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KENYA

ENERGY SECTOR

A POLICY ANALYSIS REPORT

1 EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

The energy sector in Kenya is centred around biomass, petroleum and electricity. Electricity is largely generated from renewable sources – geothermal and hydropower. There is a heavy reliance on wood fuel and other biomass, which makes up 68% of the energy consumption, primarily for cooking and heating. Since the country's energy sector was opened up to private investment in the 1990s, the energy sector has grown, and investor and private sector activities have increased, owing to the favourable business climate, weather conditions, and business incentives, including favourable tax breaks and subsidies.

Kenya has one of the most developed power sectors in sub-Saharan Africa, having opened its market to Independent Power Producers (IPPs) in the mid-1990s. Kenya benefits from factors including: an active private sector; Kenya Power's long track-record as a creditworthy off-taker; and abundant renewable energy resources, especially geothermal, wind and solar.

Kenya is an importer of petroleum and natural gas. The discovery of 600 million barrels of crude oil in northern Kenya in 2012 raised hopes of Kenya becoming an oil exporter. However, the relatively small size of the deposits, the cost of extracting them, falling global oil prices, and the shift away from fossil fuels, are factors which have dampened those hopes.

Lower-than-forecasted demand growth has also forced the sector to scale down on approval ofnew generation capacity. The government had initially planned to expand Kenya's power production of 1,300 MW by 500MW when it came to power in 2013. Due to prevailing market conditions (lack of demand) and an underestimation of the time it takes to develop new power plants, Kenya's power production has only increased to 2,651 MW. However, this is still above Kenya's peak demand of 1,912 MW.

The government has committed to shifting Kenyans to the use of clean cooking technologies by 2030. To achieve this, the government has backed the LPG industry with tax incentives and subsidies, as well as encouraging a thriving industry of alternative cooking fuels such as ethanol. New legislative frameworks governing the energy and extractives sectors have been passed into law in the last four years, opening up new opportunities in oil and gas exploration and extraction, electricity generation, and rural electrification.

The energy sector in Kenya also faces its fair share of challenges, including from climate change, which has caused the country's reliance on hydropower to be considered as a risk due to changing weather (rain) patterns. Limited and aging distribution infrastructure, high technical and commercial losses, opaque procurement processes, right of way disputes, PPA inconsistencies, and other challenges affect sector growth.

1.1 SECTOR RISKS

POLITICAL	Political push to keep electricity and fuel costs down to the detriment of Kenya Power and fuel companies. Lack of overt support or understanding of the business from key stakeholders. Corruption risks, particularly in Parliament.
ECONOMIC	Heavy and costly investments that take a long time to mature. Differing price sensitivities between rural and urban consumers. Land risks, Right-of-way and community engagement (both Generation & Transmission).
POLICY/ REGULATORY	There are gaps in the regulatory framework and tariffs, seeing as the Energy Act is relatively new and has yet to be fully implemented. Bureaucratic inertia. Policy focus on LPG as the primary cleancooking solution when there are other options in the market.
COMMERCIAL	Powerful LPG lobby. Politically connected and/or effective competitors. Inadequate access to project financing, especially early stage risk capital.
LEGAL	Overzealous regulatory or tax enforcement resulting in drawn-out disputes or litigation. Implementation of a new regulatory and legislative framework. Long procedures and inconsistency in approval of Power Purchase Agreements (PPAs). Lack of clear off-grid regulatory framework

1.2 SECTOR OPPORTUNITIES

POLITICAL

Policymakers are open to investments in the sector.

Kenya's Climate change commitments and need access to climate finance to plug financing gaps and make policymakers interested in green/sustainable solutions.

Lack of fiscal capacity means that the government is looking to leverage Public- Private Partnerships to invest in the sector.

ECONOMIC

Engage and involve local investors to bolster the value proposition to the government.

Proactively educate, work with and reassure the revenue authority to assuage fears about revenue leakage.

Growing household and residential demand for reliable and affordable energy.

POLICY/ REGULATORY

The new regulatory framework offers significant opportunity for private power generation, mini-grid and off-grid solutions.

Kenya is attempting to invest in nuclear power, US nuclear power expertise could be utilised in this effort.

Clean cooking offers a mass market for LPG and other clean fuel solutions.

The enactment of the Energy Agency (EA) to facilitate prudential regulation, enhance stakeholder interests and boost investor confidence.

BUSINESS

Large commercial enterprises are investing in private power solutions to escape expensive and unreliable grid power.

The existing geothermal industry is expanding into Ethiopia and Djibouti.

The geothermal industry is expanding into Sub Saharan Africa with Djibouti and Ethiopia contracting KenGen to explore the countries' potential.

The proximity of new infrastructure (rail and SEZ) to renewable resources offers opportunities for the clean industry.

There are business opportunities in other forms of energy, such as wind and solar energy, as the continent and the country move to build its renewable energy generation and looks to fill in the existing energy gaps to make it economically competitive.

Streamlining of the biomass energy trading arrangements. Divestiture of GoK from oil refining, marketing and transportation in favour of private sector investments.

Heavy focus on access to electricity means there is significant opportunity for the enablers of this, namely grid expansion, energy storage, and utilities that are able to cover their costs.

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3 SECTOR POLITICAL ECONOMY

ENERGY SECTOR STRUCTURE

Kenya's energy sector is made up of a combination of sources, including;

Biomass Petroleum Electricity

which form the base of the country's energy supply.

Kenya has a heavy dependency on biomass in particular, leveraging public charcoal, which contributes to approximately sixty-nine per cent (69%) of the country's Total Energy Consumption (TEC).

Petroleum accounts for twenty-two per cent (22%) of TEC, with a majority of the urban poor and the rural populations using kerosene lamps as the main source of lighting and cooking.

Notably, Kenya currently imports all of its petroleum supplies. Finally, electricity, which is a mix of geothermal, hydropower and thermal energy sources, contributes to nine per cent (9%) of the country's TEC.

These energy sources, and recent moves by the Kenyan Government supported by its donors towards renewable forms of energy, have created a dynamic platform for the development and growth of the renewable energy sub-sector. Currently, renewable energy makes up approximately 58.1% of the country's electricity capacity.

In cooking, Kenya has been moving away from wood and charcoal due to their negative environmental impact,2 and moving towards more sustainable forms of renewable energy, particularly liquid petroleum gas. Increasing electricity connection is reducing the population's reliance on kerosene as the primary source of lighting for Kenya's households.

