-of-way is also used for access roads.

Vegetation that could pose a danger to a transmission line or tower is removed inside the right-of-way and outside the right-of-way if it could come too close to lines and pylons. On the right-of-way, low-growing vegetation is allowed to grow after construction and subsequently maintained at an optimum level.

Access Roads

Access is needed to the transmission tower sites for both line construction and maintenance. Grading and clearing vegetation may be required for access road construction. Roads are usually murrum. Access roads can be permanent or temporary depending on the need during construction and land use. On most rights-of-way, permanent access roads provide a way to repair and maintain the pylons and lines and are available for emergencies.

In farmland and other areas where the existing land use is not compatible with a permanent access road, KETRACO uses temporary access roads during construction, then removes the roads and replants or otherwise restores the original land use.

Sub-stations

The high voltages used for electricity transmission (e.g. 220kV) are converted for consumer use to lower voltages (e.g. 11kV) at substations. Substations vary in size and configuration but may cover several acres, and are cleared of vegetation and surfaced with gravel. Access is limited to authorized personnel and the substation is fenced and gated for safety and security. In general, substations include a variety of structures, conductors, fencing, lighting, and other features that result in an "industrial" appearance.

KETRACO signs 2012/2013 performance contract

By Geoffrey Otieno

After successful negotiations of the Company contract, KETRACO Board Chairman Mr. Justus Kageenu led the Company management in signing of a performance contract on Tuesday, 4th September 2012, for the period 2012/2013. The Company is expected to implement all the agreed targets as per the 2012-13 performance contract guidelines.

Present during the signing ceremony were, the permanent secretary in the Ministry of Energy Mr. Patrick Nyoike, KETRACO Board of Directors Chairman Mr. Justus Kageenu accompanied by the Managing Director & CEO Eng. Joel Kiilu, Ms. Esther Nkatha M'ithiri - board member, as well as Mr. Duncan Macharia and Mr. Godfrey Kariuki - heads of departments in KETRACO.

The permanent secretary noted that signing the same agreement with the government made it imperative to do so at the ministry level. Mr. Nyoike acknowledged that he could not achieve the desired target without the help of the workers, who were the "engine room" of the energy sector in Kenya, and in particular the KETRACO family. "You are the people doing the work while we are simply coordinating to ensure that things are done correctly," Mr. Nyoike told KETRACO representatives during the signing ceremony.

He pointed out to KETRACO directors and managers at the ceremony the need to fast track some of the key projects and singled out the 400kV Mombasa – Nairobi transmission project which would increase the amount of energy load to Nairobi once completed. "KETRACO has a huge task ahead in order to achieve its mission," said Mr. Nyoike who also pledged to support KETRACO to achieve the transmission agenda in the energy sector.

"This is definitely not new because in the good old days in the civil service, there used to be a method of tracking performance. What we are doing is simply re-introducing what we used to do. The performance contract which we are signing today is a subset of what the honourable ministers have already signed with His Excellency at the Prime Minister's office," Mr. Nyoike said. "It has to cascade down to all of us since we are the ones to make the necessary input to ensure that the ministry succeeds."

Following the signing of the contract KETRACO hopes to improve its ranking in the public service institutions as the contract is cascaded in every department and all its employees.



KETRACO Board of Directors and Management members led by Chairman Mr. Justus Kageenu (3rd left in back row) and MD Eng. Joel Kiilu (2nd left in back row) sign 2012/2013 performance contract with the P.S Ministry of Energy Mr. Patrick Nyoike (Left seated)

Engineers visit Chinese factories

By Titus Mwaura & Francis Mumo



Ascertaining the Chromatic dispersion in OPGW



Physical inspection of a junction/ Splice box



Zinc galvanisation thickness tests

The KETRACO Engineering team visited several companies in China from 28th March to 6th April 2012 to witness factory acceptance tests for some equipment for the Rabai - Malindi – Garsen- Lamu Transmission Line project. The equipment included insulators, Optical Ground Wire (OPGW) and hardware fittings.

The team that travelled to China consisted of Titus G. Mwaura and Francis M. Mutinda.

The team visited Xiangtan Guowang Insulator Company in Hubei

province, ZTT Optical Ground Wire & Fittings Company in Jiangsu Province and JS hardware in Jiang Su province, Jiangsu town.

At Xiangtan Guowang Insulator Co. the insulators were tested for their mechanical strength and soundness, creepage distances and zinc galvanisation thickness, among other tests.

For the Optical Ground Wire (OPGW), among the tests done included visual inspection of the cable, breaking load tests, water

penetration tests and attenuation.

The hardware fittings were mainly tested for their mechanical soundness, break load tests, zinc galvanisation thickness among other tests.

All these tests were carried out as per the equipment specific IEC standard as part of quality assurance and to ensure conformity to the same. All the tests carried out on the sample equipment were successful and hence suitable for installation.

The return of the ‘Man Eaters of Tsavo’

By Sulea Naliaka

History repeats itself. Remember the stories about the British constructing the Kenya- Uganda Railway in 1898? Can you remember the Man Eaters story? Where a number of construction workers died in their line of duty in Tsavo National Park? The Tsavo Lions stalked the construction campsite, dragged Indian workers from their tents at night and devoured them. The exact number of people killed by the lions is unclear, although it is estimated that 135 victims died. With all these scary happenings, the British completed their construction as planned.

Inside the National Park passes KETRACO's project; the 400/ 220kV Mombasa- Nairobi transmission line. This is a 482 km transmission line from Mombasa to Nairobi, and is the largest project of its kind to be implemented in Kenya, and in the region. The project is divided into 3 lots with lot one stretching from Rabai to Tsavo River, lot two from Tsavo River-Athi River and lot three consists of an underground cable in Embakasi.

Lot two lies along the ‘Man Eaters of Tsavo’ corridor. Construction of transmission towers along Tsavo East National park is facing the same challenges faced by the railway constructors in 1898. Tsavo being the home

of wild animals, the contractors have spotted several leopards and elephants strolling around their construction sites.

The contractor has expressed fear of working inside the park. “Our people are very afraid of the wild animals. It is a big challenge and this slows down the construction pace,” noted Mr. Roji O. Varghese, the project's Senior Surveyor. The team has been forced to hire Kenya Wildlife Service Rangers to guard the contractors as they work during the day.

With the construction work inside the park, the team is allowed to work from 7am to 5pm so as to be guarded by KWS. One or two security officers survey the area all day as the team digs foundations and erects transmission towers. “We also noted that the drilling process is noisy and this also helps us scare away the wild animals,” added Mr. Roji.

The team noted that this is the animal's habitat and so other than the erected transmission towers, they will leave the park as natural as possible so as to retain the animals patterns in the park.

Regional power networks revamped to increase capacity

After years of neglect, high-voltage electricity transmission systems all over the world are getting some much-needed attention. Driven by population and economic growth, policy initiatives, and a renewed industry focus, significant capital investments are being made to expand and extend transmission infrastructure. Thousands of miles of new transmission lines are being built and existing systems are being retrofitted to add new capacity and greater monitoring capabilities.

“Many different forces are driving a growth spurt in the transmission market,” says Managing Director Eng. Joel Kiilu. “In some countries, burgeoning populations and thriving economies are creating increases in electricity demand. Even where demand is relatively flat, renewable energy and the smart grid have created the need for increased transmission capacity and the increased use of phasor measurement units, Wide Area Monitoring Systems, and transmission automation.”

Eng. Joel Kiilu adds that in Kenya and many other regions, cross-border transmission projects are being developed to relieve power shortages and to feed competitive electricity markets. In all of these areas, technological advancements such as High Voltage Direct Current (HVDC) and high-temperature superconductors are increasingly being utilized for specialized transmission applications.

Power sharing has become more prevalent in the African electrical power pool context in recent years. In line with developments in the regional economies, such as the formation of the East African Community (EAC), Southern African Development Community (SADC) and the Economic Community of West African States (ECOWAS), neigh-

bouring countries have seen benefit in the sharing of electricity. This has enabled countries like South Africa, who have surplus power, to run their stations at maximum output without the risk of an oversupply of power.

Conversely, countries with limited or unreliable power generation capacity now have access to power, without the intensive capital investment required to construct new facilities.

Countries can purchase power in bulk enabling them to redistribute it locally at a cheap price. Another advantage that power sharing brings is flexibility - demand peaks and troughs can be better managed with the larger pool of power.

Regional networks have occurred both on an informal basis, where neighbouring countries simply agree to share, and on a more formalized basis, such as with the Eastern African Power pool (EAPP) and Southern African Power Pool (SAPP), where a number of countries have been linked and purchase power at regulated prices.

Kenya and Tanzania have recently been discussing a connection to the Zambian power grid, which would bring Kenya into the Southern African Power Pool (SAPP). South Africa, Ghana and Zambia are the biggest net exporters of power on the continent.

The large number of interconnection projects throughout Africa has been a boon for companies with expertise in transmission lines, power networks and cabling. Both multinationals seeking to establish themselves in Africa and ambitious local companies wanting to expand their operations into other parts of the continent have benefited from the growth in this area.

International business boosts energy sector

The current transmission situation in the country has led to a substantial increase in the tariffs and has brought the energy situation to the front pages of all newspapers. The prevailing energy shortage has elaborated the need for increased investment levels to further develop the sub-sector and new production capacity is forthcoming.

Most important is the 482km 400kV Mombasa-Nairobi line, but other lines are also under consideration for commissioning. During the last decades investments in the transmission grid has been minimal.

KETRACO's focus to changes in purchasing prices and urgent need for new grid investments leads to large funding requirements. In order to get an overview of the financial challenges we use a financial model for long term financial projections. This model is used to:

- Analyze different market scenarios and specific sen-

sitivity analyses by major parameters

- Estimate the future Bulk Tariff
- Facilitate funding planning and show the amount of subsidies needed

There are three main market scenarios: High, Medium (or Base) and Low. They are based on three different transmission scenarios and three sets of assumptions for other inputs. The investment scenarios are defined in the Grid Development Plan.

KETRACO will, through increased planning capabilities, aim at giving the development partners a realistic overview of the business and investment scenarios of KETRACO's implementation capacity and the outlook for financial scenarios. The objective is to improve the possibilities to get long term funding commitments and thereby a sustainable system expansion free from major execution gaps, and in total to build up an attractive sector for IPP investors and regional trading.

Mombasa-Nairobi Transmission Line largest in the region

The 482km 400/220kV Mombasa-Nairobi transmission line is the largest project of its kind to be implemented in Kenya and in the region. It was conceived out of the need to expand transmission capacity between Mombasa and Nairobi. The existing transmission capacity between Mombasa and Nairobi comprising 1x132kV and 1x220kV lines is estimated at 100MW, which is inadequate and has high transmission losses.

