



**ENERGY & PETROLEUM
STATISTICS REPORT
2020**

FOREWORD

The Energy and Petroleum Regulatory Authority (EPRA) is the Country's independent energy and petroleum regulator established under the Energy Act, 2019 and is responsible for economic and technical regulation of the electricity, renewable energy and petroleum sub-sectors. Among the key mandates of the Authority pursuant to Section 10(jj) of the Energy Act, 2019 is to collect and maintain energy data.

Kenya's Energy Sector has experienced tremendous growth and development since independence with paradigm shifts occurring over time in the regulation and structures of utilities in both the electricity and petroleum sub-sectors. The country has emerged as a leader in promotion of renewable energy in Africa and beyond. The guiding policies and regulatory frameworks that have led to a revamped and highly effective energy sector include the Sessional Paper No. 4 of 2004, Vision 2030, the Energy Act 2006, (superseded by the Energy Act, 2019) and the Petroleum Act, 2019. These frameworks have not only guided investments in the sector, but also enhanced sector regulation, efficiency, energy security and sustainable development.

2019 witnessed development and full operationalization of new infrastructure in the Energy Sector. The key highlights within the Electricity sub-sector was the full operationalization of the, Lake Turkana Wind Power with a capacity of 310MW to the national grid and the Garissa 54.5MW Solar Power Plant by the Rural Electrification and Renewable Energy Corporation (REREC). The 165MW Olkaria V by KenGen was commissioned during the same year. These developments have greatly increased the share of renewable energy in the country.

In the Petroleum sub-sector, full operationalization of the 20-inch Mombasa- Nairobi Pipeline dubbed "Line 5" and additional storage tanks at the Kenya Pipeline Company (KPC) took place. This is not only bound to increase the pipeline to: road transport ratio that stood at 80:20, but also reduces the cost of demurrage and subsequently, the cost of petroleum retail prices.

In regards to electricity access, the rate of connectivity stands at 76.49% making the country one of the global leaders in increasing electrification. Only Vietnam and Myanmar have achieved such performance before. The peak demand increased to 1912MW in October 2019 against an installed capacity of 2,819 MW. This progress is attributed to major initiatives in the last mile connectivity program and energy investment programs in line with Vision 2030.

It is my hope this report will provide critical information and statistics in the energy and gas sectors in the country thus enhancing the quality of decision-making. I am convinced that the report will be a key guide to investors and the public on major developments and emerging issues in the energy sector in Kenya for the prosperity and wealth of the nation and her people.

Daniel Kiptoo
Ag. Director General

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ABBREVIATIONS AND ACRONYMS

AGO	Automotive Gas Oil
AGOL	Africa Gas & Oil Limited
CAK	Competition Authority of Kenya
CBR	Central Bank Rates
CMA	Capital Markets Authority
EAC	East African Community
EOPS	Early Oil Piloting Scheme
EPRA	Energy and Petroleum Regulatory Authority
ERC	Energy Regulatory Commission
FCC	Fuel Cost Charge
FERFA	Foreign Exchange Rate Fluctuation Adjustment
GDP	Gross Domestic Product
GHG	Green House Gases
GWh	Gigawatt-hour
HHI	Herfindahl Hirschman Index
IPP	Independent Power Producer
KETRACO	Kenya Electricity Transmission Company
KNBS	Kenya National Bureau of Statistics
KOT	Kipevu Oil Terminal
KPA	Kenya Ports Authority
KPC	Kenya Pipeline Company
KRA	Kenya Revenue Authority
LPG	Liquefied Petroleum Gas
LTWP	Lake Turkana Wind Power
MWh	Megawatt-hour
NOCK	National Oil Corporation of Kenya
NSC	Network Service Contract
PPA	Power Purchase Agreement
PPPs	Public Private Partnerships
REREC	Rural Electrification and Renewable Energy Corporation
SOT	Shumanzi Oil Terminal

1

INTRODUCTION AND BACKGROUND

1. The Energy and Petroleum Regulatory Authority (EPRA) is established under the Energy Act, 2019 as a single sector regulatory agency responsible for economic and technical regulation of the electricity, renewable energy and petroleum sub-sectors in Kenya. The core mandates of the Authority include; tariff setting and review, licensing, enforcement, dispute resolution and approval of Power Purchase Agreements (PPA's) and Network Service Contracts. The Authority is also mandated to oversee the regulation of the upstream petroleum and gas sectors.

2. Among the Authority's key objectives as outlined in Section 10(ii) and 10(jj) of the Energy Act, 2019 is to monitor, ensure implementation of, and observance of the principles of fair competition in the energy sector in coordination with statutory authorities. The Authority is also mandated to provide such information and statistics to the Cabinet Secretary as may from time to time be required. Consequently, the Authority collects and maintains energy data.

3. In the 2018/19 FY, the Authority committed to commence preparation of the Energy Statistics Report, 2018 for publication. This was after the report underwent Board approval in the middle of the year. The Director-General approved a comprehensive data template dubbed the "Energy Statistics Template,". This is aimed at enabling accurate recording and presentation of data in line with international best practices. The template has been beneficial in the preparation of this Report. With the transition from ERC to EPRA, the Energy Statistics Report will be updated to capture more information on upstream petroleum and energy emission-related statistics.

4. The key statistics captured in this Report include energy supply, energy demand, energy balance, energy prices, competition and market shares, energy trading, energy indicators and emissions from the energy sector.

5. Data on the electricity sub-sector include: the monthly pass-through costs, energy generation, generation costs, tariff evolution, generation expansion and peak demand trends. In the petroleum

sub-sector, the data captured includes monthly pump prices, infrastructure expansion and the licensing of upstream business operators.

6. This 2019 Energy Statistics Report therefore, provides key data to inform policy makers, public, investors, academicians and consumers on emerging issues. The Report captures key statistics in electricity, petroleum and renewable energy subsectors and emerging issues on greenhouse gases including the Grid Emission Factor. These statistics will enable the Authority to continuously develop and implement frameworks in line with achieving the nations' Big Four (4) Agenda and subsequently, Vision 2030.

7. Energy is regarded as a major enabler in the development of the Kenyan economy. For the country to experience economic growth and better-quality life for its citizenry, access to adequate and reliable energy supply is imperative.

8. Kenya's energy sources consist of imported fossil fuels and renewable energy sources which include biomass, hydro, geothermal, solar and wind.

9. The overall goal of the energy sector is to provide affordable, sustainable and reliable supply of energy that will stimulate high and sustained economic growth leading to higher incomes, increased employment and reduced poverty levels.

10. Kenya is endowed with renewable energy including wind, solar and geothermal resources. With full exploitation of these resources, Kenya is capable of producing clean and reliable energy.

11. The discovery and exploitation of oil and gas in the country will add impetus to the country's economic growth, speed up the reduction of inflation, make the local currency stronger and thus increase the country's purchasing power for imports.

1.1 The Kenyan Economy

12. This Report captures statistics in the energy sector for the year 2019. The Economic Survey 2020 estimates that the Gross domestic product expanded by 5.4% in 2019 compared to a growth of 6.3% in 2018.

13. The growth was spread across all sectors of the economy but was more pronounced in service-oriented sectors. Agriculture, Forestry and Fishing sector accounted for a sizeable proportion of the slowdown, from 6.0 per cent growth in 2018 to 3.6 per cent in 2019. This was mainly on account of suppressed long rains that disrupted the normal planting season in key agricultural zones. Similarly, the manufacturing sector grew by 3.2 per cent in 2019 compared to 4.3 per cent growth in 2018, partly owing to a constrained supply of raw materials from agricultural activities. Performance in service activities was boosted by accelerated growths in Financial and Insurance (6.6 per cent) and Real Estate activities (5.3 per cent).

14. Devolution has become the biggest gain from the Constitution of Kenya, 2010, which ushered in a new political and economic governance system. The devolved governance system has promoted greater investments at the grassroots, strengthened accountability and public service delivery at local levels.

15. While economic activity faltered following the 2008 global economic recession, growth resumed in the last eleven years reaching 5.4% in 2019 placing Kenya as one of the fastest-growing economies in sub-Saharan Africa. The economy has been boosted by a stable macroeconomic environment, low oil prices, rebound in tourism, strong remittance inflows and government-led infrastructure development initiatives.

16. Generally, key macroeconomic indicators were largely favorable to growth during the period under review. Interest rates declined after the Central Bank Rate (CBR) was reviewed downwards from 9% in 2018 to 8.5% in 2019. This signaled an easing of the monetary policy with the aim of boosting economic growth in the money market. The Kenya Shilling recorded mixed performance against its major trading currencies. The Kenyan shilling depreciated in 2019 as compared to 2018 against the US Dollar recording 102 Ksh/Usd in 2019 and 101.3Ksh/USD in 2018. The current account balance as a percentage of GDP, remained 5.8% in 2019 as compared to the

previous year 2018. The period was characterized by a rise in inflation from 4.7% in 2018 to 5.2% in 2019. The period was characterized by a rise in inflation from 4.7% in 2018 to 5.2% in 2019.

17. The sudden escalation in inflation was mainly influenced by increased food prices during the period under review.

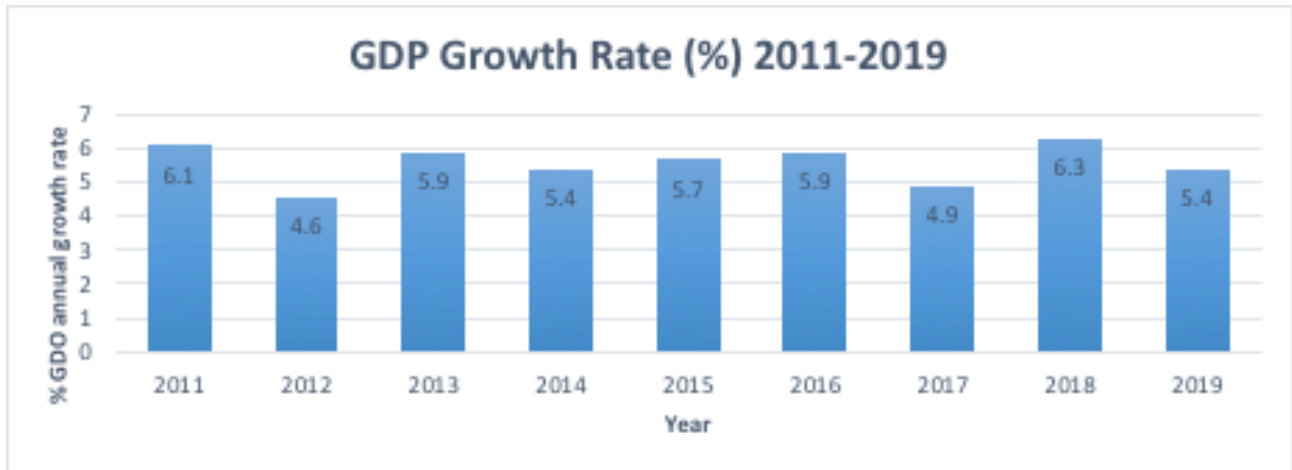
18. According to the World Bank's economic update, projects in Kenya's economy will grow by 1.5% in 2020 in its baseline scenario, sharply down from an estimated 5.6% in 2019, due to the COVID-19 pandemic. However, in a more adverse scenario, economic output may contract in 2020. To put the above scenario into context, it is expected that the shock will be larger and reduce growth below that of 2008, when Kenya's economy grew by 0.2% (from 6.9 per cent in 2007) as a result of post-election violence, drought, and the global financial crisis.

19. The uncertainty around growth and other economic projections is unusually high at this time as a result of the undetermined future path of the virus and policy, household and firm behavioral responses in Kenya and globally. In the long-term, adoption of prudent macroeconomic policies will help safeguard Kenya's robust economic performance.

20. This includes implementation of fiscal and monetary prudence and lowering deficit down to 4.3% by FY19/20 as per the Medium-Term Fiscal Framework. The fiscal consolidation needs the avoidance of compromising public investments in critical infrastructure key to unlocking the economy's productive capacity.



Figure 1: GDP Annual Growth Rate 2011-2019



Source: KNBS, Various Publications

2.

STATISTICS FOR THE ELECTRICITY SUB-SECTOR

21. The electricity sub-sector in Kenya has witnessed various reforms that have led to efficiency and revamped competition. Electricity generation is completely unbundled with increased private sector participation while transmission is undertaken by both Kenya Power and the Kenya Electricity Transmission Company (KETRACO). The distribution segment is mainly carried out by the Kenya Power. However, a number of mini-grids have been licensed to supply electricity to customers in marginalized areas and selected gated communities.

2.1 Installed Electricity Capacity in Kenya

22. The installed electricity capacity in Kenya has increased from 1821MW in 2013 to 2819MW by end of December 2019 while the total effective capacity was 2736 MW. Notably, the proportion of geothermal power capacity has increased to 26.2% of the total effective capacity compared to 14.8% in 2013. This was mainly as a result of Kenya Electricity Generating Company (Kengen) adding the first unit of its new Olkaria V geothermal power plant to the grid in the period under review. This has significantly reduced dependence on generation from hydropower plants and displaced thermal power generation that has considerable fuel energy costs and associated effects on the economy. Table 1 below provides a profile of installed and effective capacity in Kenya from 2013 to 2019.

