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Celebrating

**RAILA
ODINGA**



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CONTRIBUTORS

Eng. Prof Lawrence Gumbe

Eng. Reuben Kosgei

Eng. Shammah Kiteme

Eng. Jude Loveday, FIEK, CE

Anvar Joseph Alot

Mwangi Kaburu Murikwa

Haron Kipkorir Samaei

Eng. Mary Abungu

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Call for Papers

The Institution of Engineers of Kenya (IEK) publishes Engineering in Kenya magazine, whose target audience includes engineering professionals, practitioners, policymakers, researchers, educators and other stakeholders distributed to its target readers free of charge through hard and soft copies. IEK invites you to contribute articles for our next and future editions. Articles should reach the Editor not later than **20th April, 2026**, for our next issue, whose theme is **Timber and Forestry Engineering** and related sub-themes, across all engineering disciplines. An article can range from engineering projects to processes, machinery, management, innovation, news and academic research.

The articles must be well researched and written to appeal to our high-end readers in Kenya and beyond.

The IEK Editorial Board reserves the right to edit and publish all articles submitted, in line with standing editorial policy. All articles should be in Word document format, 500-700 words, font type Times New Roman and font size 12.

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Message From the Editor



Eng. Prof. Alex Muumbo

Eng. Raila Amolo Odinga (1945–2025) was a defining figure in Kenya's post independence history, whose imprint on national infrastructure and political institutions endured far beyond his tenure in public office. Known affectionately as "Baba," Odinga's life blended engineering acumen with prodigious political activism, shaping Kenya's infrastructure (roads and housing), policy frameworks, and democratic culture over four decades. His legacy is a testament to his unwavering commitment to democracy, justice, and the people of Kenya. It is clearly evident that his tireless efforts to champion constitutional reforms, advocate for social justice, and promote national unity have left an indelible mark on our nation. His passion and dedication to public service are an inspiration to many, and his impact will be felt for many generations to come. As an engineer by training and a statesman by conviction, he exemplified how technical expertise, visionary leadership, and unwavering commitment to public good can intersect to shape nations and institutions.

Raila's professional grounding as a mechanical engineer shaped his approach to public service and infrastructure development. Early in his career he founded East African Spectre Ltd, reflecting a belief in local enterprise and technical capacity. His first major public infrastructure

impact came when he served as Minister for Roads, Public Works and Housing (2003–2005), where he injected fresh energy into Kenya's road construction programme and set ambitious expansion targets for national connectivity. During this period, he oversaw the revival of key transport corridors, laying technical and institutional groundwork for future large scale projects.

The transformation of the Thika Superhighway is among the most visible legacies of this era. Though much of the physical construction was completed after his tenure in the ministry, Odinga's leadership in conceptual redesign, financing frameworks, and bureaucratic streamlining was pivotal to the project's eventual realization. The highway's expansion reduced commute times, enabled higher commercial throughput, and signaled a new era of modern road design in Kenya's rapidly urbanizing economy.

Odinga's infrastructure vision matured when he became Prime Minister under the Grand Coalition Government (2008–2013). In this powerful coordinating role, he co launched Kenya Vision 2030, a long term development blueprint that positioned infrastructure at the heart of economic transformation and regional integration. By working across party lines with President Mwai Kibaki, Odinga helped transform Vision 2030 from a technocratic plan into a shared national agenda critical for post crisis stability.

This period saw Odinga marshal political support for mega regional initiatives such as the Lamu Port–South Sudan–Ethiopia Transport Corridor (LAPSSET) and promote broader development schemes like the revival of Lake Victoria maritime trade through harbor dredging efforts. These projects symbolized a commitment to integrated economic corridors that would connect landlocked regions to seaports and foster regional commerce.

Beyond national transport arteries, Odinga championed urban

infrastructure that expanded inclusion and dignity for underserved populations. His support for slum upgrading in Nairobi's Kibera settlement brought improved housing, sanitation, and basic urban services to communities long neglected in national investment plans. This focus on people centred infrastructure reflected a belief that technical development must be tied to equitable social outcomes.

Odinga's influence extended well beyond Kenya's borders. In October 2018 he was appointed by the African Union (AU) as the High Representative for Infrastructure Development in Africa, tasked with advancing the continent's infrastructure agenda under the Programme for Infrastructure Development in Africa (PIDA). His mandate included mobilizing political support and development assistance across member states and regional economic communities for continental infrastructure priorities, including the Trans African Highways Network and high speed rail projects aligned with Agenda 2063.

During his tenure, he worked to elevate infrastructure as a political priority for African integration, advocating for strategic coordination among AU organs and stakeholders. He served in this capacity until February 2023, when the role was transitioned to the African Union Development Agency–NEPAD, which assumed full responsibility for implementing the continental infrastructure agenda. The AU Commission later lauded his service and impact on advancing connectivity goals integral to the African Continental Free Trade Area (AfCFTA).

Odinga's political impact was equally transformative. A stalwart of Kenya's push for multiparty democracy, he was instrumental in expanding democratic space, challenging one party dominance, and advocating for constitutional reform that culminated in the Constitution of Kenya, 2010. This constitution redistributed power, strengthened checks and balances,

and entrenched devolved governance foundational shifts with enduring institutional significance.

Perhaps most consequential was Odinga's role in navigating political crises. After the disputed 2007 election and ensuing unrest, he agreed to a power sharing deal that avoided further violence and facilitated national healing through the National Accord. This negotiated settlement model was a defining moment for institutional stability. In later years, his willingness to engage in broad based unity initiatives signaled an adaptive statesmanship that prioritized national cohesion.

Repeatedly contesting national elections, Odinga pushed for transparency and accountability in electoral administration. His legal challenge to the 2017 presidential vote (which was ultimately annulled) underscored the role of independent judicial review in democratic practice, setting precedents for future electoral integrity and strengthening institutional norms.

Raila Odinga's legacy is multifaceted: the roads that crisscross Kenya's highlands and urban corridors, the policy blueprints that continue to guide development, and the democratic institutions that anchor Kenya's political culture. Even as debates over the pace and impact of his contributions continue, his belief in dialogue, connectivity, and inclusive progress shaped Kenya's national trajectory and resonated across Africa.

Odinga's life offers profound lessons in leadership, resilience, and purposeful action. As a mechanical engineer, he demonstrated how professional expertise can provide credibility and a practical lens for problem-solving,

particularly in infrastructure and national development. His strategic vision, shows the importance of thinking decades ahead and linking policies to long-term growth. Despite repeated political setbacks, including detentions and opposition marginalization, The Late Eng. Raila Amolo Odinga remained persistent, embodying resilience in pursuit of his goals. He balanced pragmatism with principle. His advocacy for inclusive development, from constitutional reform to urban renewal projects underscores that true leadership seeks to uplift society as a whole, not just a privileged few. Furthermore, his continental work at the African Union reflects a commitment to building enduring institutions and systems, reminding us that the most impactful contributions are those that outlive our personal tenure. From him, we learn that leadership is a blend of technical competence, moral courage, societal vision, and dedication to leaving a lasting legacy, lessons that are applicable not only in politics but in any professional or personal endeavor.

It is with a deep sense of responsibility and pride that I welcome you to this issue of EiK Magazine, my first as Chief Editor. In dedicating this issue to Eng. Raila Amolo Odinga's legacy, I invite our readers not only to remember his contributions to infrastructure, governance, and democratic reform, but also to reflect on the broader role of engineers in nation-building beyond the drafting table and construction site. This issue is therefore more than a tribute; it is a conversation about purpose, service, resilience, and the enduring responsibility of the engineering profession to society. I invite you to engage, reflect, and be inspired.

Message From the President



Eng. Shammah Kiteme, CE,
FIEK, PMP

President, Institution of
Engineers of Kenya

On 15th October 2025 I was in Shanghai and it was a normal day. I was up late at night and started scrolling for news. In China you do not have X, Facebook or even Google. They are replaced by Weibo, WeChat and Baidoo respectively. The entire time I was frustrated that I was not getting news from home. However, somehow, I started getting bit by bit of the news. I left the country when questions about the health of The Rt. Hon Eng. Raila Amolo Odinga, CGH were emerging. However, because they came from the opposition politicians, I ignored them. There were bloggers who also tried to weigh in and say Baba was dead. Again, we could not believe them as there was no official communication.

That morning however, I saw newsflashes from credible media houses confirm the death of Baba in India. That sank me deeply, in a foreign country and alone. I was really sad, in disbelief that Baba was gone.

Raila was not your ordinary man. I met him severally and our last meeting with him was on 8th April 2025. I met him with Harisson Omar and Dr. Bob Arunga. I had gone to present to him issues affecting Engineers. We discussed the issue of compensation of Engineers. I explained to him how the entry grade for Engineers in Civil Service remains Job Group K or CSG 10

while that of Doctors and Advocates was Job Group M and L respectively. This is the same as CSG 8 and 9. I explained to him how even Architects have a higher entry job group in Civil Service which meant that an Engineer will always be left behind in promotions because of the lower starting job group. We discussed that Engineers also do not enjoy the non-practicing allowance or risk allowance unlike other professionals. We also discussed the opportunities for Kenyan Engineers in the infrastructure projects where Chinese seem to be taking roles that Kenyan Engineers can do.

Now this conversation is not new, the IEK Council had also visited Baba on 16th August 2024 and I led the council to among other things install Baba as a fellow of IEK. He was really happy. Just like my meeting with him in April, he too published this in his social media handles. I was happy to find the plaque I gave him prominently displayed in his office during my visit on 8th April 2025. The IEK council also paid a courtesy call to Baba in 2018 when I was a fresh, young Council Member and Eng. Collins Juma was the IEK President.

All through our engagements and conversations with him, Baba listened very carefully. He also told us very many interesting stories about the history of Engineering in Kenya, his education in Germany and experience working as a lecturer at the University of Nairobi. He had very sharp memory and accurate description of events from way back in 1970's to 80's and present. He explained to us how he founded East Africa SPECTRE Limited. He recalled names and events precisely and even the atmosphere in meetings he attended in 1970's.

In our meeting in August 2024, he briefed us of his vision for Africa if elected the Africa Union Commission Chair. I was so impressed with his grasp of issues in Africa that after the meeting I wrote an article on the Standard endorsing his candidature. I was happy to do so as an Engineer, but also as his President.

Now, my meeting with Baba in April was not just because we always discussed with him issues to do with Engineering but also because during the 31st IEK Convention he gave a very good speech to IEK members. The Cabinet Secretary for Roads Mr. Davis Chirchir also committed to take me to meet Baba so that the issues I raised would be addressed. I therefore reasoned with myself, why should I wait for the CS to take me to see Baba? Why can't I just go and see him myself?

Back to my stay in Shanghai, I attended one of the meetings with fellow Engineers from all over the world. One Prof. Gretchen Kalonji from the US had learnt of Baba's demise and when she saw me, she embraced me and passed his condolences on Baba's death. We both wept and everyone in the room, Engineers from all over the world, passed their condolences on his demise.

And so, with the news of his death and the national mourning and funeral, we celebrated Baba who also went with many other names like Tinga, Hummer, Agwambo, Enigma, Joshua as people called him affectionately.

IEK later paid a visit to Mama Ida Odinga at the Opoda farm and the burial site of Baba at the Kang'o ka Jaramongi.

I reflected for long and very hard on the death of Raila. One, we had lost a voice that could speak with authority on Engineering issues as one of us. But two, we did not have anyone close to who Raila was. He cared deeply and in my last meeting with him he took my mobile number so that he could call me as a follow-up. We actually planned to go and meet His Excellency the President. Raila was to facilitate that. It therefore dawned on me the need for Engineers to join politics. I take this opportunity and urge many of us to celebrate Baba by joining politics so that we can influence policy. We have General Elections in 2027 and I encourage as many Engineers to take the present themselves to be elected as candidates for various elective positions.

We decided to induct Baba into IEK's hall of fame as the only Engineer to have risen to his levels but also to produce this issue of Engineering in Kenya celebrating his life as part of our keeping the memory of his dedicated service to humanity alive and preserved for the future generations.

We all dearly miss Baba but we must make sure that we fight for the ideals he fought for. His campaign manifesto

had three things; **Infrastructure, Infrastructure and Infrastructure**. Like many of us I have made some personal decisions influenced by his life. I invite everyone to read this issue of EiK and be part of celebrating the only Rt. Hon Eng. Raila Amollo Odinga, CGH we will ever have. May His Soul Forever Rest in Peace. **Nind gi kwe Jaduong.**

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Message From the Honorary Secretary



Eng. Jacton Mwembe,
PE, MIEK

Welcome to our 25th Edition of Engineering in Kenya magazine. This special and historic publication dedicated to celebrating the life, legacy, and enduring influence of Eng. Raila Amolo Odinga, EGH, FIEK, a distinguished engineer, statesman, and long-standing member of the Institution of Engineers of Kenya. This themed issue has been deliberately curated to honor his remarkable journey and to reflect on how engineering principles, when anchored in vision and service, can shape a nation. It is both a professional tribute and a national reflection.

This edition is therefore more than a commemorative publication; it is an intellectual and professional discourse inspired by the life of Eng. Raila Odinga. In this edition, we reflect on his narratives and legacy while embracing the role of engineers in leadership, governance, and sustainable development. It challenges us to appreciate engineering not merely as a technical discipline, but as a lifelong commitment to problem-solving in service of humanity.

Eng. Raila Amolo Odinga was an engineer whose training shaped his worldview and leadership philosophy. His engineering education instilled in him analytical discipline, respect for

evidence-based decision-making, and an enduring belief in infrastructure as the foundation of socio-economic transformation. These attributes remained evident throughout his public life, influencing his approach to policy, institutional reforms, and national development planning.

Throughout his distinguished career, Eng. Raila Odinga consistently championed infrastructure as a catalyst for inclusive growth and national cohesion. He understood roads, railways, energy systems, and industrial capacity not as isolated projects, but as interconnected systems capable of unlocking opportunity, enhancing productivity, and restoring dignity to communities. His contributions to Kenya's infrastructure discourse helped elevate engineering from a technical function to a strategic national imperative.

Eng. Raila Amolo Odinga was a Fellow Member of the Institution of Engineers of Kenya. His relationship with IEK was both symbolic and substantive. Eng. Raila Odinga's engagement with the engineering fraternity over several decades reinforced the importance of strong professional institutions in shaping ethical practice, technical excellence, and public trust. His association with IEK remains a powerful reminder that engineers have a duty not only to build structures, but also to shape institutions and policies that endure.

Beyond infrastructure and policy, Eng. Raila Odinga was a passionate advocate for education, mentorship, and youth empowerment. He firmly believed that sustainable national development is anchored in investment in technical education and the nurturing of young talent. His support for engineering education, skills development, and institutional capacity-building inspired generations of engineers.

This publication further captures the breadth of Eng. Raila Odinga's influence reflections towards senior engineers, policymakers, academics, and industry leaders. The edition traces his impact across energy, transport, standards, regulation, and higher education, presenting a leader whose engineering foundation informed pragmatic, long-term solutions. The featured content illuminate not only his accomplishments, but also the values that defined his life, resilience, intellectual rigor, courage, and unwavering commitment to the public good.

Complementing these reflections is a carefully selected body of technical and peer-reviewed articles addressing contemporary engineering challenges. Topics such as renewable energy integration, grid resilience, climate-responsive building systems, transport infrastructure, and dispute resolution resonate strongly with the development priorities long championed by Eng. Raila Odinga. In this way, the publication seamlessly bridges legacy and future responsibility.

I take this opportunity to commend the IEK Editorial Board and contributors for producing a publication that honors history while inspiring progress. This issue stands as a lasting tribute to Eng. Raila Amolo Odinga, EGH, FIEK, and as a renewed call to engineers to lead with competence, integrity, and courage.

I invite our readers to dwell deeply within these pages; to reflect, to learn, and to be inspired. May this issue strengthen our professional resolve and reaffirm the noble ideals of engineering. Above all, may it honor the memory of Eng. Raila Odinga, whose life demonstrated that engineering, guided by vision and conscience, can truly shape a nation.

The Raila Odinga I knew



Eng Prof Lawrence Gumbe
Chairman -Nuclear Power
and Energy Agency

My earliest memories of Raila Odinga are when I was about 10 years old. Growing up in Kisumu, my parents and the Odingas were neighbours in Kisumu Kaloleni before independence and in Milimani after independence. My siblings and Raila's younger siblings were friends and playmates. The Odinga children often told us about their two brothers, Oburu and Aluo, who were students in Europe.

I first saw Raila when I was a child when he must have been on holiday in Kenya. My real interactions with Raila began when I was a student at the university of Nairobi. I met him a few times and we discussed engineering and politics. I was employed as a tutorial fellow by the University of Nairobi in October 1981. My interactions with Raila increased. We often had lunch at the cafeteria on the Main Campus. And drinks at the university's Senior Common

Room and a few glorious locations in the city. In this period Raila and myself were in the progressive wing of Kenyan politics. The minimum we could countenance was a social democratic Kenya.

Raila passed away in October last year. I have been asking myself a few questions. Who was Raila? What did he stand for? What is his legacy? What lessons can we learn from his work and life?

Karl Marx famously said, **Men make their own history, but they do not make it just as they please; they do not make it under circumstances chosen by themselves, but under circumstances directly found, and given and transmitted from the past.**

As we assess and celebrate the achievements and challenges of Raila Odinga's life we must be aware that he was not deity. He was a man living in a world in which his boundaries were set by history and geography. The greatness of persons is measured on how they were able to lead others in moving the above boundaries. Raila did move boundaries- quite a few.

Kenya's political struggles, from 1900 to present, evolved from anti-colonial resistance.

This includes the Kavirondo Tax Payers Association and the Young Kikuyu Association of 1920s. The Kenya African Union, KAU, was formed in 1946 to agitate for rights to the African. Some members like Makhan Singh called for immediate independence. By 1952 the Mau Mau armed rebellion started. This led to the declaration of emergency, the jailing of prominent leaders like Jomo Kenyatta and severe representation in the colony.

African political activity increased in the mid 1950s. wWder African representation quickly followed in the Legislative Assembly, Legico. In 1957 African members were elected to the Legislative Council through a restricted franchise. A trade unionist, Tom Mboya, together with other Africans promoted to ministerial posts, refused to assume official responsibilities.

A constitutional conference was held at **Lancaster House in London in January and February, 1960**, that led to a transitional constitution legalizing political parties and giving Africans a comfortable majority on the Legislative Council. The, left of centre, Kenya African National Union (KANU) was subsequently inaugurated, adopting a firm stance on land resettlement in the highlands. Independence was formally declared in December, 1963.

Kenya became a republic in December 1964, with Kenyatta as its first president. The entire KADU membership had earlier defected to KANU, rendering Kenya a de facto one-party state. This act of defection



strengthened the right wing in Kanu. This ostensible unity did not, however, make for harmony.

Cold war politics were at play in Kenya in the 1960s. There was intense struggle between the left, led by Odinga, and right, led by Kenyatta, wings of Kanu. The main focus of the struggle was ownership of the economy and land.

In 1969 Mboya, then the KANU secretary-general was assassinated in circumstances that have never been satisfactorily explained. Ethnic tensions escalated rapidly over the next few months, reaching a point in October, 1969, when the KPU was banned, and its principal leaders, including Odinga and seven other party representatives, were detained.

Opposition to Moi's one-party rule grew during 1990. In July, 1990, Charles Rubia, Matiba and Raila Odinga, son of the former Vice President, were arrested and detained without trial when their public "pro-democracy" rallies were banned. Their arrest was protested at home and abroad, and riots spread in the central province. Though a KANU Delegates' Conference in December voted to keep the one-party system, a government-sponsored national dialogue was set in motion with the goal of facilitating broader democracy in spite of one-party rule. Despite these mollifying gestures, public discontent with the government and KANU increased. In August, 1990, Oginga Odinga and six prominent opposition leaders, formed the Forum for Restoration of Democracy (FORD) with extensive multi-ethnic support. The new movement immediately gained the public's support and its popularity soared.

Raila played a very significant role in the return to multiparty politics. He was an engine of Ford, Ford Kenya and urban resistance politics. Under this intense pressure, President Moi finally relented at a special KANU conference on 3 December 1991.

Raila Odinga played a pivotal role in emergence of NARC in 2002. NARC was a popular peoples' movement that sent KANU packing after 40 years of miss-rule. "Kibaki Tosha" said Raila at a Liberal Democracy rally at Uhuru Park in October 2002. Kibaki became the NARC candidate.

Mwai Kibaki was elected president resoundly defeating Kanu's Uhuru Kenyatta. Kibaki was voted for by Kenyans from across the country. NARC's popularity was based on leadership by a team representing the interests of the various groups constituting the country.

The Ninth Parliament, 2002- 2007, will be remembered for its bold attempt to review the Constitution of Kenya and in that attempt LDP took a lead role both in the debate

on the Constitution in Parliament and in the mobilization of the Nation in the lead up to the Referendum. The first referendum for a new constitution of 2005 failed. The second one in 2010 succeeded. Raila played significant roles in the referendums. In the period 2013 to 2025 he was a very effective opposition leader.

In summary, Raila Odinga was is a fellow of the Institution of Engineers of Kenya as well as a professional engineer. He worked at the University of Nairobi as a lecturer in the Department of Mechanical Engineering. He also worked at the Kenya Bureau of Standards as its Deputy Managing Director.

Raila Odinga has worked as a consulting engineer. He founded Spectre Ltd and Spectre International Ltd. The former firm manufactures liquefied gas cylinders. The later firm produced ethanol and other products from molasses.

Raila Odinga was the African Union Ambassador for Infrastructure. We saw him champion various engineering projects like the giant grand Inga electricity dam in the Democratic Republic of Congo and the recently commissioned 4km bridge in South Sudan.

Raila Odinga was Minister for Energy, Minister for Public Works and Housing and Prime Minister of Kenya. He demonstrated great vision in the transformation of Kenya, Africa and the world through development of infrastructure and proper governance systems. He was champion of good governance and the rule of law.

Raila Odinga was arguably the most consequential opposition figure in modern Kenyan history, a politician who shaped the country's democratic landscape and popularised the language of devolution and equity in governance.

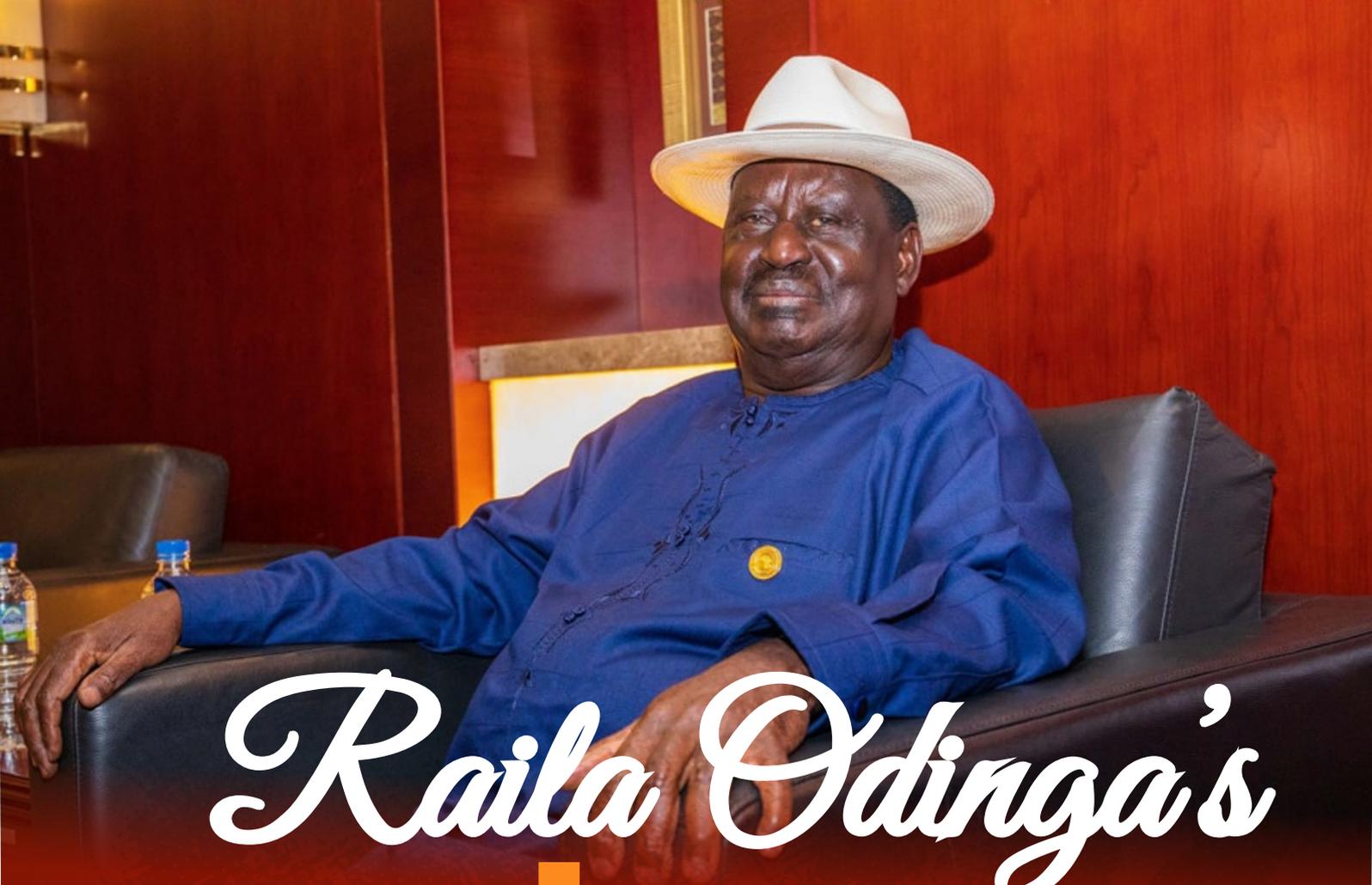
Raila stood as a living metaphor for Kenya's struggle against centralised autocracy, having been detained, exiled and vilified and yet, never silenced. Despite never capturing the presidency after five attempts, he remained the loudest voice on equitable governance, decentralization and inclusion.

Raila championed the transformation of Africa through infrastructure development and industrialisation. This he said would liberate the masses from hunger, disease, unemployment and backwardness.

Raila's style of politics embraced populist mobilisations. He employed political pragmatism with a willingness to form strategic coalitions across ideological divides to achieve systemic reforms.

I am sure that history will judge Raila Odinga kindly.

Raila stood as a living metaphor for Kenya's struggle against centralised autocracy, having been detained, exiled and vilified and yet, never silenced.