These energy sources, and recent moves by the Kenyan Government supported by its donors towards renewable forms of energy, have created a dynamic platform for the development and growth of the renewable energy sub-sector. Currently, renewable energy makes up approximately 58.1% of the country's electricity capacity.

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Private sector involvement in Kenya's electricity generation was spurred in 2003 by the development of the feed-in tariff policy, which guarantees power producers revenue through off-take agreements with the country's power utility. This has attracted private investment in power generation that has caused Kenya to move from an electricity deficit to a surplus in twenty years. This private-sector inclusion has been particularly notable in renewable power generations and has resulted in notable projects, such as the development of the Lake Turkana Wind Project – the largest single private investment in Kenya, which is projected to produce 310 MW of power, making up approximately seventeen per cent (17%) of the country's power production. East Africa's largest solar power plant (financed by China) in northern Kenya which is looking to produce 50 MW of solar power.

Apart from the generation of electricity, private sector players have also played a role in the transition of power produced through mini-grids. DFID funded Powerhive has been instrumental in rural area connectivity. Vulcan ink has also begun to make modest inroads into the retail and distribution market, selling small-scale solar power directly to consumers through mini-grids. The EPRC has also introduced draft Energy (mini-grid) Regulations 2021 which, if passed, will attract investors and spur significant growth in this area by providing a viable regulatory framework. Furthermore, in early 2018, the ERC announced that a domestic firm, PowerGen, raised USD 4.5 million, and applied for a licence to generate and supply electricity via solar power and mini-grids. PowerGen currently operates at the Unilever tea estate in Kericho, and a number of other off-grid areas, with plans to provide electricity to 50,000 people in Kenya and Tanzania over the next two years.

[1] The heavy reliance on this largely informal sector energy supply is due to biomass being widely used in rural areas by low-income households for cooking and heating and is perpetuated by poor rural electrification.

[2] Deforestation and carbon dioxide emission.

3.1 POLITICAL LANDSCAPE

The Energy sector is highly politically visible and features significantly in the government's development plans as a key enabler of the Big 4 agenda. The Big 4 agenda prioritises:

FOOD SECURITY

UNIVERSAL HEALTH

AFFORDABLE HOUSING

MANUFACTURING SECTOR

All of which require sustainable power to be achieved. The government has also committed towards investment and a shift towards renewable energy under the Paris agreement. Renewable energy sources (geothermal and wind) have largely been discovered in areas surrounded by marginalised communities, which makes it difficult to access them without government involvement. These areas have proven difficult for investors to navigate, as exposure to local cultural dynamics pose a hindrance to project advancement. This also provides avenues for political leaders to use the communities to further their agenda by disrupting projects.

3.1.1 KEY STAKEHOLDERS AND INFLUENCERS

Charles Keter | **CS, Energy**

As Kenya's Cabinet Secretary for Energy and Petroleum, Hon. Charles Keter is responsible for the oversight, policy and governance of the Ministry's mandate to facilitate the provision of clean, sustainable, affordable, reliable, secure and quality Energy and Petroleum services for national development, while protecting the environment. His main focus is on the national key flagship projects incorporates: Universal Electricity Access, Transmission and Infrastructure Development, Commercialization of Crude Oil, Security of Supply for Petroleum Products and the Accelerated Generation of Power amongst others.

Preceding his appointment in December 2015, Hon. Charles Keter was the Senator for Kericho County and Deputy Leader of Majority in the Senate from 2013 to 2015. During his 13-year career in politics, Hon. Keter was also the Assistant Minister for Energy and Petroleum between 2008 and 2010, and a Member of Parliament for Belgut Constituency. His political career was preceded by nine years of experience in the Telecommunications Sector, with expertise in Information Technology, Systems Analysis and Anti-fraud as assistant manager of Anti-Fraud Section, Telkom (K) limited.

Joseph Njoroge | **PS, Ministry of Energy & Petroleum**

Dr. Eng. Joseph Njoroge, MBS was appointed to his current position of Principal Secretary in the Ministry of Energy and Petroleum in May 2013 and became the PS in the State Department for Energy following re-organization of government in December 2015.

He has wide experience in power engineering and management. Prior to his appointment as PS, he was the Managing Director of Kenya Power and Lighting Company.

Dr. Eng. Njoroge holds a Bachelor of Science degree in electrical engineering and Master of Business Administration, with a major in strategic management. He is a Chartered Electrical Engineer, a member of the Institution of Engineering and Technology, UK, a Registered Consulting Engineer, and a Fellow of the Institution of Engineers of Kenya. He is also Chairman of the MBA Chapter of the University of Nairobi Alumni Association. He holds a PhD from the University of Nairobi's School of Business.

Eric Mwangi | **Senior Advisor, Ministry of Energy**

Eric Mwangi is an advisor to the CS of the Ministry of Energy, as well as a technical advisor to the Senior Technical Officer at Power Africa. With over two decades of experience in advisory and investments in the public and private sector, he has worked across a number of key industry sectors, including energy, telecoms, infrastructure, agriculture and education. Prior to his role as advisor, he worked for international firms such as Monitor Group and Dalberg in the US, Europe and Africa. Mwangi has a bachelor's in Economics and Policy Analysis from Cornell University, New York.

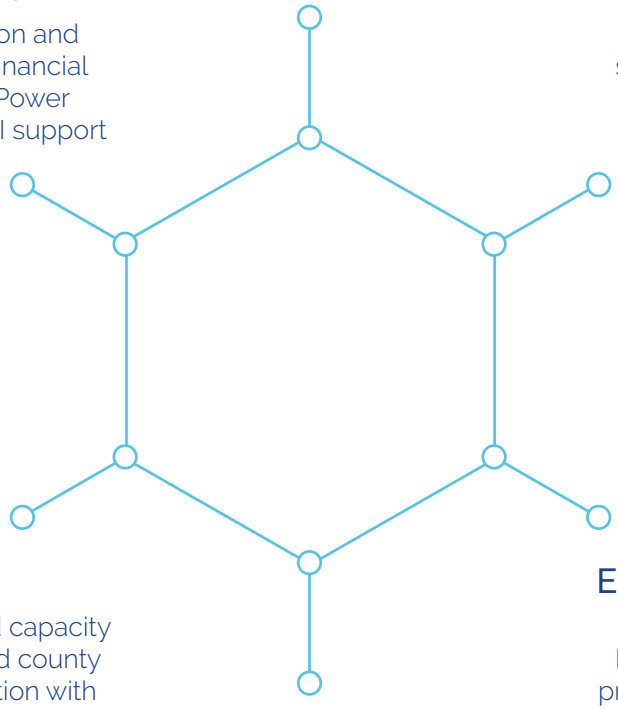
Peter Mbugua | **Rural Electrification and Renewable Energy Corporation**

Peter Mbugua is the CEO of REREC, the state corporation established through the promulgation of the Energy Act 2019 and the successor to the Rural Electrification Authority (REA). He was confirmed as the new CEO for a period of three years in January 2018. Prior to this role, Mbugua was REA's head of finance.