Table 1: Installed and Effective Capacity

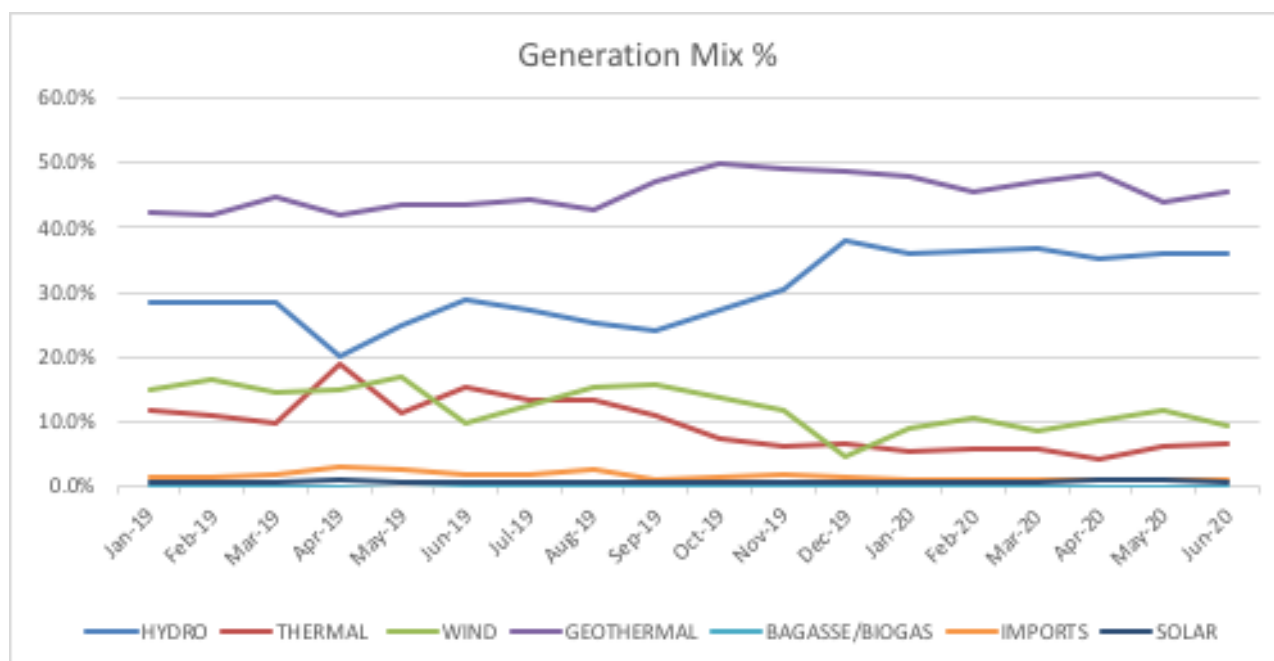
Year	Installed Capacity						Effective Installed Capacity							
	Hydro	Thermal Oil	Geo-thermal	Wind	Co - generation	Solar	Total	Hydro	Thermal Oil	Geo-thermal	Wind	Co - generation	Solar	Total
2013	812.3	714.4	241.8	26.3	26		1820.8	766.6	693.2	236.5	5.3	21.5		1,723.1
2014	818.3	751.3	573.4	26.3	26.0	-	2195.3	797.5	712.6	558.0	5.3	21.5		2,094.9
2015	820.4	833.6	627.0	26.1	26.0	0.6	2333.7	799.5	799.2	619.0	26.1	21.5	0.2	2,263.3
2016	818.7	801.6	652.0	26.1	28.0	0.6	2327.0	797.5	762.9	644.0	26.0	23.5	0.2	2,254.1
2017	826.2	806.9	652.0	26.1	28.0	0.7	2339.9	805.0	765.8	644.0	25.5	23.5	0.6	2,264.4
2018	826.2	807.7	663	336.1	28	50.7	2711.7	805.0	768.2	655.0	335.5	23.5	50.6	2,637.8
2019	826	749	828	336	28	51	2819	805	716	816	326	24	50	2,736

Source: EPRA, Kenya Power

2.2 Power Generation

23. This sub-section of the Report provides an analysis of statistics on electric power generation from January 2019 to June 2020. The contribution from hydropower generation increased from 28.4% in January 2019 to 37.8% in December 2019. This was followed by a slight fluctuation between January and June 2020 with June recording 36.2% in generation. Thermal power generation decreased from 11.6% in January 2019 to 6.7% in June 2020. This was due to the acceleration of renewable energy adoption especially geothermal, wind and solar to substitute the costly thermal plants. Geothermal power remains the highest contributor, however, wind power generation significantly declined from 15% in January 2019 to 9.6% in June 2020. Bagasse/Biogas recorded the least contribution with a zero percentage throughout the reporting period. Figure 2 below provides an analysis of the electricity generation mix by technology for the period of January 2019 – June 2020.

Figure 2: Energy Mix Trend Jan-19 to Jun-20

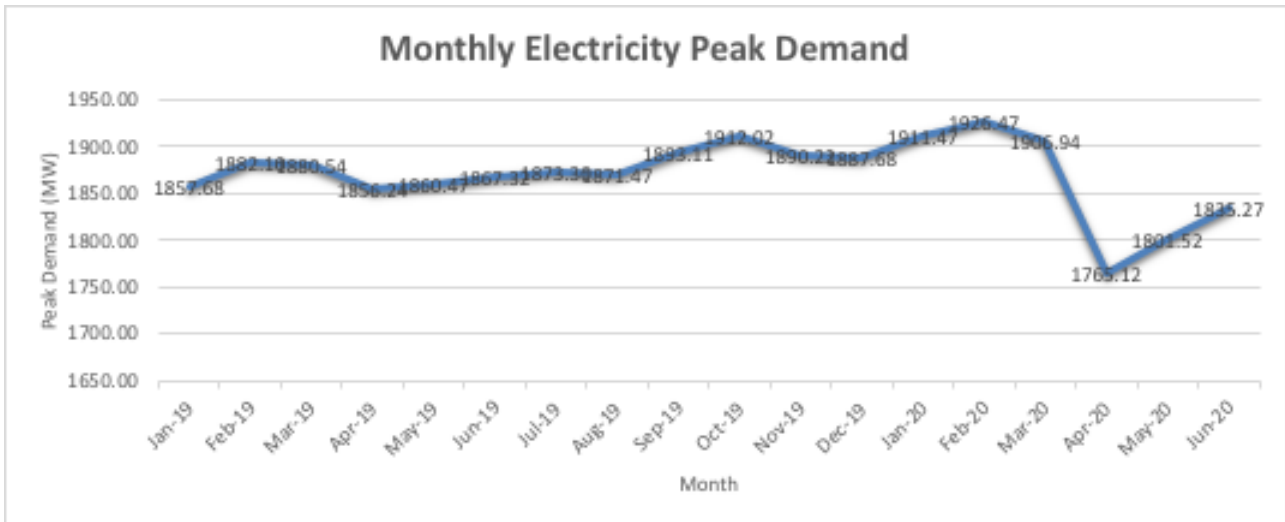


Source: EPRA

2.3 Analysis of Electricity Peak Demand

24. Analysis of electricity demand shows that it has been increasing over time. The Peak demand was recorded at 1912MW in October 2019 against a total installed capacity of 2819 MW. The increase in peak demand was attributed to confidence in the Kenyan economy and initiatives to increase connectivity through the Last Mile Connectivity Program. The highest demand recorded on the interconnected system in the period was 1926 MW recorded on 19th February 2020. There was a 3.99 % drop in the monthly peak demand to 1835 MW over the period. This drop-in demand was due to a slowdown in economic activities because of the effects of the Covid-19 pandemic. Figure 3 shows the monthly peak demand for the period Jan 2019 to June 2020.

Figure 3: Peak Demand MW (Jan 2019 – Jun 2020)



Source: EPRA

2.4 Reliability Indices

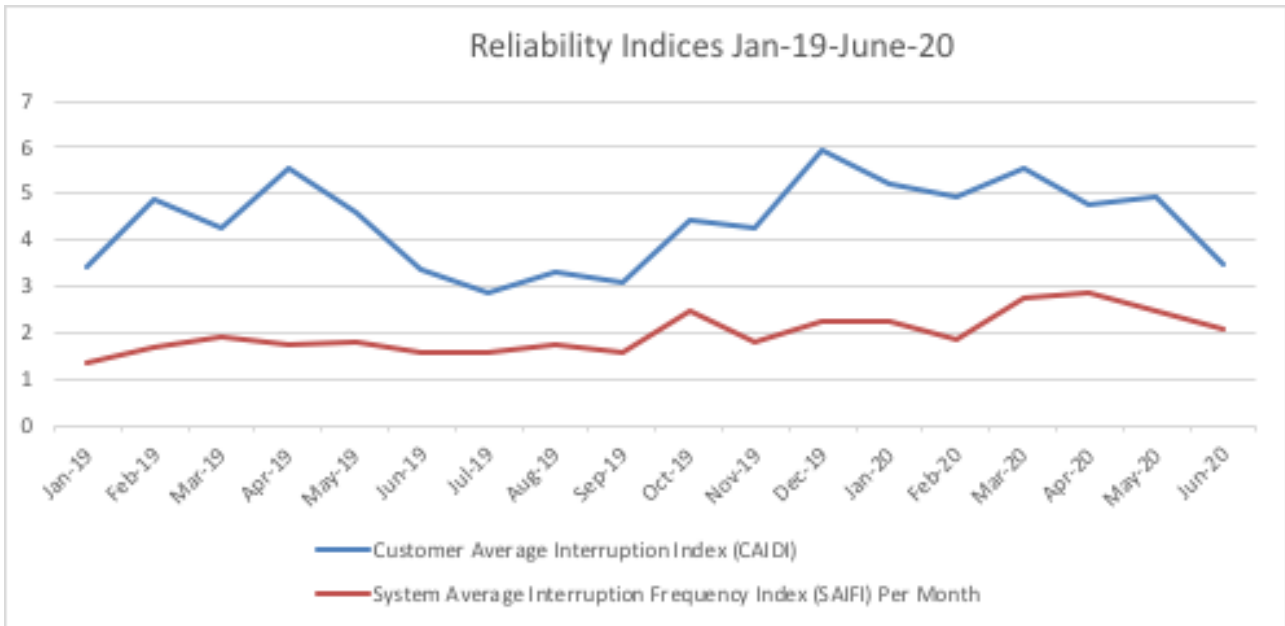
25. The Authority uses the System Average Interruption Frequency Index (SAIFI) and Customer Average Interruption Duration Index (CAIDI) to measure the reliability of power supply in the country.

$$SAIFI = \frac{\text{Total Number of Customer Interruptions per reporting period}}{\text{Total Number of Customers Served per reporting period}}$$

$$CAIDI = \frac{\text{Sum of customer interruption durations per reporting period}}{\text{Total number of customers interrupted per reporting period}}$$

26. Statistically, the country has enjoyed reliable power supply by the single power distributor, Kenya Power. Between the Periods January 2019 to June 2020, the average SAIFI was 1.98, while CAIDI was 4.37 over the same period. The Low SAIFI and CAIDI recorded over the period is a manifestation of the vast upgrade of the transmission and distribution system by the government. Figure 4 shows the SAIFI and CAIDI for the period January 2019 to June 2020. The performance is still below the international best practices of less 1 and 2.5 respectively. The high losses of power is a clear indication that much more needs to be done to improve on reliability of power supply to customers as well.

Figure 4: Reliability indices Jan 2019 – June 2020

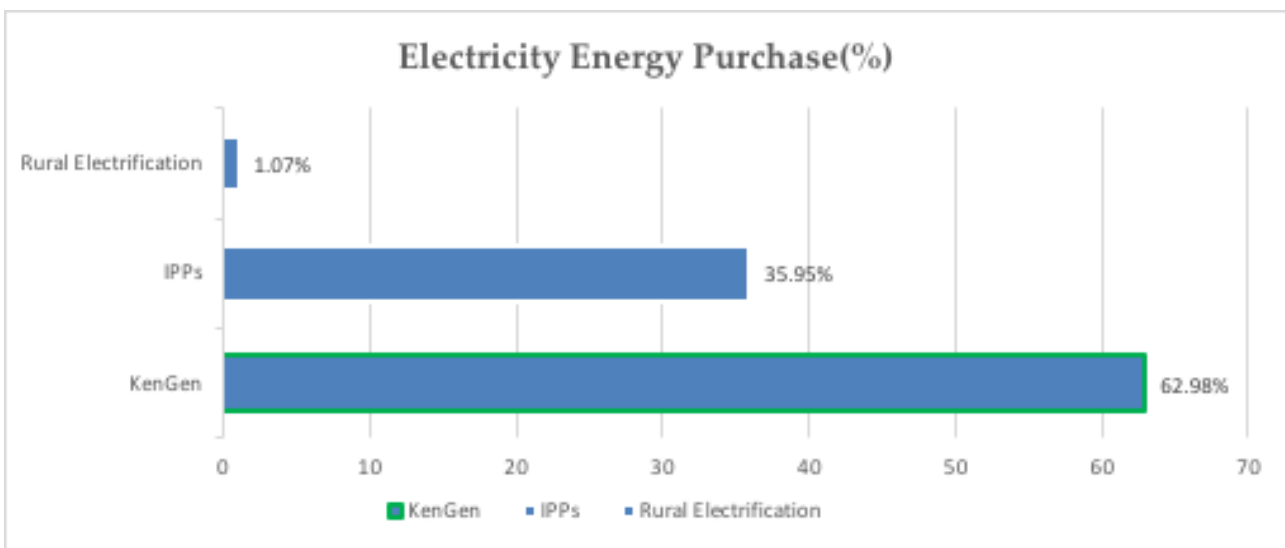


Source: EPRA

2.5 Competition Analysis and Market Share Data

27. This sub-section of the report provides data on market share and competition analysis. The structure and share of power generation in 2018/19 remains in favor of KenGen with a 62.98% share compared to the share of IPPs at 35.95%. However, PPs percentage contribution has increased as compared to the previous which was at 24%. This is attributable to the fair regulation and conducive Energy policies boosting private investments in electricity generation. Figure 5 shows the percentage of energy purchased for the year 2019.