Raila Odinga's Legacy



By Hudson Chitala , General
Manager
East Africa Spectre Limited

The late Eng. Raila Amollo Odinga (1945–2025) was a trained Mechanical Engineer from Magdeburg University, Germany whose career bridged technical expertise, industrial management, academic instruction, and, most prominently, political leadership in infrastructure development. He was a registered Professional Mechanical Engineer in Kenya. Throughout his life, he championed the promotion of

Engineering profession to be at the center of solving local problems.

Here are the some of the key contributions of Raila Odinga to engineering and infrastructure development in Kenya and African region:

Founding of East Africa Spectre Limited.

In 1972, while teaching at the University of Nairobi, Eng. Odinga sold his Opel Car to raise funds to purchase equipment from a foreign investor who was leaving Uganda. This equipment, he founded the Standard Processing Equipment Construction and Erection Company. This company was later renamed East Africa Spectre Limited. It was a pioneer Liquified Petroleum

Gas (LPG) cylinder manufacturer in East and Central Africa. The company still stands tall today boasting of employing over One hundred and fifty employees spanning over two factories.

Kenya Bureau of Standards

Mr. Odinga pioneered the founding of Kenya Bureau of standards to set, maintain oversee standards for locally manufactured goods. He worked as group Standards Manager rising through ranks to become Deputy Director. Through KEBS, he championed development of standards to ensure locally manufactured goods meets international standards and be competitive in terms of quality.



Ministerial Leadership and Infrastructure Reform (2003–2005)

As Minister for Roads, Public Works, and Housing under President Mwai Kibaki, Odinga transformed the sector:

- **Reforming Road Agencies:** He was a driving force behind the restructuring of the road sector, leading to the creation of autonomous road agencies (KeNHA, KeRRA, KURA) in 2007. These institutions brought structure, accountability, and professionalism into the management of the road network in Kenya.
- **Roads 2000 and 2007:** Raila Odinga's tenure as Minister for Roads and Public Works marked a turning point in Kenya's infrastructural development. Together with and in consultation with the Late President H.E. Mwai Kibaki, he pushed for the establishment of Roads 2000 and Roads 2007 strategy. This strategy focussed on delivery of road infrastructure while utilizing locally available resources, economically and in a socially responsible manner. Under his stewardship, critical projects such as the Nairobi Bypasses - Northern, Eastern, and Southern - as well as the expansion of Thika Superhighway, Nyandarua, Isiolo - Moyale, Kericho-Kisumu, Kisumu-Kakamega-Webuye-Kitale, in Coast et al were realized. His determination to reclaim grabbed land and protect road reserves exemplified his unyielding commitment to public good over private greed.

Through his Roads 2000 and Roads 2007 programs, Raila laid the groundwork for one of the most ambitious expansions of Kenya's road network. From 63,000 kilometres in 2003, the network grew to 161,000 kilometres by 2009 and later to over 246,700 kilometres in 2018. His policies not only improved mobility and trade but also connected remote communities to the heart of economic opportunity. Even in his final years, Raila remained vigilant, calling for reforms in the three road agencies to enhance efficiency and empower county governments through greater allocations in the Road Maintenance Levy Fund (RMLF). His influence in Parliament ensured this vision began to take shape.

- **Alternative Road Technologies:** He piloted the use of concrete paving for heavily trafficked roads to ensure longer lifespans compared to conventional asphalt, with the Mbagathi Way being a notable example. This road was renamed Raila Odinga Way in his honour



Early Academic Contributions

Upon returning to Kenya from Germany in 1970, he lectured at the Department of Mechanical Engineering at the University of Nairobi, contributing to the training of the first generation of locally trained engineers.

Pan-African Infrastructure Development (2018–2023)

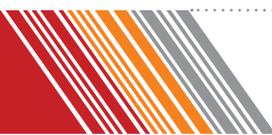
As the African Union High Representative for Infrastructure Development in Africa, Odinga:

- **Championed Connectivity:** He championed major continental projects, including the LAPSET Corridor (Lamu Port-South Sudan-Ethiopia-Transport), the Grand Inga Hydro-power dam in the DRC, and the Kisumu-Malaba-Kampala Standard Gauge Railway.
- **Advocated for Integration:** He worked to align national projects with the African Union Agenda 2063, arguing that interconnected infrastructure is essential for intra-African trade.

Recognition and Advocacy

- **Fellow of the Institution of Engineers of Kenya (FIEK):** He was a recognized fellow of the IEK and consistently advocated for the prioritization of local engineers in public projects, pushing for the validation of technical skills and the Recognition of Prior Learning (RPL).
- **Vision 2030:** He was a co-leader in launching the Kenya Vision 2030, which anchored the country's long-term development in robust infrastructure.

Raila Odinga's legacy is often highlighted as one that blended "technical acumen with political courage," emphasizing the need for engineers to be involved in high-level policy decision-making.





Rt. Hon. Raila Odinga, EGH: The Political Engineer

By Eik Correspondent

When most people talk about Raila Odinga, they usually picture the politician: the opposition leader and the reformer, that tirelessly advocated for democracy in Kenya. However, there is another side to him, one that shapes everything he does, even if others failed to notice it. Raila Odinga is, at his core, an engineer. That is not just a matter of his degree; it was his way of seeing the world. He thought like an engineer, planned, and, honestly, led like one.

His politics bore the imprint of engineering logic, systems thinking, structural reform, long-term planning, and an

unwavering belief that infrastructure shapes destiny. For him, things like roads, energy, standards, and strong institutions were not just add-ons to governance but the very foundation of it.

This is the story of Raila Odinga not simply as a political actor, but as a political engineer: a man who approached leadership as a design problem, Africa as an unfinished system, and governance as an infrastructure that must work for people to thrive.

The Engineer first

Raila trained as a mechanical engineer in Germany. That was back in the post-independence days, when a lot of young Africans saw engineering as a tool for building nations, not just machines. It was practical, hands-on work.

When he returned to Kenya, he taught engineering drawing at the University of Nairobi, a discipline that is all about communication in engineering as it demands precision, clarity, and foresight. You have to visualize what is not there yet and make that vision clear to everyone else. That mindset stuck with him.

Later, at the Kenya Bureau of Standards (KEBS), colleagues remember someone deeply committed to process, order, and making institutions work. He was there at a formative time, when Kenya was setting up its entire standards infrastructure. That is, the systems for measurement, testing, and quality that quietly ensure safety and competitiveness in the background. Standards are one of those things you only notice when they fail. Raila grasped that earlier on, and it clearly influenced his later insistence on strong institutions and sound frameworks across government.

From technical systems to political structures

While most politicians got caught up in personalities and power plays, Raila saw systems and their weak spots. Whereas others chased quick wins, he aimed for deep, structural change. His stand against authoritarianism was not just a moral stance; it was a technical necessity. He saw a broken system and knew it would keep failing, no matter who sat at the top.

His experiences, detention without trial, exile, repeated clashes with the state, did not push him away from

reform. If anything, they reinforced his conviction that a flawed system will produce bad outcomes. This conviction eventually shaped his push for constitutional reform. Kenya's 2010 Constitution, perhaps the country's most ambitious governance overhaul, really did feel like it was built on engineering principles. Think separation of powers, checks and balances, and decentralisation. These were not just political slogans; they were genuine design features, built with redundancy and fail-safes in mind.

Infrastructure as a tool of equity

You would be hard-pressed to find another Kenyan leader who talked about infrastructure with Raila's depth and consistency. To him, roads were not just stretches of tarmac, they were economic equalizers. Energy was not just about power generation; it was the oxygen for industry. And ports, railways, and standards? They were direct pathways to greater dignity and productivity.

During his time as the Minister for Roads and Public Works, and later for Energy, he drove reforms to clean up sectors notoriously bogged down by inefficiency and patronage.

He fought against shady contractors, pushed for open procurement, and put technical skill ahead of political loyalty.

Technical personnel who served in government back then remember something very rare in our country: a political boss who actually understood blueprints, specifications, and risk assessment. His leadership was not for show, but for emphasizing on working sessions focused on what was actually feasible, and that made all the difference.

The Engineer at the policy table

Even after leaving those ministerial posts, Raila kept close ties with engineering and technical circles. The Institution of Engineers of Kenya (IEK) recall several meetings where he listened intently to their concerns about pay, career structures, professional recognition, and using local expertise in major projects.

He did not just nod along, but questioned why engineers, the people designing projects and bearing responsibility for public safety, were paid less than other professionals. He

understood risk, liability, and accountability not as abstract concepts, but as daily technical realities.

His vision stretched beyond Kenya's borders, too. When he was a candidate for African Union chairmanship, he laid out a continental engineering plan: trans-African highways, integrated rail networks, streamlined airspace, and massive energy projects like the Inga Dam. These were not just campaign promises. They were practical, feasibility-driven ideas born from Africa's real development gaps.

Africa as a design challenge

Raila viewed Africa as a place of interdependence and breakdown of systems. He frequently pointed out the contradiction of Africa being a continent that is rich in natural resources having more trade with the developed countries than it does with its own neighbours. For him, this was not about ideology, but an infrastructure problem.

He often emphasised that:

- i. You cannot trade without roads.
- ii. You cannot industrialise without reliable electricity.
- iii. You cannot integrate without common standards.
- iv. You cannot effectively govern without strong institutions.

His vision for the AU was based on technical collaboration, harmonising policies and using infrastructure as the main driver for integration. When Hon. Raila discussed railways, he did so from a logistical point of view, instead of a symbolic point of view. When he discussed the role of aviation and airlines, he did so from an efficiency perspective, instead of a political perspective. When he discussed energy, he did so from the point of view of common capacity, instead of narrow nationalism.

Raila understood what the real costs are, how to maintain them, what the human component is and what the risks are for the governance process of projects.

Lessons for Engineers in leadership

Raila Odinga's career is a quiet challenge for the majority of Engineers.

To begin with, one's technical experience does not limit them as an Engineer, it is actually an enabler. In the face of all of the politics and rhetoric that are present within many sectors, Engineers bring logic, a long-term view of things, and accountability.

The second principle is that Raila Odinga was not motivated by pursuit of heroism, but instead by genuine reform. Therefore, engineers should consider their roles in the context of creating larger systems rather than solely focusing on completing their own projects.

In addition, getting involved with politics does not represent a betrayal of one's profession; rather, it may ultimately be how you can best contribute to it.

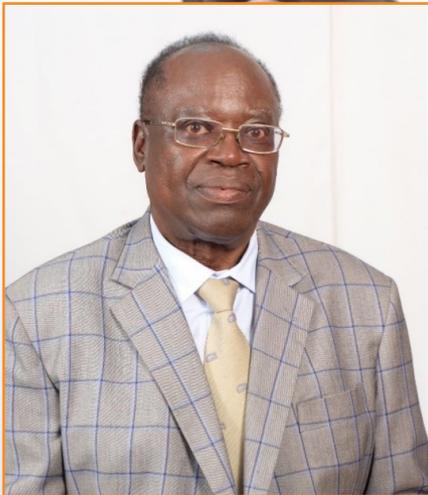
Finally, Africa's future must be built through engineering. That is, construction of roads, utilities, networks, regulations and good governance, which will bring about positive change; therefore, speeches alone will not help with bringing about Africa's new governance structure.

A blueprint, not a finished project

The legacy of Raila Odinga will forever be appreciated. He has left behind a foundation upon which Kenyan engineers can continue to build a better future; he catalysed change among engineers and inspired professional institutions and policies of the country. Hon. Odinga proved that political

leadership does not require giving up professional work; he demonstrated that engineers have a valid role in politics and belong to the very heart of a country's vision. He was an engineer who never stopped drafting plans, even when the system itself seemed determined to resist the build.

Engineering Leadership, National Reform, and the Raila Odinga Legacy: Reflections from Eng. R. K. Kosgei



Eng. Reuben Kosgei
Partner, Associated Services Consultants

Q1.

Engineer Kosgei, could you briefly reflect on your journey in the engineering Profession?

I graduated in 1974 and began my career as an Assistant Mechanical Engineer at the Ministry of Works. I was trained both locally and overseas, and worked with the Ministry for about seven years. That period really grounded me in practical engineering practice and public service. On the practical side, I was attached to Kenya Railway Workshop and African Marine and General Workshop for a total period of one year. In 1976, I was attached to a consulting firm and a contracting firm after my postgraduate diploma in the United Kingdom. On successful completion of my training, I was promoted and posted to Kenyatta International Conference Centre as Mechanical Engineer (Building Services).

After that, I moved to the Kenya Bureau of Standards, where I also worked for another seven years. At KEBS, I was in charge of Maintenance and Project Management of all of KEBS buildings, metrology, materials testing, bio-chemical laboratories and equipment therein. I was also exposed to standard specification, quality assurance, and this was a very important phase of my career.

Later on, I joined a consulting firm known as Kaburu Okelo and Partners, where I worked for about seven years. Eventually, I registered my own consultancy firm, which allowed me to consolidate the clients I was handling. Thereafter, I teamed up with a partner and joined Associated Services Consultants, a firm offering Mechanical and Electrical Engineering Services together with project management. This transition into consultancy allowed me to apply my experience more independently and mentor younger engineers.

It is also important to note that I served in the IEK Council from 2001 and was the President of the Institution of Engineers of Kenya from 2014 to 2016. I have also been the Chairman of Association of Consulting Engineers of Kenya and represented the engineers in various Boards such as The Kenya Anti-Corruption (KACC), Public Procurement Regulatory Authority, Engineers Board of Kenya and other special committees.

Q2.

How would you describe your time as President? What would you say were some of the key achievements during your tenure?

During my tenure, the first major achievement was the recruitment of the first Chief Executive officer. Previously, Clerical Staff handled administrative work and there was a shortfall in filing, receiving mail and redirecting or responding to correspondences. Once we identified our requirements, we started the recruitment process resulting in employment of the first CEO, who reported to work on 1st October, 2015.

This first CEO was a Human Resource specialist who grounded an administrative structure and being a lawyer greatly assisted in filing a bag log of returns, which were pending, in the AGs chambers.

The next major achievement was the progress we made on office ownership of property and moving to our new offices. Before I became the IEK president, I served as the Chair of the Development Committee and we managed to acquire Chaka Place but found the space a bit small for our offices. We, therefore, continued to stay in the offices shared with the Engineers Board of Kenya at the Ministry of Works Building Centre though we were under pressure to leave. Towards the end of 2014, we managed to purchase our own offices at Top Plaza which we started partitioning. Finally, at the end of October, we completed setting up and shifting to our offices.

Another major achievement was the introduction of the IEK Constitution 2015 Amendments. Over the years, the constitution we used was inherited from the East African Institution of Engineers. In 1972 at the breakup of the East African Community, the Institution of Engineers of Kenya was born. The members had previously tried to introduce amendments through retreats and meetings for many years without success. During my tenure, we were finally able to present a draft to the Special General Meeting, and the members approved it, leading to the adoption of an amended constitution. Thus, I became the last Chairman and the first President of IEK though I exited in April 2016. The members welcomed the new constitution with zeal and created more interest in the IEK Elections.

Another milestone was having Mhandisi Savings and Credit Co-operative Society domiciled in IEK offices at Top Plaza. Previously, the Sacco operated from the Pioneer's offices at Langata but during my time, we brought it closer to members to encourage active participation and growth of the Sacco.

Q3.

Hon. Odinga is widely known for championing institutional reform and accountability. How important are these principles in strengthening professional bodies like the Institution of Engineers of Kenya?

At the heart of engineering practice is ethics. Whether one is a professional engineer or a consulting engineer, the exercise of responsibility must be guided by clear ethical standards and minimum professional benchmarks. For consulting engineers in particular, ethics apply on several levels. First is responsibility to the profession itself: an engineer must remain independent and avoid conflicts of interest. For instance, a consultant should not be involved in a contracting role on the same project where they are being paid to provide independent professional advice.

Engineers must also exercise their duties with fairness, justice, and transparency, including full disclosure where required, while actively contributing to the growth and development of the profession.

Responsibility to the public is equally critical. Engineers

are entrusted with designing systems and solutions that directly affect communities, and therefore must prioritize public safety, sustainability, and societal well-being in all their work.

In addition, engineers should uphold professional integrity by associating only with practitioners who observe ethical standards. When working alongside other professionals, they must act with mutual respect, avoiding undercutting colleagues or criticizing other consultant's work without understanding the basis upon which decisions were made.

Ultimately, professionalism in engineering is about serving the best interests of the client, the profession, and the public. These ethical principles are the foundation upon which strong institutions and credible professional bodies are built.

Q4.

How does political leadership in Kenya influence professional bodies like the Institution of Engineers of Kenya?

Political leadership is largely driven by political will. Political will is what determines how effective professional bodies become. When the political will is strong, professional institutions are encouraged to set high ethical standards and, importantly, to enforce compliance. However, when political will is weak, you begin to see laxity, both in enforcement of standards and in public accountability.

This also affects public perception. Trust in professional bodies is eroded when political leadership does not actively support professionalism, ethics, and regulatory frameworks. In essence, political will shapes both the strength of institutions and the confidence the public has in them.

Q5.

The late Raila Amolo Odinga was your boss at Kenya Bureau of Standards (KEBS). How did you join KEBS, and what was it like working with him in a professional setting? What kind of legacy do you think Raila Odinga leaves for future generations of Engineers, planners, and public servants?

I first met Hon. Eng. Raila Odinga at the University of Nairobi. He taught me Engineering Drawings in my first year. Engineering Drawings is an important subject that all engineers learn as it is their main language of communication.

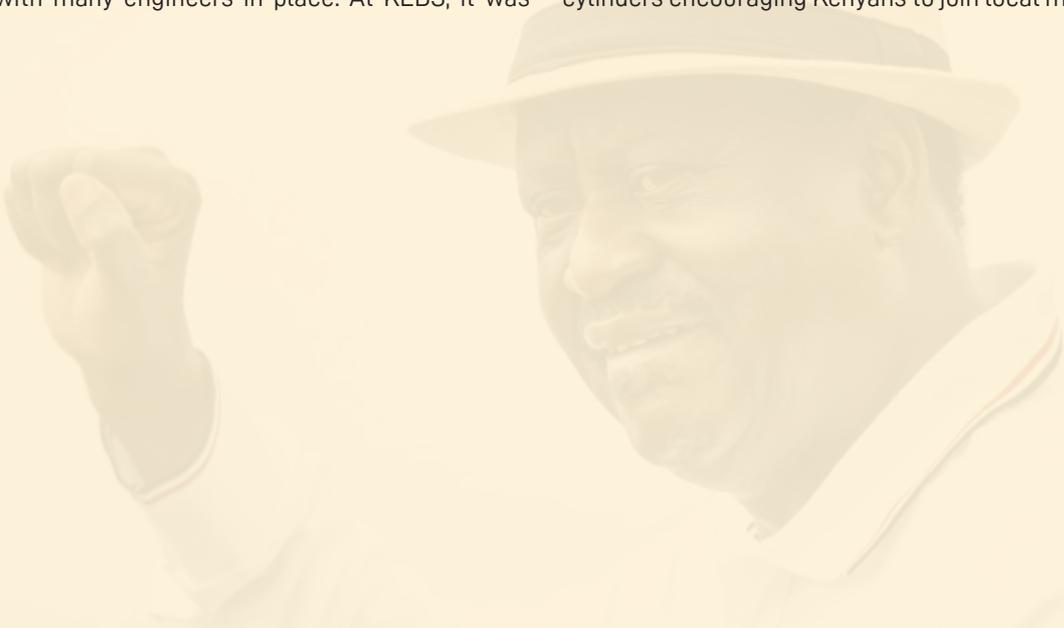
Shortly after that, he left and joined the Kenya Bureau of Standards. Later on, when I had completed my training at the Ministry of Works, a position was advertised at KEBS for a maintenance engineer. I applied and attended the interview, and Eng. Raila Odinga was on the interview panel. Although I performed well, I was not selected initially because I was not yet registered. However, I was later invited for a second interview when a vacancy arose, and I was eventually employed at KEBS. I was in charge of Maintenance, Production Workshops and Project Planning and Eng. Raila Odinga was the head of our division and my immediate boss.

He was a boss who gave you room to work. He trusted you, encouraged you, and allowed you to take responsibility for your tasks. At the Ministry of Works, the systems and structures were different as there was an organization structure, with many engineers in place. At KEBS, it was

different since it was a relatively new organization. We came up with building systems from the ground up, setting up departments, and recruiting staff. That environment required initiative, leadership, and vision, and those qualities were very evident in how Eng. Raila Odinga worked.

Further, Kenya Bureau of Standards writing standards and carrying out quality assurance, it is an organization with special laboratories for Metrology, i.e. calibration of time, weight, power etc., materials testing, biochemical analysis and infrastructural services. These areas have skilled engineers and scientists in running the systems and offering services. Eng. Raila Odinga was Key in setting the initial foundation for this organization.

The legacy left behind by Eng. Raila Odinga for young engineers, planners and public servants is an example of a trained and experienced Kenyan who used his skills to develop and reform institutions that serve Kenyans. For instance, at KEBS he helped set up the organization, ensuring the products sold in Kenya, whether manufactured locally, or imported are of acceptable standards. Also, as an entrepreneur, he set up his own company making gas cylinders encouraging Kenyans to join local manufacturing.



Dr. Ida Odinga, EGH Champions Local Manufacturing and Engineering Excellence During IEK Visit to East Africa Spectre Ltd.

The Institution of Engineers of Kenya (IEK) recently paid a courtesy visit to East Africa Spectre Ltd, an engagement aimed at strengthening industry-institution collaboration, gaining practical insights into local manufacturing, and supporting the production of Engineering in Kenya Magazine issue twenty-five (25). The visit brought together engineering professionals, industry leaders, and IEK Editorial Board in a forum that underscored the critical role of engineering in Kenya's industrial and economic development.

The IEK delegation was led by its President, Eng. Shammah Kiteme, alongside Honorary Secretary Eng. Jacton Mwembe, Honorary Treasurer Eng. Jennifer Korir, Editorial Board Chairman Eng. Prof. Alex Muumbo, Editorial Board Secretary, Eng. Dr. Caroline Matara, Editorial Board Member, Eng. Evaline Langat, and Publishing Officer, Leonard Kiprotich Kigen. The team was hosted by East Africa Spectre Ltd's Managing Director, Dr. Ida Odinga, EGH who provided an in-depth overview of the company's operations, growth trajectory, and contribution to Kenya's industrial manufacturing sector.

A key focus of the engagement was the conceptualization and content development for the 25th edition of Engineering in Kenya Magazine, a special issue themed "Celebrating Raila Odinga." The edition seeks to highlight Hon. Eng. Raila Odinga's enduring contributions to Kenya's engineering landscape, infrastructure development, and national leadership. Notably, the magazine will acknowledge his role as the principal founder of East Africa Spectre Ltd, tracing the company's origins in engineering and industrial manufacturing and its sustained contribution to strengthening Kenya's local industrial capacity.

In her address, Dr. Ida Odinga, EGH commended IEK and its members for their commitment to advancing engineering professionalism and excellence in Kenya. She candidly highlighted several challenges confronting East Africa Spectre Ltd, particularly difficulties in importing essential raw materials required for the manufacture of LPG gas cylinders. According to Dr. Odinga, restrictions on large-scale imports, especially of powder coatings and other critical inputs, have significantly constrained production capacity, limiting the company's ability to fully meet market demand.

Against this backdrop, Dr. Ida Odinga challenged local engineers and engineering institutions to explore opportunities for establishing indigenous manufacturing enterprises. She emphasized that local production of key industrial inputs would not only reduce reliance on imports but also create

employment opportunities, enhance revenue generation, and accelerate national industrial growth.

Dr. Odinga further underscored the importance of stronger collaboration between engineering professionals, academic institutions, and IEK. She noted that bridging the gap between industry and academia is essential in ensuring that graduates of engineering and technical programs acquire practical, hands-on experience alongside theoretical knowledge, thereby better preparing them for the realities of the workplace.

Addressing matters of regulation and safety, Dr. Odinga called on engineering regulatory bodies to strengthen enforcement of existing standards, particularly in the construction sector. She stressed that strict adherence to safety regulations is critical in preventing tragedies such as building collapses, which remain a pressing national concern.

The visit concluded with a guided tour of East Africa Spectre Ltd's facilities and deliberations on potential areas of collaboration. Both IEK and the East Africa Spectre Limited reaffirmed their shared commitment to advancing engineering excellence, innovation, and industry institution partnerships in Kenya, expressing optimism that such engagements will drive the country toward greater industrial self-reliance.





Eng. Shammah Kiteme, CE, FIEK, PMP®, President of the Institution of Engineers of Kenya (IEK), presents a copy of Engineering in Kenya Magazine (EiK), Issue 21 themed Medical and Healthcare Engineering, to Dr. Ida Betty Odinga, EGH, Managing Director of East Africa Spectre Limited, on 3rd February, 2026.



Dr. Ida Betty Odinga, EGH, Managing Director of East Africa Spectre Limited, addresses members of the IEK Editorial Board during a courtesy call by the Institution of Engineers of Kenya (IEK) on 3rd February 2026.



The IEK delegation, led by its President Eng. Shammah Kiteme, alongside Honorary Secretary Eng. Jacton Mwembe, Honorary Treasurer Eng. Jennifer Korir, Editorial Board Chairperson Eng. Prof. Alex Muumbo, Editorial Board Secretary Eng. Dr. Caroline Matara, Editorial Board Member Eng. Evaline Chebet Langat, and Publishing Officer Leonard Kigen, pose for a group photo with their host, Dr. Ida Odinga, EGH, Managing Director of East Africa Spectre Ltd.

Other Pictorials Inside the Factory Tour of East Africa Spectre Ltd

The pictorials below capture moments from the factory tour at East Africa Spectre Ltd, where the Managing Director, Dr. Ida Odinga, EGH, led the IEK delegation through the facility to explore the manufacturing processes of LPG gas cylinders.





Powder coating process of LPG gas cylinders at East Africa Spectre Limited. The coating provides a refined finish while enhancing corrosion resistance, durability, and safety. Powder coating is a high-performance, environmentally friendly alternative to conventional liquid paint used in the manufacture of LPG cylinders and tanks.



Importance of Powder Coating in LPG Gas Manufacturing

Superior Corrosion Protection

Powder coating provides a thick, tough barrier (often 3-5x thicker than liquid paint) that seals the metal surface from moisture, oxygen, and chemicals, preventing rust-related failures by up to 70%. This is essential for both above-ground (UV resistance) and underground (soil moisture resistance) tanks.