The project was thus initiated out of a need to increase transmission capacity between Mombasa and Nairobi as the existing capacity could not transmit extra load. The line will contribute to evacuation of power generated by the committed plants (combined capacity 290MW) and a number of other plants that are included in the country's generation expansion plan. This project is a Kenya Vision 2030 Medium Term Flagship project and is expected to be complete by September 2013.

Benefits of the Project include the evacuation of thermal energy from Rabai and future Liquefied Natural Gas (LNG) and Coal power plants

to be based in the Coast, increase power transfer capacity between the Coast and Nairobi and strengthen the National Grid.

The Government of Kenya's electrification target is to add 1 million consumers to the grid over the next 5 years. This will require substantial investments in both generation and transmission. Substantial new thermal generation capacity is planned in Mombasa. The project is designed to evacuate this new power capacity to Nairobi.

The project involves construction of 482km 400/220kV transmission line between Mombasa and Nairobi and extending the substations at Rabai and Embakasi.

The project will be constructed in two phases:

Phase 1 is implemented in three Lots as follows:

Lot 1: This involves the construction of 29km of 220kV double circuit overhead transmission line from Rabai substation to Mariakani substation and about 163km of 400kV double circuit overhead transmis-

sion line from Mariakani substation to the Tsavo River.

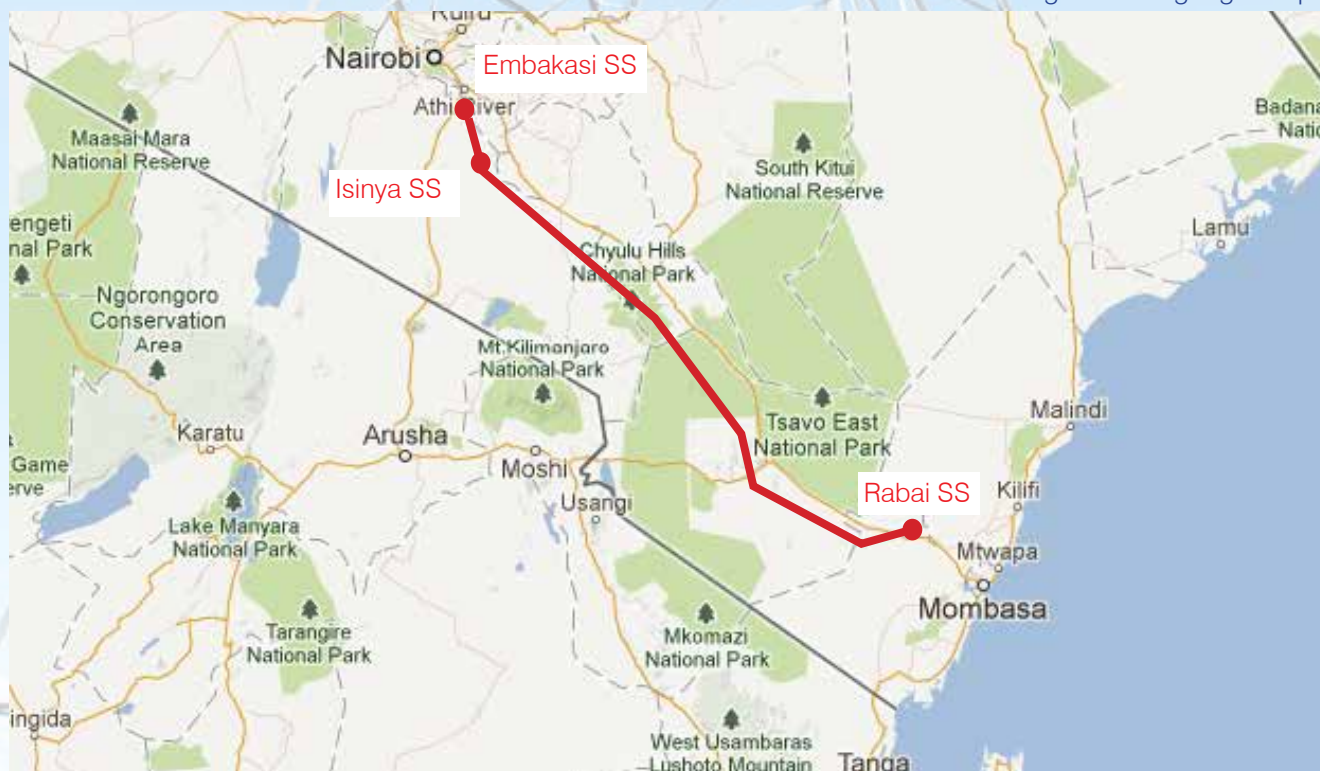
Lot 2: This will see the construction of 52km of 220kV double circuit overhead transmission line from Embakasi substation to Isinya substation and about 230km of 400kV double circuit overhead transmission line from Isinya substation to the Tsavo River.

Lot 3: This is an 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.

Phase 2 includes construction of new substations at Mariakani and Isinya. The project is currently in Phase 2.

The project is jointly funded by African Development Bank (AfDB), Agence Francaise de Developpement (AFD), European Investment Bank (EIB) and the Government of Kenya with a total project cost amounting to Ksh 12.88 billion.

image source: google maps



KETRACO's Completed Projects

KETRACO has already completed the construction of a number of high voltage transmission infrastructure comprising of lines, switch gears and sub-stations across the country since its inception. These completed projects have helped open up geographical areas without access to the National Grid, enhance capacity for evacuating power from planned generating plants and build inter-connectors to facilitate regional power trade with neighbouring countries.

The projects include:

Mumias - Rang'ala

The 97 km 132kV line, and sub stations from Mumias Sugar Company through Rang'ala, to Kisumu Mamboleo substation was completed in May 2012. The line will serve Rang'ala, Kisumu and its surrounding environment.

Kamburu - Meru Line

The 122 km single circuit 132kV line, and sub-station was completed in June 2010. The scope of the project was to enhance power supply quality and reliability in Mt. Kenya region with emphasis on Meru and nearby towns. The project was also commenced to minimize system losses occasioned by long distribution lines.

Chemosit - Kisii Line

The 62 km 132/33kV line and sub-station was completed in June 2010. The objectives of the project were to enhance power supply quality and reliability in Nyanza region, especially in Kisii and nearby towns and minimize power losses due to long distribution lines.

Rabai - Galu Line

47 km single circuit 132kV line and sub-stations was commenced to sufficiently supply the coastal region with electricity for the growing demand. This project will ensure that there is un-interrupted supply of electricity at the tourism destination area.

Sondu - Miriu - Kisumu Line

The 50 km 132kV line aims at increasing the access to electricity in the region, increased customer connectivity, reduce technical losses and improve quality of supply.

KETRACO brings brighter days



Ms. Serah's new home which she built and roofed with the compensation she received

By Sulea Naliaka

Residents and business owners in the Coastal region of Kilifi, Malindi all the way to Lamu Island will soon dance to some electric tunes. This is because of the 220kV Rabai-Malindi-Garsen-Lamu project that will connect this region that is a key tourist destination in Kenya to the National Grid.

The current supply of electricity in the area is insufficient and unreliable with frequent voltage fluctuations.

The locals were therefore delighted to have the project in their area as they feel that this would indirectly bring in development mainly in the form of skilled and unskilled labour opportunities. The women and youth are now benefitting from their small businesses by supplying goods and services to the project staff.

Generally, the local communities are in favour of the project. Most of the affected locals have received their way leave compensation and the process is ongoing. Serah, a local at Kakoneni Village in Malindi County, is very grateful to KETRACO for their projects. "I appreciate the fact that KETRACO came to this village. Even though they acquired our land, we were compensated and this has helped my family a lot!" she stated. Serah was compensated for her piece of land and trees and used the compensation to build a new semi-permanent house. Furaha Safari, another resident in the same area also acknowledges KETRACO's work and noted that she was awaiting compensation for her trees.

The hotels in the region will also enjoy adequate and un-interrupted supply of electricity once the project is completed. This will support tourism in the region. The project will also take electricity to the proposed Lamu Port and replace the existing expensive diesel generators.

There is also hope that the project proponent would have some corporate social responsibility (CSR) actions that would invest in development projects in the areas such as schools, water, health centres, roads and cottage/ juakali business capital.

Turkana to host biggest wind power plant in the region

Kenya's remote county of Turkana has been receiving international limelight recently. From oil discovery to hosting the biggest wind power project in Kenya. The Lake Turkana Wind Power Project (LTWP) aims to provide 300MW of reliable, low cost wind power to the Kenya National Grid, equivalent to approximately 20% of the current installed electricity generating capacity.

The ambitious project, which is backed by the African Development Bank (AfDB), marks the largest single private investment in Kenya's history, and will diversify Kenya's electricity from hydro-electric power, which provides around 60% of its electricity needs but is prone to drought and irregular rainfall, leading to blackouts and shortages that dampen economic growth.

The planned 300MW LTWP in Northern Kenya, will earn up to Sh1.3 billion in carbon credit sales a year, raising hope for improvement of the livelihood of communities living around the site. "The community around Turkana has been marginalized for a long time and the project promises a windfall in terms of proceeds from carbon credit sales that would be used to improve development in the region," Bobby Pittman, AfDB's

Vice President for Infrastructure, Private Sector and Regional Integration affirmed.

The project will comprise 365 wind turbines (each with a capacity of 850 kW), the associated overhead electric grid collection system and a high voltage substation. The project also includes upgrading of the existing road from Laisamis to the wind farm site, a distance of approximately 204km, as well as an access road network in and around the site for construction, operations and maintenance. The Kenya Electricity Transmission Company Ltd (KETRACO), with concessional funding from the Spanish Government, is constructing a double circuit 400kv, 428km transmission line to deliver the LTWP electricity along with power from other future plants to the National Grid.

Nick Nuttall, spokesman for the United Nations Environment Programme (UNEP), said Kenya was among a group of developing countries where UNEP had mapped potentially windy sites and ones with good solar potential. He said LTWP had plans to expand the wind farm once the first phase is under way.

The project aims at producing reliable power as Marsabit County is generally gifted with exceptional wind resources.

Data collected and analysed since 2007 indicate that site has some of the best wind resources in Africa, with consistent wind speeds averaging 11 meters/second and from the same direction year round.

Another advantage of the power project is the low cost power. Lake Turkana Wind Power Project will be the least cost power generation option available in the country along with geothermal power and at even less cost than the feed in tariff for other wind projects set at US\$12 cents/kWh. The tariff will be approximately 60% cheaper than thermal power plants.