Figure 5: Electricity Energy Purchase (%) 2019



Source: EPRA, 2020

The Herfindahl Hirschman Index

28. The Herfindahl Hirschman Index is a statistical measure of concentration of firms in a market that gives insight on the market structure as well as state of competition. The HHI accounts for the number of firms in a market as well as the concentration by incorporating the relative size of all firms in the market. It is calculated by squaring the market shares of all firms in the market and summing the squares as follows:

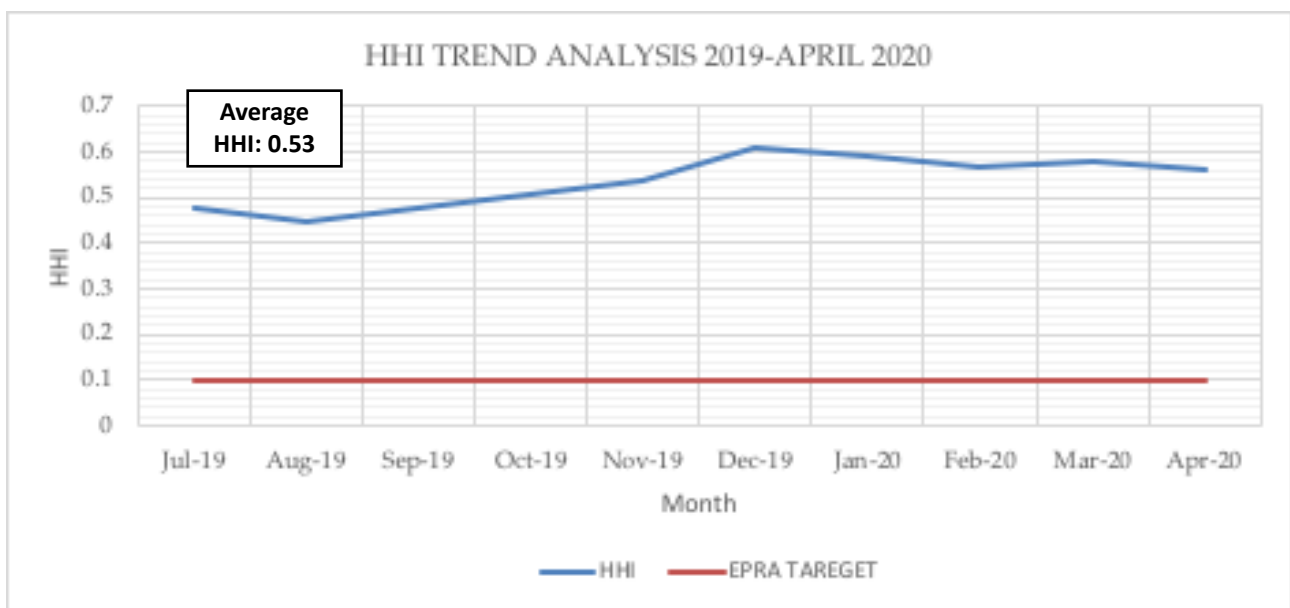
$$HHI = \sum_{i=1}^K (MS_i)^2$$

29. Where, MS_i represents the market share of the i th firm and k represents the total number of firms in the market.

30. The HHI gives a much heavier weight to firms with large market shares due to the squaring effect. This corresponds to the theoretical notion in economics that the greater the concentration of output in a small number of firms, the greater the likelihood that ceteris paribus, competition will be weak and the lower the concentration of output the greater the likelihood that ceteris paribus, competition will be strong. The HHI reaches a maximum value of 10,000 (if shares are in percentage form) or 1 (if market shares are in fractional form).

31. With regard to competition analysis based on the above analysis, the average HHI index for electricity power generation stood at 0.53 by April 2020 compared to 0.48 in July 2019. This is above the expected threshold of 0.1 that is expected by the Authority. KenGen has market power in the generation segment of the power market. The increased HHI Index for the electricity market was attributed to KenGen's commissioning of the 165 MW Olkaria V geothermal plant as well as the decommissioning of Iberafrica's 56MW power plant after expiry of the Power Purchase Agreement (PPA).

Figure 6: Trends in Electricity HHI, July 2019-April 2020



Source: EPRA

- An index below 0.1 indicates low concentration
- An index between 0.1 and 0.18 indicates moderate concentration
- An index above 0.18 indicates high concentration

2.6 Evolution of Electricity Tariffs

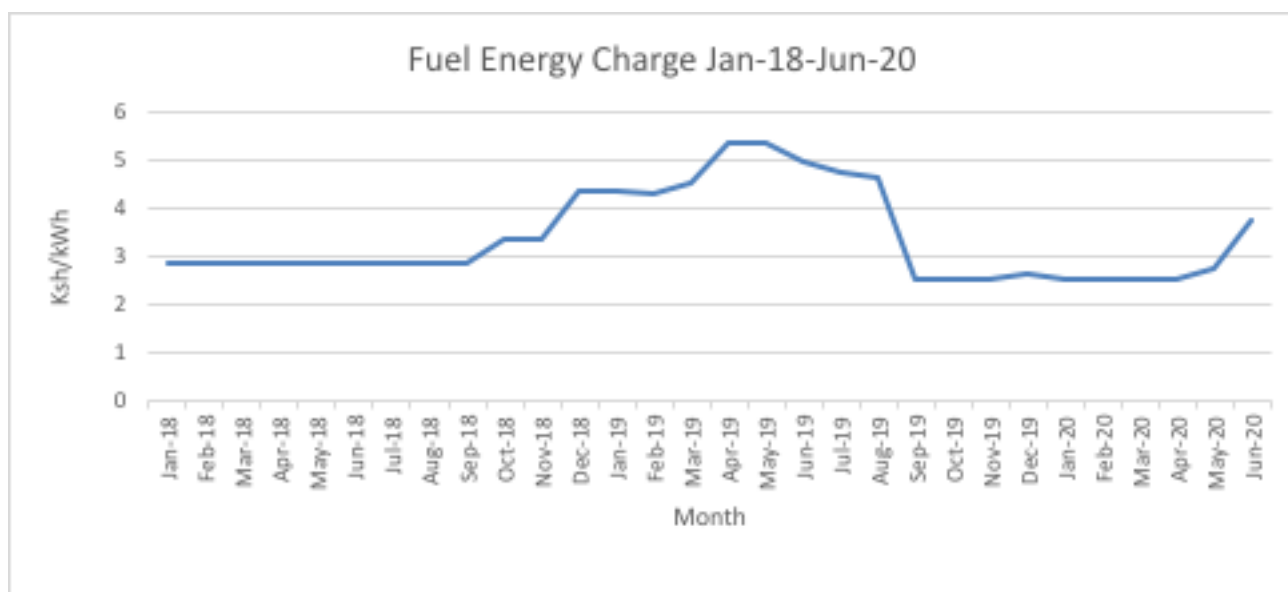
32. The evolution of electricity retail tariffs has had mixed performance. The electricity tariff mainly comprises the non-fuel tariffs; value added tax, levies and Pass-through Costs: Fuel Energy Cost (FEC), Foreign Exchange Rates Fluctuations Adjustments (FERFA), Water Resource Management Authority (WARMA) levy and Inflation Adjustments and taxes.

33. The monthly fuel cost pass through charges are managed by EPRA as approved in the electricity retail tariffs. The FEC rate is computed monthly, but the applicable charge is set at an agreed level to mitigate against any sharp increases in electricity prices. In this regard, when the computed FEC is above the set cost, the charge to customers is maintained at the set cost and any amount not recovered by the generating company is recovered in subsequent months during periods of improved hydrology when the FEC falls below the set cost.

2.6.1 The Fuel Energy Cost

34. The Fuel Energy Cost was fairly stable over the two-year period ending December 2019. In January 2018, the FEC recorded was 4.30 Ksh/kWh and then increased to 4.51 KSh/kWh in February 2018 due to the low hydrology. FEC increased to 5.35 Ksh/kWh in March and April 2018. In May, June and July FEC declined to 4.95 Ksh/kWh, 4.75 Ksh/kWh and 4.6 Ksh/kWh respectively. From August to December 2018 the FEC remained constant at 2.5 Ksh/kWh. In 2019 FEC reached an all-time high in May 2019 at 3.75 Ksh/kWh then continued to decline closing the year in December 2019 at 2.65 Ksh/kWh. In January 2020 the FEC dropped to 2.5Ksh/kWh and remained stable till the month of April before rising to 2.75Ksh/kWh in May and further to 3.75Ksh/kWh in June 2020. Figure 7 shows the Fuel Energy Charge for the period January 2018 to June 2020. Figure 7: Fuel Energy Charge Jan-18 to Jun-20.

Figure 7: Fuel Energy Charge Jan-18 to Jun-20

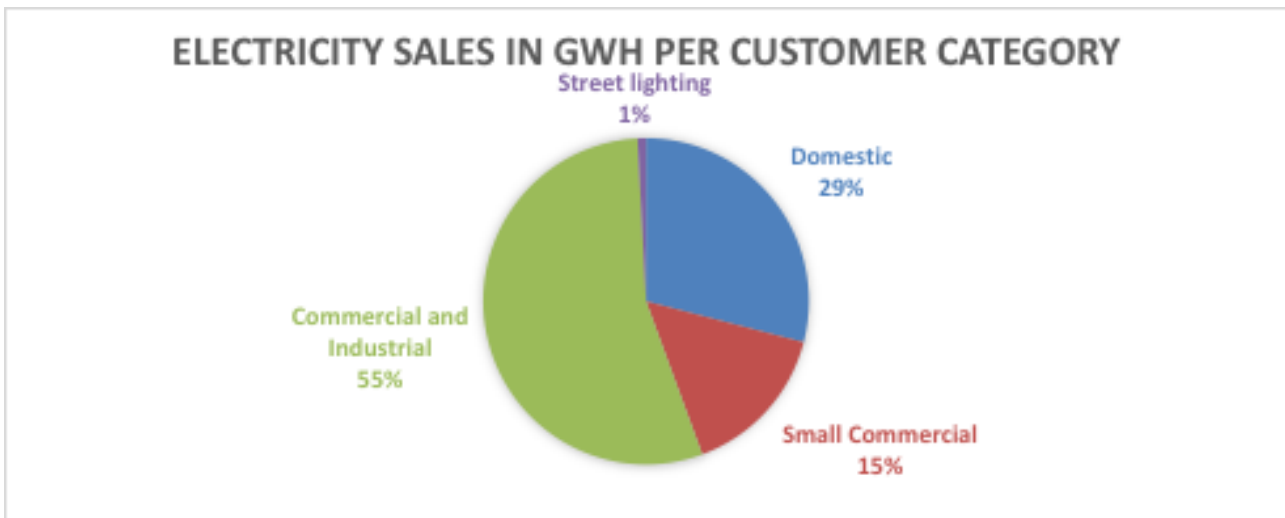


Source: EPRA, 2020

2.7 Electricity Consumption

35. The demand for electricity has shown an upward trend in the last 5 years. While the demand was 7,655 GWh in the 2014/15 financial year, it increased to 8,769 GWh in the 2018/19 financial year. This represents an average annual percentage increase of 3.7%, with the highest growth recorded in 2014/15 (5.7%). Overall, there has been a positive growth among all consumer categories. This is largely attributed to the increased efforts in attaining universal access to electricity by 2022. A summary of trends in consumption among various customer categories, and consumption by region during the last 5 years is shown in Table 2 and Figure 8.

Figure 8: Electricity Sales Per Customer Category



Source: EPRA, 2020

2.7.1 Analysis of Electricity Sales by Customer Category, (GWh)

36. Table 2 shows consumption of electricity by different customer categories in GWh from 2007/08 to 2018/19 for customers connected in the interconnected system (Excluding those in off grid network). During the financial year 2018/2019, commercial industrial customer tariff category had the highest consumption at 4462GWh, representing 55% of the total consumption. This was followed by domestic customers at 2366GWh (29%), small commercial 1250 GWh (15%) and street lighting consumed 68GWh (1%). Table 2 illustrates electricity consumption by customer category.

Table 2: Sales in GWh Per Customer Category

TARRIF	TYPES OF CUSTOMERS COVERED BY THIS TARIFF	SALES IN GWH				
		2014/15	2015/16	2016/17	2017/18	2018/19
DC	Domestic	1,866	2,007	2,138	2,335	2,366
SC	Small Commercial	1,143	1,153	1,201	1,222	1,250
CI	Commercial and Industrial	4,030	4,104	4,266	4,225	4,462
IT	Off-Peak	15	26	41	33	N/A
SL	Street lighting	35	40	55	66	68
	REP System (DC*((D-C,SC,SL)	525	537	549	554	595
	Export to Uganda	38	43	20	22	27
	Export to Tanesco	2	2	2	1	0.01
	TOTAL	7,655	7,912	8,272	8,459	8,769
	% INCREASE P.A.	5.70%	3.40%	4.50%	2.30%	3.70%

Source: Kenya Power

2.8 Electricity Transmission Data

37. Access and reliability of power supply are dependent on the transmission and distribution network. Over the last five years, the government has accelerated its efforts in upgrading of the networks and building new networks for power effective power evacuation. The national grid network comprises of 400Kv, 220Kv and 132Kv transmission systems. The distribution network comprises of 66Kv, 33Kv and 415/240v distribution systems. To stock transmission and distribution lines has increased by 5% between 2017/18 to 2018/19 from 224,228kM of lines to 236,134KM.

Table 3: Transmission and Distribution in Kilovolts (kV) 2007/8 to 2018/19

VOLTAGE (kV)	2014/15	2015/16	2016/17	2017/18	2018/19
400 kV			96.8	1,244.4	2,116.4
220 kV	1,352	1,452	1,555	1,686	1,686
132 kV	2,824	3,087	3,208	3,322	3,372
66 kV	952	977	1,000	1,168	1,187
33 kV	21,370	27,497	30,846	34,508	35,177
11 kV	32,823	35,383	37,234	38,968	39,797
Total HV and MV	59,322	68,396	73,940	80,897	83,335
415/240V or 433/250V		110,778	139,642	143,331	152,799
TOTAL	59,322	179,174	213,582	224,228	236,134
% INCREASE P.A.	4.8%	15.3%	19.2%	5%	5%

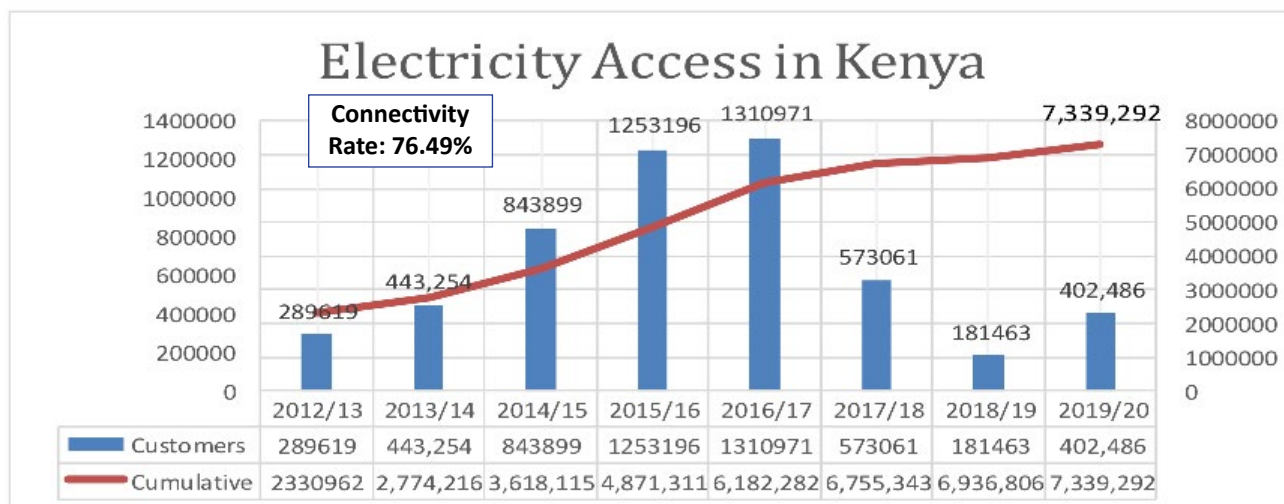
Source: KPLC/KETRACO

2.9 Electricity and Customer Access

38. The total number of connected customers increased from 2.3 Million in 2013 to 7.3 Million by the end of January 2020. The country has passed the 75% household connectivity threshold establishing her as a regional leader in electricity access at 76.49%.