Enhanced Durability and Safety: The process creates a hardened, impact-resistant, and flexible finish that protects cylinders during rough handling, transportation, and storage. This extends the service life of the cylinders by up to 50%.

Environmental Sustainability (Low VOCs)

Unlike liquid paints that contain solvents, powder coatings are essentially 100% solid, releasing little to no volatile organic compounds (VOCs) into the atmosphere.

High Efficiency and Reduced Waste

Modern, automated powder coating systems achieve transfer efficiencies in excess of 95%. Overspray can be collected and reused, significantly reducing waste.

Consistent Quality and Finish

Electrostatic application ensures uniform coverage across complex, rounded surfaces, preventing drips or sags. This consistency results in superior, professional, and uniform coating thicknesses.

Cost-Effectiveness

Although initial setup costs might be higher, the reduction in maintenance, longer, and decreased need for reapplication make it a more cost-effective, long-term solution.

Beyond Politics: Raila Amolo Odinga's Enduring Influence on Engineering, Policy, and Public Service



Eng. Shammah Kiteme,
CE, FIEK, PMP President,
Institution of Engineers of Kenya

In this special commemorative edition, the President of the Institution of Engineers of Kenya, Eng. Shammah Kiteme, reflects on the life, leadership, and enduring legacy of the late Right Honourable Raila Amolo Odinga, an engineer whose influence extended far beyond the technical profession into national and continental leadership.

Q1.

How would you define Raila Odinga, and what legacy did he leave within the engineering fraternity and the broader technical community?

Raila Odinga was a mechanical engineer trained in Germany. His professional journey in Kenya spanned academia, public service, and national leadership. He served as a lecturer at the University of Nairobi, worked as a senior staff at the Kenya Bureau of Standards, and later founded an engineering firm dealing with engineering products, East Africa Ltd.

He also served as Minister for Energy, Minister for Roads, and later as Prime Minister. In all these roles, engineering was central to his work. His footprint is evident in the

energy sector, in roads and infrastructure development, and in efforts to streamline the construction sector, particularly at a time when issues such as unqualified contractors were prevalent.

Raila's contribution went beyond training young engineers at university. He was deeply involved in standards development, building regulations, and policy formulation. At cabinet and prime ministerial levels, his engineering mindset influenced national decision-making. His legacy in engineering is both technical and policy-driven.

Q2.

The Institution of Engineers of Kenya paid several courtesy calls to him over the years. What were some of the key issues discussed, and were there tangible outcomes from these engagements?

We paid him several visits. During my last engagement with him, on 8th April 2025, I led a team from IEK where we discussed critical issues affecting engineers.

One major issue was the scheme of service, specifically improving the entry grade for engineers within the public service from the current job group K to L. We discussed compensation, professional and risk allowances, pending bills, and opportunities for Kenyan engineers in the infrastructure sector.

He was particularly struck by the disparity in compensation between engineers and other professionals such as lawyers and doctors. He was categorical that this imbalance was unfair. He requested detailed information from us and showed genuine interest in advancing the welfare of engineers. He even asked for my personal number and I was hoping to hear from him thereafter. Unfortunately, some of these engagements have been overtaken by his demise.

I equally interacted with him when he was contesting for

the African Union Commission Chair position. What stood out for me was how he demonstrated a deep understanding of Africa's development challenges and opportunities. He spoke passionately about energy investments, including projects such as the Inga Dam in the DRC. He highlighted the need to open up African airspace, questioning why flying from Cape Town to Cairo requires multiple clearances.

He also spoke about Trans-African highways and railways, from East to West and from Cairo to Cape Town. He

emphasized Africa's low contribution to global trade and the fact that intra-African trade remains limited compared to trade with the Western world.

What stood out was that his grasp of these issues was not superficial. It was clear he understood them deeply and believed in practical solutions. As the IEK, we committed to supporting that vision, and I personally wrote an article in support of it in the Standard newspaper.

Q3.

Looking at the engineering profession today, especially engineers in leadership positions, do you think engineers have a strong enough voice in Kenya?

Frankly, we do not have a strong voice at all. That reality hit me deeply when Raila Odinga passed on. He was one of the very few engineers at the highest level of political leadership. Any president would listen to him.

Today, decisions affecting engineering are largely made by non-engineers. Ministries handling engineering matters are often led by non-engineers. Parastatals dealing with technical issues are headed by non-engineers. The last cabinet minister who was an engineer served many years

ago, until recently when Eng. Eric Mugaa was appointed as the Cabinet Secretary for the Ministry of Water, Sanitation, and Irrigation

As IEK, we have tried to amplify that voice. When we speak, people listen and appreciate our input. However, the question remains, *'Where have engineers been all along?'* The absence of engineers in Parliament and Cabinet is a serious gap.

Q4.

What do you think needs to be done to change this situation?

We must intensify advocacy. Policymakers are often comfortable until pressure is applied. Unless engineers make themselves visible and impossible to ignore, meaningful engagement will not happen.

That said, there has been progress. IEK is increasingly invited to contribute after building collapses or during

policy formulation. However, engineering still lacks representation at the highest decision-making levels, unlike law or medicine, which have strong institutional presence in government.

The voice of engineers is growing, yes, but it is still not where it should be.

Q5.

Raila Odinga strongly believed in synergy between professionals, policymakers, and institutions. How can engineers today work together across public service, private sector, and academia for the future?

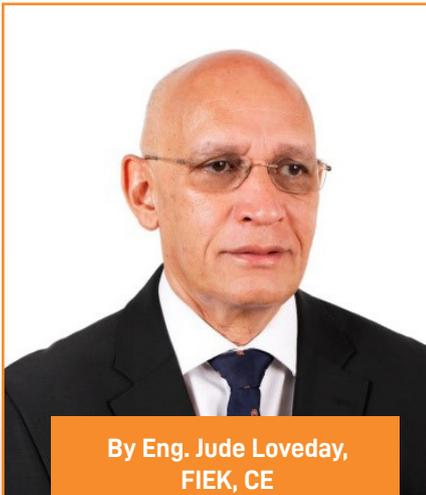
The biggest challenge is fragmentation. Engineers in government sometimes feel secure and disconnected from those in private practice. Those in private practice may feel those in government are self-serving. This division weakens us.

We must recognize that we either survive together or fall together. Someone in government today will retire and

return to the private sector tomorrow. Decisions made today should not disadvantage others.

There is dire need for unity, long-term planning, and strategic alliances. Raila Odinga represented engineers at the highest level of leadership. His passing left a gap that we must deliberately work to fill, through collective effort, leadership development, and sustained advocacy.

Raila Amolo Odinga Through the Eyes of Those He Mentored



By Eng. Jude Loveday,
FIEK, CE
Honorary Consul of the
Republic of Seychelles in
Kenya

Engineer Jude Ian Wayne Loveday is a registered Consulting Engineer with the Engineers Board of Kenya, a Fellow of the Institution of Engineers of Kenya (FIEK), Member of the Association of Consulting Engineers of Kenya (ACEK), Member of the Architectural Association of Kenya – Engineers Chapter, Member of the Institution of Construction Project Managers of Kenya, and a Licensed Water and Dam Engineer.

He serves as a Director at Professional Consultants Ltd and is also the Honorary Consul General of the Republic of Seychelles in Kenya.

In this interview, he reflects on his early mentorship under the late Rt. Hon. Raila Amolo Odinga and the values that shaped his professional journey:

01

The Rt. Hon. Raila Amolo Odinga played a key role in shaping you into the engineer you are today. Could you take us back to that period and share how he influenced your professional growth?

I first met Rt Hon. Raila Amolo Odinga in 1981 when I was a second year Civil Engineering student at the University of Nairobi. I undertook internship his then Engineering consultancy firm, Applied Engineering services Ltd.

My exposure to engineering consultancy under his stewardship shaped my destiny to become a consulting engineer. Through my early interactions with him, I learned that one should pursue a field that fits who you are, not just what you are. That way, your

values, personality, and passions align with purpose-driven work. This greatly influenced my decision to focus on structural engineering, a field I truly enjoy.

He emphasized hard work, skill development, and knowledge transfer. He shared his experiences generously, and this enabled my professional growth. One lesson he repeated often was: 'Stay calm. There is a calmness shortage in the world.' Over the years, cultivating calmness has been a crucial skill for me in handling engineering challenges.

02

You worked with Raila Odinga on several consulting and technical engagements. What stood out about his leadership style in professional settings? Could you highlight specific projects you did with him?

I would fundamentally refer to him as a Standards Engineer. This was demonstrated during his time at the Kenya Bureau of Standards. He protected standards firmly and never allowed negotiations that would compromise them. He was guided by principles and chose what was right rather than what was easy. Raila believed that reality won from time to time.

In technical engagements, when solutions were presented, the best option was selected based on engineering reality and acceptable standards, even when those decisions were difficult to make. A good example would be the clearing of road reserves to provide long-term, sustainable transport solutions.

03 Raila Odinga transitioned from technical practice into public leadership. Do you believe his engineering background influenced the way he approached governance and infrastructure development?

I strongly believe his Engineering background transitioned him from technical practice into public leadership. He never believed in running the Government purely on ideology but also on Engineering and economic policies. He believed in inclusivity, a fundamental philosophy in engineering. This was reflected in his leadership style. His political approach

could be interpreted as maintaining strength, cohesion, and appeal rather than seeking to destroy opponents. He focused on offering practical solutions to problems in production/manufacturing, infrastructure and value addition. His ability to propose bold infrastructure solutions most definitely stemmed from his technical foundation.

04 You are currently involved in the design of the mausoleum for the late Raila Amolo Odinga in collaboration with the Government of Kenya. What does this project mean to you personally and professionally, and how are you translating his legacy into the design?

I had been working closely with the late Raila Amolo Odinga, representing his family on a master plan and renovations for the Jaramogi Odinga Mausoleum and Museum located at Kango Ka Jaramogi in Bondo, Siaya County, together with a team of professional experts from the National Museums of Kenya and the Ministry of Heritage.

Following his sad demise, the family prioritized the construction of a mausoleum at his burial site preferably before his first annual memorial. I am privileged that they have allowed me to continue representing them on technical matters in collaboration with other relevant government

institutions.

Having known him for the past 45 years, this is a very special assignment for me. It is a special honour to participate in developing an iconic, serene space for reflection that honours his unique life and achievements. It is a collective goal for all parties involved in this assignment to carefully select and customize the architecture, materials and decorative elements to reflect his statesmanship, personality, passions and what he meant to his community, the people of Kenya, the people of Africa and the world at large.

05 If he were speaking to young engineers today, what values do you think he would urge them to prioritize

- i. **Hard work:** Consistent focus, persistence and practice to acquire new skills and knowledge. Basically, going beyond minimum requirements
- ii. **Continuous learning:** Improving skills and adapting to industry changes.
- iii. **Ethical integrity and professionalism:** Upholding high moral standards. That is, honesty, accountability, and reliability, while complying with industry-specific codes of conduct.
- iv. **Practicality:** Gaining hands on experience
- v. **Proactivity and resilience:** Forward thinking, risk management and ability to transform stress into control.



Raila Odinga at the AU: Africa Through an Engineer's Lens

By IEK Correspondent

Raila Amolo Odinga's engagement with the African Union is a widely well-known aspect of his lifetime pursuit of evidence-based leadership, Pan Africanism, and public service. Engineer Raila, a former technocrat turned politician, brought a special combination of political energy, technical expertise, and broad continental idealism to Africa's development agenda, especially in the areas of regional integration, infrastructure development, and governance.

His work at the AU reinforced a long-held belief: Africa's transformation must be planned for, coordinated, and sustained.

He once said, "Africa's future will not be negotiated into existence. It must be built through infrastructure, policy coherence, and shared political will."

An engineer's approach to continental governance

Raila's contribution to the African Union demonstrated his systems thinking. Despite the fact that others concentrate on distinct national objectives, he was generally able to identify Africa as a single system of integrated economics and technical systems. It was believed that governance was an essential component of the institutional framework, energy standards, and infrastructure.

Even the best infrastructure projects are doomed, he claims, if institutions are weak and policies are unfavorable. As a result, his AU engagements consistently emphasized:

- i. Robust frameworks for governance
- ii. Harmonization of policies among member states
- iii. Honoring technical and professional organizations
- iv. Accountability in the provision of public infrastructure

The majority of engineers and technical

specialists on the continent agreed with the above since they are the ones most impacted by policy implementation failures.

Infrastructure, the backbone of African integration

Roads, railroads, ports, energy grids, and digital infrastructure were not merely developments but integrations, and Raila consistently promoted the idea that infrastructure is the tangible language of unity.

He underlined the necessity of:

- i. Transportation corridors across Africa
- ii. Regional highway and rail systems
- iii. International connections in the energy sector
- iv. Infrastructure that supports the objectives of the AfCFTA

"You cannot speak of African integration while our roads stop at borders and our power grids end at national lines," he once stated during his AU campaigns.

Energy, technology, and the future of the African industry

Raila's AU posts had energy as their leitmotif. For Raila, energy was not merely a social commodity but a medium for industrialization, innovation and development.

He fervently supported technology-driven infrastructure planning, off-grid and decentralized solutions for marginalized communities, regional power pooling, and significant investments in renewable energy.

assisting technical collaboration and professional organizations

In addition to infrastructure concerns, Raila promoted professional exchanges among African nations. He thought that experts, engineers, and technocrats could significantly influence Africa's

development.

He emphasized the importance of mutual recognition of professional credentials, the strengthening of engineering schools in Africa, the sharing of knowledge among technical professionals, and the application of ethical standards in the building of public infrastructure.

A Pan-African vision for the continent

Raila's actions within the AU were heavily influenced by pan-African values. He was open about Africa's reliance on outside markets, dispersed airspace regulations, and low levels of intracontinental trade.

His vision was to have:

- i. A rise in trade within Africa
- ii. Integrated transportation systems and open skies
- iii. Decreased non-tariff obstacles
- iv. Stronger African-led institutions

Engineers' and policy makers' legacy

For leaders, policymakers, and engineers alike, Raila Odinga's legacy at the African Union offers timeless lessons. He proved that political leadership and technical expertise are complementary rather than antagonistic.

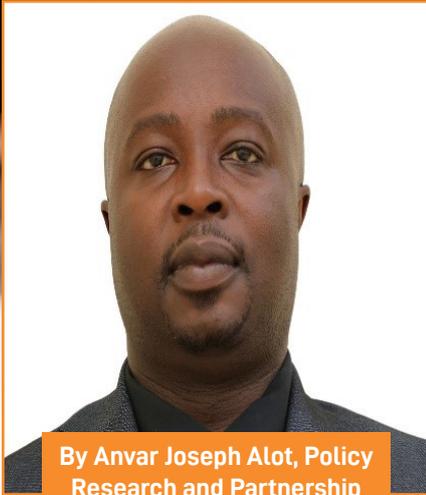
His journey as an AU candidate highlighted the significance of:

- i. Engineers taking on roles in governance and leadership
- ii. Vigorous advocacy via professional organizations
- iii. Closing the gap between policymaking and technical expertise

In light of Africa's ongoing infrastructure deficiencies, climate change concerns, and governance reforms, Raila's AU work served as a striking example of how development can become sustainable when it is carried out with visionary leadership, integrity, and collaboration



Navigating Leadership and Influence in a Loud Media Age



By Anvar Joseph Alot, Policy Research and Partnership Manager, IEK

Light, when present, feels ordinary. When absent, it becomes everything. This paradox offers a powerful lens through which to understand public life, leadership and even our personal journeys. In Kenya's political landscape, few figures embody this tension between light and shadow more vividly than Rt. Hon. Eng Raila Amolo Odinga, particularly in his long, complex and often love-hate relationship with the media. For decades, the media has both amplified his voice and scrutinized his every move. At times, it has shone a light on his ideals, sacrifices and role in shaping multiparty democracy. At other times, it has cast shadows, questioning his strategies, highlighting controversies and framing narratives that are not always flattering. Raila Odinga's engagement with the media reflects a deeper truth about public life, visibility comes at a cost. The same spotlight that elevates can also burn. When coverage is favorable, it is embraced as necessary and just. When it turns critical, it is often condemned as unfair or hostile. This oscillation creates a relationship that appears contradictory but is, in reality, inseparable. Leaders need the media to exist meaningfully in the public imagination, just as the media needs leaders to hold power accountable. When either is missing, society feels the loss.

The media, at its best, is not an enemy but a mirror. It reflects society's hopes, fears and contradictions. Raila's long career shows how enduring leadership requires resilience, the ability to withstand glare without losing direction and to keep walking even when the light seems unkind.

This lesson extends far beyond politics. In our personal lives, we often live under our own versions of the spotlight. Opinions from peers, expectations from family, judgments from society and increasingly, the relentless exposure of social media. We measure ourselves against curated images and loud criticisms, forgetting that light is not always gentle. Sometimes it reveals imperfections we would rather keep hidden. But those imperfections are not failures, they are proof of humanity.

To live fully is not to escape negativity, but to refuse to be defined by it. Raila Odinga's journey, marked by detention, defeat, resurgence and relevance, illustrates that progress is rarely linear. The noise never truly disappears. What matters is the inner compass that keeps one moving forward. When we worry excessively about criticism, we dim our own light. When we accept that scrutiny is part of visibility, we learn to stand taller within it.

Raila's many nicknames tell the story of a leader shaped and tested, by constant public scrutiny. Known as "Baba," he is seen as a political patriarch; as "Agwambo," the mysterious strategist who often defies expectations; "Jakom," the authoritative organizer; "Tinga," the bulldozer who pushes through resistance; and "Rao," the familiar public figure permanently under the media spotlight. Each name reflects a different response

to visibility, pressure, criticism and influence in an era where narratives are shaped instantly and reputations are contested loudly. Together, they illustrate that leadership in a noisy media environment is not about silence or safety, but about resilience, adaptability and the courage to remain visible despite scrutiny. An enduring lesson that speaks directly to the generation stepping into this same demanding, ever-watchful spotlight.

To the youth. You are inheriting a world louder, faster and more exposed than any generation before you. Your ideas will be judged quickly. Your mistakes may be public. The temptation will be to retreat, to dim yourselves or to live cautiously so as not to attract criticism. But remember, light that never shines cannot be missed and voices that are never raised cannot change anything.

Do not live your life obsessed with avoiding the negative. Negativity is inevitable when you dare to matter. Instead, live intentionally. Choose values over validation. Choose purpose over popularity. Like the media's relationship with leadership, life will sometimes celebrate you and sometimes challenge you. Both are necessary. Praise can motivate, but critique can refine.

To all, do not allow fear of criticism to paralyze you. Engage with the world honestly, accept that not everyone will agree with you, and understand that even harsh light can help you see more clearly. Live your life fully, boldly and with awareness. When the light is present, appreciate it. When it flickers, protect it. And when shadows fall, remember they only remind us of how important and meaningful the light has always been.

Impact of the Increasing Number of Prosumers to the Kenyan Grid

Mwangi Kaburu Murikwa¹, Haron Kipkorir Samoei¹

¹ Kenya Power, P.O. Box 30099 - 00100, Nairobi, Kenya
mwassmurikwa@gmail.com

ABSTRACT

The emergence of prosumers, entities that both produce and consume energy, has brought about a paradigm shift in the traditional energy landscape. Technological advancements have seen the development of grid-tie inverters that enable prosumers to couple their generation to the grid leading to the current monthly injection of about 2 GWh into the Kenyan grid. This is likely to increase with the increasing energy prices, reducing cost of renewable energy technologies, and implementation of net metering regulations. Investors are developing power purchase agreements (PPA's) with consumers whereby the investor installs and maintains a solar photovoltaic (PV) system at the consumer's premises and bills them for the generated energy at rates that are lower than the utilities. This has catalysed this emerging trend of partial grid-defection

and the unintended consequence is a more pronounced duck-curve. Prosumers affect the grid's stability with their intermittent and bidirectional captive power flows, which are not within the control of the System Operator (S.O). They also affect the revenues of several energy sector players. The methodology entailed installation of power quality analysers (PQA) at a few sampled prosumers followed by a comprehensive analysis of data from PQA's, Smart Energy Meters and SCADA system. The study analyses the benefits and challenges posed by prosumers on the Kenyan grid and identifies strategies of optimizing the performance of these distributed energy resources (DERs) for the mutual benefit of all parties in the energy ecosystem. It recommends careful planning, investment in technological advancements, and development of regulatory frameworks.

Key words: Prosumers, Net Metering, Partial Grid Defection, Duck-Curve, Captive Power, Distributed Energy Resources.

1 Introduction

The distribution network of Kenya's electrical grid was envisioned to be passive and unidirectional where bulk power is received from the transmission network and delivered to the consumers. However, due to reducing cost of renewable energy sources and the desire for reliable power, many energy consumers are installing grid-tied captive power at their domestic or industrial sites thus turning the distribution network to an active bi-directional network.

The term prosumer is a combination of the terms producer and consumer.

They are individuals who not only consume electrical energy from the grid but also produce their own energy and inject the excess generation back to the grid causing bidirectional power flow between the grid and the customer's installation.

Kenya has developed renewable energy sources to a level that about 90% of the grid's energy is from renewable energy. In the last financial year of 2022/2023, Kenya's generation mix had 45% geothermal, 19% hydro, 17% wind, 3% solar and 10% thermal energy. This is exclusive of the energy injected by prosumers into the grid since it is neither purchased nor

actively measured.

Unlike traditional captive power installations where the generation was charging a battery bank, technological advancements have seen the development of grid-tied inverters that help the prosumer avoid the high cost of batteries. Additionally, investors who install and maintain rooftop solar photovoltaic (PV) system at customer's premises on behalf of the customer have catalysed this emerging trend of partial grid defection. The energy flow of three sampled prosumers is as summarised in the table below.

Table 1: Energy Data of Sampled Prosumers (Source: Author)

NAME	VOLTAGE LEVEL (kV)	FORWARD ENERGY (+kWh)	REVERSE ENERGY (-kWh)	REVERSE ENERGY (%)
Prosumer - 1	Low	161,522	101,171	63%
Prosumer - 2	Medium	3,046,453	129,297	4%
Prosumer - 3	High	26,916,408	7,635,720	28%

2 Methods

The main objective of this research is to provide a better understanding of the impact of prosumers to the Kenyan grid and although there are hundreds of them on the grid, three were selected for in-depth analysis. The methodology involved identification of the key prosumers, at various voltage levels. The first prosumer selected is coupled to the grid on low voltage the second on medium voltage and the third on high voltage. They are also located in different regions of the country but the locations are withheld due to customer confidentiality. Equipment for measuring and logging data was installed/utilised for obtaining parameters such as voltage, frequency, current, power and power-quality events. Finally, the data was analysed with the aim of understanding the current and future impact of prosumers to the Kenyan grid.

3 Results

3.1 Prosumer on Low Voltage Network (230V or 400V)

Prosumer-1 is coupled to the grid at the low voltage network and is served by a three-phase 200kVA distribution transformer, which also serves domestic customers in that village. The graphs below is a 24-hour profile showing his import and export of power to the grid.

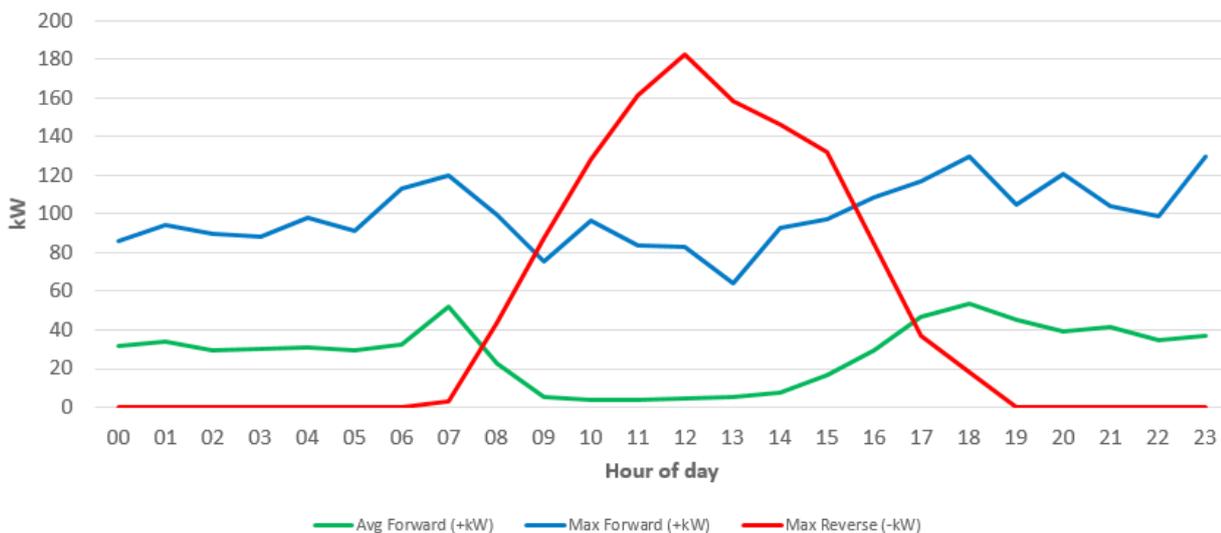


Figure 1: Import and Export Power Profile of Prosumer-1 (Source: Author)

It is observed the 200kVA step-down transformer that was designed to comfortably supply the load of at most 130kW (65% of transformer capacity) has become an overloaded step-up transformer that the prosumer uses to inject up to 183 kW (91% of the transformer's capacity) back to the grid.

3.2. Prosumer on Medium Voltage Network (11kV or 33kV)

Prosumer-2 is coupled to the grid at the medium voltage network and like majority of captive power plants; he uses solar photovoltaics (PV). He is served by a feeder, which also serves about 12,000 commercial and domestic customers. The graph below shows the load profile of the feeder and the prosumer.