Marsabit County is among the poorest counties in Kenya; Loyangalani area is one of the poorest in Marsabit. As part of Lake Turkana Wind Power Project, a Corporate Social Responsibility (CSR) programme is in place for the communities in order to ensure that livelihoods are improved; Lake Turkana Wind Power Project will use a combination of revenue from carbon credits and profit to form and fund a trust, which will ensure a well targeted plan over the 20 years of the investment.

Thika Power Plant: World Bank boosts effort to diversify from hydro power

The World Bank is investing an estimate of 12 billion in the Thika Power Plant to help construct a 87MW Thermal Power Plant. The power Plant aims to diversify Kenya's electricity away from hydropower which is currently the biggest source of energy and will feed all its power into the National Grid.

The plant, that produces 87MW, will use Heavy Fuel Oils (HFO) that is a quicker and viable option to address the energy deficit in Kenya. With heavy reliance on hydro energy, power supply is not stable during drought season as water supply becomes low. During these times, emergency electricity becomes an option but is really expensive. HFO plants are a quicker and viable option to address the energy deficit in Kenya, given the relatively long development period of other sources like geothermal energy and coal.

The Thika project is one of three plants that the government issued tenders for in 2009 to boost power supply and encourage private sector participation in electricity supply.

The Sh12 billion Thika Power plant is a subsidiary of Lebanese firm Melec PowerGen. "With the massive growth in energy demand in Africa; Independent Power Projects can add reliable and sustainable capacity to the

power network," said Samer Nasr, Managing Director of Melec PowerGen Inc.

"To successfully implement an IPP, you need a partner with extensive knowledge and experience, as well as a country that enjoys stability and has the required structures. We believe both Kenya Power and Kenya have all of these, and are leading the way in the development of electrical infrastructure in sub-Saharan Africa," he added.

Energy PS Mr. Patrick Nyoike observed that discussions with other independent power producers were ongoing with an aim of facilitating the set-up of other plants that are scheduled for completion by 2016.

The World Bank estimates that power shortage currently cost the Kenyan economy 2% of the GDP growth. "Thika and the recent series of independent power projects in Kenya demonstrate how the private sector can help the government meet growing demand for electricity. The choice of Heavy Fuel Oils will further diversify Kenya's energy sources, making power generation more stable." observed Jean Philippe Prosper, IFC Director for East and Southern Africa.

Alongside IFC, African Development Bank and Absa Capital will contribute Sh2.9 billion to these projects.

Source IFC international finance corporation

Kenya ventures into nuclear energy

By Basett Buyukah

The Nuclear Electricity Project Committee (NEPC) has had an eventful time in the year 2012. Born less than two years ago - in November 2010 - it is tasked with fast tracking the implementation of nuclear electricity generation in Kenya. Toward this end, two significant events have taken place in the recent past.

Between July and August 2012, NEPC in conjunction with the International Atomic Energy Agency sponsored 29 Kenyans to participate in a moth-long fellowship at the Texas A & M University's Nuclear Power Institute. Besides representation from NEPC's secretariat, the fellows were drawn from the Ministry of Energy, the Energy Regulatory Commission, The Kenya Industrial Research and Development Institute (KIRDI) and The Kenya Bureau of Standards (KEBS). Also represented on the list of fellows were Kenya Power and The Radiation Protection Board.

The purpose of the training was to equip a multidisciplinary team with the skills, aptitude and knowhow towards the development of an effective nuclear power programme. The course comprised lectures, laboratory practicals in a research reactor and simulated field exercises on nuclear emergency preparedness and disaster response. The course also entailed site visits to the South Texas Nuclear Power Plant and stakeholder engagement initiatives comprising schools and local communities in greater Texas.

The Texas A&M University's summer fellowships are just one aspect of a comprehensive capacity building programme for Kenya's Nuclear Electricity Project Committee. Six Kenyans were last year admitted to the Korea Institute of Nuclear Graduate Studies (K-INGS) to pursue Master's degree programmes. A further 15 were sponsored by NEPC to pursue Masters degrees at the University of Nairobi's Institute of Nuclear Science and Technology. These initiatives will be replicated in subsequent years. The ultimate aim is to attain a core of competent, well-trained, knowledgeable and skilled manpower to handle the rigours of a nuclear power programme. This is with due regard to the functions and responsibilities envisaged under Kenya's nuclear power programme.

The first week of October is synonymous with the Nairobi International Trade Fair. Thus, NEPC, made its debut appearance at the NITF in the annual ritual that ran between 1st and 7th October 2012. It was an exciting time for the newest kid on the energy block as it showcased itself before an eager and attentive audience. Engaging various stakeholders and the public is a core mandate of NEPC. The NITF provides a fertile ground to sow the seed, germinate the roots and branches and blossom the flowers towards fulfilling this important task. The response was overwhelming with throngs of



showgoers visiting the NEPC stand to understand more about nuclear electricity and the whys and wherefores that informed the decision to introduce it in Kenya's energy mix.

Meanwhile, its full steam ahead with the prefeasibility study which provides the building blocks for the nuclear power programme. This will be followed by a feasibility study and subsequently the invitation of bids for the construction of the first nuclear power plant. All things being equal, the first nuclear power plant with a capacity of 1,000MW will go live in 2022. It is envisioned that this capacity will increase to 4,000MW just in time to power Vision 2030. In other words, four nuclear power plants would be operational in Kenya in slightly under two decades from now. By then, it is projected that nuclear electricity will provide about 20% of the country's total capacity within the energy mix.

[Basett Buyukah is the Director, Publicity & Advocacy, NEPC]

In Picture



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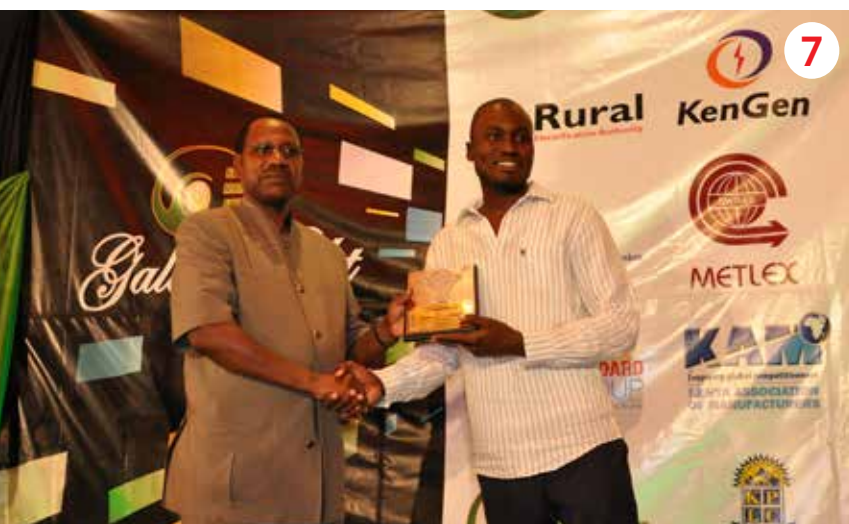
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1. PGI officials visit KETRACO offices for a contract signing between the two companies

2. HR&A Manager Agnes Ongadi (3rd Right) receives the keys for the new office space from Mr. Joseph Ngugi of Buildmore Construction Ltd (3rd left) who partitioned the space acquired to accommodate the growing number of KETRACO employees

3. Performance Contract signing at the Ministry of

Energy between KETRACO and the government in 2010. From left: Mrs. Agnes Ongadi Head of HR, Rev. Dr. Jessie Mutura former Board Member, Hon. Patrick Nyoike PS Ministry of Energy, Mr. Justus Kageenu Chairman of the Board and Eng. Joel Kiilu KETRACO MD

4. President Mwai Kibaki (left), accompanied by Energy Minister Hon. Kiraitu Murungi (2nd left), visit the KETRACO stand where they are received by the Company's MD Eng. Joel Kiilu (Right) Chair-

man of the Board Mr. Justus G. Kageenu (Centre) and Board member Rev. (Dr.) Jessie W. Mutura (2nd Right) during the 2nd National Energy conference. The conference whose theme was 'Powering the Vision' was held from the 4th to 6th of September 2011 at the KICC, Nairobi.

5. (L) Mr. P. K. Das, Senior V.P of Jyoti Structures Limited and KETRACO M.D Eng. Kiilu during the contract signing for the construction of the Suswa-Isinya project.

In Picture



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6. Members of the Board during a tour to the Hydroelectric Plant in 2011

7. KETRACO MD & senior staff participating at the Energy Management Award at the Intercontinental Hotel in Nairobi April 2011

8. KETRACO staff led by Human Resources and Administration Manager, Mrs. Agnes Ongadi (left) donating blankets for the Sinai Fire tragedy victims at Shauri Moyo Rescue Centre in Nairobi

9. KETRACO staff enjoy themselves during the Staff Fun Day held at Kenya School of Law in Karen

10. KETRACO engineers witnessing soil investigation tests for the 400kV Mombasa-Nairobi line

11. Staff members and Board Member Mrs. Felister Kivisi (Centre) during the cake cutting at the Annual Staff Party in December 2012

12. Board Members interact with future engineers and innovators during a tour to the Nyaga Sub-Station

during a recent tour of the Kilimambogo-Thika-Githambo Project

13. Mr. Joe Ager (General Manager International Business) assists construction workers during the Mombasa-Nairobi line tour with Members of the Board, October 2011

14. Staff members enjoy team building at the Brackenhurst International Conference Centre, near Limuru town

Geothermal, the best source of sustainable electricity

By Ruth Musembi

The Geothermal Development Company was set up with the aim of providing reliable renewable energy that will sustain economic growth and thus reduce Kenya's dependence on thermal energy.

GDC's accelerated geothermal development strategy has borne tremendous fruit. Several areas are worth of mention:

Steam Development

Three years since inception, the GDC's score card is impressive courtesy of our innovative approach to accelerated geothermal development. The Olkaria Geothermal Field GDC has 354MW of steam from 59 wells. This is the steam that will be used to generate 280MW of electricity from two power plants currently under construction.

Within the same timeframe, GDC has drilled seven wells in the Menengai Geothermal Field. Four wells have undergone well testing with a yield of 25MW steam. The other wells are in the test period.

GDC is drilling geothermal wells to avail steam to private and public investors who convert it into electricity. Already, GDC has shortlisted 19 power generation firms who have expressed interest in converting the steam developed by GDC into electricity.

By concentrating on drilling, GDC has effectively removed upfront risks that have in the past been a deterrent to geothermal development. It is important to note that since the 1950's only 209MW out of a potential of 10,000MW of geothermal power have been harnessed. However, from 2009, GDC has developed steam that is equivalent to 354MW; a proof that geothermal will soon become the base load source of electricity in Kenya.