39. Between January 2019 and January 2020, 402,486 customers have been connected to the national grid from 6,936,806 customers in January 2019 to 7,339,202 power consumers in January 2020. Kenya is currently the only East African country with electricity access for over 75% of her population. Figure 9 below shows trend analysis of electricity access in Kenya.

Figure 9: Trends in Electricity Connectivity, 2012/13- 2019/20



Source: EPRA and Kenya Power

2.10 Licenses in Electrical Power Undertakings

40. The Authority is mandated by the Energy Act 2019 to issue licenses for all power undertakings in the energy sector. The Authority issues licenses to power generators, Electrical Contractors and electrical licenses. Table 4 shows a list of licensed generators that were licensed during the one-year reporting period ending 2019 with a total licensed capacity of 891.6MW. Table 5, table 6 and table 7 show Number of approved solar PV licenses, approved electrical licenses and approved energy auditors.

41. Further to table 4 below, a detailed list of all approved power undertakings with license and permits as at May 2020 is provided as Annex 8.

Table 4: Approved Power Undertakings

SN	Name of Plant	Location (County)	Licensed Capacity Energy Source (MW)	Licensed Capacity by Source (MW)	
FY 2018/2019					
1	Mumias Sugar	Kakamega	26	Cogeneration	26
2	Nithi Hydro Power Limited	Tharaka Nithi	5.6	Hydro	5.6
3	Isiolo Project Limited		40	Solar	40
4	UETCL		-	Energy Exchange	-
5	Aperture Green	Kiambu	50	Wind	140
6	Bahari Wind Limited	Lamu	90		
7	AGIL	Nakuru	140	Geothermal	180
8	Sosian Menengai Limited		40		
Total Licensed Capacity (MW)					391.6

Source: EPRA, 2020

Table 5: Approved Solar PV Licenses FY 2018/19

Category	Number of Licenses
Solar P V Contractors/Vendors (SPVC)	43
Solar PV System Manufacturers/Importers (SPVM)	22
Solar PV Technicians (SPVT)	54

Source: EPRA, 2020

Table 6: Approved Electrical Licenses and Electrical Contractor Registrations 2018/19

Electrical Licenses/Registrations		
License Class	Electrical Licenses	Electrical Contractor Registrations
C2	175	192
C1	114	81
B	27	18
A1	33	51
A2	6	4
Total	355	346
Cumulative Total as at June 2018	4788	1782

Source: EPRA, 2020

Table 7: Approved Energy Auditors for Designated Facilities 2018/19

Category	Number of Licenses
Energy Audit Firms (EAF)	4
Energy Auditors (EA)	1

Source: EPRA, 2020

3

PETROLEUM AND GAS SUB SECTOR

42. This sub-section of the report provides data on the petroleum and gas sector in Kenya. The petroleum sector is organized into three sections: the upstream, mid-stream and downstream segments. The upstream section involves the process of exploration, development and production of crude oil and natural gas. The mid-stream section revolves around storage, refining of crude oil into consumable petroleum products and transportation. In the downstream section, refined products are made available to the consumers through supply and distribution to registered petroleum retail stations.

3.1 Upstream operations Data

43. Petroleum exploration in Kenya began in the 1950s within the Lamu Basin. It was not until 2012 when the first commercially viable oil discovery was made in the Tertiary Rift, followed by significant gas discoveries in offshore Lamu Basin. To date, over 86 wells have been drilled majority being based along the Tertiary Rift. An estimate of over 4 billion barrels of crude oil reserves have been encountered in the Lokichar sub-basin by Tullow PLC and its partners, with recovery oil estimated to be over 750 million barrels

44. Kenya has four (4) petroleum exploration basins including: Lamu Basin, Anza Basin, Mandera Basin and Tertiary Rift Basin. Oil and gas exploration in the country began in 1956 and the breakthrough came in March 2012 with the discovery well –Ngamia 1 Well, in Lokichar Basin in Turkana County. As at December 2015, seventy-four (74) wells had been drilled with twelve (12) hydrocarbon discoveries to date, nine (9) of which are in Turkana County. The other three are in Anza Basin and Offshore Lamu.

45. As at December 2015, there were forty-six (46) petroleum exploration blocks in Kenya of which 44 have been licensed and are operated by twenty-three (23) International Oil Exploration Companies.

46. Domestic crude oil deposits have been located in Turkana, the northern part of Kenya bordering Uganda and South Sudan. Extraction is ongoing. The crude oil is transported to Mombasa via road for export through the Early Oil Piloting Scheme (EOPS). The commercial viability of domestic refining of crude oil is still being analyzed.



Table 8: Summary of basins and well drilled

Basin	Area (Sq. KM)	Wells Drilled	Average Sediment Thickness
Lamu	26,1000	19	12,000
Mandera	43,404	2	10,000
Anza	81,319	15	10,000
Tertiary Rift	105,673	34	40,000

Source: MOPM, 2019

3.2 Imports of Petroleum and Gas Products

47. Petroleum is one of the prime movers of the country's social and economic development. Petroleum products are predominantly used in transport, commercial and industrial sectors. Kenya imports all its petroleum products requirements. The Ministry of Petroleum and Mining coordinates this activity with oil marketing companies through a process known as the Open Tender System (OTS). The Kenya Pipeline Company provides product movement infrastructure including storage and oil pipeline services.

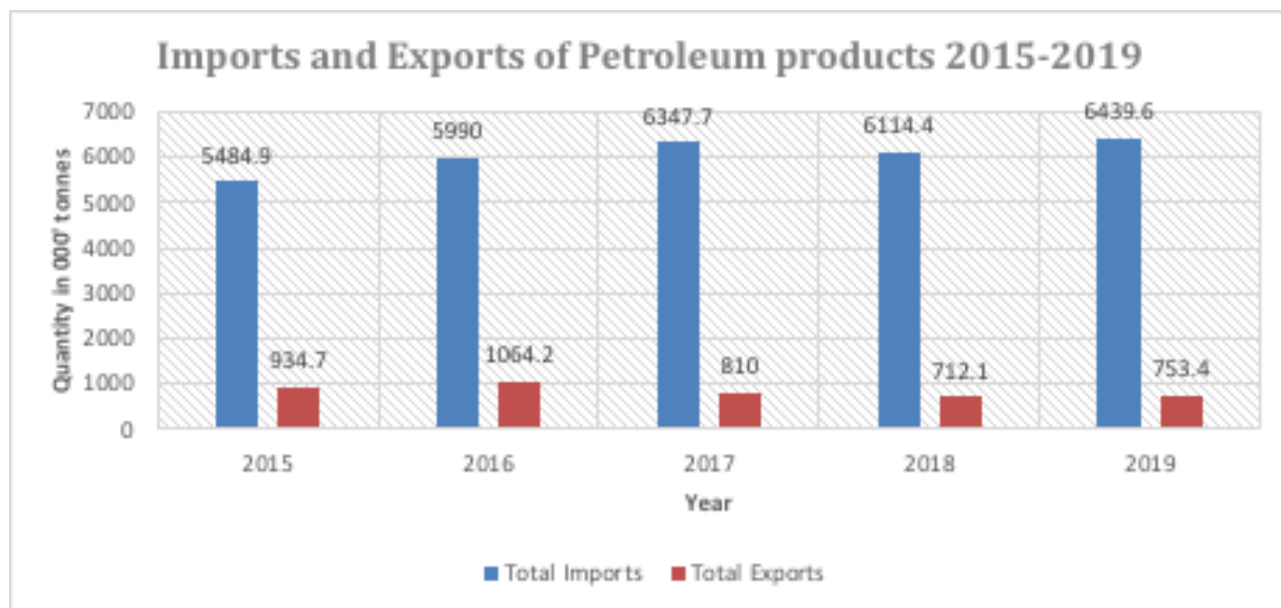
48. The total quantity of petroleum products imported into the country has increased from 6,114.4 thousand tonnes in 2018 to 6438.9 thousand tonnes in 2019, representing an increase of 5.3%. Table 9 shows the quantity of petroleum products imported in the country. Figure 8 shows the share of imports and exports of petroleum products in the country for the period ending 2019.

Table 9: Summary of basins and well drilled

Year	Crude petroleum	Petroleum fuels	Lubricating oils	Lubricating greases	TOTAL	% change P.A
2007	1598.7	1999.9		93.2	3,691.8	
2008	1687.7	1704.5	12.4	118.6	3,523.2	(4.5%)
2009	1610.1	2559	17	265	4,151.1	17.8%
2010	1551.5	2071.9	3	218.2	3,844.6	(7.4%)
2011	1772.1	2235.6	0	278	4,285.7	11.5%
2012	997	2803.4	7.1	1.8	3,809.3	(11.1%_
2013	567.4	2985.9	6.9	2.3	3,562.5	(6.5%)
2014		4400.2	6.8	2.4	4,409.4	23.8%
2015		4418.1	10.8	2.8	4,431.7	0.5%
2016		5978.3	9.1	2.6	5,990	35.2%
2017		6334	11.2	2.5	6,347.7	6%
2018		6101.1	10.0	2.6	6,114.4	(3.7%)
2019		6425.4	10.9	2.6	6438.9	5.3%

Source: KNBS, 2020

Figure 10: Quantity of Petroleum Imports and Exports in '000 tonnes



Source: Computations from KNBS data

3.3 Market and Competition Data for Petroleum and Gas

49. There were over seventy-one (71) registered oil-marketing companies in Kenya as of 2019. These are companies, which market, sell and distribute oil products such as diesel, kerosene, gasoline (petrol), lubricants, and liquefied petroleum gas (LPG). Importation of petroleum products through the OTS allows all the OMCs to access petroleum products at the same price and therefore ensures competition in the petroleum market. The Market has proved competitive over the last year. However, competition has favored the innovative OMCs with just five OMCs namely; Vivo, Total and Kenol Kobil (now Rubis Energy), OLA and Gulf Energy controlling up to 49.8% of the Market for the period ending December 2019. Table 10 shows the market share of companies in the reporting period.

Table 10: Market Share of Oil Marketing Companies

Oil Marketing Company	Market share
KENNOL KOBIL (now RUBIS)	14.1%
TOTAL	12.6%
VIVO ENERGY	12.5%
OLA ENERGY	6.0%
GULF ENERGY	4.6%
NOCK	2.8%
BE ENERGY	2.7%
PETRO	2.5%
GALANA	2.5%
ROYAL	2.3%
OTHERS	37.4%
TOTAL	100.00%

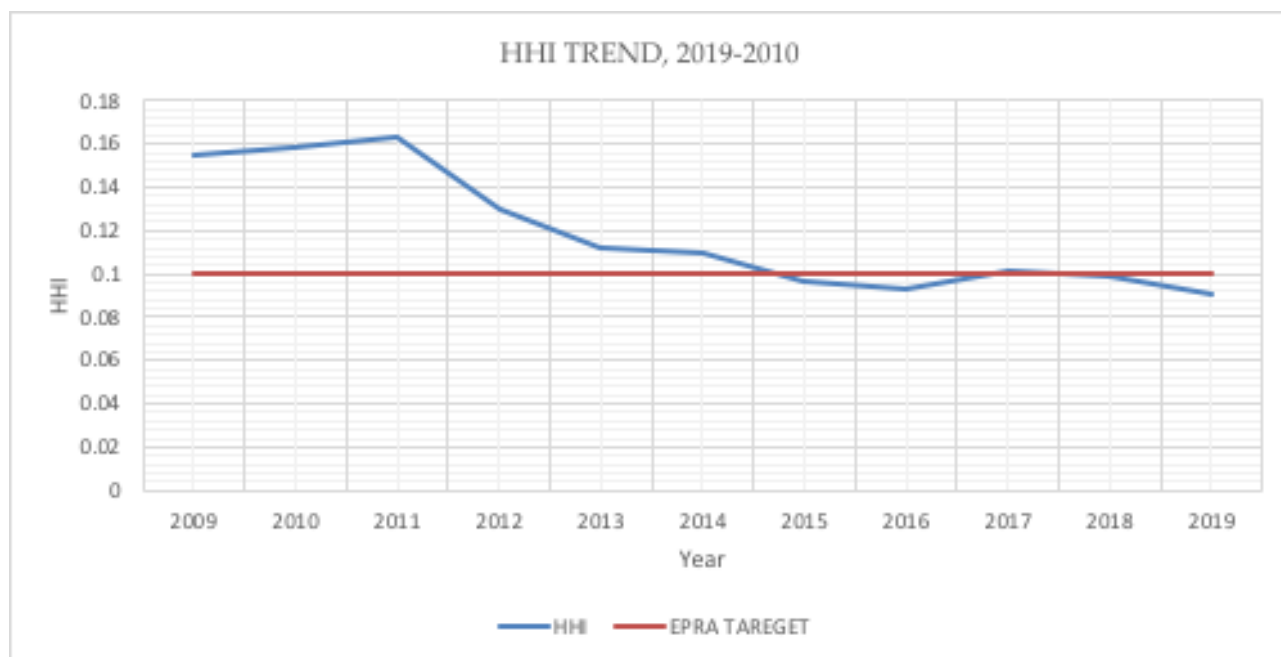
Source: PIEA 2019

50. The Herfindahl–Hirschman Index (HHI) for the petroleum industry reduced from 0.0995 in 2018 to 0.0902 as of September 2019. The HHI fell within the Authority’s expected threshold of 0.1. The rate of competition in the petroleum industry is expected to improve with effective and fair regulation from the Authority.