David Gikaria | **Chair Energy Committee, MP Nakuru Town East**

David Gikaria has been the MP for Nakuru Town East since 2017 and is a member of the Jubilee Party. He has a BA in Business Management (Purchases and Supplies Management) from Mount Kenya University.

PESTLE ANALYSIS



POLITICAL

Intergovernmental competition UHC driven policy restructuring and vested interests. Covid-19 pandemic

ECONOMIC

Fiscal consolidation and external shocks. Financial health of Kenya Power Dependence on DFI support

TECHNOLOGICAL

Ageing transmission structure Emergence of mini-grid and off grid solutions

LEGAL

Implementation and capacity gaps at national and county levels. New legislation with attendant regulation still in development

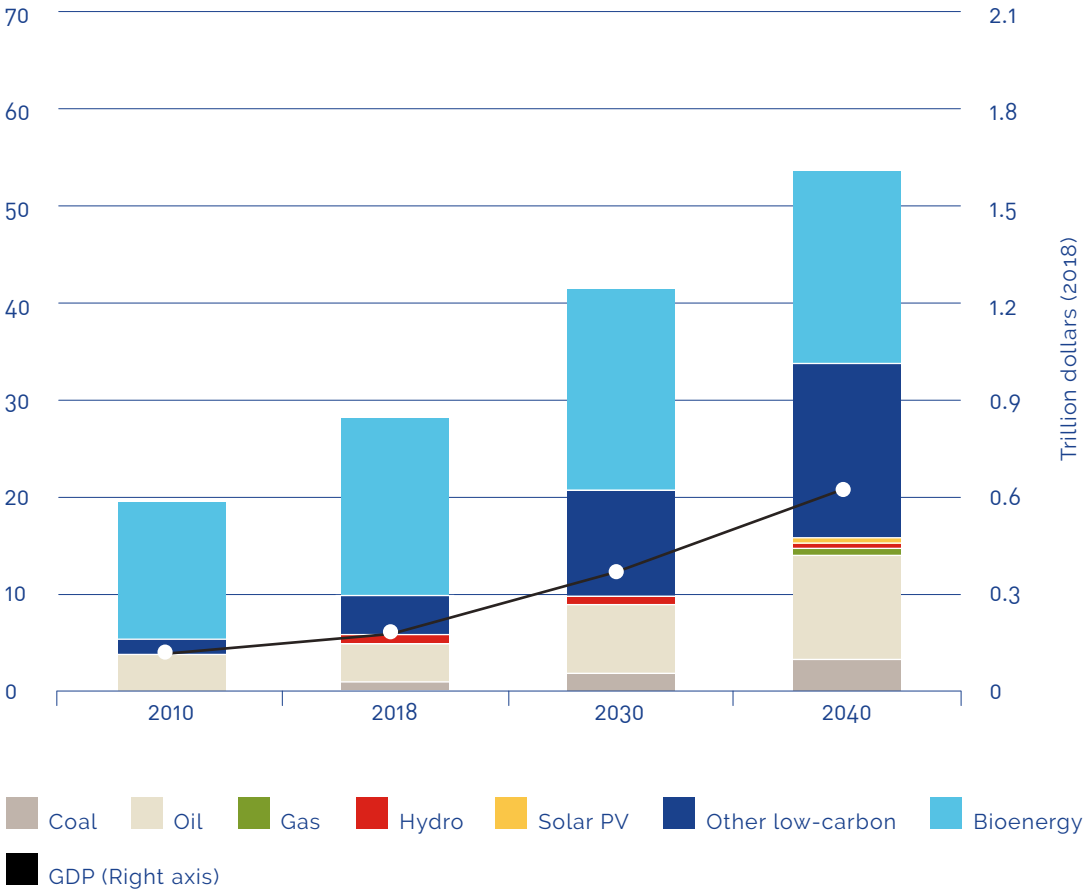
ENVIRONMENTAL

Need to phase out Heavy Fuel Oil power producers. Need to shift the population towards clean cooking.

SOCIAL

Complex stakeholder environment

Kenya primary energy demand and GDP in the Stated Policies Scenario, 2010-2040



(source: Kenya Energy Outlook)

It is anticipated that the investment in energy in Kenya will grow up to $60 billion by 2040, with renewable energy contributing to half of this.

3.2 COMMERCIAL LANDSCAPE

3.2.1 INVESTOR AND TRADE LANDSCAPE

Kenya's energy sector has continued to attract investors due to the receptiveness of the government to energy investors, guaranteed returns, and a modern regulatory framework. Currently, in the electricity sector, investor interest has shifted from large scale power generation to interest in minigrid and off-grid solutions, funded by development agencies such as the World Bank-led Kenya Off- Grid Solar Access Programme (KOSAP) programme, and the Power Africa initiatives, which are funded by the USAID and aimed at connecting those in marginalised areas to energy, dubbed as the "last mile". In the commercial sector, off grid solutions are particularly attractive to large manufacturing and agribusiness, who are looking to cut electricity costs and minimise exposure to the unreliability of the grid.

3.2.2 KEY STAKEHOLDERS AND INFLUENCERS

ENERGY REGULATORS ASSOCIATION OF EAST AFRICA

Energy Regulators Association of East Africa (EREA) was founded in 2008 and brings together utility regulators from EAC states intending to develop an effective and competitive energy market across the region through the alignment of policies. In 2013, CEOs of regulatory agencies in Kenya, Tanzania, Uganda and Rwanda signed the EREA Constitution. The Kenyan signatory, the Energy Regulatory Commission (ERC), was replaced by the Energy and Petroleum Regulatory Authority (EPRA) in 2020. **Frederick Nyang,** the ERC representative at the time, is now Director of Economic Regulations at the EPRA, with **Pavel R. Bw'Oimeke** being the Director-General. **Geoffrey Aori Mabea,** the current CEO of the EPRA who was appointed earlier this year, is Kenyan.