Using own drilling rigs and Kenyans as drilling crew

GDC acquired two additional drilling rigs in line with our strategy to lower drilling costs and fast track the pace of drilling, making a total of 4 GDC-owned rigs. By using own

rigs and local drilling crews, GDC has reduced the cost of drilling geothermal wells by nearly half. Such huge savings will translate to a lower electricity tariffs for the betterment of Kenya's economy. This is a positive development in Kenya's effort to achieve Vision 2030 which is hinged on the availability of adequate, affordable and reliable electricity. Two more rigs will be delivered next year.

Use of modular power plants

GDC has awarded a tender for the first Modular power plant in the Menengai Geothermal Field (180km Northwest of Kenya). The electricity generated from the first power plant in Menengai will be used to run drilling rigs and light the Menengai drilling camp. This way GDC will retire diesel powered generators currently in use. Additional modular power plants will be installed and the electricity channelled to the National Grid. This way, Kenyans will start to reap the benefits of additional geothermal energy as GDC continues to drill enough wells for the 400MW power plants.

GDC is promoting the use of modular power plants (also known as Well Head generation units) to reduce the geothermal power gestation period from about 5 years to about a year. In the past, the practice has been to drill many wells over a period of several years and gather enough steam for a single power plant. On average, one well produces 5MW. To construct a 100MW power plant, one needs to drill 20 wells. This, in effect, means that the drilled geothermal wells would lie idle until the last well is drilled. In Kenya, some wells have in the past been idle for well over 10 years. GDC has changed this scenario by ensuring that immediately a well is drilled and tested, a small movable unit is installed to generate about 5MW of electricity.

Developing human capacity for geothermal development

GDC has recruited and trained enough staff currently operating four drilling rigs in the Menengai Geothermal Field. We have a training programme designed to offer staff hands-on exposure to geothermal technology at our drilling site and overseas.

(Ruth is the Head of Corporate Communication and Marketing at GDC)

PRESIDENT KIBAKI LAUNCHES OLKARIA 280MW POWER PROJECT

By Grace Chepkwony

President Mwai Kibaki launched the Olkaria 280MW project on 23rd of July 2012. The Olkaria 280MW geothermal project will raise KenGen's total electricity capacity by 25% and significantly raise geothermal contribution in meeting the country's power demand.

Speaking during the ground breaking ceremony, President Kibaki noted that the project is the most significant step yet in ensuring adequate power supply in the country, while reducing the cost of electricity. "I am happy to note that this project begins the shift from hydro based electricity to a geothermal based power future. Unlike hydro generation that is at times affected by vagaries of weather, forcing us to rely on expensive modes of generation, geothermal is affordable, stable, renewable and clean," said the head of state.

KenGen Managing Director and CEO Eddy Njoroge noted that the project is a game changer in the power mix in the country. "Whereas upfront costs may be higher initially, running and maintenance costs of geothermal plants are low and hence the model holds real promise of affordable power in the country," said Njoroge.

The implementation of the mega project has been divided into four parts (lots) for ease of financing and implementing. Steam field development will be carried out by Sinopec of China, while the power plant will be built by a consortium of Toyota Tshusho of Japan and Hyundai of South Korea. Transmission lines and substation will be undertaken by KEC of India while Sinclair Knight Mertz of New Zealand is in-charge of the project consultancy.

The multi-billion project whose total cost is US \$981Million has been financed by KenGen, GOK, World Bank, KfW, EIB, AFD and JICA and will be completed in mid 2014.

Grace works for the communication department at KenGen

World's biggest power failure hits India



image source: Reuters

A customer holds a candle as he gets his hair cut in Kolkata, India during the blackout.

On 1st and 2nd August 2012, India experienced a power outage that left approximately 620 million people in the dark. This population represents an eighth of the world's population. The Tuesday power outage is believed to be the second massive outage in as many days, coming just after the country had recovered from a previous failure of the Northern grid, which had left 370 million people powerless. Electricity workers struggled to return power to the 20 affected states, restoring most of the system in the hours after the crash. After 48 hours, power had been fully restored across the country.

Speculations indicated that the blackout might have been the result of states drawing too much power from the grid. Some analysts dismissed that explanation, saying that if overdrawing power from the grid caused this kind of collapse, it

would happen all the time.

The Confederation of Indian Industry said the two outages cost business hundreds of millions of dollars, though they did not affect the financial center of Mumbai and the global outsourcing powerhouses of Bangalore and Hyderabad in the south.

Part of the problem is that India relies on coal for more than half its power generation and the coal supply is controlled by a near state monopoly that is widely considered a shamble.

The power deficit was worsened last year by a weak monsoon that lowered hydroelectric generation, spurred farmers to use pumps to irrigate their fields long after the rains would normally have come, and kept temperatures higher, keeping air conditioners and fans running longer.

Other massive blackouts in the world

On 24th September 2011, nine million people in north and central Chile were affected by a blackout that lasted for at least two hours.

On 29th June 2012, a line of thunderstorms with hurricane-force winds swept from Iowa to the Mid-Atlantic coast and knocked out power to more than 3.8 million people in Indiana, Ohio, West Virginia, Pennsylvania, Maryland, Virginia, Delaware, North Carolina, Kentucky, and metropolitan Washington, DC.

World Bank in deal to guarantee Independent Power Producers

By Kevin Sang - PR Office Kenya Power

The World Bank agreed on August 2012 to provide guarantees to commercial banks that issue stand-by letters of credit to Independent Power Producers (IPPs), enhancing efforts to improve the country's electricity generation.

The Letters of credit will act as security for power purchase agreements between the IPPs and Kenya Power as set out in the power purchase agreement (PPA), or by the Government as stipulated in its letter of support.

Speaking at the Treasury Building in Nairobi during a risk guarantee signing ceremony for Thika Power Limited, Ministry of Energy Permanent Secretary, Mr. Patrick Nyoike, said the move will eliminate burden of risk guarantees previously expected to be shouldered by Kenya Power. "Provision of payment securities to IPPs by Kenya Power has however become unsustainable, as it affects the Company's ability to raise funds for its core business needs," said Mr. Nyoike.

Mr. Nyoike revealed that the Company has so far provided payment securities in the form of stand-by letters of credit to Tsavo Power, OrPower 4 and Rabai Power Ltd. with a value of three to four months payments.

"Kenya Power is mandated with procurement of bulk power from generators with the objective of meeting the growing power needs of the growing economy. The company has to consistently enter into power purchase agreements with power generators bringing on board new capacity to ensure that the objective of meeting national power demand at any time is satisfied," he added.

Mr. Nyoike said IPPs will continue playing a critical role in meeting energy needs of the growing economy and complementing the investments by the government and KenGen in the generation expansion.

Different structures of energy markets

By Eng. Justin Muna

There are three types of power market structures: de-regulated, semi-deregulated and regulated.

A deregulated market structure is an unbundled transmission system operator, with third party access, such as an independent generation (IPP). Parts of the retail market are competitive with independent wholesale power purchasers either for re-sale or for own use. Here, IPPs and wholesale buyers are allowed access to the cross border interconnection.

In a semi-deregulated structure, the bundled national Vertically Integrated Company (VIC) owns a major part of generation capacity, the entire transmission network and the distribution network. IPP access is allowed but the national utility is a single buyer. Third party access is also allowed, but to the national transmission network and not to cross border interconnectors.

In a regulated structure however, there is only one single Vertically Integrated Company (VIC) which is a monopolist and there is no third party access or IPPs.

Trends in market models

There are many different market models all over the world ranging from vertically integrated utilities to full-on retail competition. The trend has been shifted from a vertically integrated monopoly to various levels of competition in generation, wholesale and retail activities driven by the following objectives: achieving universal access to electricity, promoting integrated rural development, unlocking value in state assets, widening the participation of private sector in the industry, attracting foreign direct investment and ensuring security of electricity supply.

Electricity market models

A key element necessary for competition is the creation of an electricity market or set of trading mechanisms and instruments.

There are two broad market models that can be used to describe the way in which sellers and buyers of electricity interact. The first is the power pool model which has been widely implemented, initially in countries such as the UK and South America.

In this model generators bid their power into a pool (i.e. a block of power at a particular price for a particular period – usually an hour or half hour a day ahead). The bids are stacked from the lowest to the highest, and the pool operator prepares commitment and dispatch schedules a day ahead on the basis of a demand forecast and merit-order of power bids from the pool based on the lowest price bids.

Power is dispatched to meet demand and hence surplus generators (i.e. those with the higher prices) are not dispatched. The purchasers then buy their power from the pool at a price that is based on the bid of the last

dispatched plant, i.e. the system marginal price, plus any capacity payments.

System balancing is managed by the system operator, based on separate price schedules for increases or decreases in actual generation output or consumption (balancing market). The costs of system operation and balancing are added to the pool price, and all generators and purchasers are required to make their physical purchases or sales of electricity through the pool, although they might hedge the risks with financial contracts for differences.

However, it has been observed that demand-side participation tends to be weak in many of these power pools. As more experience develops with competitive electricity markets, a multiple electricity trading market model or multi market model is often adopted. Here, not all power is traded through a single pool. The pool is voluntary and a market develops for long or medium-term bilateral contracts between generators and suppliers and/or customers outside the pool.

A single system, marginal price is replaced by a system where supply and demand market participants are paid, and pay, as bid or agreed. In this system, market risk is hedged through trading in futures or forward contracts.

Characteristics of multi market model

This system is characterized by bilateral trades – long to medium term (bilateral contracts for physical power delivery), futures – medium term (year ahead or month ahead through power exchange), short term markets – day ahead (day ahead through power exchange), balancing markets – real time market (for varying demand and supply to balance the system) and settling – after post (settlement for each trading platform).

There are bilateral markets that involve contracts between power generating companies and load serving entities (LSEs) which can be retail electricity providers or other major buyers.

There must always be a balance between the supply and consumption of electrical power. In balancing power markets, the participants bid a price to alter production or consumption. This is used when any imbalances arise in the power system. When there is a balance between the supply and consumption of electricity power, the required frequency of the voltage is maintained.

The model also includes ancillary services. This comprises of various types of energy and capacity to meet reliability requirements. Active power is the primary reserve: automatic governors on plants. There are also secondary reserves: automatic signals based on real time metering of system balance, and tertiary reserves: manual, fast (e.g. < 15 min) and slow.

Reactive power which shall be delivered locally comprises of short-circuit power, reactive reserves, voltage control and black start capability.