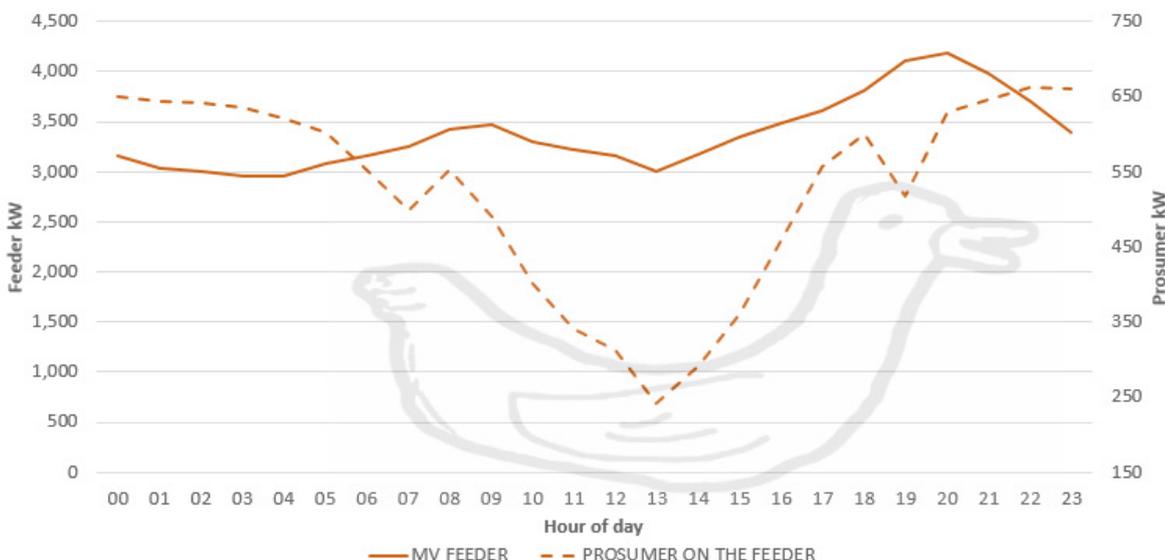


Figure 2: Load Profile of Feeder and Prosumer-2 ; Duck-Curve (Source: Author)

It is observed the two curves draw a silhouette of a duck. At night Prosumer-2 draws power from the grid but during the day, his power demand from the grid reduces (belly of the duck) upto a point at midday where the excess captive power generated is injected back to the grid causing an artificial reduction in the feeder's load (back of duck).

3.3. Prosumer on High Voltage Network (66kV, 132kV or 220kV)

The Prosumer-3 is coupled to the grid at the high voltage network, and like all other prosumers, his export power is not under the control of the S.O and can therefore affect the quality of grid power by triggering voltage spikes, dips etcetera as illustrated in the figure below.

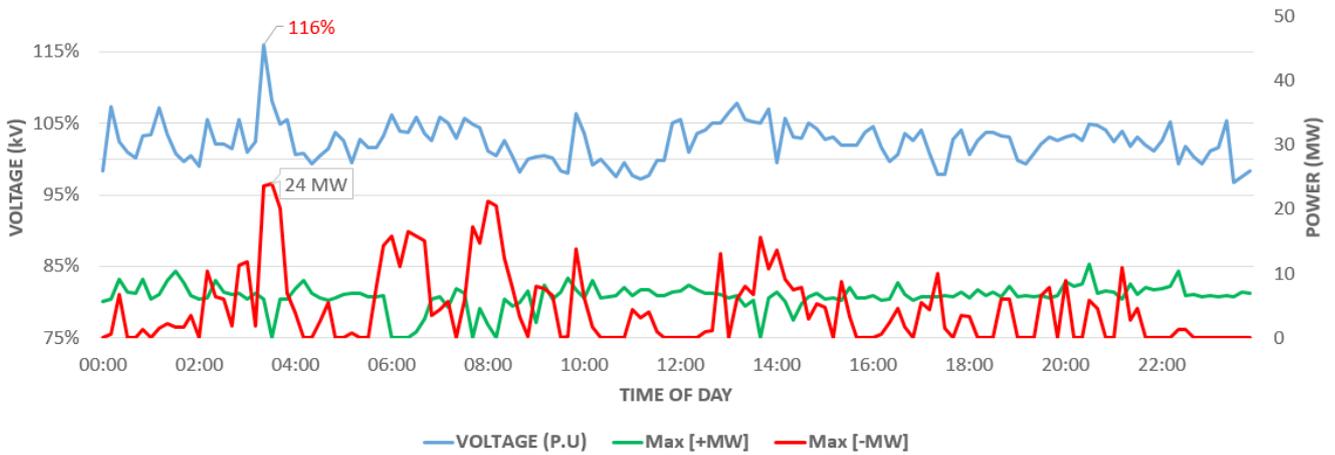


Figure 3: Relationship between Prosumer-3 Reverse Power and Grid Voltage (Source: Author)

A correlation between prosumer-3's reverse power and the grid voltage is evident where the grid voltage spikes to 116% for 2 minutes when prosumer-3 suddenly injects an un-expected 24 MW into the grid.

4 Discussion

Generators - Reduced Plant Capacity Factor and Revenues

Prosumers pose a risk to the conventional power generating companies since they need to ramp down their generation during periods of high prosumer generation [4].

$$\text{Generating Plant's Capacity Factor} = \frac{\text{Actual Generation (MWh)}}{\text{Nameplate Capacity(MW)} \times \text{Time(h)}}$$

To maintain balance between demand and supply when prosumer is actively generating, curtailment of generation is done which effectively reduces the capacity factor of the power plants [5] and in turn reduces the revenues for the electricity generation companies.

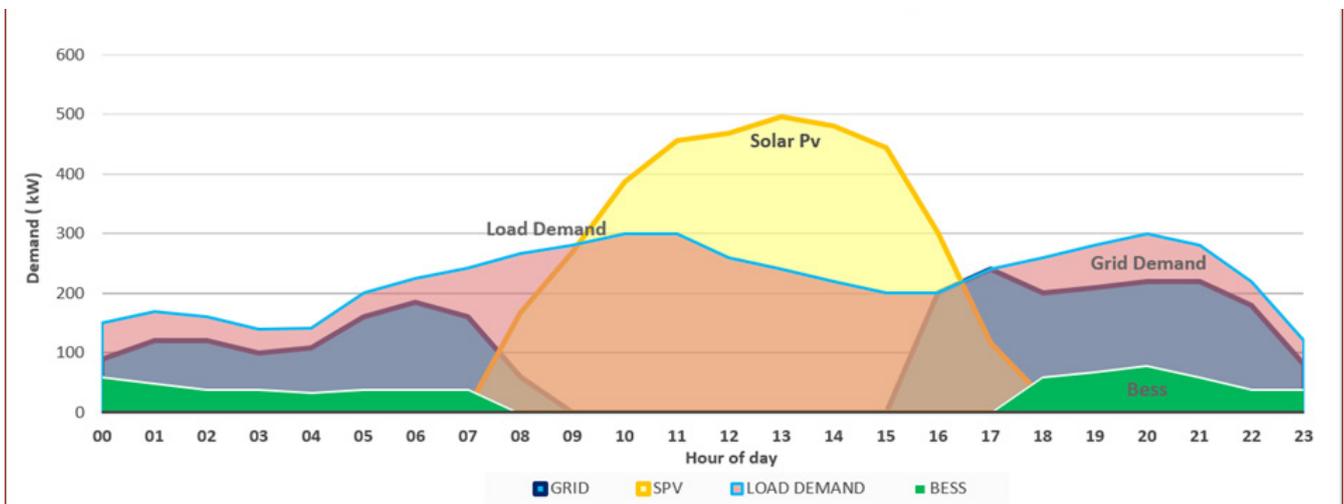


Figure 4: Forecast of Typical Load Profile and Power Supply Sources of Future Prosumers (Source: Author)

System Operator (S.O) – Grid Management and Power Quality

The task of managing power generation dispatch is entrusted to the S.O who arranges and schedules dispatches based on the prevailing electricity demand to ensure that critical grid parameters, such as voltage and frequency, remain within acceptable limits. However, the growing number of prosumers presents a significant challenge in managing the grid because he lacks visibility and control over the operations and dispatch schedules of these distributed energy sources (D.E.R).

Power quality entails supply stability and it encompasses voltage events such as dips, swells, over-voltages & under-voltages, which are characterized by magnitude and durations [6]. The variability in power injected into the grid by prosumers introduces voltage and frequency fluctuations which may pose adverse effects on the operations of electrical and electronic equipment.

Distributor & Retailer – Infrastructure constrains

The bi-directional power flow, and dumping of excess generation may introduce new dynamics in grid infrastructure, improper design of the power plant to match with the existing grid infrastructure including transformers, cables, metering devices and protection devices may lead to damage of the equipment's and further escalate the utility's operations cost.

Power Consumers – power quality

The variability in power generation from renewable introduces voltage and frequency fluctuations on the grid which may introduce adverse effects on plant operations by causing damage to equipment's, reduced productivity due to plant downtime etc.

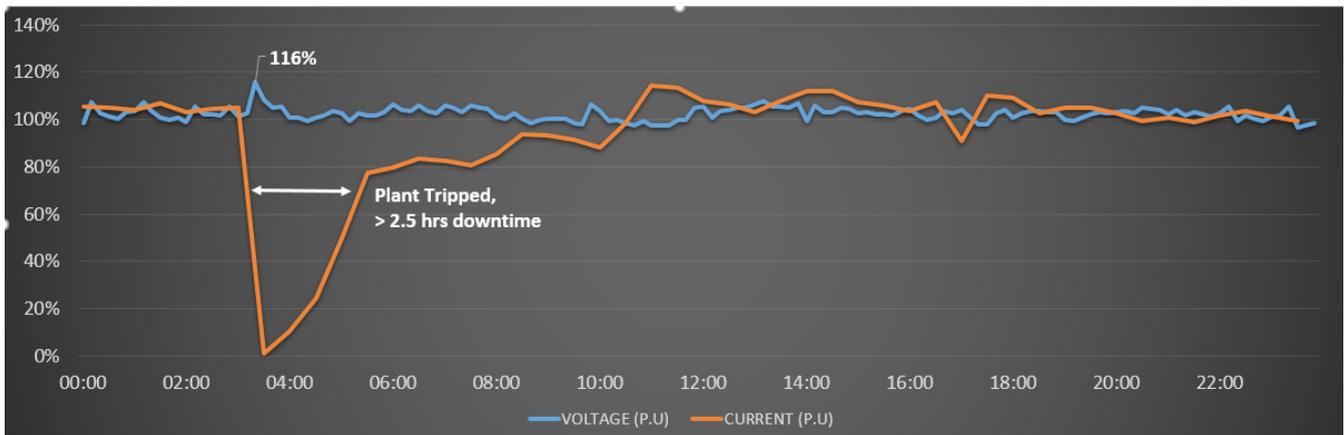


Figure 5: Impact of Voltage Fluctuations to Customer's Production (Source: Author)

5. Conclusions

Energy transition is gaining momentum and the growing number of prosumers have the potential to reshape the energy landscape. The pursuit of affordable, reliable power supply coupled with incentives such as net-metering has demonstrated the potential of influencing various aspects including grid stability, power quality, cost of electricity, revenues of energy sector stakeholders and energy accounting.

Energy sector players and policy makers therefore need to develop strategies of ensuring an optimal and coordinated integration of prosumers as part of the future energy system. This can be implemented through a multifaceted approach including technological, infrastructural and regulatory initiatives such as battery energy storage systems (BESS), smart grid distributed intelligence and tariff formulation.

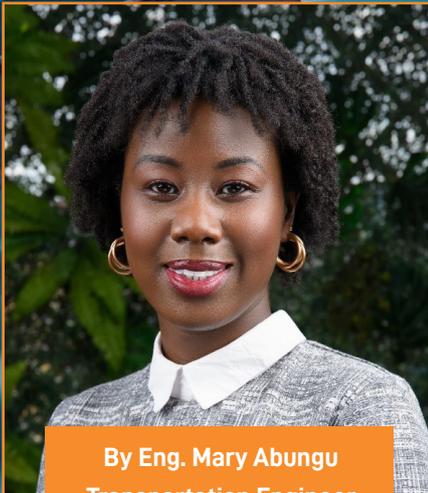
Areas of further studies include; how prosumers can contribute to grid stability, utilization of grid-tie inverters for reactive power compensation and voltage regulation and how to bolster grid capacity through the aggregation and optimization of distributed energy resources.

Acknowledgement

We wish to thank the almighty God for being gracious to us and enabling us to do all that we have done, our families for their moral support and encouragement, our colleagues and friends for their insights and their contributions towards this research. We also extend our appreciation to Kenya Power for facilitating us with the resources, platform and conducive environment to conduct this work.

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By Eng. Mary Abungu
Transportation Engineer
TIMCON Associates

Engineer Mary Abungu: An Award-Winning Transportation Engineer and Road Safety Advocate.

01

What initially drew you to the field of transportation engineering, and how has your journey shaped your focus on road safety ?

I entered transportation engineering because roads shape opportunity, but I quickly learned they can also shape loss. Seeing how predictable many serious crashes are shaped my focus on road safety.

Over time, my work has centred on practical, evidence-based solutions, especially for vulnerable

road users like pedestrians, cyclists, children, and public transport users.

My work now is grounded in the belief that death and serious injury are preventable when we design and manage roads for human mistakes.

02

Your academic training at Newcastle University and your professional work at TIMCON Associates have exposed you to both global and local transport systems. How has this blend of international and Kenyan experience influenced your approach to transport planning and safety?

My academic experience at Newcastle University grounded me in the principles of sustainable transport planning, how cities manage movement, land use, accessibility, and safety through integrated systems. It also exposed me to international best practices where road safety is treated as a core performance outcome, not an afterthought.

Returning to the Kenyan and regional context through my work at TIMCON Associates has sharpened

my understanding of what implementation really looks like: competing priorities, limited resources, informal travel patterns, rapid urban growth, human behaviour, and corridors that carry mixed traffic with high exposure for pedestrians and boda boda riders.

That blend keeps me focused on solutions that are evidence-based, locally workable, and Safe System-aligned.

03

As the founding director of Sustainable Mobility Africa (SUMO Africa), what inspired you to establish the organization? What gaps in the transport sector are you seeking to address?

SUMO Africa focuses on policy advocacy and reform, and supports safe, accessible, and inclusive mobility systems for all, particularly vulnerable road users.

I founded Sustainable Mobility Africa (SUMO Africa) to strengthen collaboration across a sector that a lot of times works in silos. Road safety and mobility outcomes depend on many actors, transport agencies, police, health services, planners,

communities, and progress slows when these groups don't plan and act together.

We work to translate data and lived experience into practical policy recommendations, support institutions to align with the Safe System approach, and create platforms where government, practitioners, and communities can jointly design solutions.

04

At the WTA Conference Nairobi 2025, you spoke on 'Strengthening Multi-Sectoral Collaboration to Enhance Road Safety Data.' What practical steps do you believe institutions can take to better share and use road safety data for impact?

Start by agreeing on standards, definitions, formats, and what sufficient data looks like. Then formalize sharing (MOUs/SOPs), assign focal points and working groups where possible, and hold regular "data-to-action" reviews.

Most importantly, link data to decisions: implementation, enforcement plans, treatments, budgets, and management. Data only saves lives when it changes what gets done next.

05

You were recognized as 'Road Safety Champion of the Year' at AA Kenya's inaugural Road Safety Excellence Awards in July 2025. What did this recognition mean to you personally and professionally? Can you highlight other major recognitions you have received in your career as a road safety advocate?

Being recognized by AA Kenya reminded me that persistence matters, especially in work that requires many institutions to move together. It was both humbling and motivating, because it comes with responsibility to keep delivering impact and saving lives.

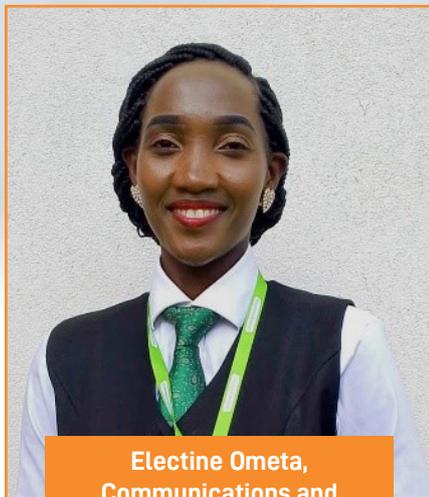
Other recognitions that have been meaningful in my journey include:

i. Receiving the Best Contribution award during my MSc in Transport Engineering, Planning and Management at Newcastle University (in collaboration with Capita, 2021).

ii. Receiving Local Action awards from the Global Youth Coalition for Road Safety for initiatives such as the 2024 Local Action award for "Connect the Dots, Save a Life" and the 2025 Local Action award for "Safe Steps to School."

iii. Being named Employee of the Year at TIMCON Associates (2022, 2023 and 2025)

Youth Empowerment in Technical Education Under Raila's Advocacy.



**Electine Ometa,
Communications and
Marketing Intern, IEK**

As Kenya continues to reflect on the life and legacy of the late Rt. Hon. Raila Amolo Odinga, a figure whose passing marked the end of an era in the country's political and social history, tributes flow from across the continent, remembering a man synonymous with reform, resistance, and democratic struggle. Yet beyond the well-documented political milestones lies a deeper, less interrogated legacy, one rooted in ideas about development, productivity, and the future of Kenya's youth.

For decades, Raila Odinga positioned himself not merely as a political actor, but as a development thinker concerned with how nations grow, industrialize, and empower their people. His public life consistently engaged with structural questions like how economies created opportunity, how societies distributed dignity, and how young people were prepared to participate meaningfully in national progress. It is within this intellectual space rather than partisan politics that his advocacy for technical education found its clearest relevance.

Raila urged greater investment in training young people in digital and technological skills, including artificial intelligence, arguing that such investment would make youth

more competitive in the global job market. At Siaya Community Digital Hub graduation ceremony in May 2025, he emphasized that preparing young Kenyans for evolving job landscapes requires deliberate action and practical training rather than passive expectation. In his commentary on youth empowerment, Odinga highlighted the need for "real action, not just policies on paper" to enable young people to start and sustain businesses.

Odinga also pointed to the importance of institutional support for youth participation at all levels of public and private life, advocating for the creation of a Youth Commission with equitable gender representation as a foundational step toward advancing youth roles in national development. In line with his long term vision for youth leadership and capacity building, plans were announced to establish a Raila Odinga Academy in Leadership, intended to celebrate the 20th anniversary of his party and provide a platform for cultivating leadership skills among young people. This was officially announced during a Parliamentary Group meeting in Machakos, with plans to launch the academy during a youth event in Mombasa.

Earlier in April 2025, while attending the installation of the new Vice Chancellor at the Co operative University of Kenya's Karen campus Odinga encouraged young people to think creatively and make deliberate efforts toward wealth creation, stressing that cultivating a culture of saving and investment is essential for economic progress.

At the time of his passing, Kenya was grappling with a persistent and troubling paradox. Young people make up a sizable segment of Kenya's population yet youth unemployment remains alarmingly high. Each year, thousands of young Kenyans leave schools and universities only

to encounter a labour market that neither absorbs their qualifications nor values their skills. At the centre of this crisis lies a widening mismatch between education outcomes and the practical demands of the economy, particularly in engineering, manufacturing, infrastructure, and industrial development.

It is against this backdrop that Raila Odinga's long-standing emphasis on technical and vocational education took on renewed significance. He consistently argued that Kenya's development could not be sustained by academic credentials alone, but by a workforce equipped with practical, technical, and problem-solving skills. To him, technical education was not a secondary option for those who fell short of university pathways, but a strategic engine for youth empowerment, economic productivity, and national transformation.

Raila Odinga's advocacy for youth empowerment and technical education was rooted in a lifetime of reformist thinking and exposure to development models both at home and abroad. During his studies in mechanical engineering in East Germany (Magdeburg) in the late 1960s and early 1970s, he gained firsthand experience of industrial training systems and hands-on skills development. Upon returning to Kenya, he applied this knowledge as an engineering lecturer at the University of Nairobi, witnessing how practical training could drive national growth. These experiences convinced him that Kenyan youth needed access to similar opportunities, equipping them with the skills to participate meaningfully in engineering, manufacturing, and infrastructure projects. Raila's later years increasingly emphasized practical empowerment for young people that they must be equipped with real, usable skills to fully participate in Kenya's economy and contribute to social progress.

Long before his political prominence, in 1971, while serving as an engineering lecturer at the University of Nairobi, he founded Standard Processing Equipment Construction & Erection Ltd, later known as East Africa Spectre Ltd, one of Kenya's early indigenous manufacturing firms producing LPG cylinders and industrial products. In a show of personal commitment, he reportedly sold his German car to raise capital to acquire machinery for the company, demonstrating both resourcefulness and belief in the potential of local industry.

He frequently called for education systems to identify and support skilled youth, advocate for apprenticeship and certification pathways, and extend incentives to craftsmen, artisans, and technically trained young people so that their passions could become professions and industries. In 2021, he specifically proposed establishing a human resources development body to keep a data bank of skilled youth, organize skills competitions, and send talented young practitioners to international platforms like the World Skills Competition. 'The human resources development body will keep a data bank on the skilled youth, source support, including extending specific incentives to small and medium enterprises run by craftsmen and artisans, and ensure their passions become professions, industries and jobs for the nation,' he wrote.

On August 31, 2019, he presided over the official opening of the Ugunja Technical and Vocational College at Mbosie Village in Ugunja Constituency, Siaya County. He described the event as an encouraging milestone, highlighting the importance of establishing a modern, well-equipped institution at the grassroots level to make technical education more accessible to Kenyan youth. For Odinga,

initiatives like this were not merely symbolic; they represented a tangible pathway for young people to acquire practical skills, engage in meaningful employment, and contribute directly to national development through engineering, manufacturing, and infrastructure projects.

The late Raila engaged with youth and education not only through community events but also on academic and institutional platforms that foregrounded structural challenges facing the younger generation. In September 2021, he delivered a public lecture at the University of Nairobi titled "*Youth & Challenges of Nationhood in Kenya/Africa*," where he addressed issues of unemployment, education access, and the importance of preparing young people with the skills to participate in national development. "I want to prepare Kenyan youth for the jobs of the future. I want Kenyan youths to focus on where the world is going and not where it is coming from. I therefore do not subscribe to the school of thought that, 'Kazi ni Kazi'." he said. He also connected with trainees at technical institutions, notably at Bondo Technical Training Institute in May 2025, where he urged Technical Training Institutes to invest in artificial intelligence and future oriented skills to help youth bridge job market gaps that is posing security threats to the nation.

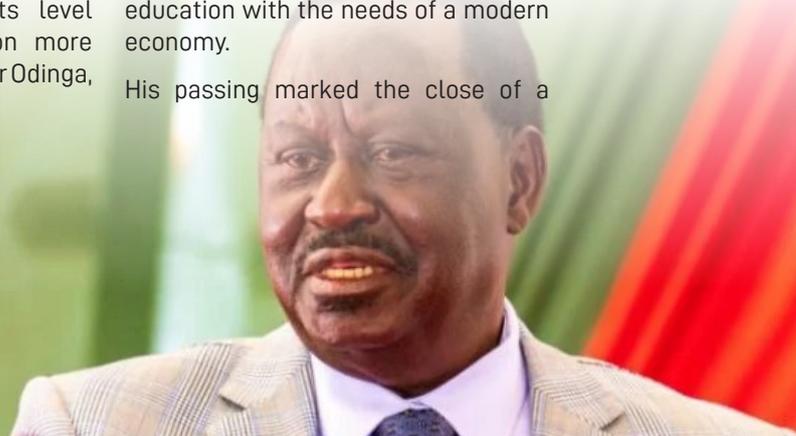
Whether speaking to university students about their role in Kenya's future or advocating for advanced skills training in technical settings, Raila consistently stressed that preparing youth with practical and forward looking skills was central to empowering them and aligning education with the needs of a modern economy.

His passing marked the close of a

long public life, but not the end of the questions he persistently raised about youth, work, and national development. His advocacy for technical education was never framed as a finished project; it was an ongoing response to structural challenges he believed Kenya had yet to resolve. What he achieved was largely ideological but consequential. He helped legitimize technical education as a serious development pathway, elevating conversations around TVETs, applied engineering, manufacturing, and future-oriented skills from the margins to the national stage. Through speeches, institutional engagements, and public advocacy, he contributed to reframing skills-based training as central to youth empowerment rather than a fallback option.

His advocacy posed difficult questions that outlived him. Today, the relevance of that conviction remains undiminished. Engineering, manufacturing, infrastructure, and emerging technologies continue to demand technically skilled hands and minds. The question is no longer whether technical education matters, but whether Kenya will treat it with the seriousness it deserves. Raila Odinga's legacy in this space stands not as a closed chapter, but as a blueprint, a challenge and a reminder that youth empowerment requires more than rhetoric, and that national transformation depends on investing in skills that build, sustain, and innovate.

In the end, the enduring question he left behind is not about what he envisioned, but about what the country chooses to do with it.





Technoeconomic Analysis Of Hybrid Solar-Diesel Minigrids In Kenya: A Case Study Of The Retrofitting Eldas Diesel Minigrid - Pilot Site

Lilian Kanana Kamanja¹, Kahoro Wachira¹, Daniel Gombe Nyandera¹, Edith Chebet¹,
Kate Mukangula¹, Faith Karimi Koome¹, Sebastian Waita²

¹Kenya Power and Lighting Company P.o Box 30099- 00100 Nairobi

²Solar Energy Research Group, Department of Physics, University of Nairobi

P. O. Box 30197, 00100 Nairobi

Corresponding Author Email : Lilkany06@gmail.com

ABSTRACT

Generation of electricity from fossil fuels globally has led to the emission of greenhouse gases, which has been a major contributor of global warming. In addition, one of the biggest challenges in the developing world is the provision of reliable and affordable electricity access to remote and marginalized people where grid extension is too expensive.

Off-grid electrification program in Kenya for remote centres has been running since the early 80's. Until very recently, all sites were 100% powered by diesel generators. The Ministry of Energy is supporting the Rural Electrification and Renewable Energy Corporation and Kenya Power & Lighting Co. Ltd to hybridize 18 sites to maximize the use of renewable energy, reduce fuel costs and lower carbon emissions.

The government of Kenya spends up to 5 billion Ksh annually on diesel fuel for generators powering the remote sites namely (Mandera, Wajir, Kakuma, Merti, Habaswein, Elwak, Baragoi, Mfangano, Rhamu, Eldas, Takaba, Lokichoggio, Lokori, Laisamis, Faza, Kiunga, Hulugho, North Horr, Lokitaung, Dadaab, Maikona Lokiriama, Banisa).

A techno-economic analysis of retrofitting Eldas site shows that a 315.6 kW hybrid solar PV diesel hybrid system with four generators (2*65 kVA, 2*135 kVA) is sufficient to power the town of Eldas and its surroundings. Financial analysis shows that the payback period after retrofitting the minigrid is 9.4 years. In addition, 3,284 tons of Carbon Dioxide is saved. Hybridizing all the sites shows that the government of Kenya will save up to 3.6 billion Kenya Shillings per year.