RENEWABLE ENERGY RESOURCE ADVISORY COMMITTEE (RERAC).

This is an inter-ministerial committee, including members from the Ministry of Energy(PS), the CEO of the REREC, the MD of Geothermal Development Company Limited, The National Treasury (PS), The Attorney-General, PS Natural Resources and the MD of Kenya Electricity Generating Company. This committee's role is to advise the responsible cabinet secretary on matters concerning the allocation of renewable energy resources; licensing of renewable energy resource areas; management of water towers and catchment areas; development of multi-purpose projects such as dams and reservoirs; and management and development of renewable energy resources.

POWER AFRICA

Power Africa is an initiative that regroups the private sector, political leaders and financial institutions to solve Africa's energy problems. It provides technical and financial assistance and advice. The Kenyan government and Power Africa have a cooperation framework for the years 2018-2023. Power Africa worked with the Ministry of Energy on how to address the USD 14-18 billion funding gap standing in the way of the government's electrification targets, and its policy advice is now the framework for the power sector in Kenya. A total of USD 6.5 million has been provided to eight energy projects with a total capacity of 281 MW. In rural areas, 11 innovative renewable energy projects received USD 100,000 grants and 40 small-scale and off-grid projects were provided with technical and market development assistance. The key stakeholder for Power Africa is Miguel Franco, Chief of Party.

KENYA RENEWABLE ENERGY ASSOCIATION (KEREA)

The Kenya Renewable Energy Association (KEREA) is the non-governmental platform for renewable energy players in the country. Its membership includes the entire spectrum of players in the sphere, from impact entities to more traditional Kenyan names who have branched out into renewables. The platform actively represents industry interests to the government, and it appears to have the convening power to stand as the voice of the industry. **Kamal Gupta** is KEREA's current chairperson, while he also holds the position of director of solar and end-user business for Schneider Electric (East Africa).

3.3 U.S. DEVELOPMENT ASSISTANCE

POWER AFRICA

"Power Africa" is a presidential initiative launched by President Barack Obama in Tanzania during his Africa Tour in July 2013. The initiative aims at supporting economic growth and development by increasing access to reliable, affordable, and sustainable power in Africa. The program is designed as a multi-stakeholder partnership among the governments of the United States of America, Tanzania, Kenya, Ethiopia, Ghana, Nigeria, Liberia, the US, and the African private sector. Power Africa activities in Kenya are guided by a cooperation framework.

The current Power Africa-Government of Kenya Cooperation Framework was signed in June 2018, to cover the 2018-2023 implementation period. Power Africa has supported the development of 779 MW of electricity for generation projects in Kenya. In addition, various firms have received U.S. Embassy support to move transactions forward. Key projects, in which Power Africa has been involved alongside commercial and government partners in Kenya, are:

- **Lake Turkana** (Wind – 310MW) - $1,095M
- **Kipeto** (Wind – 100MW) - $320M
- **KenGen Olkaria V** (Geothermal – 158MW) - $490M
- **Garden City Mall Solar System** (Solar Micro-Grid - .86MW) - $1.9M
- **Cummins Baringo** (Biomass – 8.4MW) - $30M

4 SECTOR POLICY LANDSCAPE

4.1 LEGISLATIVE REFORM

Two pieces of legislation, the Energy Act, 2019, and the Kenya National Electrification Strategy (KNES), 2018, brought the energy docket in line with the 2010 constitution. The Energy Act seeks to rationalise the structure of the Ministry of Energy and its departments by unbundling functions according to their positions in the supply chain. It also aims to establish a clear separation of competencies on energy between the national and county levels of government. According to the act, renewable and geothermal energy production has been returned to the national government, ostensibly as a means to streamline the management of resources and, implicitly, to curb the levels of localised politicisation and avenues for mismanagement. Even though restructuring has begun, such processes are typically drawn out and politicised.

The act spurred the development of energy-specific legal and regulatory frameworks, which aim to facilitate the setting up of PPPs, with the government looking to pivot away from a dependence on development funding. Expected is the development of tariff structures that will drive down financial risks for IPPs, which have historically also been hindered by inherent political and other risks. Addressing the lack of a strong regulatory and tariff framework – which drives up negotiating periods and the risk of regulatory flux – is a current policy focus for the government as it attempts to make the sector more attractive to private investors.

The development of these frameworks is still in progress and the process is likely to be gradual and politicised. It will be further complicated by the divergence between sectoral policy at the Ministry of Energy and the Treasury's budgetary priorities. The treasury was very aggressive in its tax generation measures before the onset of the pandemic; the latest finance bill, for example, removed a number of tax and excise exemptions that were seen as key to enabling private investment in the renewables sector in particular.

However, the government is still intent on providing incentives to generate and supply clean energy. As such the National Treasury re-instituted tax exemptions on equipment used to generate geothermal, solar and wind energy in the 2021/22 budget. The government further instituted tax exemptions on goods used to generate power under PPAs.

REGULATORY REFORM

A core tenet of the Energy Act, 2019 is that it recognises the changing environment of energy regulation in Kenya. It does so by taking cognisance of the different sources of renewable energy and the creation of the corresponding licensing and regulatory agencies, as well as a dispute resolution tribunal. These new bodies are the Energy and Petroleum Regulatory Authority (EPRA) replacing the Energy Regulatory Commission. The Energy and Petrol Tribunal (EPT) is the successor to the Energy Tribunal.

The Rural Electrification and Renewable Energy Corporation (REREC) replaced the Rural Electrification Authority. The Nuclear Power and Energy Agency (NPEA) replaces the Kenya Nuclear Electricity Board. Notably, the powers of EPRA and EPT have been extended to include additional powers and functions in order to more effectively regulate and deal with disputes within the petroleum and energy sectors.

Various existing energy sector entities continue with their mandate under the act. These include Kenya Power and Lighting Company, Kenya Electricity Generating Company, Kenya Electricity Transmission Company, National Oil Corporation, Kenya Pipeline Company, and Kenya Petroleum Refinery Limited, among others.