KETRACO's milestones: Tracing the path

The Grid had a chance to speak to KETRACO Managing Director about the origin and growth of the Company. Here is what he had to say:-

How was KETRACO formed?

KETRACO was formed in pursuance to Sessional Paper No. 4 of 2004 on Energy to unbundle then Kenya Power and Lighting Company (KPLC) transmission. KETRACO was then registered on 2nd December 2008 with key Shareholders being the Ministry of Finance (98%), and the Ministry of Energy (2%).

How did the organization start to morph together?

The Chairman was the 1st appointment followed by the other Directors. Initially we were to be a paper company, registered with about 25 employees. But this was thought to be too small. Further more, the development agencies wanted a real separation of KETRACO from other energy companies, so that we could enjoy concession funding.

Where were the first offices and how was it settled?

The first staff member was Agnes Ongadi who supported the chairman. Victor Mwarabu then joined in as the Chairman's Liaison officer. A few officers at KPLC were also seconded. Isaac Khisa, now an Administration Officer followed. During the 1st Board meeting, Duncan Macharia was then invited to take the minutes. The team made arrangements for recruitment, new offices, and Board meetings among others.

The whole team moved to Caparo Place on 1st Dec 2009. Most of the staff members came in January 2010, such as the Social Economists, Surveyors and Engineers. The first team activity was Mombasa Strategic Plan that also included the Board.

What were your first impressions of the organization when you joined?

There was no time to take impressions. Everyone was busy creating, envisioning what the company wanted. The plan was to be a Project Management Company. We still retain this philosophy.

What Challenges did you face in your early days?

Amongst the major challenges the



company faced in the beginning was getting the required key staff.

There was a shortage of engineers, learning curve was stiff and at that point, Kenya Power resisted poaching. But later, the two companies had a memorandum of understanding. These challenges made KETRACO train our own staff.

Also, Kenya Power was to still retain some of their lines, so KETRACO had to start afresh. A Service Level Agreement to oversee and manage existing projects was put in place.

Another challenge that the company faced was acquiring way leaves. We thought putting up pylons was hard, but way leave acquisition is the one outstanding challenge.

Getting the Ministry of Energy to assist the company with interested / prospective agencies was also a challenge that was overcome with time.

Office set-up, partitions, documentation for projects, purchase of vehicles proved challenging then, as all these were to be done at the same time.

Since then, the need to expand has now risen. More projects are ongoing, and the Board has increased in number. I am pleased that donor support has been overwhelming to the Company and the Government of Kenya.

What are your thoughts on the progress made by KETRACO to date?

The company targets to transmit electricity over a distance of 5000km in the first 5 years. The budget for the company has also increased from Ksh. 25 million to Ksh. 6.3 billion. We are benchmarking with the best in the world with the 400kV/ 500kV lines and the marine cables.

Turning to work, briefly tell us what challenges you face and how you overcome them?

It has been a learning experience. We are growing, and so is our workload. New procedures and decisions are made before we can put policies in place. Work has to be done. New energy issues make you think out of the box. We have no history to fall back on, so we are on uncharted grounds and it's exciting. For the new structures we have to be careful with every step. Because of this, many staff members cannot take leave. Quite frankly, the strain is on everybody.

How important is your input in ensuring that power transmission projects are delivered on time?

We are leading a multi-discipline work force. This requires coordinating all the project teams to ensure that all arms are working in synchronization. Everyone's work is very important here. What we are handling is probably what would take many companies a lifetime.

What are your thoughts on KETRACO workforce?

As I earlier mentioned, we had to build from scratch, and I am happy with the staff. We have a very good team that is under a lot of strain to deliver too many projects. They are passionate about their work. But as always, there is room for improvement.

Where do you see KETRACO in the next three years?

What we are now learning will certainly make us wiser. We will be a big organization, profitable, with assets in our name. Regional trade may have taken up by then, and connections in the local grid will be very good.

KETRACO unveils campaign to fight vandalism

By Sulea Naliaka

It is a Sunday afternoon and your favourite football team is playing against your competitor, let's say Arsenal is battling it out with Manchester United. You have driven from your house to your favourite joint to seat together with your peers and watch the much anticipated game.

Before the game begins, you are already bragging of how well Rooney is going to get close control of the game, make some tight turning circles and score within the first 10 minutes for Old Trafford. The opponents on the table nearly crush you with their words. The match begins and things are getting hotter. On the 23rd minute, power goes off. Yes.

I can confidently say that this is the most frustrating point in the game lovers' lives. Same as when you are watching your Soap Opera. Before Rafaella could find out that Barbra is going to spike his drink, the lights go off.

We blame this on vandalism, both the unseen and the cases witnessed but never reported. Electricity vandalism ranges from physical disconnection of power by cutting the power lines, dismantling the transmission towers for purposes of selling the steel material, disconnecting transformers or siphoning out transformer oil or just as a result of trying to achieve an illegal connection.

The man made power failures not only make you miss witnessing Podolski's magnificent score but also causes the country's economy dearly. Vandalism is not only an economic but also represents a breakdown of values and this is a societal problem. This crime is equal to sabotage of the economy. Think of all our industries that depend on electricity for most of their processes. Think of Mbagathi Hospital where some vaccines and drugs need to be refrigerated always.

Kuwa Shujaa, Kaa Rada Campaign

It is with the above consideration that 'Kuwa Shujaa, Kaa Rada' campaign was started. The objective of the campaign is to create a common platform for all the affected players in an awareness campaign to fight vandalism. The focus of this campaign is to involve all consumers to fight vandalism as all of us stand to lose the most from acts of vandalism.

The campaign aims at taking various forms including but not limited to Social Media Campaigns on You-Tube, Twitter and Facebook, editorial coverage in mass media including TV, radio and newspapers, advertising campaign on social media, TV, radio, newspa-

pers and billboards and roadshows and activations throughout the country among others.

Key players in the campaign include Ministry of Energy partners, Telecommunication stakeholders, transport sector and the Local Authority.

KETRACO's Projects Vandalism

In its mandate to plan, design, build, operate and maintain new electricity transmission lines, KETRACO has been faced with vandalism challenges. Part of the Sondu -Miriu - Kisumu 132kv transmission line has been vandalized. People are also already building structures on the way leave corridor which is not only dangerous but also illegal. Along the Thika Kilimambogo line, metal members have been stolen and one tower came down as it was too weak to support itself.

KETRACO's head of Technical Services Dr. Mativo admits that fighting vandalism is a joint effort by the community and all the stakeholders. 'It is therefore your effort and mine to report instances of vandalism to relevant authorities. This will help stakeholders respond on time to curb this anti-social act.' he stated.

Currently, KETRACO is using special bolts that cannot be unscrewed once fixed. In addition to the anti-theft bolts, KETRACO is also installing spikes on the towers to prevent vandalism. In future the Company is planning to invest in mono poles.

A person convicted for vandalism will be liable to a minimum fine of Shs.5 million or a jail term of not less than ten years, or both. Anyone found stealing power will also be subject to a similar sentence.

This is a single large round pole which is usually impossible to vandalise unlike the current towers. Dr. Mativo admitted that all these security measures are expensive to put in place to minimize vandalism.

Vandalism and the law

Amendments to the Energy Act spell stiffer sentences to those found vandalizing or in possession of vandalized power equipment. A person convicted for vandalism will be liable to a minimum fine of Shs.5 million or a jail term of not less than ten years, or both. Anyone found stealing power will also be subject to a similar sentence.

PRSK honors practitioners at 12th awards ceremony

The 12th PRSK Awards for Excellence themed 'Inclusion and Diversity - A complete Ensemble of Kenya's people in food, music and attire' was held on 7th December 2012 at the Safari Park Hotel.

The awards were not only a celebration of excellence in Public Relations initiatives, but a platform to celebrate Kenya's diversity across all social and economic platforms and elaborate on how it can be harnessed for positive development while adding to the voice for a fair and peaceful 2013 Election.

The award ceremony was attended by Dr. Mzalendo Kibunjia the Chairman of National Cohesion and Integration Commission, Mr. Muthui Kariuki Government of Kenya Spokesman, Dr. Hannington Gaya Chairman Brand Kenya Board, Mr. Kamotho Waiganjo Commissioner at Commission for the Implementation of the Constitution, as well as practitioners drawn from public and private organizations in Kenya.

The evening saw the following organizations scoop coveted awards:-

1. Blueprint PR with Ma Youth Wa Kenya Mpo - Overall PR Campaign of the Year
2. Imagine IMC with the Heineken UEFA Champions league trophy tour - Media Relations Campaign of the Year
3. Apex Porter Novelli with the Longonot Gate Development - Consumer Relations Campaign of the Year
4. Apex Porter Novelli with the Kaa Chonjo Campaign- Public Affairs Campaign of the Year
5. Gina Din Corporate Communications with the association of Kenya Insurers Agents of the Year awards - PR Event of the Year
6. Gina Din Corporate Communications with Crown Paints Transforms your world - Social Responsibility Campaign of the Year
7. Kenya Commercial Bank with In your shoes campaign - Internal Communication Campaign of the Year
8. Hill and Knowlton Strategies with Airtel Rising stars - Sponsorship campaign of the Year
9. Kenya Commercial Bank with Mobi Bank - Technology Campaign of the Year
10. Blueprint PR with Ma Youth Wa Kenya Mpo - Not for Profit PR Campaign of the Year
11. Kenya Commercial Bank with Cascade Magazine - Corporate Publication of the Year
12. Golden Honours - Patricia Kariuki, Stephen Wangaji, Waimiri Kungu and Raphael Mworia
13. Shepherd Honors - Commission for the implementation of the constitution and Kenya Forestry Services.



Head of Corporate Communications, Raphael Mworia (Left) receives his award during the ceremony.

All in a days work

By Brian Muchilwa

It is an exciting time to be working as an engineer at KETRACO. Within the first five years of existence, KETRACO is putting up more than 5000km of transmission lines. To put it in perspective, this is more than has been built in the country's history prior to KETRACO's existence; a challenge by any measure. Fortunately, engineers love a challenge and there is a large role that engineers play in fulfilling this mandate.

Sometimes this role is not clear, leading to misunderstandings and workplace conflicts. It is important to communicate effectively with the rest of the team at KETRACO in order to ensure smooth efficient and timely implementation of projects.

The role of the engineering group is to de-

velop, and deliver engineering, procurement, and construction solutions for high voltage power transmission lines and substation projects in Kenya. These solutions span the whole project cycle; from feasibility studies to completion and commissioning. The engineer needs to make and maintain good working relationships with multi-disciplined project team members in order to provide these solutions; environmental experts, socio economists, surveyors, land economists, project accountants, procurement officers, legal officers, consultants, contractors etc.