51. It is EPRA’s responsibility to provide a level playing field to both large and small firms in the petroleum industry to attract investors and encourage expansion of the existing system. Monitoring and managing competition in the market is therefore important and has been given priority.

52. It is therefore reasonable to conclude that the downstream petroleum sub-sector/industry is improving its competitiveness, attributable to a robust licensing regime and the encouraging of smaller players to participate in the oil marketing business as confirmed by the HHI of 0.0902. Figure 11 below shows trend analysis of the HHI index in Kenya from 2009 to 2019.

Figure 11: Trends in the HHI Index for the Petroleum Sector (2009-2019)



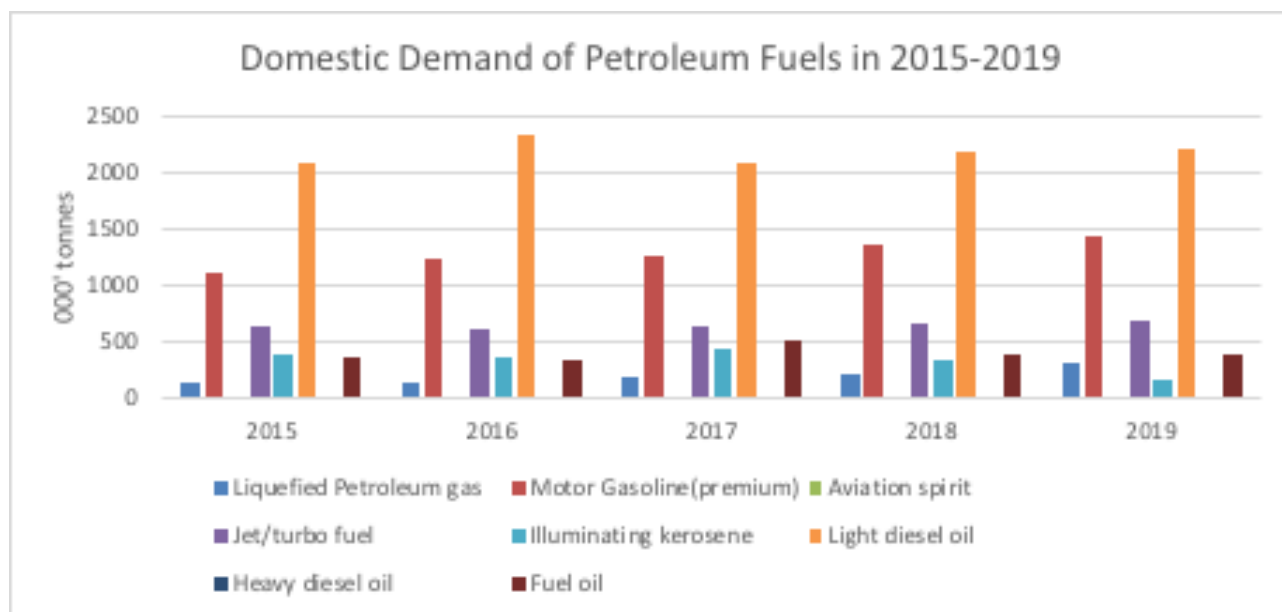
Source: EPRA,2020

- An index below 0.1 indicates low concentration
- An index between 0.1 and 0.18 indicates moderate concentration
- An index above 0.18 indicates high concentration

3.4 Consumption of Petroleum Products in Kenya

53. Light Diesel oil, the dual-purpose fuel consumed by transport and agriculture, increased from 2080 thousand tonnes in 2015 to 2,198 thousand tonnes in 2019. Motor gasoline which is mostly used in the transport sector registered a significant growth from 1107 thousand tonnes in 2015 to 1434 thousand tonnes in 2019 owing to the rise in a number of vehicles entering the domestic market. The use of LPG at homes, educational and health institutions has risen from 148 thousand tons in 2015 to 312 thousand tonnes in 2019. Illuminating kerosene, the most popular fuel for use by households in lighting and cooking registered about 168 thousand cubic metres in 2019 as compared to about 390 thousand cubic metres consumed in 2015. In general, the demand for petroleum products increased from 4738.5 thousand tonnes in 2015 to 5207 thousand tonnes in 2019 as shown in figure 11.

Figure 11: Trends in Consumption of Petroleum Products, 2015-2019



Source: KNBS

54. Table 11 shows the demand for petroleum products for the period 2015 to 2019. Total domestic demand for petroleum products increased marginally to 5.2 million tonnes in 2019. Liquefied Petroleum Gas use continued with a five-year increasing trend to record a 40.4 per cent increase to 312.1 thousand tonnes over the review period. This is partly attributed to a significant increase in the price of illuminating kerosene following the introduction of the adulteration levy imposed in 2018.

Table 11: Demand of Petroleum Products, 2015-2019 in 000' Tonnes

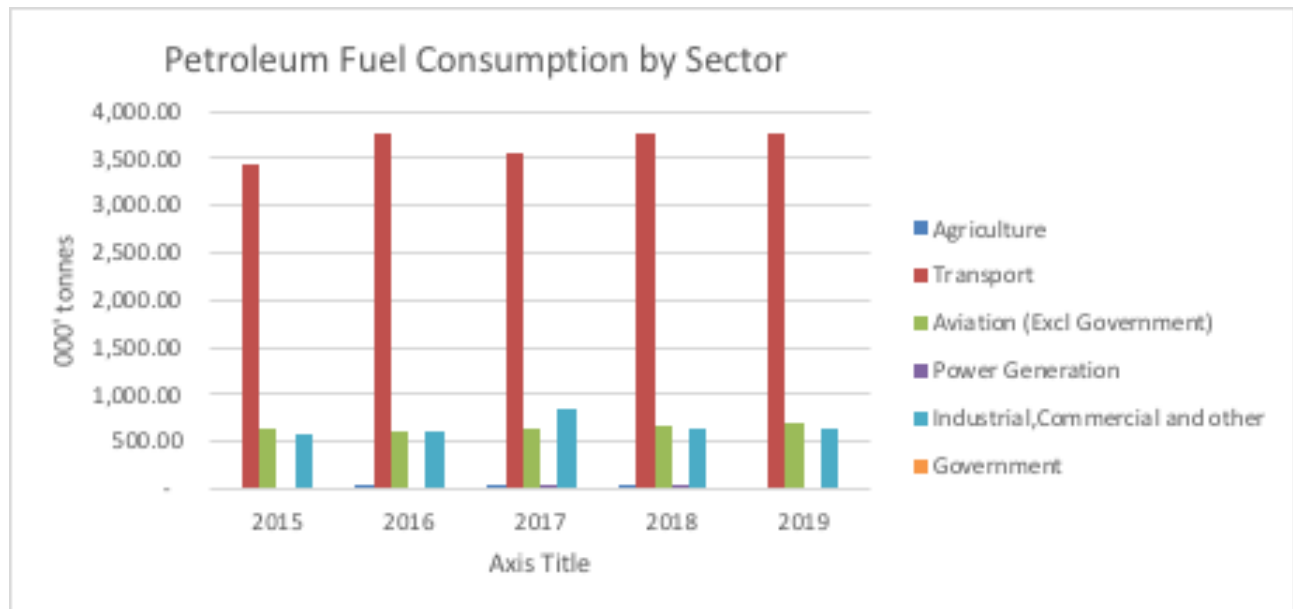
Petroleum Fuels	2015	2016	2017	2018	2019
LPG	148.6	151.7	189.3	222.3	312.1
Motor Gasoline	1107	1227.2	1267.4	1359	1434.3
Aviation Spirit	18.7	4.8	3.8	18.8	10.2
Jet/Turbo fuel	635.3	619.2	649.7	674.4	699.4
Illuminating Kerosene	390.1	371.7	448	339.4	168.3
Light Diesel Oil	2080.9	2318.3	2086.2	2173.1	2198.7
Heavy Diesel Oil	0.1	0.5	1.2	0.2	1.3
Fuel Oil	357.8	350.9	525	402	382.8
Total Domestic Demand	4738.5	5044.3	5170.6	5189.2	5207.1
Exports of Petroleum Fuels	4.8	12.5	6.4	8.4	17
Total Demand	4743.2	5056.7	5177	5197.6	5214.1

Source: Economic Survey 2020

3.4.1 Consumption of Petroleum Products by Sector

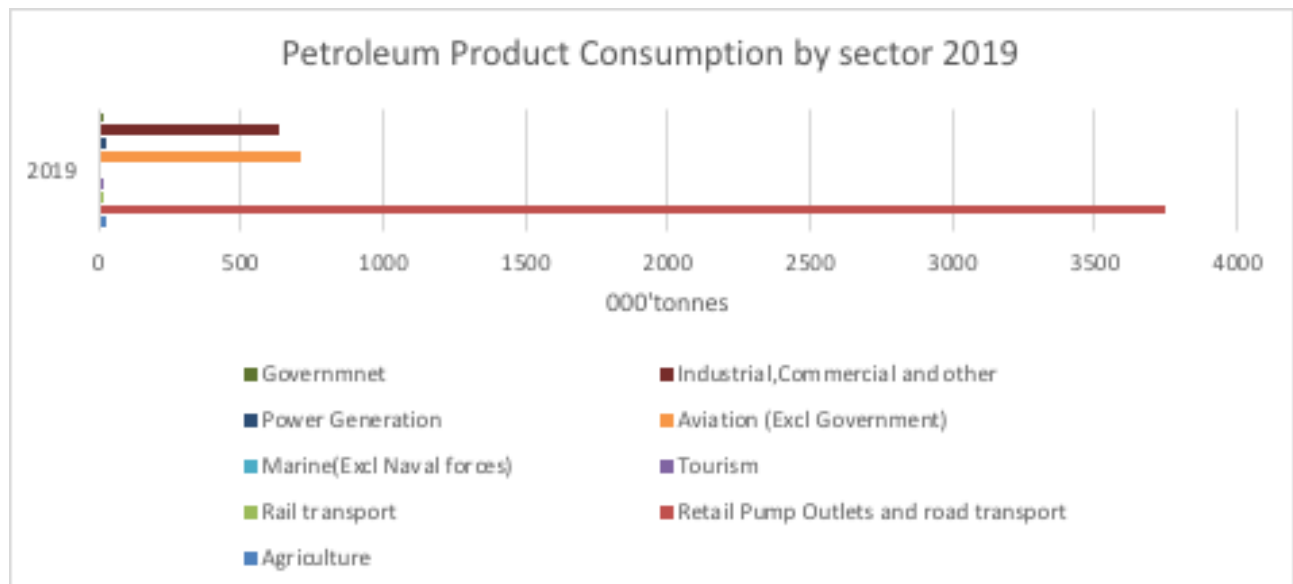
55. The bulk of petroleum products is consumed in manufacturing, commercial, transport, residential, power generation, and street lighting. The transport sector is the largest consumer of petroleum products followed by the manufacturing, agriculture and power generation respectively. Over the years, the transport sector generally consumed more than 70% of the total net domestic sales of petroleum products as compared to the manufacturing sector, which consumed less than 15% of the total net domestic sales of petroleum products.

Figure 12: Sector-wise Consumption of Petroleum Products 2017-2019



Source: Computation based on KNBS data

Figure 13: Sector-wise Consumption of Petroleum products in 2019



Source: Computations based on KNBS Data

3.5 Petroleum and Gas Infrastructure

56. The petroleum and gas infrastructure in Kenya not only ensures the security of supply and access in the country but also supports the East African Community and even countries in the great lake region such as the Democratic Republic of Congo in the Eastern Region, South Sudan and Ethiopia in the Northern Region. The petroleum and supply chain is supported by the following critical infrastructure as discussed here below:

3.5.1 Import Terminals

57. The country at the moment imports all her petroleum and gas products. The products are mainly sourced from the Middle East, Europe and Asia and imported mainly through the port of Mombasa. In order to handle products with the highest standards of environmental management and safety, the country has developed various oil terminal infrastructure to handle imports. These have been developed by the Government and related agencies or through Public Private Partnerships (PPPs) in the case of Africa Oil and Gas Limited (AGOL) that handles Liquefied Petroleum Gas. The key oil terminals include:

- Kipevu Oil Jetty (KOT): This is located at Kipevu area, Mombasa County and handles large petroleum vessels. The Product is then transferred to the government owned Kipevu Oil Storage Facility (KOSF).
- Shimanzi Oil Terminal (SOT): This is used for the importation of petroleum by small vessels.
- Mbaraki: This is a privately-owned facility.
- Africa Gas & Oil Limited (AGOL): This is a dedicated LPG facility built under concessionary terms from the Kenya Ports Authority. It is connected to a common user manifold. The only storage depot connected to it is the AGOL mainland facility.
- Kisumu Oil Jetty: This is located on the shores of Lake Victoria and is used for the exportation of petroleum products to the countries bordering the lake.

3.5.2 Petroleum Storage Tanks

58. As at December 2019, the total storage capacity stands at 887 227 m³. AGO utilizes the largest storage capacity of 37.99% followed by MSP at 27.56% with Jet A-1 using the least storage capacity at 12.56%. This is illustrated in table 12.

Table 12: Storage capacity (Gross) as of December 2019 (m³)

Station	MSP	AGO	IK	Jet A-1	Total
Moi Airport	-	-	-	7,349	7,349
Nairobi Terminal	71,726	66,551	57,187	37,116	232,580
Jomo Kenyatta Airport	-	-	-	54,141	54,141
Nakuru Depot	12,163	15,702	2,668	-	30,533
Kisumu Depot	14,371	19,388	5,013	6,516	45,288
Eldoret Depot	15,471	21,922	4,413	6,283	48,089
Sub-Total	113,731	123,563	69,281	111,405	417,980
Kipevu Oil Storage Facility (KOSF)	69,535	131,725	124,973	-	326,233
KPRL (Changamwe)	61,269	81,745	-	-	143,014
Grand Total	244,535	337,033	194,254	111,405	887,227

Source: KPC, 2020

3.5.3 Petroleum Pipeline Network

59. Petroleum pipelines: The pipeline system consists of trunk lines and distribution lines from Mombasa running through Nairobi to the Western Kenya towns of Nakuru, Eldoret and Kisumu. With the completion of Line 5, which is a twenty-(20) inch pipeline, the government has enhanced efficiency and security of supply. Line 5 which runs from Mombasa to Nairobi has the largest diameter and the fastest flow rate out of all the other lines. It is expected to meet demand for petroleum products for Kenya and the region until the year 2044. Table 14 highlights the installed flow rates as of December 2019.