The act embraces the new developments in renewable energy sources and their contribution to the sustainability of the environment. The act, therefore, crystallises the Feed-in Tariff Policy (2008) into law. All unexploited renewable energy resources are now vested in the national government, who can grant the rights to them for commercial exploitation.

The main driver of high electricity costs, according to the government, is the existence of expensive PPA's, whereby Kenya Power is locked into take or pay agreements with power producers, regardless of whether that power is utilised or not. As a result, President Kenyatta, through Gazette Notice No. 3076, instituted a taskforce whose main objective is to review the Power Purchase Agreements made by Kenya Power company with independent power producers.

The taskforce is mandated to review, renegotiate and, where necessary, terminate PPAs that may be too expensive. Eventually it is hoped that grid purchases of electricity can shift to an auction model where the utility would buy the cheapest power available at the time of despatch.

MINI-GRIDS

Currently, the EPRA is considering the draft Energy (mini grid) Regulations 2021. The new regulations seek to streamline the operation of mini-grids with capacities of up to 1 Megawatts (MW), harmonise the requirements needed for approval of the building of new mini-grids, and outline the procedure for licensing and interconnection to the main grid and processes of tariffs setting and approval. The proposed regulations will allow private companies to buy electricity from Kenya Power and resell it. In addition, the EPRA also proposes to allow applications by companies to charge more for electricity than what on-grid customers pay, which will allow investors to turn a profit.

There are currently 106 mini-grids in Kenya, with 14 owned and operated by private entities, while the Rural Electrification and Renewable Energy Corporation (REREC) owns 46, Kenya Power 28, and communities 18. Meanwhile, 180 new mini-grids are being developed by private companies and are currently in various stages of development, while the government is also planning 158 minigrids under the Kenya Off-Grid Solar Access Project (KOSAP) to be built and operated by REREC or Kenya Power. The new mini-grids developed by REREC are built using funds generated from the Rural Electrification Levy, which makes up about 5% of the total electricity charge. The KNES continues the government's focus on driving connectivity through the use of mini- and micro-grids. The Last Mile Connectivity and KOSAP projects, both funded by the World Bank, are driving initiatives in this sphere. The government has been able to drive up production, even reaching surplus, and is now looking to develop a market. This includes the provision of power to industrial parks and SEZs where traditional manufacturing activity has slumped over the past three years.

FUTURE REFORMS

There is a proposal to amend the Feed-in Tariff (FiT) Policy to set up an energy auction mechanism for the solar and wind energy markets. This will promote competitive bidding and lead to a costeffective renewable energy programme in Kenya. The transition is part of the recommendations listed in the Updated Least Cost Power Development Plan for the study period 2017-2037. The Government of Kenya has prioritised the development of geothermal and wind energy plants as well as solar-fed mini-grids for rural electrification. The 2021/22 National Budget allocated KES 10.3 billion to the development of geothermal energy, which also receives significant development assistance. According to the Economic Survey of 2020, Kenya recorded an increase in the total installed electricity capacity from 2,711.7MW in 2018 to 2,818.9MW in 2019. This increase was largely due to the additional 165MW of energy from the Olkaria V Geothermal Power Plant project, which was successfully synchronised to the national grid in September 2019.

4.1 LEGISLATIVE REFORM

Policy reformulation in the energy sector that saw the development of the Energy Act 2019 was driven by the need to iron out some of the investor concerns by encouraging resource assessment, development, and capacity building. Other key concerns raised by industry players were the high upfront investment costs, high resource exploration and development risks, land-use conflicts, inadequate expertise, and high investment in infrastructure due to long distances from sites.

The government is looking to move away from a dependence on development finance institutions' support for energy projects. The need to attract international investors is becoming increasingly important in light of the current economic environment. A new policy has been developed that aims to create an investor-friendly sector. However, its implementation is varied and is set to remain so.

Now that Kenya has reached surplus production capacity in general, its new challenge is to find a ready market, and the government is already looking to integrate industrial parks and SEZs into its power projects. However, the divergence between the need to attract FDI and the lifting of instrumental tax incentives by the treasury will make the process challenging and drawn out.

01 **FEED IN TARIFFS**

In January 2010, the Kenyan government published its feed-in-tariffs (FIT) to provide investment security to renewable electricity generators, reduce administrative and transaction costs, and encourage private investors. Enacted in 2008, the first Kenyan FIT policy only included wind, hydropower and bioenergy-generated electricity. The 2010 version of the FIT modifies the existing 2008 tariffs and includes geothermal, solar and biogas-generated electricity. 2010 tariffs apply to grid-connected plants and are valid for a 20-year period from the beginning of the Power Purchase Agreement (PPA). To become official, such PPAs linking power producers to grid system operators must meet prior approval from the Energy Regulatory Commission. Enacted tariffs vary according to the plant generation capacity, and the maximum power tariff at the interconnection point differs for firm and non-firm generators. Grid systems operators must guarantee connection and priority purchase, as well as transmission and distribution for electricity from renewable energy sources. Each project is subjected to a mandatory Preliminary Project Feasibility Assessment conducted by the Ministry of Energy to decide whether the project is financially viable.

02 ENERGY ACCESS

Kenya now has the highest electricity access rate in East Africa – total access stands at 75%, both from grid and off-grid solutions. However, a quarter of Kenyans still lack access to electricity. Responding to this challenge, in December 2018 the government launched the Kenya National Electrification Strategy (KNES) – a roadmap for achieving universal access to electricity by the year 2022. With the help of geospatial technology, the strategy has identified least-cost options for bringing electricity to homes, businesses and public facilities. In addition to grid extension and intensification, it recognizes the important role the private sector will have to play in off-grid solutions, both through mini-grids and standalone solar systems. The World Bank supported the flagship Last Mile Connectivity Program and Slum Electrification Program, which have contributed to the phenomenal expansion of electricity access in the country in the last five years. The World Bank is also supporting the government's efforts to provide electricity to 1.3 million people in remote rural areas in Kenya's underserved counties through off-grid solutions.

03 GEOTHERMAL ENERGY

Kenya's foray into geothermal power first began in the late 1960s, and the country has managed to develop significant technical capacity in the field compared to its neighbours. The country's geothermal potential is considerable – currently, it stands at 823MW, making it the seventh-largest geothermal producer in the world.