Key words: Solar PV-Diesel Minigrid, Payback Period, Greenhouse Gas Emissions, Techno-economic analysis, Eldas



1 Introduction

Over the years diesel generators in Kenya have been used to power households in off-grid rural setups and towns where the extension of the grid is prohibitively expensive. The use of diesel generators has been preferred due to their capability to supply power for 24 hours. However, the increased fuel prices and harmful carbon emissions have made the use of diesel generators only unattractive and expensive. Renewable energy systems on the other hand have been adapted due to the concerns of greenhouse gas emissions, which are contributing to climate change (Yamegueu et al. 2011).

The use of hybrid systems (diesel and solar and storage) is gaining popularity, because the use of solar energy is maximized during the day, the stored energy in batteries is maximized during the night and optimal-sized diesel generators are used to supply extra power that may be required during the peak and night hours hence ensuring reliable power.

In addition, other benefits accrued include; adoption of renewable energy systems, reduction of fuel costs and reduction of carbon footprint.

To this effect, the Ministry of Energy in Kenya is supporting the Rural Electrification and Renewable Energy Corporation (REREC) and Kenya Power & Lighting Co. Ltd (KPLC) to hybridize 18 sites. The ministry of energy spends about Ksh. 62.7 million on diesel fuel costs for Eldas power station and Ksh. 5 billion for all the 23 diesel powered mini grids in off grid areas on annual basis. In this paper, we focus on doing a techno-economic analysis of hybridizing the diesel minigrid site in Eldas, Wajir County.

Numerous authors have conducted techno-economic analysis in various parts of the (Asrari et al. 2012; Himri et al. 2008; Nema et al. 2009; Rehman and Al-Hadhrami 2010; Said and Ahmed 2014; Yamegueu et al. 2011), however, we have not come across any published work for Kenya on techno-economic analysis of hybridizing the

diesel minigrid site in Eldas.

2. Methodology

2.1 The existing layout of Eldas hybrid minigrid

Eldas' power plant currently consists of a 300kVA diesel generator operational since 2016, a 36kWp Solar PV power plant installed in August 2015 and one 1MVA 415V/33kV step-up transformer. The solar plant has not been operational for some time.

2.2 Solar radiation analysis from satellite data

The Global horizontal irradiance (GHI) and temperature for the Eldas area ranges from 5 kWh/m² to 6.3 kWh/m². Temperature in the area ranges from 20°C to 36 °C.

2.3 The daily energy demand profile

The daily energy demand for Eldas varies from a minimum of 45 kW during the day to a peak load of 145 kW at night as shown in Figure 1 below.

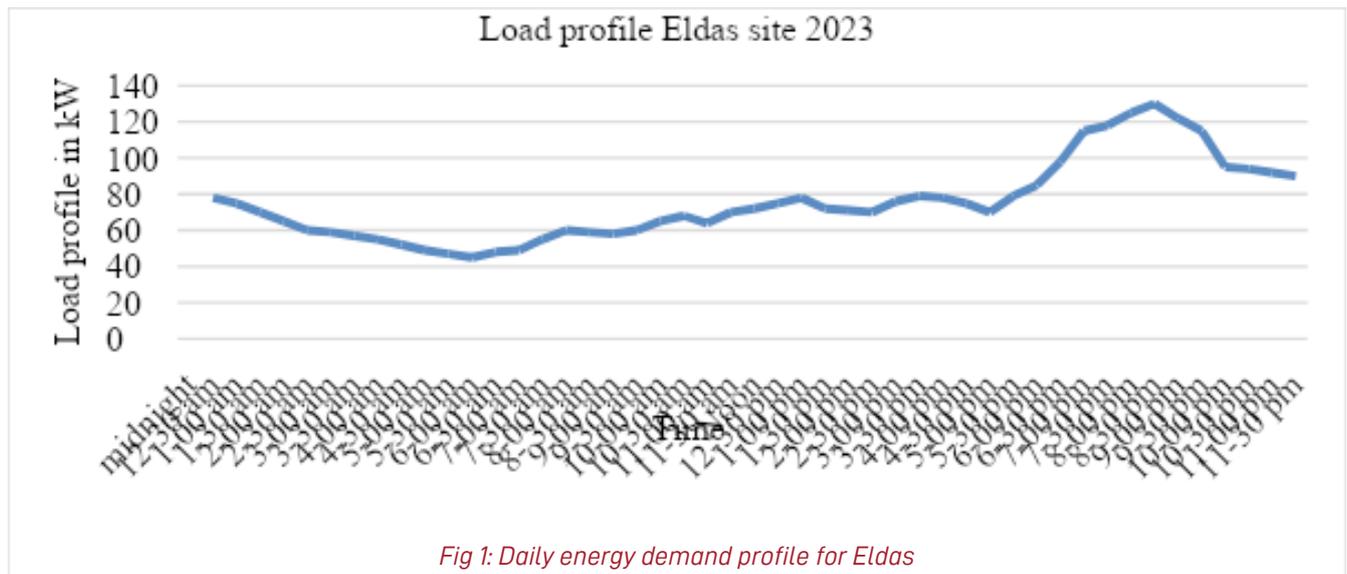


Fig 1: Daily energy demand profile for Eldas

1.4 Hybrid minigrid sizing and simulation

Design and sizing was carried out as detailed below and verified by simulation using Homer software as shown in Table 1 and 2.

Table 1: Solar PV plant sizing

Peak load	2% yearly load increase in Zero year	6.5% yearly load increase	5% yearly load increase	22% (Losses factor)
145 kW	147.9 kW	202.6 kW	259 kW	315.5 kW

Table 2: Generator sizing

Peak load	2% yearly load increase in Zero year	6.5% yearly load increase	5% yearly load increase	30% (Losses)	1/6	1/6	1/3	1/3
145	147.9	202.634	259	336.2	56.03	56.0	112.1	112.1

The distribution of the nominal power of the diesel generators is calculated as follows (33%/33%/16.7%/16.7%) as shown in Equations 1 and 2; to allow for the flexibility of picking load step-wise as it increases. Therefore, power per genset (at prime power)

$$1 \quad \frac{P_{norm}}{6} = \frac{336}{6} = 56 \text{ kVA with a +/- 20% margin}$$

$$2 \quad \frac{P_{norm}}{3} = \frac{336}{3} = 112 \text{ kVA with a +/- 20% margin}$$

Thus, the total kVA prime rating is 400 kVA with the sizes are; generator 1 – 65kVA, generator 2 – 65kVA, generator 3 – 135kVA, and generator 4 – 135kVA

Battery sizing was carried out as detailed below. The energy storage capacity for the battery is determined as shown in Equation 3

$$3 \quad \text{Energy storage capacity} = \text{Power requirement} \times \text{duration of back up power (hours)} = 259 \text{ kW} \times 1 \text{ hr} = 259 \text{ kWh}$$

Table 3 shows the parameters used to calculate the battery capacity.

Table 3: Battery capacity parameters

Energy storage capacity kWh	Days of Autonomy	Battery efficiency	Depth of discharge	Battery capacity kWh	C-rating
259	1.5	0.98	0.8	496 kWh	1C

Actual battery capacity is calculated using Equation 4

$$4 \quad = \frac{(\text{Energy storage capacity} \times \text{Days of Autonomy})}{(\text{Battery efficiency} \times \text{Depth of Discharge})} = \frac{(259 \times 1.5)}{(0.98 \times 0.8)} = 496 \text{ kWh}$$

The battery selected is made of Lithium Ion and has 14 cells of 3.2 volts 280Ah. Therefore the battery voltage is as shown in Equation 5.

$$5 \quad 3.2\text{V} \times 14 = 44.8\text{V at } 280\text{Ah (12.544 kWh)}$$

One battery string has 17 batteries connected in series of 12.544 kWh each. Therefore, one pack has 213.25 kWh as shown in Equation 6

$$6 \quad 17 \times 12.544 = 213.248 \text{ kWh}$$

The battery string voltage is as shown in Equation 7. This voltage is within the converter output voltage (40 V-900 V) and the battery inverter input voltage (600V-900V).

$$7 \quad 44.8\text{V} \times 17 = 761.6 \text{ V}$$

The number of battery strings required to meet the actual energy battery capacity is as shown in Equation 8. The total actual energy capacity is 639.744 kWh as shown in Equation 9.

$$8 \quad 496/213.25 = 2.3 \text{ strings} \approx 3 \text{ strings}$$

$$9 \quad 213.248 \times 3 = 639.744 \text{ kWh}$$

1.5 PV module, inverter, converter capacity calculation and selection

The solar PV panel selected was monocrystalline 540W and the parameters for the module at standard test conditions include; Open-circuit voltage (Voc) 49.6 V, Short-circuit current (Isc) 13.86 V, Operating voltage (Vmpp) 41.64 V and Operating current (Impp) 12.97 V, Temperature Coefficient of Voc 0.26%/°C . The DC-DC converters (model PDS1-400K) selected are modular in design and housed inside a cabinet that can hold up to 8 pieces of the modular converters. Each modular converter is rated at 50kW with an input current of (0-130 A) and an input voltage of (250-800V). The cabinet is rated at 400kW. Therefore, the sizing of the PV array is as shown in Equation 10.

$$10 \quad \text{No of panels} = (315,900 \text{ W}) / (540 \text{ W}) = 585 \text{ pcs}$$

The voltage and current of the PV string should be within limits of the 50 kW converter input current and voltage levels. One string comprises 15 panels with a Voc of 744 V as shown in Equation 11, while Equation 12 shows the Voc with consideration of temperature coefficient of 0.26%/°C .

11 $V_{oc} = 49.6 \text{ V} \times \text{No. Of panels per string (15)} = 744V_{oc}$

11 $744V \times [1 + ((250C - 200C) \times 0.26\%)] = 753.67 \text{ Voc}$

$585 \text{ panels} / 15 \text{ panels per string} = 39 \text{ strings}$

The string current (Isc) is 13.86A and the number of strings per DC-DC combiner in use is 6. The maximum string array current per DC – DC converter, peak power per converter and selected string DC-DC converter rating are as shown in Equations (13,14,15) respectively.

13 $= 13.86 \text{ A} \times 6 = 83.16A$

14 $\text{Peak power per converter} = 15 \text{ panels} \times 6 \text{ strings} \times 540W = 48,600W$

15 $39 \text{ strings} / 6 \text{ strings per converter} = 6.5 = 7 \text{ converters}$

The available capacity for the designed value for the string DC-DC Converters is 50 kW. Therefore 7 DC-DC converters are used for this system.

1.6 Battery Inverter sizing

The loads supplied are AC in nature thus there is a need to use a battery inverter for converting DC output to alternating current (AC) therefore; six inverters of 62.5 kVA were selected for this hybrid plant as shown in Equation 16. The cabinet holding 8 pieces of inverters is rated at 500kVA. The inverter is selected in such a way as to achieve an AC-to-DC ratio of 1.0 to 1.25 as shown in Equation 17.

16 $= 6 \times 62.5 = 375 \text{ kVA}$

17 $\text{DC/AC ratio} = \frac{315.6 \text{ kW (DC power)}}{375 \text{ kW Inverter AC power}} = 0.85 \approx 1$

The selected inverter model PWS1-500KTL-NA specifications include a nominal power of 500 kVA, battery voltage range of (600-900V), DC current of 837 A, AC voltage of 400 V, and AC current of 720 A. In addition, two isolation transformers are also provided each rated at 200kVA.

1.7 The Eldas hybrid Minigrd schematic/single line diagram and homer simulation extract

COMPONENT	NAME	SIZE	UNIT
Generator #1	Gen 1, 65KVA/52kW	52.0	kW
Generator #2	Gen 2, 65KVA/52kW	52.0	kW
Generator #3	Gen 3, 135KVA/108kW	108	Kw
Generator #4	Gen 4, 135KVA/108kW(1)	108	Kw
PV	Generic Flat plate PV	316	kW
Storage	Generic 1kWh Li-ion	640	Strings
System Converter	System Converter	375	kW
Dispatch strategy	Homer Load Following		

Fig 2: Homer simulation extract

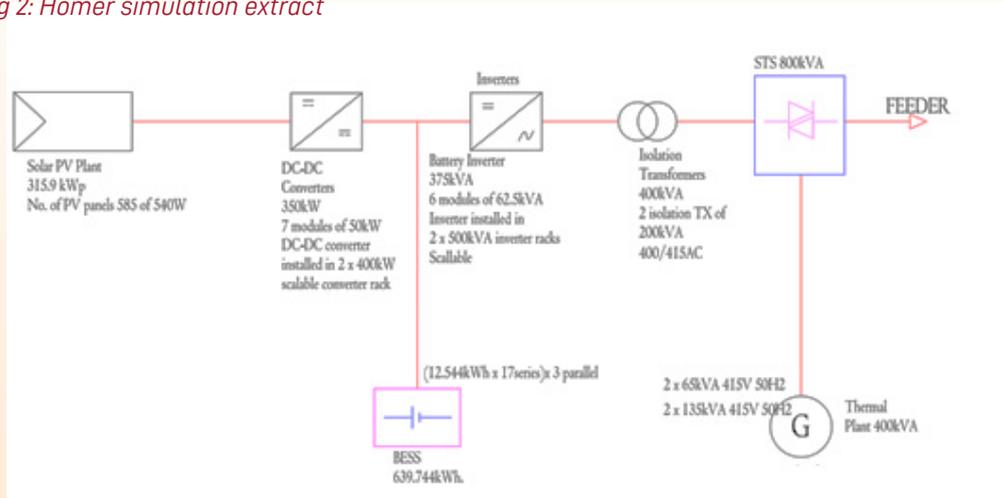


Fig 3: Eldas single line diagram

Figures 2 and 3 show the Homer simulation and Eldas single line diagram respectively.

1.8 Economic feasibility to appraise the viability of the project

The overall project cost for the Eldas site was Ksh. 374,151,594.5. The benefit accrued from the plant installed is the avoided cost of fuel. Ksh.374,151,594.5 is spent annually on fuel for diesel generators at the Eldas site. Simulation through Homer shows that after installation 70% of the plant power supplying the loads will be from renewable energy. Therefore, the payback period can be calculated as shown in Equation 18.

18

$$\text{Payback period} = (\text{Capital cost in Ksh}) / (\text{Avoided fraction of fuel cost annually in Ksh} - \text{O\&M cost (2\% of capex)})$$

The total amount of money spent by the government on fuel for the 23 diesel-powered sites is Ksh. 5,273,180,524.20. Equation 19 shows the estimation of the fuel cost savings. With the installation of the solar PV diesel plant in all 23 diesel-powered sites, the fuel consumption will be reduced by 70%

19

$$\text{Annual fuel cost for all the diesel-powered plants in Ksh} \times \text{Renewable energy fraction}$$

1.9 Carbon Balance calculation

The carbon balance is calculated using the energy yield of the PV installation for one year as computed by the PVsyst simulation, the system lifetime of 25 years, the grid LCE given in gCO₂/kWh and PV system LCE, given in tonnes of CO₂ (the total amount of CO₂ emissions caused by the operation and construction of the PV installation) as shown in Figure 4.

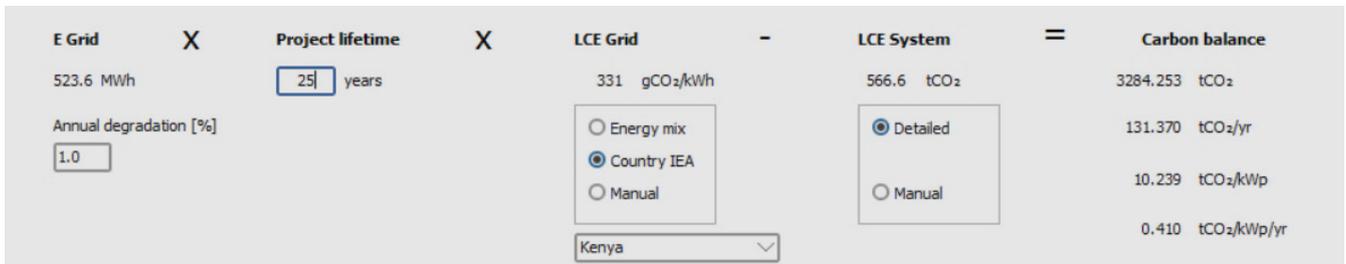


Fig 4: Carbon balance calculation

3. Results

Figure 5 shows an extract of the simulation from Homer. The total yearly production from solar PV is 511,712 kWh/yr, accounting for 69.4 of total generation. On the other hand, the annual generation from diesel generators is 317, 711 kWh/ year which accounts for 30.6% of total generation

Generic flat plate PV Multiyear Trends (Percent of First Year Value)

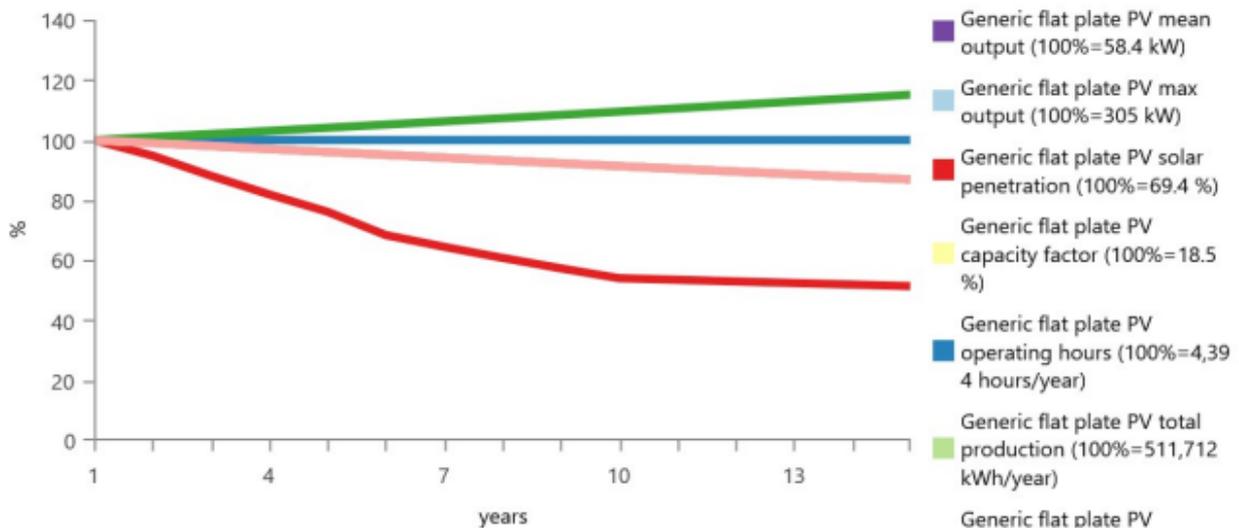


Fig 5: Homer simulation extract

Economic analysis of hybridizing Eldas power plant shows that the payback period is 9.4 years as shown in Equation 14. In addition, hybridizing all the sites shows that 3.3 billion shillings will be saved by the Kenyan Government as shown in Equation 15.

14 $\text{Payback period} = (\text{Ksh.}374,151,594.5) / (62,745,216 \times 0.7 - 3741515.945) = 9.4 \text{ years}$

15 $\text{Ksh. } 5,273,180,524.20 \times 0.694 \text{ (renewable energy fraction)} = 3,659,587,283.79$

4. Discussion

Design and simulation of the solar PV plant using Homer shows that a 315.6Wp solar PV, 400 kVA diesel generator set (65, 65, 135, 135) kVA, battery storage of 640 kWh will be sufficient to provide reliable power for the town of Eldas (for current loads and future loads).

Economic analysis shows that the payback period of hybridizing the plant is 9.4 years which is favorable as it is less than the lifetime of the solar-diesel hybrid plant. Hybridizing all the sites shows that 3.6 billion shillings will be saved which the government can channel to more useful areas of need. In addition, a carbon balance of 3,284 tons of CO₂ is achieved. Diversified sources of energy to constitute the hybrid plant will also ensure reliable power at all times for the residents of Eldas and its environs.

5. Conclusions

In this work, we carried out a techno-economic analysis of hybridizing the Eldas site. Design and sizing was carried out and verified using Homer software. Economic analysis was also done to determine the payback period of hybridizing the Eldas site and the carbon balance

was calculated. Therefore, this work shows that 315.6Wp solar PV, 400 kVA diesel generator set (65, 65, 135, 135) kVA, battery storage of 640 kWh will be sufficient to provide reliable power for the town of Eldas (for current loads and future loads).

In addition, the payback of the project is 9.4 years. Hybridizing all the diesel-powered sites also shows that the government of Kenya will save 3.6 billion shillings annually. A carbon balance of 3,284 tons of CO₂ is also realized. Thus, the techno-economic analysis of hybridizing Eldas site shows that it is technically and financially viable.

Acknowledgment

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Comparative Tariff Assessment: Grid vs. Self-Generated Electricity in Kenya

George Kimutai Komen¹

¹University of Nairobi, 30197-00100, Nairobi, Kenya
Email: kommengeorge@gmail.com

ABSTRACT

The shift towards consumer-owned electricity generation is gaining momentum. Consumers are increasingly moving away from the traditional national grid. As such, utilities, facing diminished sales, are compelled to pass on the high costs of system maintenance, Power Purchase Agreement (PPA) obligations, and operating idle capacity to customers through higher tariffs. This paper addresses the gaps in knowledge by conducting a comparative tariff assessment between grid-supplied power and self-generated electricity in Kenya. A mixed research approach was employed, utilizing both secondary data from the Energy and Petroleum Regulatory Authority (EPRA) and primary data collected from electricity consumers in the commercial and industrial. The findings found that the LCoE for self-generated electricity is relatively higher, with solar energy

costing \$418.12/MWh and diesel generators costing \$372.36/MWh, compared to the energy cost provided by the utility provider at \$200/MWh. This cost disparity can be attributed to low system utilization factors and a lack of economies of scale. The majority of consumers operate hybrid systems, with 25-50% of their total electricity consumption sourced from self-generation. The decision to defect from the grid is driven by various factors, including the need for reliable and high-quality power, access to alternative cheaper sources, environmental and energy sustainability concerns, and dissatisfaction with customer services. Implementation of the policies under Energy Act of 2019 has been slow, which can be remedied by proper planning, financing, and system integration measures are necessary.

Key words: Grid Electricity, Self-Generated Electricity, Tariff, Levelised Cost of Electricity, Hybrid Systems, Renewable Energy Source



1 Introduction

Modern distributed technologies including flexible demand, distributed generation, energy storage, and improved power electronics are driving a huge revolution in the energy sector. This shift is taking place in tandem with broader changes in power systems, such as a rise in the use of renewable energy sources, a closer coupling of the grid, and initiatives to cut carbon emissions [1]. New possibilities for the supply and use of power are being produced by these advancements. Commercial organizations are increasingly implementing hybrid energy systems, utilizing the grid at night and solar energy during the day for a variety of uses. Due to the advancement of renewable energy technology and the demand for reliable and affordable electricity, this tendency has intensified [2]. Consumers producing their own electricity is another new trend. Industrial clients are separating themselves from the grid and putting in place their own energy strategies, frequently using solar power. Many organizations and businesses have installed solar PV systems to suit their electrical needs, including Unilever Tea Kenya, Strathmore University, Garden City Mall, Total Kenya, Mombasa International Airport, and the International Centre of Insect Physiology and Ecology (ICIPE).

The price of renewable energy dramatically dropped between 2009 and 2019. Costs for solar PV decreased by 89%, from \$378/MWh to \$68/MWh, while those for onshore wind decreased by 41%, from \$135/MWh to \$41/MWh [3]. In contrast, during this time coal and nuclear energy prices

either rose or barely changed. Overall, technical improvements and the desire for less expensive and more dependable electricity are driving a change in the energy sector toward cleaner and more affordable energy sources.

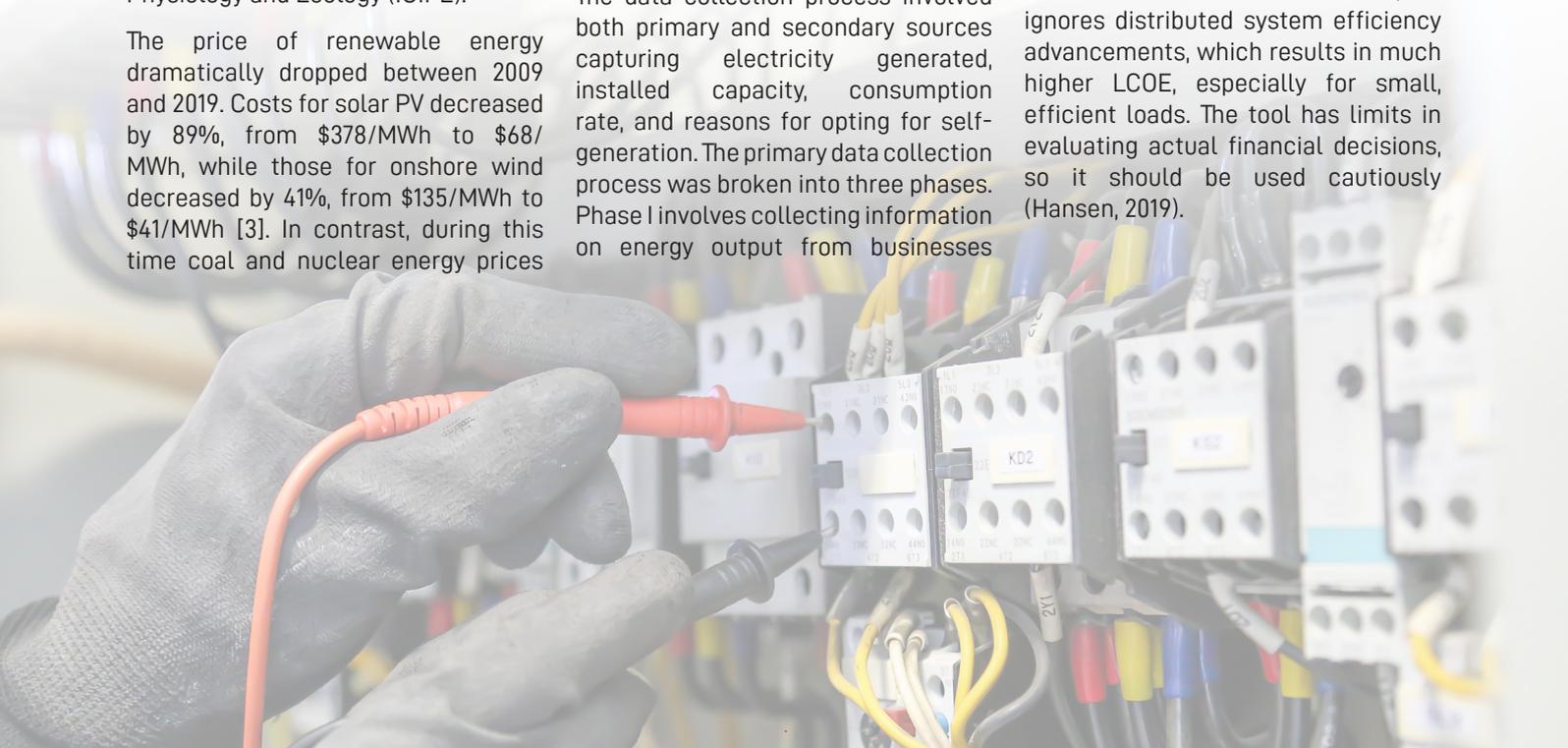
With consumers increasingly shifting to renewable energy technologies (RE), which are less expensive and more dependable, the traditional electricity market structures are being challenged [4]. Although RE may have advantages, its high start-up expenditures, ongoing maintenance, and operational costs cast doubt on the viability of self-generation as an alternative to the grid [5]. Consumers may now regulate their energy output and consumption thanks to advancements in RE and energy storage technologies, but it is still unclear what this means for utilities, customers, and legislators. Understanding this new paradigm's effects on the power industry and using that knowledge to inform decisions requires research. Arguably, it is important to look into and have a better understanding of the overall notion of self-generation and grid defection given the perception of the trend as a disruptor in the energy sector.