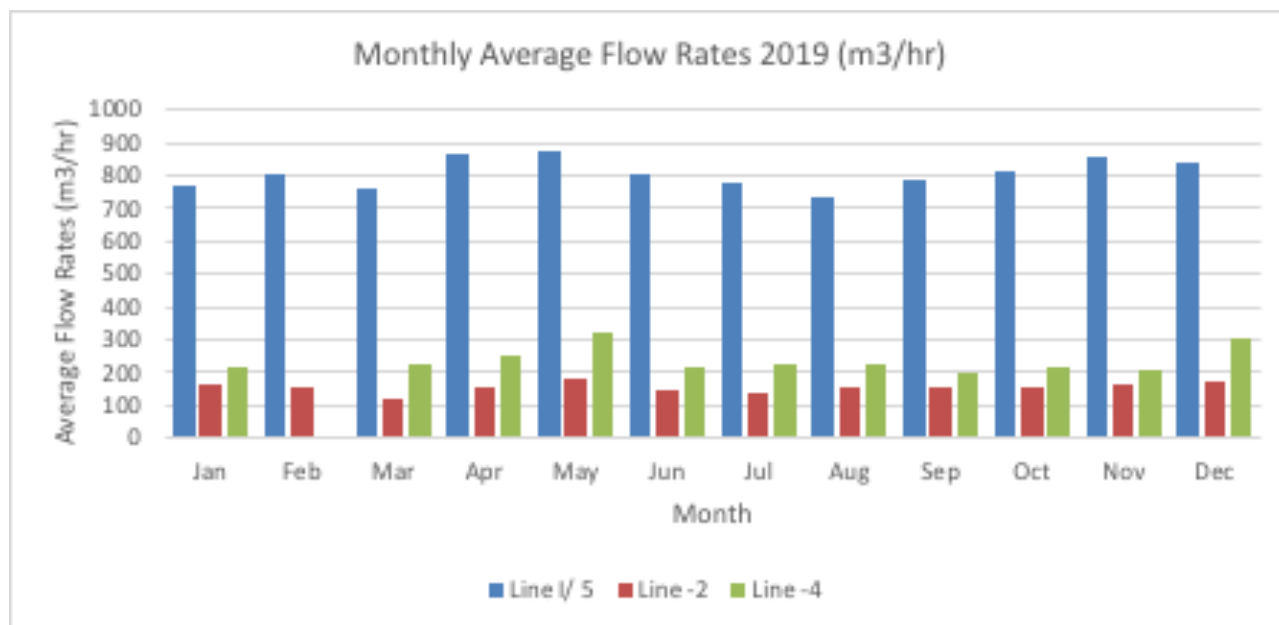
Table 13: Installed Flow rates as at December 2019

Pipeline Segments	Diameter (Inches)	Flow Rate (m3/hr)
Mombasa- Nairobi (Line 1)	14	830*
Mombasa- Nairobi (Line 5)	20	1,000
Nairobi- Nakuru- Eldoret (Line 2)	8 & 6	220
Sinendet- Kisumu (Line 3)	6	110
Nairobi- Eldoret (Line 4)	14	311
Sinendet-Kisumu (Line 6)	10	290
Total		
* Due its condition Line-1 can achieve 800m3/hr		

Source: KPC, 2020

60. Figure 12 depicts the average monthly flow rates of the major lines. Line 1/5 (Mombasa to Nairobi) overtakes the flow rate of all the lines throughout 2019 with a yearly average of 808 m3/hr. Line 2 (Nairobi-Nakuru-Eldoret) exhibits the slowest flow rate throughout 2019 averaging at 156 m3/hr in 2019.

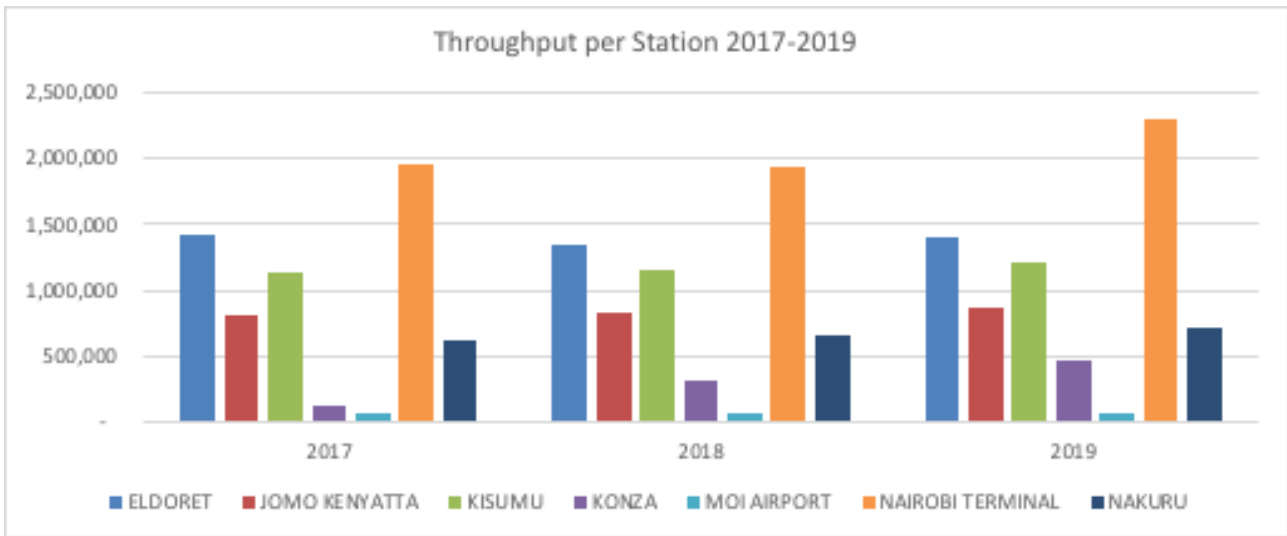
Figure 14: Monthly Average flow rate



Source: Kenya Pipeline Company (KPC) 2020

61. Nairobi terminal has the highest throughput within the time frame 2017 to 2019, followed by Eldoret, Kisumu and Jomo Kenyatta respectively. Moi Airport exhibits the lowest throughput as illustrated in figure 15.

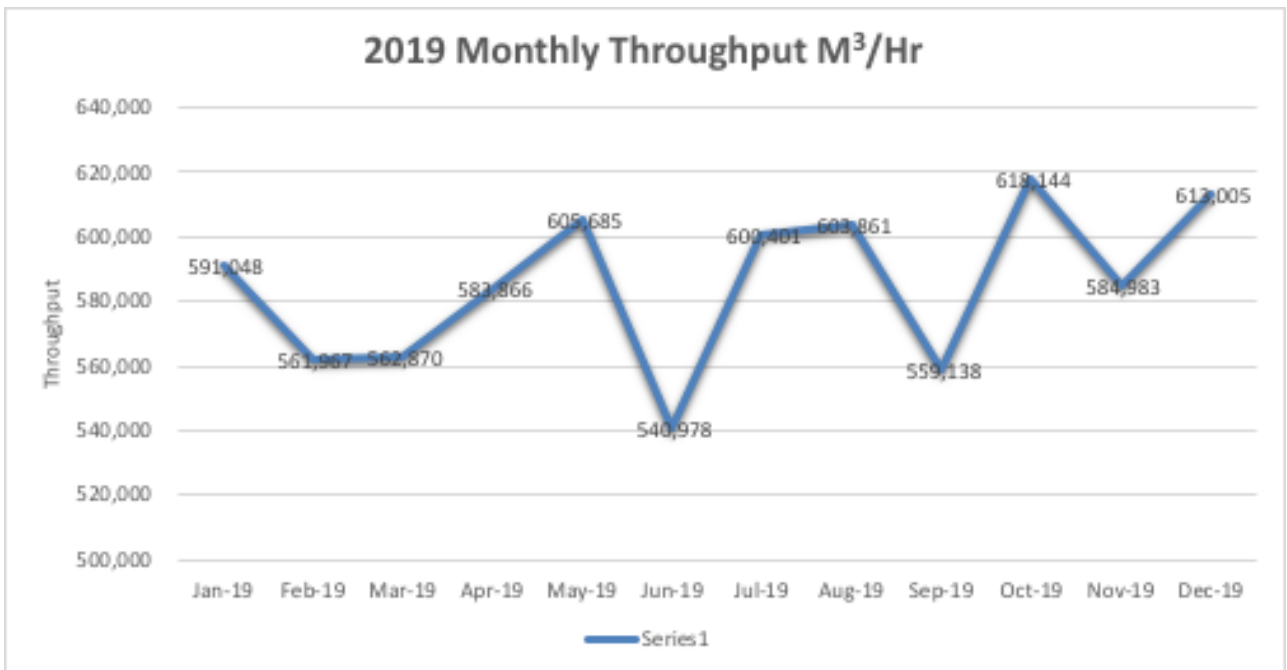
Figure 15: Throughput per station



Source: Kenya Pipeline Company (KPC) 2020

62. In terms of throughput, the year 2019 started at 591,048 m³/hr, experiencing steady fluctuations until Jun 2019 when it dips down to 540,978 m³/hr. Subsequently reaching the highest throughput in October 2019 at 618,144 m³/hr and closing the year at 613,004 m³/hr. The monthly throughput trend is depicted in Figure 16.

Figure 16: Monthly Throughput (2019)



Source: Kenya Pipeline Company (KPC) 2020

3.6 Petroleum and Gas Retail Networks

63. Kenya has over 1,800 retail stations. Stations are classified as Tier 1, 2, 3 and 4 depending on land area, services offered and storage capacity.

3.7 Licensing of Petroleum and Gas

64. The Petroleum Act CAP 116 was enacted in 1948 (with a major revision in 1972) and was a major law governing the petroleum sub-sector until 2006. The petroleum sub-sector was highly regulated with price controls for the main products. When the sector was liberalized in 1994, various challenges were experienced such as proliferation of substandard petroleum facilities and products. To address the challenge, Sessional Paper No. 4 of 2004 set the pace for a new law to regulate the petroleum sector, hence the Energy Act No. 12, which was enacted in 2006.

65. Following the enactment of the Energy Act No. 12 of 2006, the Electricity Regulatory Board (ERB) was transformed to the Energy Regulatory Commission (ERC). Consequently, the ERC was mandated to regulate petroleum, renewable energy and electricity sub-sectors. The Energy Act, 2006 was further repealed and a new Energy Act, 2019 and Petroleum Act, 2019 enacted earlier in March 2019. The Energy Act, 2019, provided for the transition of Energy Regulatory Commission to the Energy and Petroleum Regulatory Authority with expanded mandates. Additionally, Section 74(1) (a) of the Petroleum Act, 2019 gives the Authority the mandate to grant licenses, permits or certificates to any person willing to undertake importation, exportation, bulk storage or transportation of petroleum crude or products. Petroleum licensees are classified into the following categories:

Table 14: Petroleum Licensees 2019

Licensee	Number
Importers of petroleum products	115
Storage depots	26
LPG storage and filling stations	64
Pipeline transportation	1
Wholesalers and Exporters	540
Transportation by Road	100
Retailers	1800
Petroleum Tankers	640
Petroleum Drivers	600

Source: EPRA

66. Some of the companies operate in almost all the above licensable activities. Observance of fair competition is regulated in liaison with the Competition Authority of Kenya.

3.8 Pricing Data for Petroleum and Gas

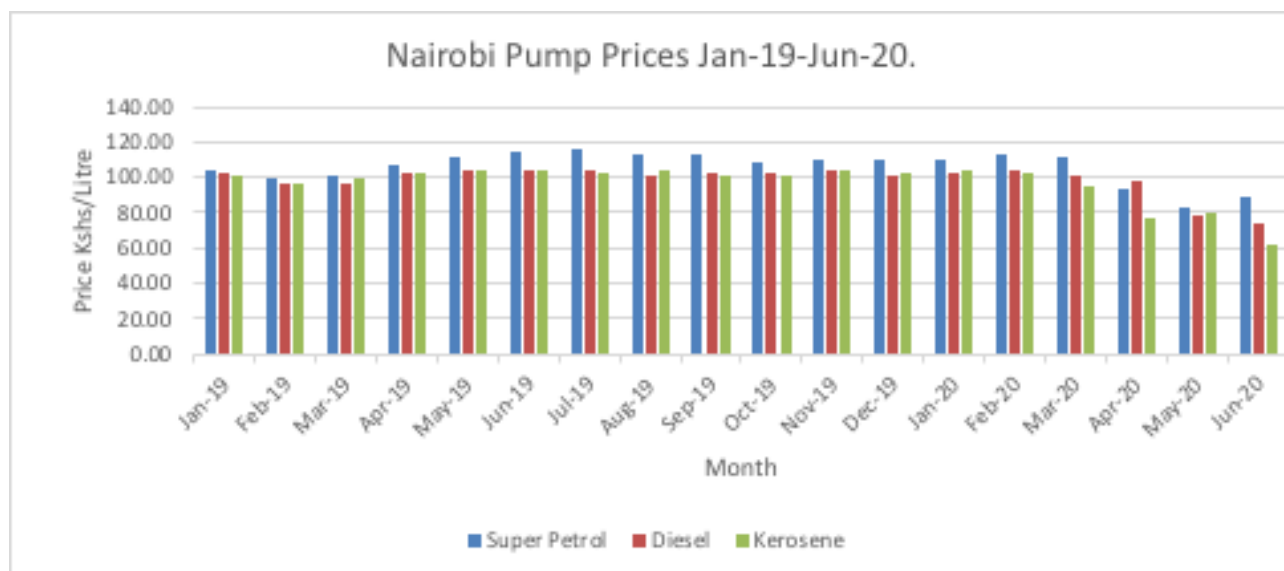
67. Under, Section 101(y) of the Petroleum Act 2019, EPRA, is mandated to determine the whole- sale and retail prices of petroleum and petroleum products. In compliance with the statute, the Authority regulates the maximum petroleum pump prices for AGO, Super Petrol and Illuminating Kerosene. The Authority publishes maximum pump prices for all major towns around the country every 14th day of every month.