The government has managed to develop several operations in the Olkaria region and the Geothermal Development Company (GDC) acts as the SPV for PPP partnerships and post-deal services at the technical level. Sources close to the ministry have pointed out that a duplication of competencies between KenGen, the state energy operator, and the relatively new GDC complicates deal generation and implementation processes.

This strong track record in geothermal energy production has been tempered by significant financial and political risks, which have limited the country's ability to attract, and retain, large-scale private investors, who will be essential for weaning the sector off of development financing and reducing the cash-strapped state's operational costs and debt burden.

A case in point is the Akiira Geothermal Project, which aims to produce 140 MW in the Olkaria region, linking the projected increase in production capacity to the development of an industrial park in the area. The project is headed by Centum, a private sector player, and a consortium of financial partners. It ran into problems early on, after two of the exploration wells failed to extract viable amounts of steam. The resulting uncertainty over the viability of the project has resulted in financial partners backing out of the deal, with the European Investment Bank (EIB) cancelling its KSH 19.5 billion (USD 190 million) loan to the special purpose vehicle in late 2019.

While the geothermal sector remains promising in the long term, high levels of financial and political risks, together with the pressing need for strengthening regulatory and tariff structures, remain in the way of strong levels of private investment. Under the Sustainable Energy for all (SE4ALL), it is expected that widespread implementation of EE initiatives in households would significantly reduce GHG emissions, but also produce additional comfort, health, environmental and economic benefits.

04 WIND ENERGY

The Lake Turkana Wind Power plant has put Kenya on the map – with a capacity of 310 MW and 365 turbines, this makes it the biggest wind power project in Africa. The construction of the power plant sees the country inch closer to its goal of 100% renewable energy and eliminating thermal power. Kenya lays claim to viable wind power generation and 25% of the country is compatible with current wind technology. This coupled with the government's incentives provides an enabling environment for investors in this space.

05 BIOMASS ENERGY

Biomass energy comprises charcoal, firewood and agricultural waste. It is largely associated with rural households, poverty and environmental degradation. With the country's economic performance over the years putting a strain on households, the use of Biomass Energy has grown in popularity from 73% to 83% from 1980. This growth was exacerbated by the introduction of tax on cooking fuel and the limited access to clean energy brought about by taxation.

Biomass energy is used more commonly in households for heating and cooking purposes. It is also used in big institutions, such as schools, for cooking. The government has on occasion tried to regulate the biomass energy space by imposing bans on logging and timber harvesting.

However, this has failed, because the agency instituted to oversee charcoal and firewood resources does not have a good understanding of sustainable logging. Additionally, different counties have also instituted regulations on charcoal burning and logging that overlap with the national government regulations.

While it has proven to be a challenge for the government to provide clear regulations on logging and charcoal burning, this provides an opportunity to train stakeholders on sustainable logging and cleaner methods of charcoal production. It also provides the government with the opportunity to streamline regulations in the biomass energy space by aligning county-level agencies with nationallevel agencies, thus reducing overlaps in mandates.

06 LPG

Although LPG demand has grown in Kenya over the years, the market space remains small, taking only 0.7%, as biomass energy takes the lion's share of cooking energy. The growth of the LPG market in Kenya has been attributed to certain policy measures, which are in place to ensure clean energy, including tax exemptions and government subsidies for equipment. This ensures better product availability, making the switch to clean cooking energy for institutions easy. Improved transportation and port facilities have also played a huge role in ensuring accessibility. Since 2016, LPG has been exempted from VAT, and the government initiated a program to distribute 6 kg cylinders and cookstoves at a subsidized price to low-income households.

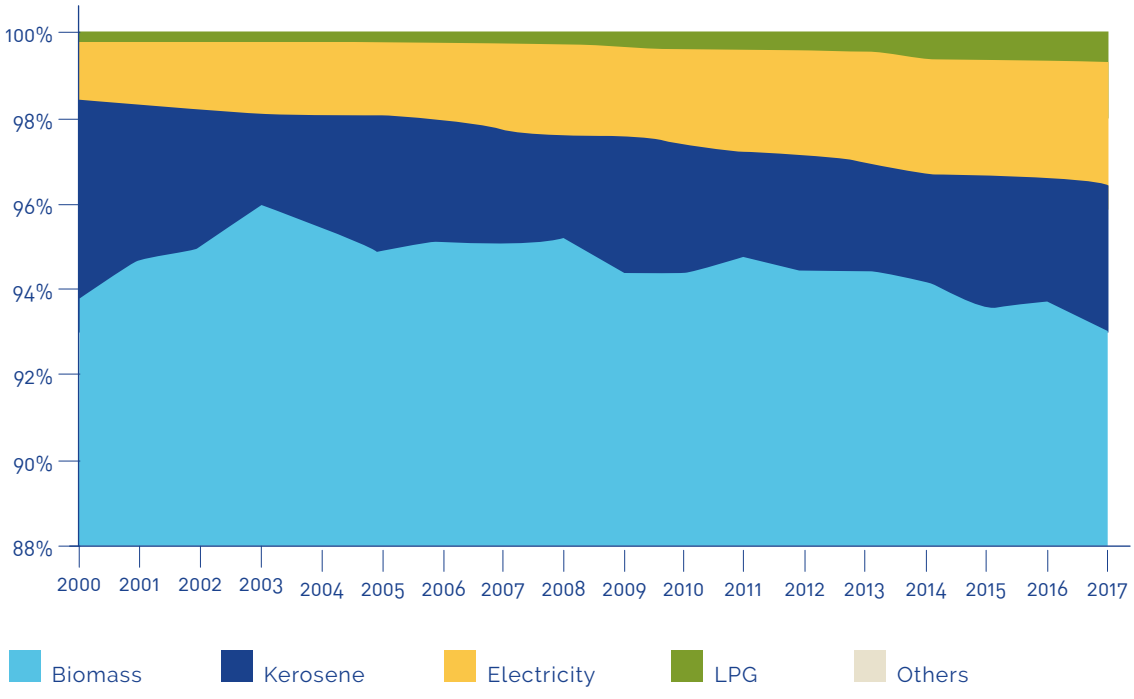
Although there is government good will, the lack of retail price regulation has made LPG inaccessible to low-income households. Due to the significant revenue pressure facing it, the government removed VAT exemption status from LPG in 2021. The government's focus on LPG as a priority for increasing clean cooking has led to significant infrastructure investment. At the Kipevu Oil Terminal in Mombasa, the Kenya Ports Authority.