It is also worth noting that there are other support services that, even though are not directly involved, are essential in facilitating these activities and usually affect the quality, schedule and overall cost of projects.

Engineers at KETRACO play a pivotal role in managing these activities and linkages on a day to day basis. The tasks performed in fulfilling the roles vary and may require the engineer to function out of the office or to travel to site. In a nutshell, engineers are tasked with ensuring that the transmission network that KETRACO constructs is world class. To deliver, we need the support of other team members. We cannot do it alone.

Brian Muchilwa is a graduate electrical engineer at KETRACO. He holds a BSc in Electrical Engineering and a BA in Physics from Idaho State University, USA and Post Graduate course work in Engineering and Technology Management from Portland State University, USA.

Conducting effective meetings

By Zaituni Asmani

There are good meetings and there are bad meetings. Bad meetings drone on forever, you never seem to get to the point, and you leave wondering why you were even present. Effective ones leave you energized and feeling that you have really accomplished something.

To conduct successful meetings one needs to observe a few simple rules that will ensure the time spent is productive for everyone:

Be prepared

Planning ahead puts you in control of the meeting. Not only does this enable you to ensure time is well spent, and objectives are met, but it also reigns in jittery nerves.

The preparation process includes setting objectives, selecting and preparing content, venue and time schedule, and preparing for anticipated questions and reactions.

Select participants

The decision about who is to attend depends on what you want to accomplish in the meeting. This may seem too obvious to state, but it is surprising how many meetings occur without the right people there. Inform each person about the meeting, its overall purpose and why their attendance is important. Send participants a copy of the proposed agenda along with the meeting notice.

Have someone designated to record important actions, assignments and due dates during the meeting. This person should ensure that this information is distributed to all participants shortly after the meeting.

Develop your agenda

When setting your agenda, think of the outcome you hope to have and what activities need to occur to reach that outcome.

Your agenda needs to include a brief description of the meeting objectives, a list of the topics to be covered and a list stating who will address each topic and for how long.

What's the most important thing you should do with your agenda? Follow it closely!

Opening meetings

Always start on time; this respects those who showed up on time and reminds late-comers that the scheduling is serious. Welcome attendees and thank them for their time.

How you start sets the tone for the entire meeting. So ensure that your opening statements are engaging.

This is also the time to review the agenda, giving participants a chance to understand all proposed major topics.

Conducting meetings

There are five powerful ground rules to follow: time management, encourage participation, ensure attendees remain focused, maintain momentum and reach closure.

Keeping momentum ensures that the process keeps moving, thereby helping with time management. You might ask attendees to help you keep track of the time.

Assign Action Items

Do not finish any discussion in the meeting without deciding how to act on it. Listen for key comments that flag potential action items and do not let them pass by without addressing them during your meeting. Assigning tasks and projects as they arise during the meeting means that your follow-through will be complete. This also shows participants that you value their input as well as their time.

Evaluations of Meeting Process

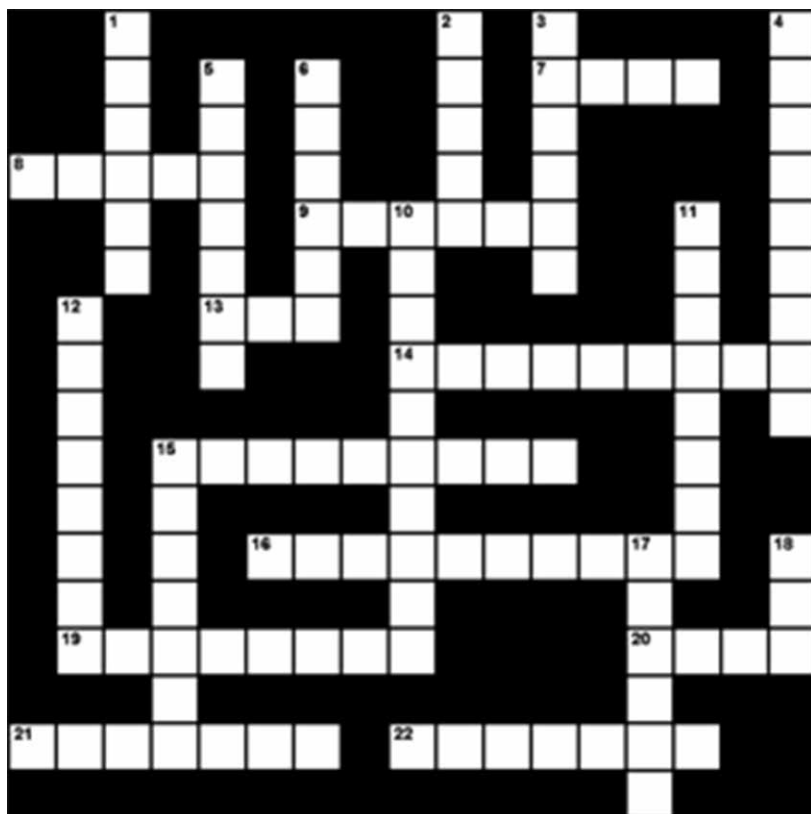
It is amazing how often people complain about a meeting being a complete waste of time, but they only say so after the meeting. Get their feedback during the meeting when you can improve the meeting process right away. Every now and then conduct 5-10 minutes "satisfaction checks"; quickly have participants indicate how they think the meeting is going.

Closing Meetings

Always end meetings on time and attempt to end on a positive note.

At the end of a meeting, review actions and assignments, and set the time for the next meeting. Clarify when meeting minutes and/or actions will be reported back to members.

Following these simple rules will ensure that attendees leave feeling that they have been through a sensible, well organised experience.



Across

7. Unit of electrical power, named after the Scottish inventor of the steam engine
8. A rotating machine that transforms electrical energy into mechanical energy
9. The kind of electricity you create by rubbing a balloon on your head
13. Atom or group of atoms that carries a positive or negative electric charge as a result of having lost or gained one or more electrons
14. Emission of radiant energy in the form of waves or particles
15. It transmits electricity, like copper
16. Opposition to the passage of an electric current
19. Elementary particle consisting of a charge of negative electricity
20. Smallest particle of an element that can exist either alone or in combination
21. Uncharged elementary particle
22. Electric potential or potential difference

Down

1. Elementary particle that carries a positive charge
2. Electromagnetic radiation in the wavelength range including infrared, visible, ultraviolet, and X-rays
3. Device for making, breaking, or changing the connections in an electrical circuit
4. Flash produced by a discharge of atmospheric electricity
5. Complete path of an electric current including the source of electric energy
6. Inventor of the electric light bulb
10. Force acting on particles of matter, tending to draw them together
11. Electrical charge with more protons than electrons
12. Electrical charge with more electrons than protons
15. Electrical flow through a conductor
17. Definite quantity of electricity
18. Unit of electrical resistance

puzzle source - surfnetskids.com



Did You Know that...

If you had a light bulb on the moon connected to a switch in your bedroom, it would take only 1.26 seconds for that bulb to light up, 238,857 miles away.

If you traveled as fast as electricity, (about 300,000 kilometers = 186,411.358 miles per second the speed of light), you could go around the world 8 times in the time it takes to turn on a light switch.

The first power plant owned by Thomas Edison opened in New York City in 1882.

Thomas Edison didn't invent the first light bulb but he did invent one that stayed lit for more than a few seconds. Thomas Edison invented more than 2,000 new products, including almost everything needed for us to use electricity in our homes: switches, fuses, sockets and meters.

Ben Franklin didn't discover electricity but he did prove that lightning is a form of electrical energy.

If you scuffed your feet long enough without touching anything, you would build up so many electrons that your finger would explode! But this is nothing to worry about, unless you have carpeting.

The electrons travel through your bloodstream and collect in your finger, where they form a spark that leaps to your friend's filling, then travels down to his feet and back into the carpet, thus completing the circuit.

Birds sit safely on electric power lines because a bird only touches one line. If the bird were to touch another line or pole the electricity would travel through the bird, either to the ground or another wire.

The Saint, the Surfer and the CEO

Are you an avid reader? You probably have read The Saint, the Surfer and the CEO.

Is this story fiction or not? One is not sure, just as in the case of the author's previous book "The Monk Who Sold His Ferrari". It reads like fiction, but the story seems to resemble the life of the author, who is an ex-lawyer.

The author, Robin Sharma, writes about transforming the corporate and personal life into a path of high vision and integrity. This novel reads easily and the teaching concepts are

integrated in the character's conversations and thoughts.

Whether you read this as a work of fiction, or as a semi-autobiography, the story is interesting, and the truths discovered by the main character are the same truths we ourselves are seeking and discovering in our own lives.

It is a powerful book, full of ways to enhance our life, both professionally and personally.

Fun to read and enlightening too!

bookreview source- inerself.com

RECIPE



GARLIC CHICKEN

By Caroline Njaaga

If we are not dashing to the office, or leaving work and hoping traffic, we are thinking of what we shall have for dinner or what we can cook in a few minutes without spending too much time preparing the food. At the same time, you want to spend time with your kids, spouse and other loved ones, you are hoping to watch news, a movie or even the latest season of your favourite series and get at least 8 hours of sleep. Here is a four ingredient recipe that you can try and have time to rest and bond with family.

- A whole chicken
- 4 huge garlic cloves, minced
- Juice of a 2 lemons
- 4 teaspoons vegetable oil
- Salt and pepper to taste

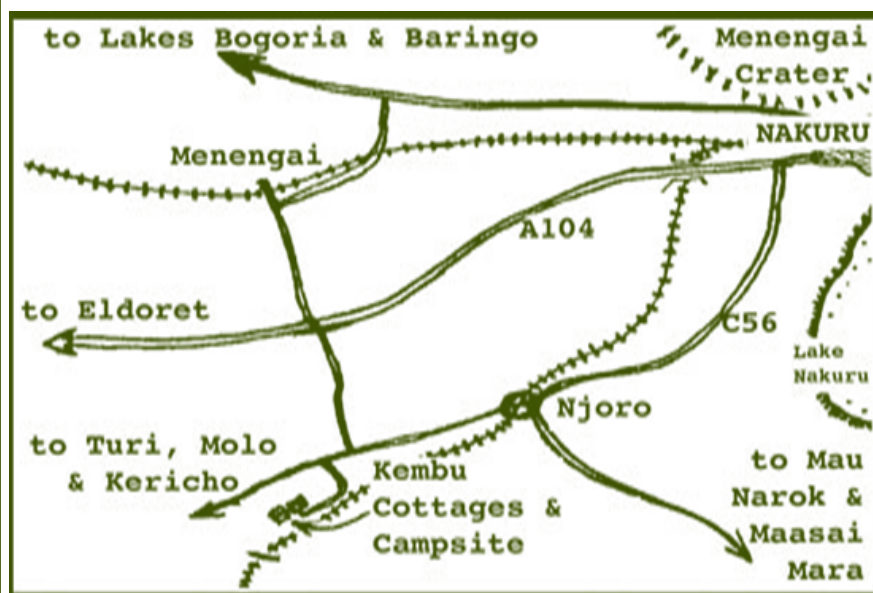
Instructions

Mix the juice, garlic and oil in a bowl. Rub some salt and black pepper on the chicken. Pour the sauce on the chicken in a baking pan. Bake the chicken at 375 degrees for 20-25 minutes or until juices run clear. Enjoy!

recipie source- cooks.com

WHERE TO GO....