68. The analysis of petroleum pump prices displayed mixed performance in the last one year. For Nairobi, Super petrol pump prices increased from 104.21Ksh/litre in January to 115.39Ksh/ litre in July 2019. This was followed by a decline to 112.81Ksh/litre in September and further to 109.50 Ksh/litre in December 2019. This was followed by an increase to 110.20Ksh/Litre and 112.87Ksh/Litre in January and February 2020 respectively. The super petrol price then declined to 83.33Ksh/Litre in May 2020 before increasing to 89.1Ksh/Litre in June 2020. Diesel pump prices increased from 95.96 Ksh/litre in February to an all-time high 104.76 Ksh/litre in June though there were fluctuations within the trend. Kerosene pump prices steadily increased from 96.50 Kshs/ litre in February to a maximum 104.37 Ksh/litre in May then experienced steady fluctuations and closing the year at 102.31 Ksh/litre in December.

69. Fuel adulteration remains a challenge due to unethical behavior of some marketers who have not embraced patriotism and fair competition. The Authority has however created a new directorate of Enforcement and Consumer Protection and this has reduced the malpractices to a huge extent due to heightened surveillance efforts.

70. The LPG prices are not regulated. This is mainly because the LPG infrastructure is still underdeveloped. However, with improvement of infrastructure, Open Tender System (OTS) can be introduced to deepen competition and economies of scale in supply.

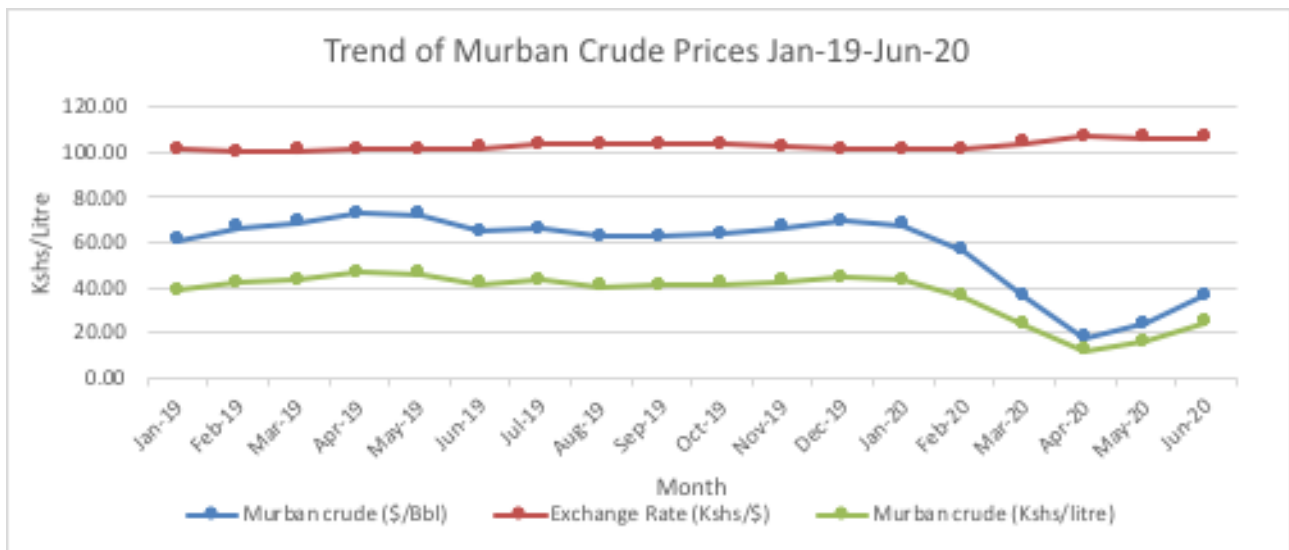
Figure 15: Nairobi Petroleum Pump Prices Jan-19-Jun-20



Source: EPRA, 2020

71. With regard to the international oil and gas markets, throughout 2019, increases in U.S. petroleum production as a result of increased fracking of shale deposits exerted downward pressure on global crude oil prices. In addition, production cuts by the Organization of the Petroleum Exporting Countries (OPEC) and U.S. sanctions on Iran and Venezuela that limited crude oil exports from those countries compounded the pressure on international crude oil prices. Consequently, annual average Murban Adnoc crude oil prices dropped from 71.48 USD/Bbl in 2018 to 64.92 USD/Bbl in 2019. Murban crude oil recorded the lowest price of 17.64USD/Bbl in April 2020 followed by a rise to 23.52USD/Bbl and 36.34 USD/Bbl for May and July 2020 respectively. The decline in crude oil prices was as a result of drastic decline in demand following lockdowns and travel restrictions due to corona pandemic.

Figure 16: Trends in international price for Murban Crude Prices and Exchange rate for Jan-19-Jun-20



Source: Computations based on EPRA data

Table 15: Approved list of firms undertaking importation, exportation and wholesale of petroleum products with the exception of LPG as of December 2019

No.	License Number	Company Name	Expiry Date
1	ERC/PET/3973	ALBA PETROLEUM LIMITED	12/01/2019
2	ERC/PET/3964	DALBIT PETROLEUM LIMITED	12/01/2019
3	ERC/PET/3972	FOSSIL FUELS LIMITED	12/01/2019
4	ERC/PET/3956	HASS PETROLEUM KENYA LIMITED	12/01/2019
5	ERC/PET/3970	OLYMPIC PETROLEUM LIMITED	12/01/2019
6	ERC/PET/3955	PETRO OIL KENYA LIMITED	12/01/2019
7	ERC/PET/3983	TOTAL KENYA LIMITED	12/01/2019
8	ERC/PET/4015	BANODA OIL LIMITED	23/01/2019
9	ERC/PET/3988	CITY OIL (K) LIMITED	23/01/2019
10	ERC/PET/4026	HASMACK COMPANY LIMITED	07/02/2019
11	ERC/PET/4025	TEXAS ENERGY LTD	07/02/2019
12	ERC/PET/4034	ELIORA ENERGY LIMITED	08/02/2019
13	ERC/PET/4040	ROYAL ENERGY (K) LIMITED	08/02/2019
14	ERC/PET/4072	SOCIETE PETROLIERE KENYA LIMITED	20/02/2019
15	ERC/PET/4073	AWALI GROUP LIMITED	21/02/2019
16	ERC/PET/4075	ILADE OIL CO. LIMITED	22/02/2019
17	ERC/PET/4102	MS OIL LIMITED	05/03/2019
18	ERC/PET/4084	NATIONAL OIL CORPORATION OF KENYA	05/03/2019
19	ERC/PET/4090	SAVANNA ENERGY KENYA LIMITED	05/03/2019
20	ERC/PET/4115	NETGAS AND ENERGY LIMITED	12/03/2019
21	ERC/PET/4107	ORYX ENERGIES KENYA LIMITED	12/03/2019
22	ERC/PET/4131	JAK LINE COMPANY LTD	21/03/2019
23	ERC/PET/4136	ONE PETROLEUM LIMITED	21/03/2019
24	ERC/PET/4135	TECAFLEX LIMITED	21/03/2019
25	ERC/PET/4182	EMKAY INTERNATIONAL LIMITED	05/04/2019
26	ERC/PET/4155	MOIL KENYA LIMITED	05/04/2019
27	ERC/PET/4161	ZACOSIA TRADING LIMITED	05/04/2019
28	ERC/PET/4194	MERIDIAN ENERGY LIMITED	06/04/2019
29	ERC/PET/4193	TESLOR CORPORATION LIMITED	06/04/2019
30	ERC/PET/4188	TOSHA PETROLEUM (KENYA) LIMITED	06/04/2019
31	ERC/PET/4208	BACHULAL POPATLAL (KENYA) LIMITED	13/04/2019
32	ERC/PET/4210	RED STAR PETROLEUM LIMITED	13/04/2019
33	ERC/PET/4211	ENGEN KENYA LIMITED	16/04/2019
34	ERC/PET/4218	AFRO PETROLEUM LTD	19/04/2019
35	ERC/PET/4236	BUZEKI ENTERPRISES LIMITED	19/04/2019

No.	License Number	Company Name	Expiry Date
36	ERC/PET/4232	MENA ENERGY LIMITED	19/04/2019
37	ERC/PET/4241	ASHARAMI SYNERGY LIMITED	30/04/2019
38	ERC/PET/4240	ASTROL PETROLEUM COMPANY LIMITED	30/04/2019
39	ERC/PET/4253	HARED ENERGY LIMITED	30/04/2019
40	ERC/PET/4276	TAAM PETROLEUM LIMITED	30/04/2019
41	ERC/PET/4291	BULK PETROLEUM LIMITED	18/05/2019
42	ERC/PET/4307	EPPIC OIL (K) LIMITED	18/05/2019
43	ERC/PET/4342	DESERT STAR OIL CO.LIMITED	25/05/2019
44	ERC/PET/4376	BRAIN FIELD OIL AND GAS LIMITED	30/05/2019
45	ERC/PET/4385	GLOBAL PETROLEUM PRODUCTS KENYA LIMITED	30/05/2019
46	ERC/PET/4404	MOGAS KENYA LIMITED	30/05/2019
47	ERC/PET/4280	RIVA PETROLEUM DEALERS LIMITED	30/05/2019
48	ERC/PET/4458	BUSHRA ENERGY LIMITED	26/06/2019
49	ERC/PET/4552	LUQMAN PETROLEUM LIMITED	06/07/2019
50	ERC/PET/4531	OILCOM (K) LIMITED	06/07/2019
51	ERC/PET/4579	TOWBA PETROLEUM COMPANY LIMITED	13/07/2019
	License Number	Company Name	Expiry Date
52	ERC/PET/4609	EVON INTERNATIONAL ENERGY LIMITED	17/07/2019
53	ERC/PET/4636	LINK OIL LTD	17/07/2019
54	ERC/PET/4607	OILPRO LIMITED	17/07/2019
55	ERC/PET/4604	PERFORMANCE PARTS LIMITED	17/07/2019
56	ERC/PET/4615	RANWAY TRADERS LIMITED	17/07/2019
57	ERC/PET/4622	VIVO ENERGY KENYA LIMITED	17/07/2019
58	ERC/PET/4639	KOSMOIL PETROLEUM (EA) LIMITED	25/07/2019
59	ERC/PET/4703	RAMJI HARIBHAI DEVANI LIMITED	25/07/2019
60	ERC/PET/4723	AFTAH PETROLEUM(K)LTD	27/07/2019
61	ERC/PET/4767	GAPCO KENYA LIMITED	02/08/2019
62	ERC/PET/4746	OIL ENERGY KENYA LIMITED	02/08/2019
63	ERC/PET/4744	PETROCAM KENYA LTD	02/08/2019
64	ERC/PET/4819	AXON ENERGY LIMITED	16/08/2019
65	ERC/PET/4832	JOJES OIL DEALERS LIMITED	16/08/2019
66	ERC/PET/4842	GASLINE PETROLEUM LIMITED-Conditional License	24/11/2018
67	ERC/PET/4897	OCEAN ENERGY LIMITED	31/08/2019
68	ERC/PET/4895	REGNOL OIL (K) LIMITED	31/08/2019
69	ERC/PET/4967	EAST AFRICAN GASOIL LIMITED	12/09/2019
70	ERC/PET/5037	KAYMAN ENERGY LIMITED	28/09/2019
71	ERC/PET/5039	TORCH ENERGY LTD	28/09/2019
72	ERC/PET/5068	KENCOR PETROLEUM LIMITED	05/10/2019

Source: EPRA, 2019

4

RENEWABLE ENERGY

4.1 Solar Energy

72. Kenya's geographical location astride the equator gives it a unique opportunity for a vibrant solar energy market. The country receives good solar insolation all year round coupled with moderate to high temperatures estimated at 4-6 kWh/m²/day. The percentage of solar energy harnessed for commercial and domestic applications is insignificant relative to the potential. Solar energy can be used for lighting, heating, drying and generating electricity.

4.1.1 Installed Capacity of Solar Power

73. The Garissa Solar Power Plant with an installed capacity of 54.5MW is the only solar power plant connected to the national grid and is owned by the Rural and Renewable Energy Corporation (RREC) formally the Rural Electrification Authority (REA). The national grid covers only a small percentage of the national territory. Connectivity in rural areas is especially low. Solar home systems provide an alternative to allow rural dwellers to access electricity without connecting to the grid.

4.1.2 Solar Home Systems

74. An estimated 500,000 rural households in Kenya have solar home systems. This success has been largely due to private sector activity. The high level of uptake has been through the sale of products that best fit the purchasing power of rural households, and by making these products available within the mobility range of potential customers. Companies such as M-Kopa, Sun King, Mobisol and Azuri offer consumers a battery package capable of running three or four lights, TV and a sound system. Payment modes vary with most clients paying monthly by use of mobile platforms for three years before taking full ownership of the equipment.



4.1.3 Solar Water Heating Installations

75. Solar water heating systems are mainly used in homes, hotels, hospitals and learning institutions. As of December 2014, a survey to determine the number of installed solar water heating (SWH) units was launched. The demand for solar water heating (SWH) is however, projected to grow to more than 800,000 SWH units by 2020 equivalent to 300,000 TOE. This represents a growth rate of 20% per annum.

Table 16: Solar Heating Installations

Category of License	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	TOTAL
Solar Water Heating Contractors (SWHC)	2	14	42	31	49	0	138
Solar Water Heating Technicians (SWHT)	8	83	59	41	54	0	245

Source: EPRA, 2020

4.2 Bioenergy

76. Bio-energy is the energy derived from various sources of solids, liquids and gaseous biomass including fuel wood, charcoal, ethanol, bio-diesel and biogas. Biomass contribution to Kenya's final energy demand is 70% and provides for more than 90% of rural household energy needs. The main sources of biomass in Kenya include charcoal, wood-fuel and agricultural waste. The government has identified the existence of a substantial potential for power generation using forestry and agro-industry residues including bagasse. The total energy generated through cogeneration using sugarcane bagasse is 193MW. Mumias Sugar Company, an independent power producer generates 35MW out of which 26MW is dispatched to the grid. However, opportunities within other sugar factories estimated to be up to 300MW have not been exploited.