(KPA) is constructing a new oil terminal that will include an LPG storage facility with capacity of 30,000 metric tonnes. The Private African Gas Oil Terminal – linked to the local investor Jaffer Mohammed – has a capacity to handle 30,000 metric tonnes and has been sending signals that it intends to expand storage capacity. Furthermore, on her first state visit to Kenya, President Samia Suluhu Hassan of Tanzania announced a private sector-led gas pipeline between Kenya and Tanzania that will increase the supply of Gas (while avoiding shipping and landing costs in Kenya).

07 HYDROPOWER

Hydroelectric power is the largest source of energy in Kenya with a potential of 40,000 GWh that is yet to be fully developed. Some of the challenges that hydropower production faces include high installation costs, climate change, and significant land use. Due to a shift in focus, the government's plan on hydro power may not be as clearly stipulated as its plan on renewable energy. This is as a result of changes in investor interest, and improvement in technologies used in the renewable energy space.

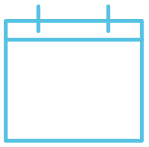
Kenya residential/commercial energy consumption by fuel



(Source: IHS Markit)

4.3 POLICY HURDLES

SLOW PACE OF REGULATORY DEVELOPMENT:
The energy act provides a number of new opportunities in the energy sector around mini- and off-grid solutions, potential new grid utility operators, an auction system for energy, smart grids, and net metering. However, these will only come to be realised when relevant regulations have been developed and approved. This process can be lengthy, as the Ministry of Energy and EPRA have limited capacity.



PRIORITY MISMATCH:
Whereas the government's goal is to attract investors and grow PPPs in the energy sector, some proposed regulations, such as those relating to the 2020 solar PV, may stifle the growth of the renewable energy sector, as they imply higher costs of installation, particularly for small systems that may form part of a mini grid.

TAXATION:
The tax regime around the energy sector has been unstable, with the government committing to clean energy before raising taxes on clean sources of energy in 2020 – then removing the taxes in 2021. The LPG sector, after receiving tax incentives, will now pay 16% VAT, forcing many households to revert to unsustainable cooking sources. The divergence between the need to attract FDI and the lifting of instrumental tax incentives by the treasury will make the environment more challenging for investors.

LACK OF CLARITY:
A duplication of competencies between KenGen, the state energy operator, and the relatively new GDC complicates deal generation and the implementation processes.

5 STAKEHOLDER MAPPING

STAKEHOLDER MAPPING

NAME	INSTITUTION	ROLE/TITLE	ISSUE OF RELEVANCE
PRESIDENCY AND MINISTRIES			
Uhuru Kenyatta	Office of the President/Jubilee Party	President/Chairman	Economic development, Local content, politics, security, creative industry development
Njee Muturi	Office of the President	Deputy Chief of Staff	Legislation, regulation
Joseph Kinyua	Office of the President	Head of Public Service	Fiscal policy
Paul Kihara Kariuki	Office of the Attorney General	Attorney General	International treaties, government contracts, PPPs
Kennedy Ogeto	Office of the Attorney General	Solicitor General	International treaties, government contracts, PPPs
Ukur Yatani	The National Treasury	Cabinet Secretary	Fiscal policy, digital tax
Julius Muia	The National Treasury	Principal Secretary	Taxation, multilateral taxation, revenue generation
Charles Keter	Ministry of Energy	Cabinet Secretary	Energy Generation, PPPs, Energy sector generation, Grid expansion, Clean cooking.
Dr. Eng. Joseph Njoroge	Ministry of Energy	Principal secretary	
Eng. Isaac Kiva	Ministry of Energy	Director Renewable Energy	
John Munyes	Ministry of Mining and Petroleum	Cabinet Secretary	
Andrew Kamau	Ministry of Mining and Petroleum	Principal Secretary Petroleum and Mining	

STAKEHOLDER MAPPING

NAME	INSTITUTION	ROLE/TITLE	ISSUE OF RELEVANCE
REGULATORY BODIES			
Peter Mbugua	REREC	CEO	rural electrification
Mr. Daniel Kiptoo Bargoria	EPRA	Acting Director-General	Energy & petroleum regulations
Eng. Collins Juma	Nuclear Power and Energy Agency	CEO	Nuclear Power development

NAME	INSTITUTION	ROLE/ TITLE	ISSUE OF RELEVANCE
ASSOCIATIONS			
Eng. James Mwangi	KEPSA Energy and Extractive sector board	Chair	KEPSA is the apex private sector advocacy body and regularly liaises with the government on policy development and implementation.
	ESAK – Electricity Sector Association of Kenya		ESAK is a member-based organisation composed of stakeholders in the electricity sector ranging from Independent Power Producers (IPPs), project developers, consultants, contractors, legal practitioners, finance organisations all working across Generation, Transmission & Distribution and Off- Grid sub sectors of the electricity space in Kenya.
Koen Peters	GOGLA	Executive Director	The global association for the off-grid solar energy industry. Established in 2012, GOGLA now represents over 180 members
Kamal Gupta	KEREA (Kenya renewable energy association)	Chair	KEREA was formed in August 2002 by members of the Renewable Energy Resources Technical Committee of the Kenya Bureau of Standards (KEBS) and is registered under section 10 of the societies act.

STAKEHOLDER MAPPING

NAME	INSTITUTION	ROLE/ TITLE	ISSUE OF RELEVANCE
PUBLIC SECTOR PROGRAMS			
KOSAP	Susanne Hounsell	Energy sector lead SNV	Will deploy 121 mini-grids expected to cover 27,000 households by 2022 at a cost of $40 million. These will be deployed in a public-private partnership model and coordinated by KPLC and REREC.
Power Africa Transactions and Reform Program (PATRP)	Dawid Pieterse	Chief of Party	RTI International has partners with Power Africa under this program to catalyse reforms in the energy sector in East Africa.
SREP-Scaling Up Renewable Energy Program			
Green Mini-grid Facility			Initially funded by DFID, but is now funded by the EU, and is implemented by AFD via Innovation Energie Développement (IED), I-Dev, and Practical Action Consulting. The facility provides technical assistance, investment grants, and outputbased grants to catalyse investment in the mini-grid sector.
Facility for energy inclusion			Designed by the African Development Bank (AfDB) to provide senior and mezzanine debt to off-grid, mini-grid, and small-scale independent power producers with a target ticket size of $1 million to $15 million, with a maximum of $30 million. The overall size of this fund is $500 million with on-grid (including mini-grids) and off-grid windows.