2 Methods and Tools

The data collection process involved both primary and secondary sources capturing electricity generated, installed capacity, consumption rate, and reasons for opting for self-generation. The primary data collection process was broken into three phases. Phase I involves collecting information on energy output from businesses

that had self-generation systems giving details on installed capacity, installation causes, and difficulties. The sampled self-generating systems had an installed capacity of more than 20 kW. Phase II gathered information from Engineering, Procurement, and Construction (EPC) vendors to reduce biases by capturing their viewpoints on the energy sector's capacity, costs, trends, difficulties, and incentives. In order to provide insights into the variables influencing self-generation and its effects on Kenya's energy sector, Phase III involves acquiring secondary data from EPRA, describing pricing, structural models, and changes in electricity sourcing from the national grid. The information covers tariff techniques and structures from 2013 through 2022.

The least expensive method of producing one's own electricity was determined using the LCoE methodology. The cost that results from comparing the lifetime cost of each organization to the discounted present value of the lifetime power produced indicates the point at which defecting economically makes sense. Although the tool makes comparing the competitiveness of technologies simpler, it does not take into account all project costs and financial factors. It ignores project hazards and oversimplifies project risks and discounted rates. Furthermore, it ignores distributed system efficiency advancements, which results in much higher LCOE, especially for small, efficient loads. The tool has limits in evaluating actual financial decisions, so it should be used cautiously (Hansen, 2019).



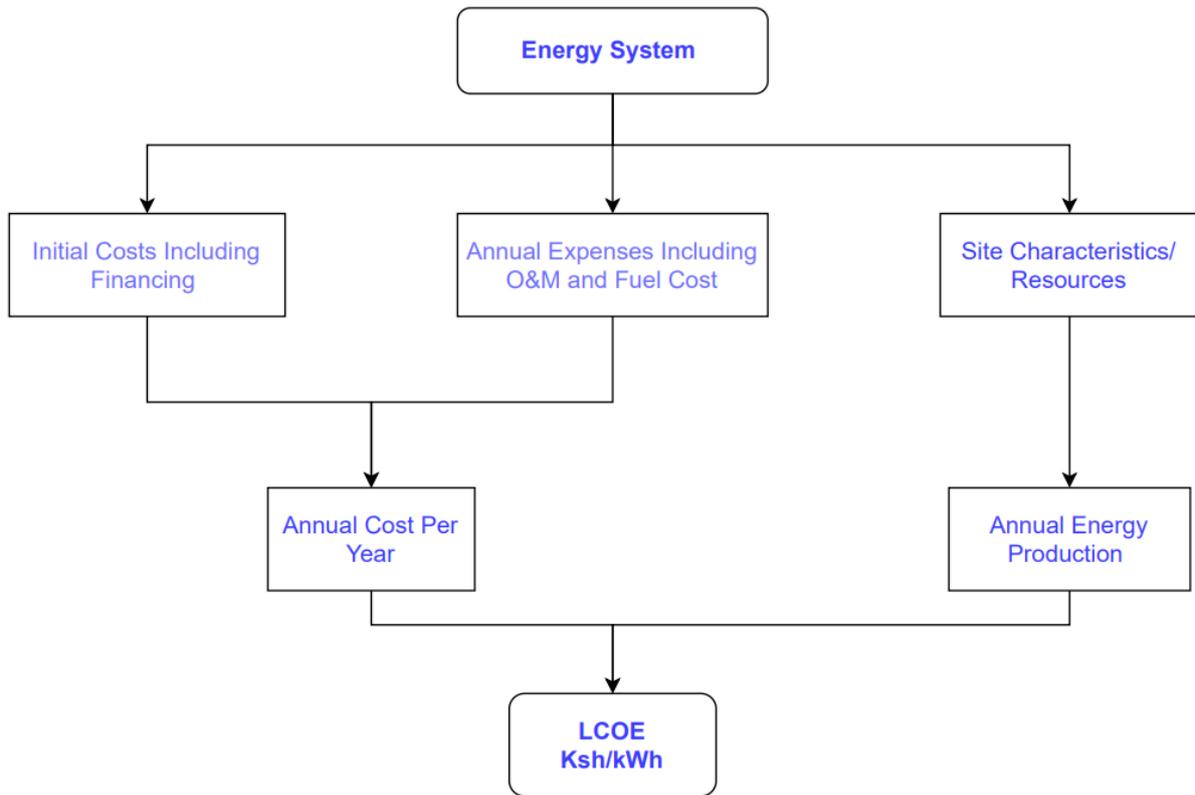


Figure 1: LCOE Concept

LCOE = (Lifecycle Cost)
(Lifetime Electricity
Production (kWh)

$$= \frac{\left(\frac{\sum_{t=0}^n (I_t + O_t + M_t + F_t)}{(1+r)^t} \right)}{\left(\frac{\sum_{t=0}^n E_t}{(1+r)^t} \right)}$$

Where:

LCOE: Levelized Cost of Electricity

I_t: Initial Capital Cost

O_t: Operation Cost,

M_t: Maintenance Cost,

F_t: Fuel Cost

E_t: Total sum of Energy produced over the lifecycle

t: the plant/ system

r: discount rate (r) accounting for depreciation in value of costs and energy

3 Results

From primary data, 11 companies were sampled and data collected from them. Table 1 shows the energy source with respective installed capacities, initial cost, operating hours, operating and maintenance costs (O&M) and electricity sources that include solar PVs, diesel generators, natural gas turbines.

Table 1. System variables for the surveyed companies (1 USD = Ksh 110 at the time of study)

CONSUMER	ENERGY SOURCE	INSTALLED CAPACITY	INITIAL CAPITAL (KSH IN MILLION)	OPERATING HOURS	ANNUAL O&M (KSH IN MILLION)
A	Solar PVs	1.2 MW	270	2500	1.66
	Diesel Generators	7.5 MVA	90	300	2.1
B	Solar PVs	1.67 MW	300	2500	0.3
	Diesel Generator	400 kVA	5	400	0.7
C	Solar PVs	850 kW	60	3000	0.7
	Diesel Generators	2 MVA	20	250	1.5
	Natural Gas	10kW	20	1500	1.1
D	Solar PVs	20 kW	2.1	3000	0.1
	Diesel Generators	160 kVA	0.8	500	0.3
E	Solar PVs	230 kW	23	2500	0.8
F	Solar PV	2.5 MW	270	3000	0.56
	Diesel Generators	4.32 MVA	50	600	3.2
G	Solar PVs	150 kW	15	2500	0.5
	Diesel Generators	1 MVA	10	300	1.8
H	Solar PVs	560 kW	50	3000	0.8
	Diesel Generators	1.5 MVA	20	250	1.5
I	Solar PVs	410 kW	40	2500	0.5
	Diesel Generators	2.5 MVA	30	300	1.4
J	Solar PVs	290 kW	30	2500	0.4
	Diesel Generators	500 kVA	5	200	1.1
K	Solar PVs	670 kW	70	3000	0.9

Levelised Cost of Electricity

The survey discovered that the majority of solar PV systems ran for between 2,500 and 3,000 hours annually, while diesel generators were only used for between 200 and 500 hours. Operation and maintenance (O&M) costs for solar PV systems included replacement parts, maintenance, clearing, administration, annual inspection, and security, whereas diesel generators also had fuel costs in addition to other O&M costs. Based on theoretical data, solar PV systems were projected to have a lifespan of 30 years [6], whilst diesel generators and natural gas turbines were assumed to have a lifespan of about 20 years. The discount rate taken was 7.5% and expected inflation rate was 7%. The calculated LCoE of the systems is shown in the Table 2.

Table 2: Calculated LCoE for the Surveyed Consumers

Consumer	Energy source	Life cycle cost of the system (Ksh)	Life cycle electricity produced (Ksh)	LCoE (Ksh)
A	Solar PVs	930,979,551	10,279,892.71	90.56
	Diesel Generators	433,631,018.70	9,534,232.50	45.48
B	Solar PVs	1,032,443,891	14,306,184.02	72.17
	Diesel Generator	26,837,098.88	677,989.87	39.58
C	Solar PVs	207,998,495.8	8,737,908.80	47.78
	Diesel Generators	101,227,653.70	2,118,718.33	23.80
	Natural Gas	99,344,348.48	70,623.84	70.33
D	Solar PVs	7,538,588	205,597.85	36.67
	Diesel Generators	5,179,089.26	338,994.93	15.28
E	Solar PVs	81,553,815.48	1,970,312.77	41.39
F	Solar PV	930,535,887.90	25699731.77	36.21
	Diesel Generators	250,479,589.50	10,983,435.84	22.81
G	Solar PVs	53,112,779	1,284,986.59	41.33
	Diesel Generators	55,557,502.94	1,271,231	43.70
H	Solar PVs	174,072,850	5,756,739.92	30.24
	Diesel Generators	101,227,653.70	1,589,038.75	63.70
I	Solar PVs	138,778,551.50	3,512,296.68	39.51
	Diesel Generators	147,839,457	3,178,077.50	46.52
J	Solar PVs	104,169,579.40	2,484,307.40	40.30
	Diesel Generators	28,720,404.06	423,743.67	67.78
K	Solar PVs	242,948,131	6,887,528.11	35.27

Grid Tariffs Charges

The Energy and Petroleum Regulatory Authority (EPRA) in Kenya has established tariffs and billing structures for various consumer groups over specific time periods. These consumer groups, categorized as CI 1-5, primarily consist of commercial and industrial consumers. The billing components include fixed charges, energy charges, off-peak charges, and demand charges [7]. Between 2013 and 2018, billing was based on fixed charges, demand charges, and consumed charges. Fixed charges were imposed regardless of electricity usage. However, in 2018, the billing structure shifted to be based on consumed energy, off-peak charges, and demand charges. For instance, CI1 consumers had fixed charges of Ksh 2,000.00, which later increased to Ksh 2,500.00 by 2018. CI4 consumers saw fixed charges replaced with higher consumed energy charges, starting at Ksh 7.30 and increasing to Ksh 7.80 by 2020.

Grid Defection

Many organizations opt for a hybrid strategy due to the high upfront costs of being completely off-grid, the costs of power storage devices, and the need to save money on infrastructure. Some companies also use feed-in tariffs and cheaper off-peak prices to balance their electricity costs. Despite these changes, many users still use the grid for things like controlling supply and demand imbalances, controlling voltage and frequency, and having the option to export excess electricity. Utility providers have proposed solutions like raising fixed fees and demand-based pricing in response to trends in customer desertion.

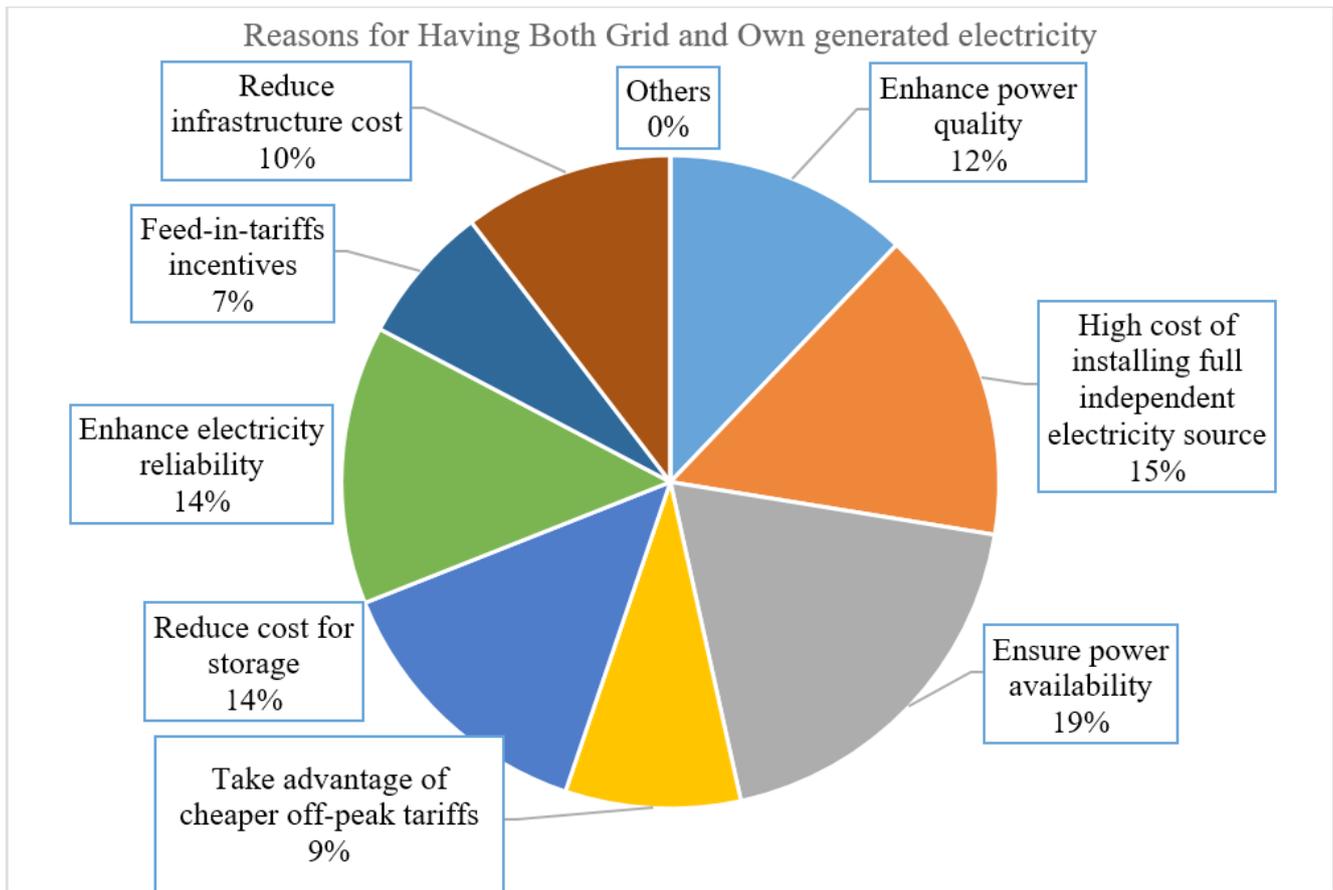


Figure 1. Reasons for having both grid and own generated electricity

4 Discussion

Hybrid systems in industrial setups with motors drives can increase Total Harmonic Distortion (THD), has a detrimental effect on the performance of self-generated electricity, operational expenses, and equipment reliability [8]. Load sensitivity, component integration, system upkeep, and power quality are a few difficulties. Only a small percentage of respondents, who largely used net metering and FIT pricing, had agreements to deliver extra power to the grid and thought these agreements were favourable. Regulation-related problems, high rates, and lengthy negotiation processes are some of the current impediments to self-generated power, although proper policy implementation might dramatically lower the LCoE [9].

In addition to these charges, consumers face several additional fees, including fuel charges, foreign exchange rate adjustment fluctuation adjustment (FERFA), inflation adjustment (INFA), security support facility (SSF), water levy (WARMA), and various taxes and

levies. These additional charges can constitute approximately 45% of the total cost of electricity, making grid electricity relatively expensive. Comparatively, Kenya Power benefits from economies of scale and density in providing electricity. However, consumers generating their own electricity do not incur these additional charges [10]. Nevertheless, self-generated electricity can have a higher LCoE when compared to grid electricity.

For certain consumer categories throughout particular time periods, EPRA in Kenya has defined tariffs and billing systems. Commercial and industrial consumers make up the majority of these CI 1-5 consumer groupings [7]. Fixed charges, energy charges, off-peak costs, and demand charges are some of the elements of the bill. Billing was based on fixed charges, demand charges, and consumption charges between 2013 and 2018. There were set fees regardless of how much electricity was used. The pricing structure changed in 2018 to be based on energy usage, off-peak fees, and demand fees.

Customers also pay for fuel, FERFA, INFA, SSF, WARMA, and other taxes and levies in addition to these expenses. Grid electricity is relatively expensive because of these extra costs, which can account for up to 45% of the overall price of electricity. Kenya Power, in contrast, makes use of economies of size and density while supplying electricity. However, these extra costs are not incurred by consumers who generate their own electricity. Compared to grid electricity, self-generated electricity may have a higher LCoE [11]. However, economic factors also play a role in the choice to keep grid connections.

5 Conclusions

The energy industry has changed significantly over the past ten years as a result of a number of variables, including dispersed generation, flexible demand, grid system liberalization, environmental concerns, and the need for reliable, affordable electricity. In order to solve challenges like power stability, economic effectiveness, environmental sustainability, and energy independence, commercial

and industrial consumers in Kenya are rapidly embracing self-generated electrical systems. The study discovers, however, that the price of self-generated power varies considerably, with solar PVs costing, on average, Ksh 46.49/kWh and Gensets Ksh 40.96/kWh, frequently as a result of low-capacity utilization. The price of grid power is largely steady. Despite using self-generated electricity, users still rely significantly on the grid because of blackouts and other issues. For more consumers to choose self-generation, policy implementation and utility provider support must be improved. The utilization factor should be increased, policy implementation should be improved, and more study should be done on hybrid integration systems and electrical reliability.

Acknowledgement

The author expresses gratitude to Prof. Cyrus Wekesa for continuous support throughout the project. The unnamed participants and companies, as well as EPRA management, are thanked for their valuable contributions and assistance in data collection, crucial for achieving the research objectives.

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Sustainable Partnerships in Telecommunication Networks in Kenya: Case of Kenya Power Fiber

Daniel Wakaba Kiniti
Consulting Engineer
Kenya Power & Lighting Company Limited, P.O. Box 30099, Nairobi

ABSTRACT

Information and Communication Technology (ICT) is the number one globalization facilitator. Social-economic activities globally apply ICTs in their goals. The complex electronic networks used worldwide are interconnected by a sophisticated telecommunication network consisting of Fiber Optic Cables (FOC), Wireless radios (Wifi) and Twisted Copper Cables. To mitigate the huge costs, the Kenya governments and private firms have come together in partnerships to lay the undersea FOCs which is a welcome trend in lowering the cost in Engineering a new world. However, despite Kenya having more than five undersea cables on its coast line, the huge internet capacity of more than 280 Tera Bytes has not been fully utilized and neither has its cost been brought down adequately. Partnerships have not been extended to the last mile and this presents a huge problem in lowering the cost of internet and data carriage to the millions of internet users in Kenya. The paper explores the opportunities and innovations that can be gained through partnerships within Government of Kenya (GoK) agencies in developing an open neutral carrier telecomm network that is sustainable. A case study of the

KPLC Power fiber is documented. The study addresses the current national telecomm infrastructure, and investigates the inherent issues that lead to the expensive internet and data communication in Kenya. Four key objectives are surveyed including partnerships in telecommunication infrastructure, wayleaves, last mile access, and sustainability of the networks. The methodology used is case study design using secondary data. The results of the study show that there are partnership within Government Agencies where about 60% of the Fiber plant capacity is unused 20 years after installation. The researcher recommends among other issues the enhanced use of partnerships in Telecom infrastructure within GoK agencies. This paper will assist public policy makers in drafting fact-based policies on a sustainable telecomm infrastructure, and organizational strategy formulation in telecomm partnership management. The Kenya government will also benefit in designing a cost effective telecomm network in realizing the digital superhighway as one the ICT enablers in Vision 2030.

Key words: Partnerships, Telecomm Network, Fiber Optic Cable Infrastructure, KPLC Power Fiber, Vision 2030

1.0 Introduction

1.1.1. Global Perspective

The World-Wide-Web (WWW) connects the continents through undersea Fiber Optic Cables (FOC) and satellites. Inland from undersea cables, Terrestrial FOC cables and microwave radios are used to relay the internet signals to the last mile. Due to the cost of infrastructure, it has become exceedingly expensive for players in the industry to deploy the fiber cables in a cost-effective approach especially for the last mile. This component makes internet quite expensive.

Globally, Israel has the lowest price for mobile internet and highest rate of penetration, with 1 Gigabyte (GB) of data averaging \$0.04 in 2022. 75% of the citizens own a smartphone, which is better than the United States. The data was obtained from the UK-based price comparison website cable.co.uk as per Figure 1. The study researched 5,292 plans in 233 countries.

According to the study, most expensive region is North America which has an average cost of \$4.98 per GB. The global mean is \$3.12 per GB. The highest cost is in Canada at \$5.94, followed by the

United States (\$5.62), while Greenland is the cheapest (\$3.36). The report ranked Kenya as having an average of \$0.84 per GB which was commendable compared to other Sub-Saharan African countries with St. Helena as high as \$41 per GB ranking highest in the world. According to Staistica.com, as of January 2023, Morocco had an internet penetration of approximately 88.1 percent, making it the country with the highest internet penetration in Africa. Seychelles ranked second, with around 82 percent, followed by Egypt with approximately 81 percent.

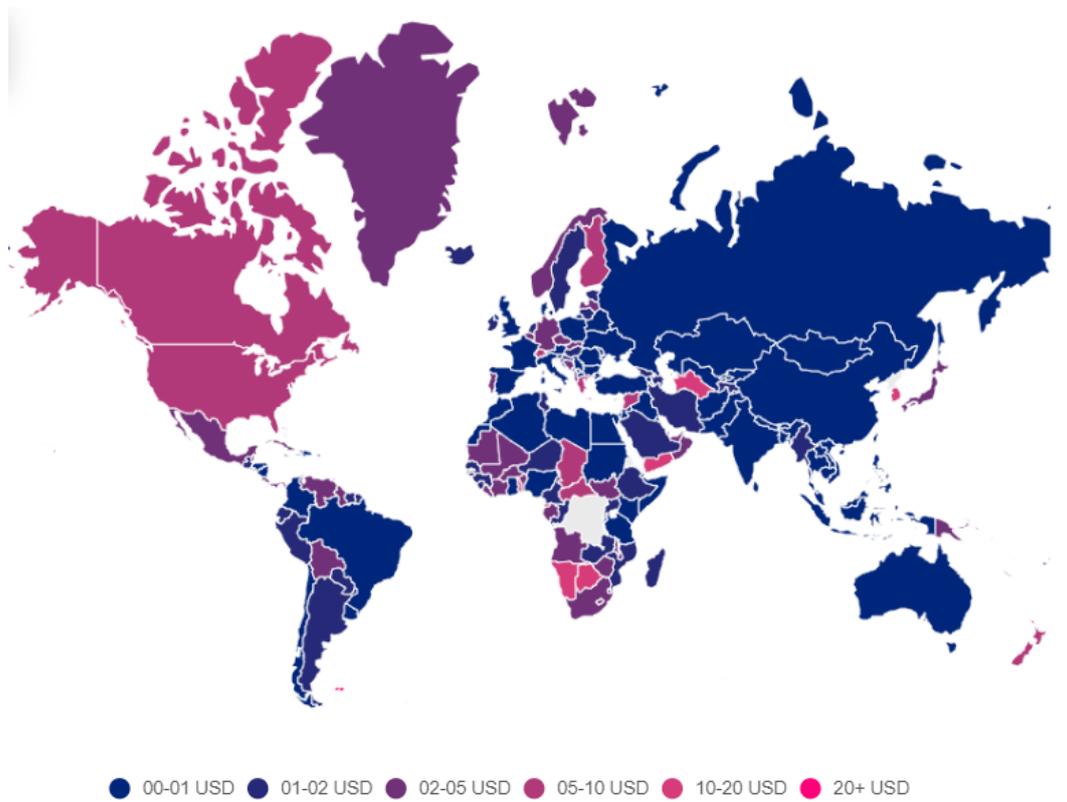


Figure 1: Global Internet Prices. Source: Cable.co.uk

According to Submarine Cable Networks (Sub.com, 2023), there are 562 undersea Fiber Optic cables. The cables have been realized through various partnerships by governments and private players. These partnerships have made it possible to have huge internet data capacities at the coast lines of most member partners at very affordable prices.

1.1.2 Regional Status

Within the East Africa region, the lowest price of mobile data is in Somalia having \$0.63 per GB, followed by Tanzania at \$0.71, Sudan at \$0.75,

Kenya at \$0.84, Rwanda at \$1.10, Uganda at \$1.31 and Burundi at \$1.36 per GB. These prices are lower than the global average of \$3.12. Particularly in Kenya the prices of providing home and business internet range from 2000 kshs (\$14) for a 3 mbps package to a high of 50,000 kshs (\$278) for 40 mbps. One of the components that contributes to the high price is the cost of establishing infrastructure and wayleaves within metro rings in urban and rural areas.

Within the Region there are no known terrestrial cable international

direct telecommunication network partnerships between governments. However, there are indirect FOC partnerships between KPLC and Uganda Electricity Transmission Company (UETCL) and Ketraco with the Grand Ethiopia Renaissance Dam (GERD) respectively. Local partnership in backbone and last mile internet access have been realized between Ketraco and Liquid Telkom, Kenya Power and Telkom Kenya and Kenya Power and MoICTDE & ICTa. However the GoK agencies do not have any formal frameworks on sustainable telecommunication networks.