By Caroline Njaaga



Are you going on leave or just need a weekend break out of Nairobi ? Try Kembu. The Kembu cottages and campsite are located on a working farm overlooking the Great Rift Valley. Offering crisp, clean air and ample space to roam - an ideal family retreat wonderful, high altitude climate - relaxed, peaceful, and friendly. There are numerous day trips in easy reach of the farm - Lake Nakuru National Park, Lake Bogoria National Reserve, Menengai Crater, Mau Forest and Kiplombe Valley. For bookings and more information, kindly log on to <http://www.kembu.com/>

garfield source- garfield.com

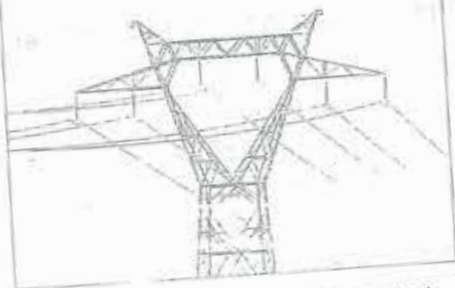


THIS MONTH'S QUOTE

"We are what we repeatedly do. Excellence, therefore, is not an act, but a habit."

— Aristotle

KETRACO IN THE PRESS



The World Bank has approved funding for an East African regional power grid link between Ethiopia and Kenya to allow the two states to trade in power.

ENERGY WB okays funding for new cross-border power transmission

Bank approves Kenya-Ethiopia electricity line

BY ZEDDY SAMBU

The World Bank on Friday approved a new transmission line between Ethiopia and Kenya, allowing the northern neighbour to sell its surplus electricity.

The approximately 1,000-kilometre cross-border power line is part of a nearly \$1.3 billion project to link the country with energy-producing Ethiopia and a broader bid to connect the electricity grids of Ethiopia, Kenya, Rwanda, Tanzania and Uganda through the Eastern Africa power pool.

The exported electricity will originate from the large number of existing and future power plants in Ethiopia. When required, the flow of electricity can be reversed and Kenya would thus use the same interconnection facilities to sell electricity to Ethiopia.

"said Makhtar Diop, World Bank Vice-President for the Africa Region.

Kenya will receive \$461 million (Sh37 billion) and Ethiopia \$745 million or Sh20.60 billion in funding to both governments disbursed through the International Development Association—the bank's fund for the world's poorest countries.

"This landmark transformational project will change the fundamentals of the power sector in East Africa. It will expand access and lower the cost of electricity supply to homes and businesses across Kenya and help to reduce thermal power emissions, a clear benefit to the region's environment," said Mr Diop in a statement.

The flow of electricity can be reversed for Kenya to use the same interconnection facilities

MAKHITAR DIOP, WB VICE-PRESIDENT

Transmission costs between Moyale and Nairobi will provide an additional Sh2 a kilowatt hour. At a maximum of Sh5 a kilowatt hour, the cost of hydro-electricity will still be lower than the current rate.

The African Development Bank (AfDB), the WB, and the French Agence Française de Développement (AFD) are jointly funding the project.

zsambu@ke.nationmedia.com

Kenya to build high-voltage transmission line

KENYA plans to build a 100 kilometre power transmission line to carry electricity from upcoming geothermal and wind power projects, Energy permanent secretary Patrick Nyoike said on Friday.

The country faces constant blackouts due to supply shortfalls and an ageing grid. It is diversifying its sources of power in order to reduce over-reliance on hydrogeneration, which is often affected by drought.

"This construction of the line

from Suswa in Naivasha to Isinya in Kajiado will help us (carry) — between now and 2020 at least 1,500 megawatts, rising to 2,000 MW," said Nyoike.

The project is jointly funded by the French Development Agency, European Investment Bank, Kenya Power and Kenya Electricity Transmission Company at a cost of \$184.3 million (approx Sh15.7 billion).

The country's main power producer KenGen is constructing

a 280 MW geothermal station in Naivasha, expected to be ready to supply power to the national grid by 2014.

Another private company is building a 310 MW wind power project at Lake Turkana, which is expected to start generating power next year.

Joel Kilu, chief executive of Ketraco, said the transmission line which would also transmit 400 MW of power imported from Ethiopia, would be completed in 2014.



DEAL: Kenya Electricity Transmission Company managing director Joel Kilu after signing a power project contract with Angel Fernandez, network director, Iberdrola Ingeniería Construcción, yesterday.

Sh5 billion project to light up Nairobi

BY STEPHEN ASTARIKO

THE government has committed a Spanish company to construct a Sh5 billion power transmission line in the greater Nairobi region.

The substation will be funded by Agence Française de Développement and the Kenyan government.

The Kenya Electricity Transmission Company signed the power project yesterday with M/s Iberdrola Ingeniería Construcción S.A.U for the project. It will form part of the transmission around Nairobi Metropolitan

area. A recent study under the Least Cost Power Development Plan for the period 2010-2030 showed the electricity demand in Kenya is expected to grow by an average 14 per cent annually from a capacity 1,205MW last year to 15,065MW in 2030.

Speaking during the signing ceremony, Ketraco MD Joel Kilu said: "The N-1 contingency plan refers to the ability of maintaining the power supply in case of failure of one of the circuits in the ring. 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 lives."

The current transmission infrastructure in the city is largely in the eastern side with connections going westwards.

The Nairobi ring project will, therefore, not only increase transfer capacity to meet the city's rising demand but will also enhance power security by providing alternative electricity paths.

The project includes the construction of Suswa-Isinya 400KV transmission line, which is under implementation.

Sh32 billion Ketraco project to improve power supply

Y RAPHAEL MWADIME

THE ongoing construction of a 490 kilometre 10KV power transmission line at a cost of Sh32 billion by the Ketraco will improve power supply in the nation once complete, the project

team leader has revealed.

Engineer Andolo Ambasi told the press in Voi during a foundation uplift tests on the first ever 400 KV transmission line project in East Africa, that once the project is complete, power outages that are currently being

witnessed in the country will be a thing of the past.

Currently, the company is putting up power towers along the line from Rabai to Nairobi.

According to the projects head technician, John Mativo, they are

facing land challenges in carrying out the project.

"A total of Sh900 million will be spent in sensitising the public along the line and also compensating their land, structures and property that will be affected during the project," he said.

He said the power line will also connect Kenya to Uganda, Ethiopia, Tanzania and Rwanda.

"The project is part of the Vision 2030 goals in which the country aims at attaining a capacity of 1555MWA. The

current country demand is 1300MWA," Ambasa explained.

The project is expected to improve internet connections in the country through a 48 fibre optic ground wire which will be carried along the power line.

Power sub-station to be opened at Awendo

By PERIZ MOKUA

gional Manager Eng. Kennedy Nengo said the project will improve quality of supply and cope with additional demand.

Sub-station

"The Awendo sub-station will provide alternative electricity supply path in the region. Increase reliability and improve power quality. The area gets its supply from Kegati and this will help Kenya Power serve the public better in case there is a disconnection at

our big transmission in Kegati," he said.

Eng. Nengo who was accompanied by his deputy Rosemary Oduor said when there is a breakdown at Kegati, the whole region experiences a blackout, adding such scenarios will be a thing of the past once the Awendo project is complete.

"KETRACO is carrying similar projects all over the country to increase access to supply in line with Vision 2030," said Eng. Nengo.

Sh8.4bn loan to step up power supply in Nairobi

Photo: JOSEPH KARUGU



DARK: Nairobi residents use candles during power rationing by Kenya government loan may reduce regular blackouts

BY STEPHEN SANGIRA

THE French Development Agency will give Sh8.4 billion concessional loan to finance the construction of a power transmission ring around Greater Nairobi.

This project includes the Suswa-Isinya transmission line (400kV) and the Isinya 220 V substation. Others are 220/66kV substations at Athi River, Ngong, Thika Road and Komarock. The money will also be used to buy switching and monitoring devices for the existing substation at Dandora.

A spur line to Ngong sub-

station and an underground cable between Dandora and Komarock substation will also be constructed.

In addition, the project will put in place a long-term programme for the Kenya Electricity Transmission Company on design, construction, operation and maintenance of 400kV transmission networks.

The deal was signed last week by Finance Minister Robinson Njeru Githae, the French Ambassador Etienne de Poncins, and the Director of AFD in East-Africa, Yves Terracol. The ceremony was attended by Energy permanent secretary Patrick Nyoike and KETRACO

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Ketraco to rival Kenya Power

BY JOHN OYUKE

Kenya Electricity Transmission Company Ltd (Ketraco) is gearing to join the lucrative bulk electricity transmission and supply market. The company incorporated in 2008 is set to present an application to the Energy Regulatory Commission (ERC) for a licence to transmit and supply electrical energy in bulk throughout the country.

The firm plans to apply for the licence in a move that is likely to create competition in the bulk supply sub-sector, which Kenya Power enjoys monopoly.

Managing Director, Joel Kithia said the licence application is to be done in pursuant to the provisions of sections 27 and 28 of the Energy Act 2006.

The notice said a copy of the application would (subject to confidentiality considerations) be available (once lodged) for inspection by the public during business hours at the registered office of the firm and at ERC offices.

The core business of the company has been to plan, design, build and operate new high voltage electricity transmission lines and associated sub-stations that would form the backbone of the National Trans-

Ketraco has asked any public or persons keen in making representation on or objections to do so by letter

Big boost for Nairobi as it signs Sh5b electricity deal

A Spanish firm will construct a 220kV ring around the Nairobi Metropolitan area, in a bid to boost reliability of power in the capital

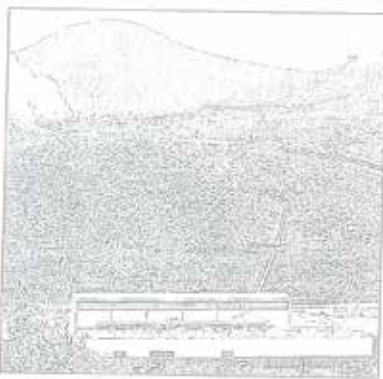
By PERIZ MOKUA

The country has signed a \$50 million (Sh6 billion) deal with a Spanish firm for the construction of a substation power project. The project will allow for the transmission of electricity imported from Ethiopia and the Lake Turkana wind project into Nairobi.