STAKEHOLDER MAPPING

NAME	INSTITUTION	ROLE/TITLE	ISSUE OF RELEVANCE
STATE-OWNED ENTERPRISES			
Kenya Power	Bernard Ngugi	MD and CEO	Electricity purchase and distribution
KenGen	Rebecca Miano	MD and CEO	Electricity generation and Geothermal development
Geothermal Development Corporation	Eng. Jared O. Othieno	MD and CEO	
Kenya Electricity Transmission Company	Fernandes Barasa	CEO	
Kenya Pipeline Corporate	Dr Macharia Irungu	MD	

NAME	INSTITUTION	ROLE/TITLE
PRIVATE SECTOR		
Africa Frontier Capital	Eric De Moudt	CEO
Sun Funder	Ryan Levinson	Co-Founder & CEO
MJ Group	Jaffar Mohamed	Chairman
Frontier Investment Management	Bernard Osawa	Project Director & Partner
Cross-boundary	Teddy Onserio	Africa Investment Advisor, East Africa
Powerhive	Christopher Hornor	President & CEO
Powergen	Aaron Cheng	CEO
Gulf Energy	Francis Njogu	CEO

STAKEHOLDER MAPPING

NAME	INSTITUTION	ROLE/TITLE
PRIVATE SECTOR		
Vivo Energy	Peter Kirema Murungi	MD
Total Kenya	Olagoke Aluko	MD
Rubis Kenya	Jean-Christian Bergeron	MD
Lake Turkana Wind Power	Jon Zaidi	CEO
Cummins Cogeneration Limited (CCL)		
Orpower	Dita Bronicki	CEO

NAME	INSTITUTION	ROLE/TITLE
MULTILATERAL AND BILATERAL PLAYERS		
World Bank		
IMF		
USAID		
U.S. Africa Clean Energy Finance Initiative (ACEF)		
African Development Bank	Ms. Nnenna Nwabufo	Director General-East Africa Hub
French Agency for Development - Agence Française de développement (AFD)	Yoka Christian	Regional Director for Eastern Africa
General Electric	Brenda Mbathi	CEO- East Africa

6 RISKS AND OPPORTUNITIES

RISKS AND OPPORTUNITIES

6.1 RISKS

Risk:
Power Purchase Agreements processes

Current status:
The PPA framework is currently under review

Driver:
Kenya Power financial risk

Risk level:
High

Risk:
Lack of clear regulatory framework

Current status:
The new regulatory framework envisioned by the energy act will take time to come into place.

Driver:
Politics and bureaucratic inertia

Risk level:
High

6.1 RISKS *(Cont)*

Risk:

Rural-Urban priority plan

Current status:

There is an imbalance between the energy issues in the rural and urban areas. The rural areas have been a low priority and lack a framework to address the key issues at that level.

Driver:

The government has a goal to improve/increase connectivity and access to power to all Kenyans.

Risk level:

High

Risk:

Weak regulatory and tariff framework

Current status:

The Energy Act 2019 requires new tariffs, which the government is unwilling to implement.

Driver:

Contractual obligations via the PPA's constraint the government's ability to lower tariffs

Politics: the cost of energy can be a hot-button issue and tariff increases in constrained economic conditions (e.g. COVID-19) can provoke public outcry and force the government to delay tariff increases.

Risk level:

High

6.1 RISKS *(Cont)*

Risk:

Petroleum prices

Current status:

Petroleum prices are comparatively high in comparison to similar markets, due to the number of levies and taxes, which comprise 50% of the retail price. Recently, the government has had to intervene in pricing due to public backlash.

Driver:

Politics: Similar to tariffs, there is a reluctance on the part of the government to significantly raise prices in a constrained environment, despite rebounding commodity prices. Furthermore, much of the retail cost of fuel in Kenya is made up of various taxes and levies. Removing some or all of these would have significant revenue generation impacts.

Risk level:

Medium

Risk:

Surplus production capacity

Current status:

The country is producing surplus electricity. Kenya Power still pays for the energy whether it is used or not, contributing to its precarious financial position.

Driver:

Unsubstantiated power demand projections.

Risk level:

Low

6.1 RISKS *(Cont)*

Risk:
High upfront investment cost

Current status:
There are several bottlenecks to importing and setting up new electricity generation projects.

Driver:
Bureaucratic inertia, litigation, land issues.

Risk level:
Medium

Risk:
Kenya Power's financial stability

Current status:
Kenya power is a in a somewhat strained financial position due to significant debt and capital expenditure undertaken to implement the last mile power project and due to its obligations to pay for all power produced rather than used under PPA's.

Driver:
Development spending on the last mile project and expensive PPA's.

Risk level:
Medium

6.2 OPPORTUNITIES

Opportunity:
Renewable Energy

Current status:
The government has been able to attract private investment in the renewable energy front. However, there is still an opportunity to further develop the resources.

Driver:
To reach the government goal of 100% renewable energy by 2022.

Opportunity:
Grid and standalone connection

Current status:
The government, through its Last Mile initiative, is driving connectivity at a county level; connection needs partners and funds to attain this goal.

Driver:
Policy

Opportunity:
Net- metering

Current status:
While it is proposed in the Energy Act 2019, the regulations around this are yet to be developed. However, it provides an investment opportunity.

Driver:
Policy/legislation

6.2 OPPORTUNITIES *(Cont)*

Opportunity:
Mini grids

Current status:
Kenya is a leader in the investment in mini-grids and the development of an appropriate regulatory framework to further drive investment.

Driver:
Policy, development spending, FDI

Opportunity:
Clean Cooking

Current status:
Kenya's ambition to achieve 100% clean cooking by 2030 has led to a conducive environment for clean cooking solutions.

Driver:
Policy

Opportunity:
Petroleum products

Current status:
Kenya is a significant player in the region for petroleum products. The expansion of critical infrastructure in the last 5 years (rail, ports and pipeline) is intended to cement that position.

Driver:
Commercial dynamics, policy.

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