1.1.3 Internet Access Partnerships in Kenya Status

For the undersea cables, there are partnerships between the Kenya Government and private firms. GoK has a 23% shareholding in TEAMs. Telkom Kenya landing station in Mombasa houses 5 undersea cables except Seacom. Internet penetration in Kenya was 32.7 % in January 2023 per data obtained in GSM Intelligence. At the same time the country had 63.94 million mobile connections which means many individuals had more than 1 connection.

1.1.4 KPLC Telecommunication Network.

KPLC has an extensive telecommunication network which consists of more than 7000 km of dark fiber, over 50 VHF and Microwave radio towers and 150 depots spread in 47 counties within Kenya. The infrastructure was established for the core purpose of managing the Power Transmission network. However, the excess capacity is available for lease to third parties as KPLC has obtained the necessary licenses from the regulator. The FOC has several advantages in that it is aerial (easy and cheaper to deploy and troubleshoot), Secure (on power lines that are out of reach by vandals), and available in 44 counties. KPLC has over 8 million customers and considering that each has a power pole, then the same network can be used for deployment of fiber cables. The distribution network to each homestead could therefore serve the twin purpose of power and telecommunication services provision.

It is therefore apparent that the extensive distribution network asset can be used conveniently by third parties to provide telecomm services for internet access. KPLC however requires to harmonize the use of the asset to maintain order and safety on the pole. By providing a single cable from the internet exchange to the nearest point for FTTH at last mile, third parties will pick up services from this point and provide internet to end users. The current partnerships with third parties at KPLC are not sustainable as depicted by the photo in Appendix 1.

1.1.5 Statement of the Problem

The challenges of internet access in Kenya are multifaceted. Pricing and access are the two key issues that require immediate attention. The price of internet at the undersea FOC landing point is very low. A huge internet capacity of over 280 Tera bytes is available at the landing stations in Kenya as per Communications Authority (CA) statistics. Various components come into play in the pricing among them the cost of transmission that include backbone and last mile access due to lack of adequate infrastructure. Other factors that contribute to accessibility include limited capacity in transmission, degraded infrastructure, poor network optimization and vandalism. Lack of unified documentation of infrastructure and uncoordinated wayleave levies by counties among other issues cause a lot of confusion in establishment and cost of Infrastructure.

This paper addresses the steps that can be instituted through cooperation and partnerships within government agencies in Kenya in establishing and use of a harmonized Telecommunication infrastructure to accelerate affordable and universal access of internet as per the strategy in the Digital Master Plan (2018). KPLC has an extensive distribution network that is accessible to 8 million customers. The paper investigates how KPLC can provide harmonized telecomm infrastructure to last mile through this network where third parties and GoK agencies will pick up services. The benefits from this partnership will be cascaded to internet users. This will translate to a harmonized service charge and a near universal access for internet users.

1.1.6 Objectives of the Study

Four objectives are surveyed including:

- i. To assess partnership in cost of infrastructure for internet access within GoK agencies
- ii. To evaluate partnership in wayleaves for internet access
- iii. To assess partnership in the affordability of last mile internet access
- iv. To determine in sustainability of prices and universal internet

access with GoK agencies.

1.1.7 Partnership Attributes

i. Cost of Infrastructure in Internet Access

The cost of infrastructure in a telecommunication network is determined by several factors with the key one being the cost of the medium of transmission (FOC in this study), followed by labour and administrative costs. The technology of the medium used determines the price in that terrestrial cables (OPGW & ADSS) each have differing prices of purchase and installation, the former being more expensive to install than the latter. The third consideration is the location of installation. Installing an underground cable is several times more expensive than installing aerial (overhead) cables. In Kenya there are partnerships or frameworks in harmonizing the cost of infrastructure establishment with the government agencies.

ii. Cost of Wayleaves in Internet Access

The cost of wayleaves in Kenya has several elements. Various licences are involved that include regulatory fees, third party wayleave licences and county government wayleave fees. These licences are not harmonized and differ from one geographical location to the other within Kenya.

iii. Affordability of Last Mile Internet Access

The price of internet in Kenya is not controlled. As such, mobile network operator's internet prices are different and limit affordability. The GoK agencies levy different prices with an endeavor of ICTa providing free internet services. The sustainability of this model is not clear.

iv. (iv) Sustainability of Prices and Universal Internet Access

By harmonizing upstream telecommunication provision, the GoK agencies will allow for downstream cascade of these benefits. This will create a sustainable model where third parties pass these benefits to last mile internet end users.

1.1.8 Benefits of the Study

Table 1 shows the benefits that can be derived from the partnerships within GoK agencies.

Table 1: Benefits derived from Telecomm Partnerships in GoK Agencies

ITEM	DESCRIPTION	EFFECT (CURRENT SITUATION)	PARTNERSHIP BENEFIT
1	Duplication of Telecom Assets within GoK	Cost of Services High	Cost of Services Low
2	Tariff for Telecomm Services within GoK	Unhealthy Competition	Common Tariff – benefit cascaded to internet user
3	Shared Services within GoK agencies e.g. Pole Leasing, Shared Bandwidth etc.	Duplication & Inefficiency	Efficiency with redundancies
4	Establishment of Remote Sites	Duplicated & Expensive	No duplication (Cheaper)

2.0 Study Methodology

2.1 Case Study at KPLC and Government Agencies

The research is a case study which is an in-depth analysis of a harmonized Telecommunication Network establishment and use at KPLC. It is specific to KPLC with its extensive telecomm network that the GoK agencies could leverage on in the last mile internet access with an aim of making internet access affordable. Secondary data collection was

used. The method of collection was from records within the agency and data from newspapers and periodicals. Qualitative method of analysis was used where data was analyzed through Tables and frequencies.

3.0 Study Results and Discussion

3.1 Case Study at KPLC and GoK Agencies

On average KPLC fiber investment from 2009 to 2022 is as shown in Table 2:

Table 2: KPLC Fibre Investment

Period	Fiber Length	FOC cores (No.)	Utilization (%)	Investments (kshs)	Net Earnings (kshs)
2009-2022	7,000	48	32	2,154,952,841	6,502,353,277

A comparison of Fiber Cable investments in other GoK agencies is shown Table 3

Table 3: Other GoK Agencies Fibre Cable Investment

Period	Agency	Fiber Length (km)	FOC cores (no.)	Utilization (%)	Investments (Estimate) (kshs)
2003-2022	A1	12,336	24	64	18,500,000,000
2008-2022	A2	3,537	48	35	2,476,000,000
2009-2022	A3	1096	96	17	1,644,000,000
2013-2009	A4	837	32	87.5	1,255,000,000
TOTAL		17,806	200	40.7	23,875,000,000

3.2 KPLC Last Mile Assets

Table 4 shows the resources within KPLC that could be used for a sustainable model in backbone and last mile Fiber Optic Cable access that can lower the cost of internet in Kenya.

Table 4: KPLC Resources' Capability for Fiber Optic Cable Deployment

Item	Description	Unit	Total	Use
1	FOC	km	>7000	Avail idle capacity to GoK Agencies
2	Depots	@	>150 in 47 counties	Colocation Facility countrywide
3	11kv Feeders	km	>90,000	Metro and Last mile FOC/Internet access
4	Distribution Network	km	>267,000	Access to homes in Kenya
5	Smart Utility Pole (Innovation on the Power Network)	@	6	Access to last mile (NBI Pilot -POC) <ul style="list-style-type: none"> Fiber to the Home & Fiber to the Wireless (FTTW). ISP – Point of retail IoT – Smart Metering & TX monitoring
6	Lit Fiber (Revenue Diversification)	@	4	4 PoP (Nbi Pilot – Phase 1). <ul style="list-style-type: none"> Access to last mile (NBI Pilot -POC) Fiber to the Home & Fiber to the Wireless (FTTW). ISP – Point of retail IoT – Smart Metering & TX monitoring

3.3 KPLC FOC Cores' Utilization

Table 5 shows the FOC cores utilization and the spare capacity

Table 5: FOC Cores Utilization at KPLC

Item	Description	No of Cores (@)	Percentage utilization out of 48 cores (%)
1	Corporate	2	4.2
2	Scada	2	4.2
3	Lease Customers	16	33.3
4	Unused capacity	28	58.3
TOTAL		48	100

3.4 Discussions of Findings

From Tables 2-5, the total investment by government agencies over a period of 20 years is 24,806 km at an approximate cost of 24 Billion Kenya shillings. However only an average 40% of the installed capacity is utilized. For the GoK Agencies to realize maximum returns from the investment, the excess (Spare) capacity has to be put in use before the network elements (e.g. FOC) become obsolete or degraded.

KPLC has diversified revenue through lease of excess dark fiber capacity and lit fiber (FTTH) technologies. KPLC also leases its poles to third parties (ISPs) for attachment of their FOC as illustrated in Appendix 1. However, this

has emerged as a challenge because of the crowding and untidiness that the cables cause on the pole. This requires KPLC to think strategically on the pole leasing business. The solutions being experimented is to procure Smart Utility Pole (SUP phase 1 in Nairobi being installed) and Lit fiber (Phase 1 in Nairobi) which will be used for lease to ISPs as an alternative to lease of poles.

3.4.1 Cost of Installing FOC and Lease Prices

The average installation cost of FOC at KPLC is kshs 700,000 and kshs 350,000 per km for the OPGW and the ADSS respectively. This includes purchase and installation of the fiber cable.

KPLC offer dark fiber to third parties at prices ranging from \$18 to \$26 per core per month on the backbone network. Last mile access is offered at \$15 to \$20 per core per month depending on whether it is rural, urban or metro.

4.0 Summary, Conclusions and Recommendations

4.1 Summary

From the findings, KPLC has a Fiber plant of over 7000km whose total utilization is at 42%. KPLC distribution network is available in all the 47 counties. The company has 90,000km of 11kv network which connects the distribution transformers. The low voltage distribution network is a

total of 267,000km. KPLC has connected over 8 million customers.

4.2 Conclusions

From the summary, KPLC has unused fiber Optic Cable capacity of 58%. This capacity has been idle for considerable length of time ranging from 3 to 10 years.

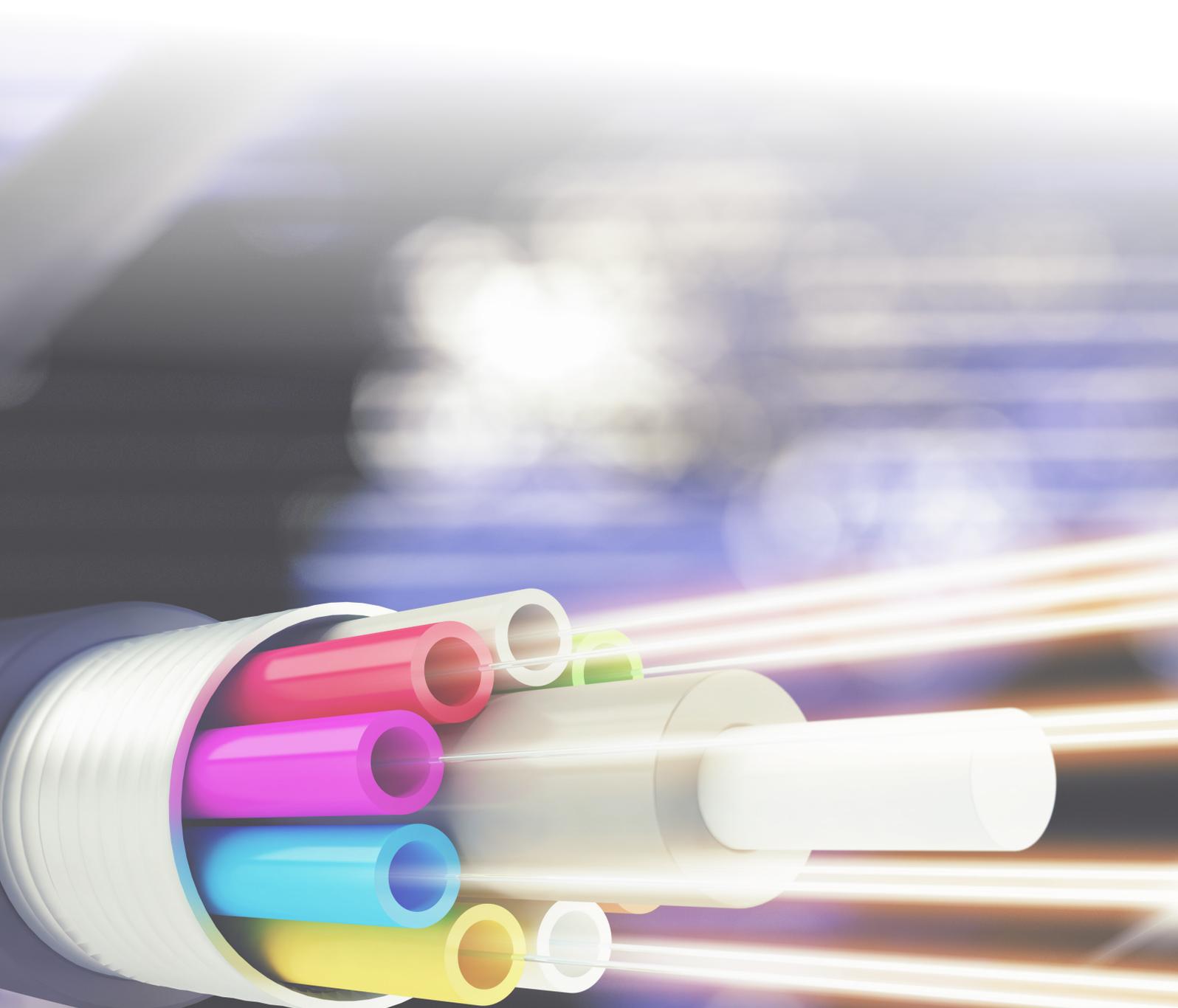
4.3 Recommendation

The study recommends that the unused fiber plant capacity at KPLC be deployed for lease to other GoK agencies and third parties. Other GoK agencies should also do the same within the GoK. This will ensure sharing of existing FOC infrastructure instead of building new plant by other agencies.

This will lead to a sustainable model where resources are not duplicated but focused into Telecomm projects that are sustainable especially for last mile internet access.

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Appendix 1: Last Mile Internet - Poles at KPLC



Figure 2: KPLC Power Distribution Network Use by Third Parties. Photo: Illustrating an Unustainable Model

Appendix 2: Current National Fiber Optic Cable Network

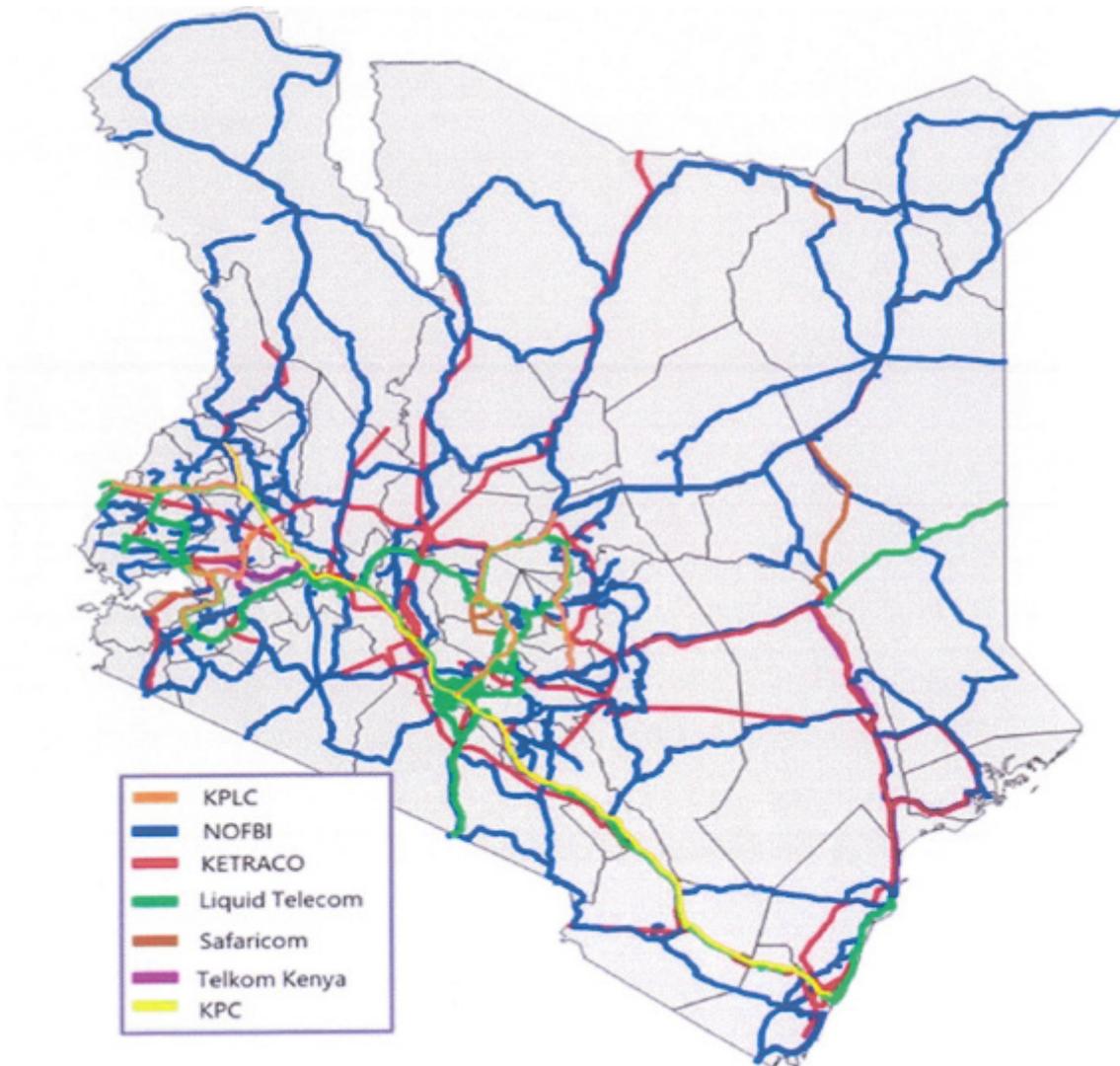


Figure 3: Current National Fiber Optic Network. Source: ICTa Periodical Masterplan

Appendix 3: An Illustration of the Undersea Cable Connection

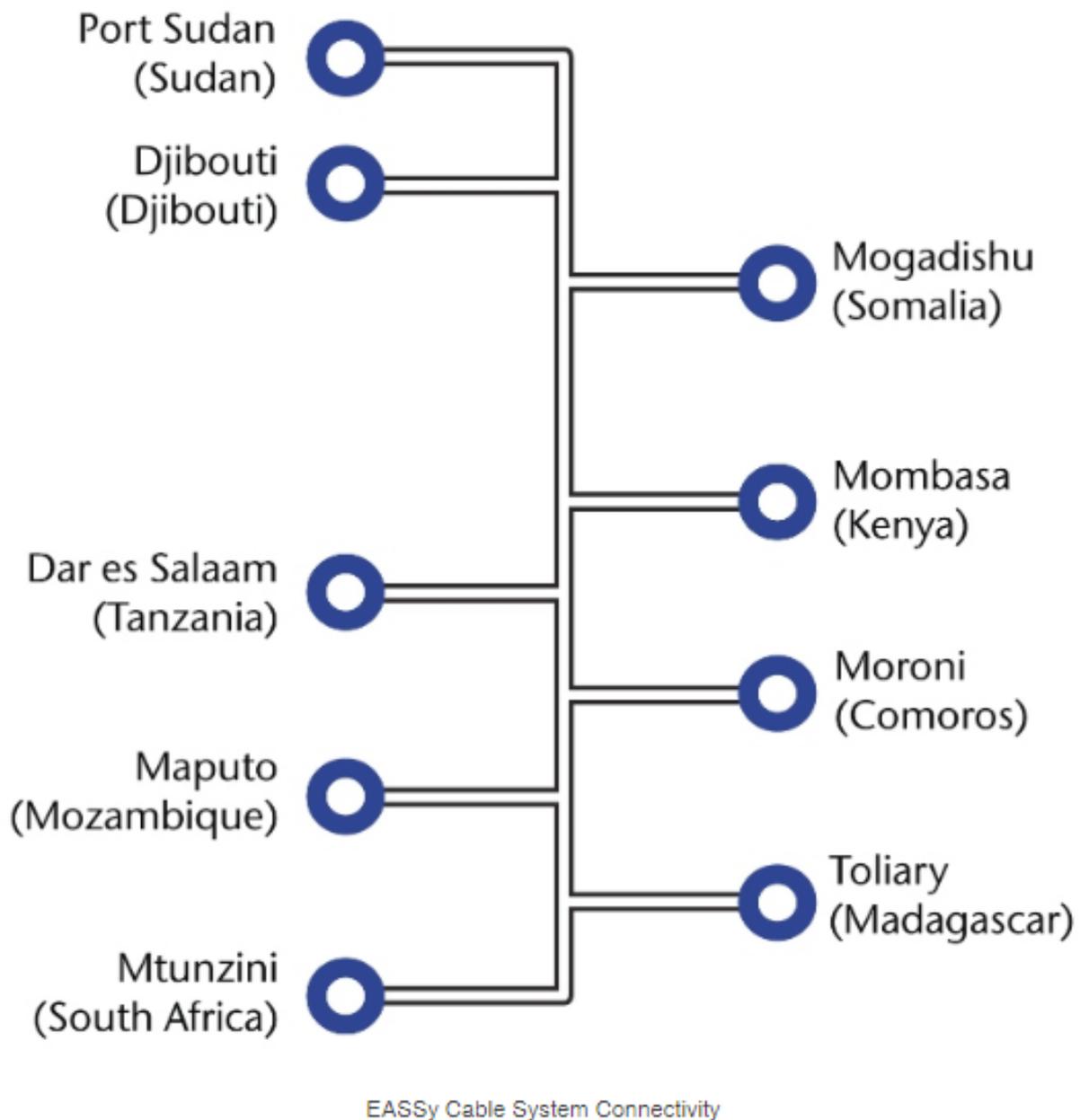


Figure 4: Illustration of Under Sea Cable Connection. Source: Submarinecable.

Appendix 4: Theoretical Review

(i) Resource Based View Theory

According to Resource-Based View (RBV) theory, organizations wish to maintain a distinctive product (competitive advantage) and will plug gaps in resources and capabilities in the most cost-effective manner (Krim, 2003). This theory emphasizes that resources internal to the firm are the principal driver of a firm's profitability and strategic advantage (Barney, 1991). RBV suggests that a firm exhibits different resources, a subset of which helps attain a competitive advantage whereas a further subset enables to sustain the competitive advantage eventually leading to increased financial performance of a firm (Barney 1991).

Organizations can apply their resources profitably to sustain competitive advantage by utilizing prospects in the market or countering threats from competitors' strategic resources. Resources enable firms to have competitive advantage, if the resources are precise, unique, not replicable and non-substitutable. Resources could be unlimitedly replicable if they have special and exclusive history, causal ambiguity, or social uniqueness (Barney, 1991).

The GoK agencies in Kenya who provide Fiber Optic Cable (FOC) services to third parties generate direct income from this asset. FOC can therefore be viewed as an important resource for these agencies. The incomes generated are used in diversification of the mainstream revenues within these firms and create guaranteed revenues which can be used as a strategy in creating a competitive advantage.

(ii) Game Theory

Game theory considers the process of competitive relationships. It is applied in situations where two or more intelligent and rational adversaries interact under circumstances of disagreements and competition. Aumann (1989, pp 2) in manuscript titled "Game theory" puts forward that "Interactive decision theory" could be a better term for Game theory. Each stakeholder considers the positive and negative payoffs in cooperation or when they act individually. The study by Rajendra and Arvind (2013) in India on a technology-based project concluded that cooperation by stakeholders was better than working individually.

The GoK agencies in Kenya compete in providing Fiber Optic Cable (FOC) services (Dark fiber, lit fiber and colocation) to Internet Service Providers (ISP) and other third parties. As per Game Theory, if this competition can be converted into cooperation, then many benefits will be realized among them lower costs of infrastructure establishment, avoidance of duplication of telecommunication services on same routes, harmonized tariffs for third party service providers, more rapid expansion to marginalized areas, and overall lower cost of providing universal internet access.

Pictorials

1. IEK pays a Courtesy Call to the Embassy of the Russian Federation

The Institution of Engineers of Kenya (IEK) engaged with the Embassy of the Russian Federation in Nairobi. The engagement was led by Eng. Shammah Kiteme, IEK President, and Eng. Prof. Christopher Maina Muriithi, IEK Council Member. During the meeting, both parties explored several areas of collaboration between Kenyan and Russian industry and academia, including knowledge exchange and technical training.

The meeting also highlighted IEK's recent activities in St. Petersburg, Russia, where the institution signed a Memorandum of Understanding (MoU) with the National Association of Mining Engineers (NAME) and participated in the Russian-African Dialogue on Raw Materials, held from 29 October to 1 November 2025. As part of the ongoing partnership, 10 IEK members will be offered scholarships to undertake studies at leading Russian universities, strengthening professional development and fostering closer ties between the engineering communities of the two countries.



2. IEK pays a Courtesy Call to the Embassy of the Russian Federation

The Future Leaders Committee (FLC) of (IEK) marked a milestone during the 32 IEK International Convention with the unveiling of its logo, marking a significant milestone in the committee's mission to inspire, mentor, and empower the next generation of engineers. The unveiling, which was accompanied by a celebratory cake-cutting ceremony, symbolized the formal launch of a new era for emerging engineers, emphasizing leadership, innovation, and professional growth. The FLC logo reflects the committee's vision of fostering a united engineering community across Kenya, one that prioritizes mentorship, collaboration, and skills development from the early stages of an engineer's career. Convention attendees applauded the initiative, recognizing it as a critical step in strengthening the pipeline of young professionals who will drive technological advancement, entrepreneurship, and sustainable development in the country. The event underscored IEK's commitment to supporting emerging engineers, providing them with platforms to connect, learn, and contribute meaningfully to the engineering sector, while also positioning the Future Leaders Committee of IEK as a beacon for innovation, professional excellence, and transformative leadership.



3.**Mr. Felix K. Koskei, EGH- Chief of Staff and Head of Public Service Presides Over the 32nd IEK International Convention Opening Ceremony.**

The 32nd IEK International Convention kicked off under the theme "Engineering the Future: The Roadmap for Kenya", with Mr. Felix K. Koskei, EGH, Chief of Staff and Head of the Public Service, presiding over the official opening ceremony. In recognition of his distinguished service, Mr. Koskei was conferred Honorary Membership of The Institution of Engineers of Kenya (IEK). During his keynote address, he highlighted four essentials for a future-ready public sector: technical accuracy, safety-first practices, upholding professional standards, and continuous professional development. He urged engineers, as custodians of major public investments, to ensure integrity, value for money, and zero tolerance for corruption. Mr. Koskei also stressed the importance of sustainable and resilient designs that place communities at the center, reinforced by strong ethics and peer accountability.