The Kenya Electricity Transmission Company Ltd (Ketraco) signed the power transmission project with Iberdrola Ingenieria y Construccion SMI for the construction of the 220kV ring around the Nairobi Metropolitan area, which is expected to boost reliability of power in the capital.

The Nairobi Ring project will also allow for power from Ethiopia and Lake Turkana Wind Project to also reach the capital city, which accounts for approximately 30 per cent of the Kenya power demand.

Business MD Engineer Joel Kithia said after signing the deal in Nairobi, "This project will see reliability of power transmission in Nairobi and also ensure a steady supply of power within the Nairobi metropolitan area," Kithia said.



The substation project will offer a future evacuation outlet for the 280 MW Olkaria Geothermal Power Plant currently under construction. The power cannot reach the city through the existing Nairobi double circuit transmission lines.

The N-1 contingency plan refers to the ability to maintain power supply in case of failure on one of the circuits in the ring.

POWER OUTAGES

"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 lives," Kithia said. He said the current transmission

infrastructure in the city is largely in the eastern side with connections going westwards.

A recent study under the Least Cost Power Development Plan (LCPDP) for the period 2010-2030 showed that the demand for electricity in Kenya is expected to grow by an average rate of 14 per cent annually from a capacity 1,205 MW last year to 15,060 MW in 2030.

The Nairobi Ring project is one

of the solutions geared meeting the nation's demand. It is planned that period to 2030 the country have added 15,570 MW that accelerated development plan.

The project also includes the Suswa-Isinya 400 kV line

State transmission firm inks Sh4.9b power project deal

Project offers future evacuation outlet for the 280MW Olkaria Geothermal power plant currently under construction

Kenya Electricity Transmission Company (Ketraco) has signed a multi-billion power transmission project deal with a Spanish construction company, Iberdrola Ingenieria y Construccion for the 220kV substation in Nairobi. Construction of the substation will be financed by Agence Francaise de Developpement (AFD) and the Government at a cost of Sh4.9 billion.

The project will offer a future evacuation outlet for the 280MW Olkaria Geothermal power plant, currently under construction, which cannot reach the city through the existing Nairobi North 220kV double circuit

transmission lines.

The Nairobi Ring Project will also allow for power from Ethiopia and Lake Turkana Wind Project to reach the city, which accounts for approximately 30 percent of the country's electricity demand. Ketraco said the project involves construction of new 220kV substations in Isinya, Suswa, Ngong, Athi River, Koma Rock and expansion works in the existing Dandora substation.

Through the Suswa and Isinya substations, power could then be transferred to and from other parts of the country like the future Konza ICT city and even to neighbouring countries

like Tanzania, Uganda, Rwanda, DR Congo and Ethiopia as part of the regional power trade.

The project is divided into two lots. Lot A comprises of the construction of a 220/66kV substation at Athi River and a 220kV substation at Isinya while Lot B include the construction of 220/66kV new substations at Ngong and Koma Rock and expansion works at the existing 220kV substation in Dandora.

Ngong substation

The transmission line works include the diversion of one of the Suswa-Isinya 400kV double circuit lines

into the new Ngong substation and the 220kV underground cable connecting Dandora and Koma Rock substations. The Nairobi ring project would therefore not only increase transfer capacity to meet the city's rising demand but also enhance power security by providing alternative electricity paths.

The Nairobi Ring Project also incorporates the Suswa-Isinya 400kV transmission line which is under implementation by Jyoti Structures of India while the overall construction supervision consultant was Power Engineers of South Africa.

KNA

mission Grid. The electricity transmission voltages would be 132,000 volts, 220,000 volts, 400,000 volts and 500,000 volts.

Kenya Power currently has the sole responsibility to transmit, distribute and retail electricity throughout the country.

It buys power in bulk from both public and private sector power generators, which it in turn retails to its customers countrywide.

It purchases power from KenGen and IPPs through Power Purchase Agreements approved by ERC.

The Commission has issued it with one transmission licence for the existing transmission network comprising 1,323 km of 220kV lines and 993 km of 132 kV lines, four distribution and supply licences for its Nairobi, Coast, West and Mt Kenya Regions and two distribution and supply permits for the isolated grids in Lamu and Garissa.

Kenya Power also has twelve generation, distribution and supply permits for the isolated grids at Elwak, Habaswein, Mpekaton, Mfangano Island, Merri, Wajir, Mandera, Moyale, Lodwar, Marsabit, Holo and Barga.

In its notice, Ketraco asked any public or local authority, person or persons keen in making representation on or objections to the granting of the licence to do so by letter addressed to the regulatory Commission.



Vision

“To be a world-class electricity transmission company and the leading inter-connector in Africa.”

Mission

“To build and operate a national electricity transmission network that is reliable, efficient, effective, safe and environment-friendly through innovative and best practices; and to promote regional power trade for socio-economic development.”

Core Values

The guiding principles in the operations of the Company are:

CUSTOMER FOCUS

The Company commits itself to attaining the highest standards in service delivery to all stakeholders.

INTEGRITY, TRANSPARENCY AND ACCOUNTABILITY

The Company is committed to acting in an honest, transparent and responsible manner while implementing its programmes.

TEAMWORK

The Company employees will work in unison at all levels and embrace a participatory approach in implementing all programmes and activities.

CREATIVITY AND INNOVATION

The Company will be a learning organization that embraces and continuously introduces change in its business processes.

COMMITMENT

The Company will embrace self-drive and hard work in attaining the highest standards in service delivery to all stakeholders.

EQUITY

The Company will uphold the highest levels of impartiality by treating all stakeholders without any discrimination whatsoever.

PROFESSIONALISM

The Company's operations will be guided by professional ethics aimed at building an appropriate corporate culture and creating the right corporate image.

LIST OF PROJECTS

Completed Projects

	Project Name & Scope	County Involved
1.	50km 132kV Sondu - Kisumu Line	Homa Bay, Kisumu
2.	48km 132kV Rabai - Galu Line	Kilifi, Kwale
3.	62km 132kV Chemosit - Kisii Line	Kericho, Kisii
4.	122km 132kV Kamburu - Meru Line	Embu, Tharaka, Meru
5.	5km 132kV Sangoro - Sondu Line	Homa Bay
6.	34km 132kV Mumias - Rangala Line	Kakamega, Siaya
	<i>Total Distance- 321 kms</i>	<i>Total Cost- Kshs. 8.3 billion</i>

Projects Under Implementation

	Project Name & Scope	County Involved
1.	475km 220/400kV Mombasa - Nairobi Line	Kilifi, Taita-Taveta, Makueni, Kajiado, Machakos, Nairobi
2.	100km 400kV Nairobi Ring and Substations	Narok, Kajiado
3.	320km 220kV Rabai - Malindi - Garsen - Lamu Line	Kilifi, Tana River, Lamu
4.	127km 220 kV Lessos - Tororo Line	Uasin Gishu/Nandi, Vihiga, Bungoma, Busia
5.	20km, 132kV Thika - Nyaga Line Kiambu	Kiambu
6.	27km & 50km 132kV Kilimambogo - Thika - Githambo Line	Kiambu
7.	250km 132kV Kindaruma - Mwingi - Garissa Line	Embu, Kitui, Garissa
8.	60km 132kV Eldoret - Kitale Line	Uasin Gishu, Trans Nzoia
9.	44km 132kV Kisii - Awendo Line	Kisii- Migori
10.	79km 132kV Nanyuki - Nyahururu Line	Laikipia
11.	65km 132kV Lessos - Kabarnet Line	Uasin Gishu, Elgeyo-Marakwet, Baringo
12.	68km 132kV Olkaria - Narok Line	Narok
13.	33km 132kV Bomet - Sotik Line	Kericho
14.	153km 132kV Mwingi - Kitui - Wote - Sultan Hamud Line	Kitui, Makueni, Kajiado
15.	33km 132kV Ishiara - Kieni Line	Embu
16.	96km 132kV Meru - Isiolo - Nanyuki	Meru, Isiolo, Laikipia
17.	20km 132kV Konza -Machakos Line	Machakos
18.	135km 132kV Konza -Kajiado -Namanga Line	Machakos, Kajiado
19.	80km 132kV Turkwel -Ortum -Kitale Line	West Pokot, Trans Nzoia
	<i>Total Distance- 2,185 kms</i>	<i>Total Cost- Kshs. 66.5 billion</i>

Planned Projects (To Start in 2013)

	Project Name & Scope	County Involved
1.	612km 500kV Eastern Electricity Highway Project (Ethiopia - Kenya Interconnector)	Marsabit, Samburu, Laikipia, Nyandarua, Nakuru, Narok
2.	430km 400kV Loiyangalani - Suswa Line	Marsabit, Samburu, Laikipia, Nyandarua, Nakuru, Narok
3.	100km 400kV Tanzania- Kenya line	Kajiado
4.	300 km, 220kV Olkaria - Lessos - Kisumu Line	Narok, Uasin Gishu, Kisumu
5.	50 km 132kV Meru-Maua Line	Meru
6.	148 km 132kV Nyahururu- Mararal	Nyandarua, Laikipia
7.	60km 132kV Rabai - Bamburi - Shanzu- Mtwapa -Kilifi Line	Kilifi
8.	100km 132kV Sondu-Homa Bay-Ndhiwa-Awendo	Homa Bay, Migori
9.	107km 132KV Voi - Taveta Line	Taita-Taveta
10.	240km Garsen-Hola-Garissa Line	Tana River, Garissa
11.	330km Garissa-Wajir Line	Garissa, Wajir
12.	40km Ishiara-Chogoria Line	Embu, Meru
13.	25km, 220kV Olkaria - Suswa Line	Narok
	<i>Total Distance- 2,992 kms</i>	<i>Total Cost- Kshs. 118.3 billion</i>



Kenya Electricity Transmission Company Limited

"Building a World Class National Grid"

WELCOMES YOU TO LAMU

We are proud to connect Kenya's 2nd
Port & LAPPSET Corridor to the National
Grid via 220kV Rabai-Malindi-Garsen-
Lamu Transmission Line

Mission

To build and operate a national electricity transmission network that is reliable, efficient, effective, safe and environment-friendly through innovative and best practices; and to promote regional power trade for socio-economic development.