Additionally, Environment and Climate Change Principal Secretary, Dr. Eng. Festus K. Ng'eno, who attended the ceremony, added that engineering the future goes beyond concrete and steel. He noted that when policymakers and engineers collaborate effectively, innovation evolves from a buzzword into a blueprint for national progress. Government Spokesperson Mr. Isaac Mwaura was also in attendance, joining other dignitaries at the opening ceremony of the 32nd IEK International Convention. The Opening Ceremony included a recap of key resolutions from previous IEK initiatives. Eng. Prof. Leonard Masu highlighted the outcomes of the 1st AJERI Conference, while Eng. Jennifer Gache presented insights from the 1 Women Engineers Convention. Eng. Annette Ingaiza shared outcomes from the 3rd Future Leaders' Summit, and Eng. Harrison Keter summarized resolutions from the 31st IEK International Convention. International perspectives were also featured, with Dr. Dmitry Sergeevich Tananykhin, Vice-Rector of Empress Catherine II St. Petersburg Mining University who delivered welcoming remarks on the implementation of higher education pilot projects, and Eng. Seng-Chuan Tan, WFEO President, joining virtually shared global insights on engineering innovation and collaboration. This ceremony concluded with a presentation of gifts and a photo session involving council members, international delegates, representatives from ACEK, EBK, and IEK, as well as partners across various event categories. Thereafter, 32nd IEK International Convention officially set the stage for four days of technical sessions, policy dialogues, and strategic engagements aimed at shaping Kenya's engineering future.

4.**.PS Mr. Liban Urges Engineers to Lead Kenya's Petroleum Powered Development.**

Principal Secretary, State Department for Petroleum, Mr. Mohamed Liban empowered engineers to view petroleum as a strategic driver of Kenya's energy security and economic growth. Speaking on "Petroleum as a Strategic Enabler for Kenya's Energy Security and Economic Growth," he highlighted how this critical resource underpins not only energy security but also infrastructure expansion, industrialization, and economic opportunities. Engineers, he emphasized, are central in designing, implementing, and maintaining projects that ensure efficiency, safety, and long-term sustainability in the sector.

Mr. Liban detailed Kenya's progress in developing oil and gas capacity, including strategic plans for transportation and storage infrastructure. He underlined the pivotal role of engineers in turning

petroleum resources into tangible national growth, stressing that coordinated efforts between engineers, policymakers, and industry actors are essential to transform energy into opportunities that catalyze innovation, job creation, and sustainable development.

In outlining the strategic value of petroleum, the PS noted that Kenya's energy future is not left to chance. By integrating careful planning, engineering excellence, and sustainable resource management, the petroleum sector can drive industrial growth and strengthen the country's economic resilience. He encouraged engineers to lead in this transformation, ensuring that petroleum becomes a cornerstone of Kenya's broader development agenda. Through this address, PS. Mohamed Liban reinforced the responsibility of engineers to champion smart energy management and infrastructure innovation, positioning the profession at the heart of the nation's journey toward a petroleum-powered, future-ready economy.

5. CS Hon. Mbadi Rallies Engineers to Strengthen Kenya's Infrastructure Agenda.



Hon. John Mbadi Cabinet Secretary for The National Treasury and Economic Planning, delivered a compelling address on "New Models of Financing Infrastructure" highlighting innovative strategies to unlock resources, empower local contractors, and ensure sustainable, resilient, and high-impact infrastructure development across Kenya. In his remarks, CS Hon. Mbadi called on engineers to play a leading role in driving Kenya's infrastructure agenda, positioning them as key partners in shaping a future-ready, resilient nation.

He emphasized that Kenya's next phase of infrastructure development relies on strategically tapping into emerging global financing streams, particularly climate finance. From the Green Climate Fund to other global green initiatives, Hon. Mbadi

stressed that projects must be well-prepared, sustainability-focused, and aligned with international standards. He noted that engineers are central to designing resilient transport systems, renewable energy solutions, and sustainable water and waste management models that meet these expectations, underscoring their critical role in national progress.

He further highlighted that successful infrastructure projects start long before construction begins. Strong preparation, rigorous feasibility studies, and sound engineering designs are essential to attract investors seeking technically viable, financially sound, and socially meaningful initiatives. He underscored the shared responsibility of government, engineers, and the private sector in ensuring projects deliver value for money and lasting impact, rallying engineers to proactively engage in planning and execution. A key focus of his address was the urgent need to support local contractors. With borrowing costs as high as 20% interest, many local firms struggle to compete on large projects. CS John Mbadi called for dedicated, affordable financing mechanisms that empower these contractors to build capacity, grow their expertise, and contribute effectively to Kenya's infrastructure agenda. "Supporting local contractors with affordable financing is essential for a competitive and sustainable construction industry," he emphasized, urging engineers to collaborate closely with contractors to strengthen Kenya's construction ecosystem.

Reflecting on Kenya's achievements, the CS highlighted landmark projects such as the Nairobi Expressway, NUG Gold Projects, the Kenya Affordable Housing Program, and renewable geothermal energy initiatives. These examples showcase the transformative power of private capital, innovation, and efficiency in national development. CS John Mbadi Ng'ongo further stressed that prioritizing local projects ensures Kenyan engineers, contractors, and suppliers remain at the centre, driving investment circulation within the economy and supporting long-term growth. Through his address, CS Hon. Mbadi clearly rallied engineers to be proactive drivers of the country's infrastructure agenda, highlighting their indispensable role in building Kenya's future.

6. Engineering Positioned at the Forefront of Kenya's Digital Revolution.

Mrs. Mercy Wanjau, Secretary to the Cabinet of the Republic of Kenya, was part of the impactful keynote addresses at the 32nd convention, offering a visionary perspective on the role of engineers in driving the nation's economic transformation. She urged the engineering community to play a central role in driving Kenya's industrialization, innovation, and global competitiveness, emphasizing that the country's engineers are pivotal in transforming ideas into scalable, high-impact solutions.

Highlighting Kenya's current standing, she pointed out that the nation ranks 124th in human capital and research and 119th in infrastructure, signaling the urgent need to strengthen engineering education, build robust talent pipelines, and place engineers at the forefront of technological advancement. Mrs. Wanjau reinforced the importance of engineers leading the development of national engineering standards and curricula, underlining that only professionals within the field can fully grasp the demands of emerging technologies.



She called for a comprehensive national talent strategy, emphasizing investment in research and development, stronger university-industry linkages, and deliberate capacity building in the engineering sector. She also stressed that Kenya's journey into the Silicon Savannah marks just the beginning, with deep technology, manufacturing, and frontier innovation representing the next frontiers that engineers must lead. Her address aligned with the convention's overarching theme of "Engineering the Future: The Roadmap for Kenya," underlining the critical role of engineers in shaping a future-ready, innovative, and globally competitive Kenya.

By strategically integrating technology, infrastructure development, and sustainable growth, Mrs. Wanjau highlighted how the engineering community can ensure that the nation remains prepared to compete in a rapidly evolving global landscape.



His Excellency, Hon. Issa Abdalla Timamy, EGH, OGW, Governor of Lamu County, officially closed the 32nd IEK International delivering a thought-provoking keynote that positioned engineers at the core of Kenya's national transformation. In his address, Governor Timamy emphasized that engineers are pivotal in translating policy into tangible outcomes, with every bridge, port, pipeline, and smart city project reflecting foresight, integrity, and technical excellence. He reminded delegates that engineering is not just about constructing infrastructure it is about building the nation's future.

The Governor highlighted that Kenya's ambitions to become the commercial nerve center of the region depend on the engineering profession's ability to drive sustainable growth across infrastructure, communication networks, and urban development. While innovation fuels progress, he stressed that only engineering grounded in ethical practice can ensure projects withstand the test of time.

He also underscored the importance of mentorship, skill development, and deliberate investment in young engineers. He described nurturing the next generation as a strategic imperative for Kenya's long-term development rather than a charitable act, emphasizing that their technical expertise and creativity are critical in sustaining momentum in national projects.

Reflecting on the convention's outcomes, the Governor praised the collaboration between engineers, policymakers, and industry partners, noting that such synergy is essential to translate visionary plans into high-impact, socially relevant projects. He acknowledged the contributions of IEK members, sponsors, exhibitors, and delegates both online and in person whose active participation ensured the success of the event.

In closing, H.E. Timamy reaffirmed that engineering remains the heartbeat of Kenya's economic transformation. With integrity, innovation, and strong professional guidance at its core, the engineering profession is poised to continue shaping a resilient, prosperous, and future-ready nation.



IEK President, Eng. Shammah Kiteme, giving his remarks during the 1st IEK Mining Conference

The president of the institution of engineers of Kenya, Eng. Shammah Kiteme, opened the mining conference by reaffirming IEK's role in convening platforms that advance key sectors of the national economy. He noted that the forum reflects the institution's commitment to ensuring that engineers are actively involved in shaping industries critical to Kenya's long-term industrial and economic development.

In his remarks, the president pointed out that despite Kenya's rich mineral endowment, the mining sector currently makes a modest contribution to the national economy. He observed that ongoing policy reforms, coupled with recent mineral discoveries, present a timely opportunity for the country to significantly expand the sector's impact. He emphasized that with the right technical, regulatory, and investment environment, mining can become a major driver of economic growth.

The president stressed that sustainable mineral development must go beyond extraction. He underscored the need for local processing and value addition to retain wealth within the country, support job creation, and open up new opportunities

for Kenyan engineers and technical professionals. He also highlighted the importance of investing in reliable power supply and supporting infrastructure as enablers of a competitive and efficient mining industry.

Concluding his address, Eng. Kiteme called on stakeholders to approach mineral resource development with a strong sense of national responsibility. He noted that prudent management of the sector could strengthen Kenya's economic independence and reduce reliance on external financing. He urged conference participants to contribute practical, solution-oriented proposals that can inform policy engagement, emphasizing that engineers' technical expertise positions them as key contributors to the future direction of the mining sector



IEK Holds the 2025 President's Dinner & Christmas Cheer at Panari Hotel, Nairobi.

The Institution of Engineers of Kenya (IEK), held its President's Dinner at Panari Hotel, Nairobi creating an elegant evening that brought together engineers, industry partners, and key stakeholders in the profession. The gathering provided a platform for connection, reflection, and recognition of the engineering community's collective achievements throughout the year. The event was graced by Dr. David Oginde, PhD, FCS, who is the Chairperson of Ethics and Anti-Corruption Commission as the Chief Guest. The event was also highlighted by the presence of distinguished guests, including Eng. John Kipng'etich Mosonik, Director to the Board of KenGen, Eng. Wilfred Oginga the Director of Urban Roads Planning & Design at KURA, Eng. Prof. Lawrence Gumbe; Board Chairman at NUPEA and Eng. James Mwangi who is the Chief Executive Officer of Kurrent Technologies Ltd. A notable feature of the dinner was the graduation of Cohort 1 of the She2She Program which marked a significant milestone in IEK's efforts to champion mentorship and leadership representation for women in the engineering profession, underscoring the institution's commitment to nurturing talent and fostering diversity within the sector. In addition to fellowship and celebration, the evening set the stage for awards and recognitions that honored outstanding contributions to the profession. These recognitions underscored the value of dedication, innovation, and leadership among engineers and supporters of the engineering agenda in Kenya. IEK members and partners departed the dinner with renewed resolve to advance the profession with integrity and innovation, and collaboration. The President's Dinner reinforced the importance of community, shared purpose, and collective pursuit of engineering excellence as the Convention continued to shape the future of the profession.

Cohort 1 of She2She Mentorship Programme graduates during 2025 IEK President's Dinner and Christmas Cheer.



The Institution of Engineers of Kenya in partnership with the Women Engineers Committee (WEC), celebrated a landmark achievement at the 2025 Presidents Dinner with the graduation of Cohort 1 of the She2She Mentorship Programme. The ceremony marked the successful completion of the programme's inaugural cycle and recognized the dedication and professional growth of its participants. Led by Eng. Jennifer Gache, the Chairperson of Women Engineers Committee of IEK (WEC) the "She2She Programme" provides structured mentorship, leadership training, and professional guidance for women engineers at various stages of their careers. Graduates of the first cohort demonstrated resilience, commitment, and readiness to assume leadership roles within the engineering sector. Their

progression reflects the tangible impact of mentorship in fostering confidence, skills, and professional growth. The initiative is part of IEK's broader vision to promote gender inclusion and equitable opportunities in engineering. By pairing emerging women engineers with experienced mentors, She2She equips participants with the tools to navigate challenges, advance their careers, and strengthen professional networks, while addressing gaps in leadership representation. The graduation highlighted the graduates' achievements and reaffirmed IEK's commitment to empowering women in engineering. As these professionals advance in their careers, they carry forward the values of mentorship, leadership, and collaboration, setting a strong foundation for a more inclusive and dynamic future in Kenya's engineering community.

New IEK Editorial Board Takes Office for 2025–2030 Term.

The Institution of Engineers of Kenya (IEK), ushered in a new Editorial Board for the 2025–2030 term, reinforcing its commitment to knowledge leadership, ethical publishing, and thought leadership within the engineering profession. The newly constituted Board will be chaired by Eng. Prof. Alex Muumbo, who takes over leadership of IEK's editorial mandate for the next five years. The inauguration, also attended by IEK President Eng. Shammah Kiteme, marked a seamless transition of leadership within the Institution's publishing board. It also provided an opportunity to formally recognize the outgoing Editorial Board, led by Eng. Prof. Lawrence Gumbe, whose tenure laid a strong foundation for growth, consistency, and credibility in IEK's publications which include Engineering in Kenya Magazine (EiK),



The African Journal of Engineering Research and Innovation (AJERI), and the IEK Weekly Newsletter. Speaking during the handover, members of the outgoing Board expressed confidence in the incoming team's ability to build on the progress achieved, noting that systems, standards, and structures were firmly in place to support continuity. The incoming Board acknowledged the trust bestowed upon them and recognized the mentorship and institutional guidance received, affirming their readiness to carry the editorial mandate forward. The transition reaffirmed the Editorial Board's responsibility as the custodian of IEK's intellectual output and that of the wider engineering fraternity. The new Board pledged to uphold the highest ethical standards in publishing while expanding platforms that amplify African research and innovation ensuring that IEK's editorial legacy continues to evolve and remain relevant in a dynamic professional landscape.

Built Environment Professional Associations Call for an End to Impunity after South C Building Collapse in Nairobi.

Built Environment Professional Associations in Kenya held a joint press briefing to address the tragic collapse of a multi-storey building under construction in South C, Nairobi. The briefing brought together representatives from the Institution of Engineers of Kenya (IEK), the Architectural Association of Kenya (AAK), The Architects Alliance (TAA), The Institute of Quantity Surveyors of Kenya (IQSK), The Association of Construction Project Managers of Kenya (ACMK), the Kenya Institute of Planners (KIP), The Institution of Surveyors of Kenya (ISK), Women in Real Estate (WIRE), The Interior Designers Association of Kenya (IDAK), The Town and County Planners Association of Kenya (TCPAK), and the Project Management Institute Kenya (PMIK). The associations expressed profound sorrow for the families affected and emphasized that such preventable tragedies are unacceptable in a country with professional expertise and regulatory frameworks. They condemned systemic lapses across the development chain of planning, design, approvals, construction, inspection, and enforcement. Highlighting long-standing sector weaknesses, the associations pointed to inadequate county development control, poor inspection and quality assurance, political interference, corruption, involvement of unqualified persons, substandard construction practices, and failure to act on lessons from past building collapses. They noted that over 100 buildings have collapsed in Kenya since 1996, yet impunity persists. They called for immediate and transparent investigations into the South C collapse, with public dissemination of findings, accountability for developers, reparations to affected families, and audits of ongoing projects. They proposed a multi-stakeholder technical task force, coordinated regulatory action, mandatory peer review at all project stages, and strengthened county planning systems. They also urged broader reforms, including a national planning information system to improve transparency, standardization, and inter-county coordination. The associations affirmed their commitment to working with governments, regulators, and the public to restore integrity, safety, and trust in Kenya's built environment.





IEK Membership Report

The IEK membership committee meets every month to consider applications for membership of the various classes received at the secretariat. The IEK council at its, 542nd, 543rd and 544th council accepted the following members under various membership categories as shown below;

Membership Class	Number Accepted- 542 nd Council	Number Accepted- 543 rd Council	Number Accepted- 544 th Council	Total
Fellow	-	3	-	3
Corporate	5	-	-	5
Graduate	48	34	89	171
Graduate Engineering Technologist	8	4	6	18
Graduate Engineering Technician	6	3	6	15
Student	12	5	2	19
Total	79	49	103	231

During the period, we had 3 members who transferred from the class Corporate to Fellow member 5 from Graduate to Corporate member. In addition, we had 171 graduates, 18 graduate engineering technologists, 15 graduate engineering technicians and 19 students were accepted as members.

Gender Data

Class	Male	Female	Percentage (Male)	Percentage (Female)
Fellow	2	1	67%	33%
Corporate	5	-	100%	0%
Graduate	131	40	77%	23%
Graduate Engineering Technologist	14	4	78%	22%
Graduate Engineering Technician	14	1	93%	7%
Student	15	4	79%	21%
TOTAL	181	50	78%	22%

Summary

Gender	No.	Percentage
Male	181	78%
Female	50	22%
	231	100%

542nd APPROVAL CORPORATE

S/N	Name	Member No
1	Brian Odeny	M.10886
2	Charles Nyangaga Wandalo	M.10219
3	David Kimemia Mwangi	M.3229
4	Joseph Kamula Muia	M.10022
5	Josephat Waruinge Wangai	M.8809

543rd APPROVAL FELLOW

S/N	Name	Member No
1	Dominic Achoka Kundu	F.4824
2	Dorcas Mutheu Musingi	F.2922
3	Samwel Ogola Ogege	F.1288

The council invites Engineers and affiliate firms to apply for membership in the various membership classes, kindly follow the link members.iekkenya.org to register or scan the QR Code below to apply for membership;



Student Voices



Olima Shamser , 23
Dedan Kimathi University of
Technology
Bachelor of Science in
Mechanical Engineering
Year of Study: 5th year

Eng. Raila Amollo Odinga, a leader at heart, a capitalist in mind, and a socialist in nature. If names are to be given, then let him be christened *"The Father of Modern Kenya"* for his vision reached far beyond democratic struggle and extended deeply into the nation's energy sector, infrastructure, and educational philosophy. He has helped guide Kenya to where it stands today, and through his unique synthesis of capitalism and socialism, he laid foundations that continue to shape modern Kenya's development trajectory.

The establishment of East African Spectre Ltd. in the 1970s, a company dedicated to manufacturing gas cylinders, filled a critical industrial and capital gap in the Kenyan market. This initiative accelerated the adoption of liquefied petroleum gas (LPG) for cooking, improving safety, convenience, and energy reliability for households. Beyond distribution, Eng. Raila Odinga influenced the development of standards governing gas cylinders, a contribution that can be directly attributed to his background in Mechanical Engineering.

Through the founding of **Pan African Petroleum Company**, he further strengthened Kenya's fuel supply chain, bringing energy closer to the people. When vision meets purposeful capitalism and social responsibility, nations grow and thrive.

A visionary systems thinker, Eng. Raila Odinga also contributed significantly to the planning of the Thika Superhighway, connecting the industrial town of Thika to Nairobi, the capital city of Kenya. This modern transport corridor revolutionized mobility, logistics, and economic productivity, becoming a catalyst for industrial growth and urban expansion. His approach reflected deep engineering logic, long-term planning, capacity optimization, and systems integration lessons that remain invaluable to today's engineering students. His legacy teaches that engineering is not merely about technical design, but about shaping entire socio-economic ecosystems.

In his political career, Eng. Raila Odinga consistently championed free and compulsory education, from early childhood through to university. Although this vision was later realized under the late H.E. Mwai Kibaki, Kenya's third president. Eng. Raila Odinga had long advocated for education as a national priority. Through the Raila Odinga Foundation, he supported students from disadvantaged backgrounds, reinforcing his belief that knowledge must remain accessible to all. Often remembered primarily as a politician, he was also once a mechanical engineering lecturer, fully understanding the transformative power of education. His unwavering commitment to learning continues to inspire generations of Kenyan youth, particularly those pursuing careers in science, technology, and engineering.

For today's engineering students, Eng. Raila Odinga's life offers a compelling blueprint: to innovate boldly, think systemically, and deploy technology for the public good.

His journey demonstrates that engineering leadership must extend learning into policymaking, entrepreneurship, and social transformation.

In Conclusion, Eng. Raila Odinga's life stands as a timeless call to Kenyan youth serving as a prove that engineering, guided by courage, vision, and service, can reshape nations and leave a legacy that never backs down.



Ian Kigen
Dedan Kimathi University of Technology
BSc. Telecommunication and Information Engineering
Current Year of Study: 5th

Young Engineers Shaping Kenya's Future in Eng. Raila Odinga's Vision

At the heart of Eng. Raila Odinga's enduring legacy lies a bold vision for Kenya; one anchored in knowledge, innovation, and strong technological capacity. For young engineers in training, this vision is not a closed chapter of history, but a living mandate. It is a direct challenge to look beyond routine application of existing technologies and to embrace research as a powerful, purpose-driven career path.

Too often, engineers are positioned as users of imported solutions. Research changes this narrative. It places young professionals in the driver's seat of national development, empowering them to design, innovate, and solve problems that are uniquely Kenyan. Strategic and underdeveloped fields such as semiconductors, advanced manufacturing, energy systems, and digital infrastructure present fertile ground where young engineers can lead transformative change.

By committing to research-driven careers, young engineers help build a knowledge-based, innovation-led economy. This path directly advances Eng. Raila Odinga's vision of self-reliance, industrial growth, and global competitiveness. The technologies, systems, and institutions developed today will not only serve Kenya's present needs but will also inspire and empower generations yet to come thus ensuring that the nation's future is engineered by its own people.

When we hear the name Raila Odinga, most often what comes to mind is his arguably illustrious political career in Kenya and beyond, but rarely do we reflect on his foundation as a trained Mechanical Engineer.

Hon. Eng. Raila Odinga studied Mechanical Engineering at the University of Leipzig, former East Germany, and later came back to Kenya. In his early years, he served as a lecturer at the University of Nairobi, and later became involved in multiple engineering and industrial initiatives in Kenya.

He was a steadily rising star, and he reached the pinnacle of excellence as an engineer when he became the prime minister of Kenya. During his tenure, Kenya saw rapid infrastructure growth, energy sector expansion and many reforms in the industrial and public sector systems.

Hon. Eng. Raila Odinga's life is a testament that engineering is a way of life that is not limited to construction sites and labs, not limited to building structures or systems, but to building nations.

His legacy is a reminder to posterity that engineering should ultimately improve lives by positively influencing policy, governance and national development.



Xerxes Majimbo , 20yrs
BSc. Civil Engineering
Multimedia University of Kenya



Mwi Dorcas , 21
Kenyatta University
BSc. Biomedical Engineering
Current year :4th year

"A nation, to an engineer, is like a complex machine that requires constant maintenance, continuous improvement, and occasional structural upgrades," says Mwi Dorcas, a fourth-year Biomedical Engineering student at Kenyatta University.

Mwi Dorcas believes that Eng. Raila Odinga exemplifies this engineering mindset in public service. Through his background in Mechanical Engineering, Eng. Raila Odinga shaped how he approached national challenges," she explains.

Eng. Raila Odinga worked at the University of Nairobi and he demonstrated that knowledge transfer and mentorship are essential for sustainable development. He also worked as founder of Kenya Bureau of Standards, thus he treated quality standards not just as regulations, but also to safeguards and protect its citizens."

Dorcas further notes on Eng. Raila Oding's role in championing projects such as the Thika Superhighway has reflected an understanding of infrastructure as critical national hardware that reduces economic friction and expands opportunity. "His support for the Constitution of Kenya 2010 showed that when a system is flawed, engineers must be bold enough to redesign it for resilience," she adds.

In conclusion, technical excellence must go hand in hand with integrity, leadership, and a commitment to public interest. Engineering is not just about machines; it is about building a better society."

Engineering remains a central driver of national development, shaping how societies move, trade, communicate, and access essential services. Robust infrastructure strengthens economic growth, promotes social inclusion, and enhances global competitiveness. In Kenya and across Africa, Raila Odinga (1945–2025) stood out as a statesman-engineer who applied technical insight to advance transformative infrastructure development. His vision continues to offer valuable lessons to engineering Professionals

Eng. Raila Odinga consistently framed infrastructure as a strategic investment rather than a public expense. During his tenure as Minister for Roads and later as Prime Minister, he championed projects such as the Thika Superhighway, which eased traffic congestion, stimulated industrial expansion, accelerated real estate growth, and enhanced trade. His approach demonstrated that infrastructure directly influences productivity and national competitiveness, positioning engineers not merely as builders, but as contributors to long-term economic planning.

His earlier leadership at the Kenya Bureau of Standards underscored the importance of quality assurance, durability, and lifecycle thinking. By supporting long-lasting engineering solutions, he emphasized sustainability and value for money.

At the continental level, his role as the African Union High Representative for Infrastructure advanced regional initiatives such as the LAPSSET Corridor and the African Continental Free Trade Area (AfCFTA), reinforcing the idea that engineering fosters connectivity and shared prosperity.

His infrastructure vision affirms that engineering is not only technical practice, but a catalyst for transformation, sustainability, and unity.



Mibei Naomi , 22yrs
Bsc. Electrical and Electronics Engineering
Kenyatta University
Year of Study: 4th



CALL FOR ARTICLES

The Institution of Engineers of Kenya (IEK) publishes Engineering in Kenya magazine, whose target audience includes engineering professionals, practitioners, policymakers, researchers, educators and other stakeholders distributed free of charge to target readers through hard and soft copies.

IEK invites article contributions for the next and future editions:



Articles range from engineering projects to processes, machinery, management, innovation, news and results of academic research. The articles must be well researched, written and appealing to high-end readers in Kenya and beyond.

The IEK Editorial Board reserves the right to edit and publish all articles submitted, in line with standing editorial policy. All articles should be in Word document format, 500-700 words, font type; Times New Roman and size 12.

Send in your article today, and secure an opportunity to feature in the magazine!

Send your article to: editor@iekenya.org
Cc: assistantpublicationofficer@iekenya.org

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