4.2.1 Biogas Installations in Kenya

77. Biogas in Kenya is widely produced with over 8000 biogas plants utilizing various raw materials e.g. agricultural wastes, slaughterhouse wastes, municipal wastes etc. However, the situation is amorphous in the sense that there is no consolidated data on biogas production making it a challenge in determining the country's installed capacity.

78. Biogas potential in Kenya has been identified in municipal waste, sisal and coffee production. The total installed electric capacity potential for all sources ranges from 29-139MW, which is about 3.2 to 16.4% of the total electricity production.

4.3 Wind Energy

79. Wind energy uses naturally occurring energy of the wind for practical purposes like generating electricity, charging batteries, or pumping water. Large, modern wind turbines operate together in wind farms to produce electricity for utilities. By the end of 2019, the installed capacity of wind plants was 335.5W.

80. The grid connected wind turbines in Kenya are: KenGen 25.5MW wind plant in Ngong comprising of thirty 850kW turbines, Lake Turkana wind power (310MW), Marsabit wind power and Habaswein wind power plant

4.4 Geothermal Energy

81. Geothermal energy utilizes the heat coming from the earth's sub-surface. Deep wells are dug to access steam and hot water from the underground reservoirs. Steam is then used to drive turbines connected to electricity generators.

82. Geothermal energy is dominant in Rift Valley region with recent estimates putting the resource potential at about 10,000MW. The installed capacity by December 2019 was 828MW. Currently, geothermal capacity provides nearly 50% of total power generation. Due to the low short-run marginal costs, geo-thermal power plants generally run as base load. At present, geothermal power is being harnessed in the Olkaria, Menengai and Eburru fields.

4.5 Energy Efficiency

83. Energy efficiency and conservation has been identified as a key factor in improving productivity in industrial, commercial and institutional facilities as well as conserving the environment.

84. During the year 2019, EPRA commissioned a regulatory impact assessment study on the Energy management regulations, and how the sector benefit from the regulations in terms of cost savings and avoided grid emissions.

Table 17: Estimated electrical energy and cost savings, and avoided emissions

Type of facility	No. of compliant facilities in category	Projected annual energy savings (GWh)	Projected annual energy cost savings (Billion Ksh.)	Projected annual avoided CO2 emissions (Ton)
Industrial	634	924	16.4	107,199
Commercial	679	178	2.8	20,667
TOTAL	1,313	1,102	19.2	127,866

Source: EPRA

85. From the study, it shows that in 2019, full compliance saved an estimated 1,102GWh, with industrial facilities saving 83% of total energy saved. The amount of saved energy would be equivalent to about Ksh.19.2 billion energy cost savings and 127,866 tons of avoided CO2 emissions annually. Clearly, energy conservation is a very clean source of energy.

5

OTHER ENERGY SOURCES AND CROSS CUTTING ISSUES

5.1 Coal Generated Energy

87. Coal is a combustible black or brownish-black sedimentary rock, formed as rock strata called coal seams. Coal is mostly carbon with variable amounts of other elements; chiefly hydrogen, sulfur, oxygen, and nitrogen. Coal is formed if dead plant matter decays into peat and over millions of years the heat and pressure of deep burial converts the peat into coal.

5.1.2 Coal Exploration

88. The Ministry of Energy has been conducting coal exploration in the Mui Basin since 1999, covering an area of 500 square kilometers and already two promising blocks have been concessioned to a Chinese company. To ease exploration logistics, the ministry subdivided the Mui Basin into four coal blocks, A, B, C and D, measuring 121.5, 117.5, 131.5 and 120 kilometer squared, respectively. Seventy-one exploration and appraisal wells have been drilled in the Mui Basin, mainly concentrated in Block C where 56 wells were drilled to depths ranging from 75 to 445 metres. Some 32 wells have intersected coal.

89. To fast track exploration, development and production, the Government has decided to concession all four blocks to private companies through a competitive international bidding process.

5.2 Nuclear energy

90. Kenya has embarked on a programme to see the country generate 1 GW (1,000 MW) from Nuclear sources between 2020 and 2022. By 2030 Kenya is slated to have installed a capacity of 4 GW of nuclear energy, generating about 19% of Kenya's energy needs. Meaning that nuclear power would be the second largest source of energy in Kenya after geothermal power, which is a clean form of energy. This will be spearheaded by the Nuclear Power Energy Agency (NuPEA) formally the Kenya Nuclear Electricity Board.



6

ENERGY MATRIX FOR KENYA

91. The Energy & Petroleum Regulatory Authority has developed Energy Balances for Kenya that depicts the flow of energy from production, through transformation to final consumption in one common unit of measurement i.e. thousand tonnes of oil equivalent (ktoe). Energy Balances are considered as the best way of presenting the energy flows in a given economy. Various multi-lateral agencies including Eurostat, the International Energy Agency (IEA) and the United Nations (UN) also prepare Energy Balances.

92. An Energy Balance is an accounting framework for the compilation and reconciliation of data on all energy entering, exiting and used within the national territory of a given country during a reference period. The Energy Balance expresses all forms of energy in a common accounting unit, and shows the relationship between the inputs and outputs from the energy transformation industries.

93. In the Energy Balance, all energy flows should be accounted for, and the balance is based on the first law of thermodynamics, which states that: “the amount of energy within any closed system is fixed and can be neither increased nor diminished unless energy is brought into or sent out from that system”.

94. Energy balances show the commodity balances in a way that explains fuel conversion and the dependence of supply of one fuel to the other. It presents the energy flow as the primary fuels are processed or used and as the consequent secondary fuels are produced and used.

95. The presentation of energy statistics expressed in natural units in the form of commodity balances between the supply and use of the energy commodities provides a check on the completeness of the data and a simple means of assembling the main statistics of each commodity so that key data are easily obtained. However, because fuels are mainly bought for their heat-raising properties that can be converted into different fuel products, it is also helpful to present the supply and use data in energy units. The format adopted is termed as the energy balance and allows users to see the fuel conversion efficiencies and the relative importance of the different fuel supplies and their contribution to the economy. The energy balance is also the natural starting point for the construction of various indicators of energy consumption, (for example consumption per capita or per unit of GDP) and energy efficiency. The energy balance also acts as a high-level check on the data accuracy as apparent energy gains in conversion processes or large losses indicate data problems.



96. The energy balance is a multipurpose tool that is designed to::

- a) Enhance the relevance of energy statistics by providing comprehensive and reconciled information on energy situation on national territory;
- b) Provide comprehensive information on energy supply and demand in national territories in order to understand energy security, the effective functioning of energy markets and other relevant policy goals and formulation of energy policies;
- c) Serve as a quality tool to ensure the consistency and comparability of basic statistics;
- d) Ensure comparability between different years and between different countries;
- e) Establish the basis for estimation of CO₂ emissions;
- f) Provide the basis for aggregated indicators (e.g. energy intensity etc);
- g) Compute efficiencies of all the transformation processes occurring in the country (e.g. refining, electricity production by combustion of fuels, etc.);
- h) Allow calculation of relative shares of various products (including renewables vs non-renewables) or sectors to the country total;
- i) Provide an input for forecast modelling and
- j) Provide a common framework for international comparisons.

97. The scope of an energy balance is determined, by amongst other things:

- i) Territory boundary – defined by the boundary of the national territory of the compiling country;
- ii) Product boundary – defined by the scope of all energy products shown in the balance columns;
- iii) Flow boundary – defined by the scope of energy flows (uses) shown in the balance rows.

98. Product and flow boundaries are fixed in the short term. If new sources of energy are discovered and used, they should be reflected in the balance. The scope of energy balance does not include:

- i) Passive energy such as heat gain of building and solar energy falling on the land to grow crops, etc.
- ii) Energy resources and reserves;
- iii) Extraction of any materials not included in primary energy production;
- iv) Non-energy products not used for energy purposes (e.g., waste and wood are covered in energy balance only to the extent they are used for energy production and not when used for other purposes).

99. The energy balance shows the content of the commodity balances translated into a standard energy unit. In Kenya, tonnes of oil equivalent (toe) are used though alternatives such as joules, therms or GWh could be used. The balance shows, for all fuels together the flows from production to final use, including the movements between fuel categories, for example gas produced, may be transformed into electricity and then consumed by the domestic sector.

6.1 Structure of the Energy Balance for Kenya

100. The energy balance presents an overall view of the energy supply for Kenya. The relative importance of each energy commodity dependence on imports; the contribution of our own fossil and renewable resources and the interdependence of commodities on one another.

101. The energy balance is constructed from the commodity balances and is normally presented by arranging the data in columns by fuel type. Heat sold is also included and treated as a fuel. An energy balance contains three main blocks of rows as explained below:

102. **Top block** – flows representing energy entering and leaving the national territory as well as stock change to provide information on supply of energy on the national territory during the reference period.

103. **Middle block** – flows showing how energy is transformed, transferred, used by energy industries and lost in distribution and transmission.

104. **Bottom block** – flows reflecting final energy consumption and non-energy use of energy products.

105. A separate row is reserved for the statistical difference (defined as the difference between primary supply and primary demand).

106. The main sections of the energy balance are described through the drawing out some of the differences of treatment compared with the commodity balances as described below:

107. **Primary energy supply:** Within the energy balance, production covers extraction of primary fuels and the generation of primary electricity (hydro, nuclear, wind). The production of secondary fuels (refined petroleum products such as petrol) and secondary electricity (that generated from coal-fired power stations) are shown in the transformation section and not in the indigenous production row at the top of the balance. For fossil fuels, indigenous production represents the marketable quantity extracted from the reserves. Indigenous production of primary electricity comprises hydro-electricity, wind and nuclear energy. The energy value for hydro-electricity is taken to be the energy content of the electricity produced from the hydro power plant and not the energy available in the water driving the turbines. A similar approach is adopted for electricity from wind generators where the electricity is regarded as the primary energy form because there are currently no other uses of the energy resource “upstream” of the generation. For nuclear, an estimate of the heat content of the steam from the reactor is used as a measure of production output.

108. The other elements of the supply part of the balance are identical to those in the commodity balances, imports, exports, marine bunkers and stock change. Exports and international marine bunkers are normally shown with negative signs, to indicate that they are taken away from the production figure before determining a measure of primary supply.

109. A stock build carries a negative sign to denote withdrawal from supply whilst a stock draw carrying a positive sign shows addition to supply. Primary supply expresses the national requirement for primary energy commodities from all sources and foreign supplies of secondary commodities. It is an indicator of the use of indigenous resources and external energy supplies. Both the amount and mixture of fuels in final consumption of energy commodities in the United Kingdom will differ from the primary supply. The “mix” of commodities in final consumption will be much more dependent on the manufacture of secondary commodities, in particular electricity. Primary supply is the combination of the indigenous production, trade, marine bunkers and stock changes (taking their signs into account).

110. **Transformation:** This plays a key role in moving primary electricity from its own column in the balance into the electricity column, so that it be combined with electricity from fossil-fueled power stations and the total disposals shown.

111. Indigenous production of primary electricity comprises of nuclear electricity, hydroelectricity and electricity from wind generation. Nuclear electricity is obtained by passing steam from nuclear reactors through conventional steam turbine sets. The electrical energy from hydro and wind is transferred from the Primary electricity column to the Electricity column using the transfers row because electricity is the form of primary energy and no transformation takes place.

112. Quantities of fuels entering the transformation activities (fuels into electricity generation and heat generation, crude oil into petroleum products (refineries), or coal into coke ovens) are shown with a negative sign to represent the input and the resulting production is shown as a positive number. For electricity generated by major power producers, the inputs are shown in the major power producers’ row of the coal & peat, crude oils, petroleum products, gas, geothermal, solar & wind etc., combustible, renewable and waste, primary electricity and heat columns.

113. The total energy input to electricity generation is the sum of the values in these ten columns. The Total column shows total electricity generated from these inputs. Within the transformation section, the negative

figures in the Total column represent the losses in the various transformation activities. This is a convenient consequence of the sign convention chosen for the inputs and outputs from transformation. Any positive figures represent a transformation gain and, as such, are an indication of incorrect data.

114. Energy industry use and final consumption in which the figures for final consumption and energy industry use generally follows the principles and definitions described under Concepts and Definitions.

6.1.1 Actual Energy Matrix for Kenya 2019

115. The actual energy balance matrix for 2019 is provided in 'Annex 12' for ease of presentation. As can be observed, Kenya is still highly dependent on primary sources of energy, which are mainly biomass based. In order to achieve sustainable energy development, there is need for a clear policy on utilizing the available resources well while at the same time improving efficiency in energy conversion and use.

6.1.2 Results and Discussions of the Kenyan Energy Matrix

116. 1. In reference to the International Standards in 2019, Kenya falls under modest consumer of energy. The total electricity generation was at 11,620.7 GWh in 2019, an increase of 3.9% from the previous year. Geothermal remained a major source of generated electricity in the country accounting for up to 45% of total generated electricity. Wind power registered a substantial increase from 375.6 GWh in 2018 to 1,562.7 GWh in 2019, which is attributed to full operationalization of the Lake Turkana Wind Power Plant. Solar power generation also registered a significant increase with generation of 92.3GWh in 2019, up from 13.7GWh in 2018, fully attributed to full operationalization of the Garissa Solar plant. However, thermal and Hydro power registered decrements of 15% and 19.6% respectively in 2019. The recent trends indicate that the country is currently benefiting from renewable energy sources with over 85% of electricity generation from renewable sources. Additionally, 98.3% of electricity consumed was generated within the country.

117. The total electricity generated, is shared by more than 74% of the country's population leaving less than 25% of the population without access to electricity. This implies that significant number of Kenyans use alternative sources of energy such as charcoal or firewood especially in the rural areas.

118. In Petroleum, Kenya's net imports for 2019 stood at 5.682 million tonnes, an increase of 5.3%. Demand for petroleum products increased slightly to 5.2 million tonnes. Uptake and use of LPG saw an upward trend recording 40.4% increment for the period ending 2019 with consumption of 312.1 thousand in the year 2019. This trend has been attributed to deliberate government policy to scale up LPG consumption and introduction of the adulteration levy on kerosene.

6.1.3 Summary of the Overall Energy Balances for Kenya

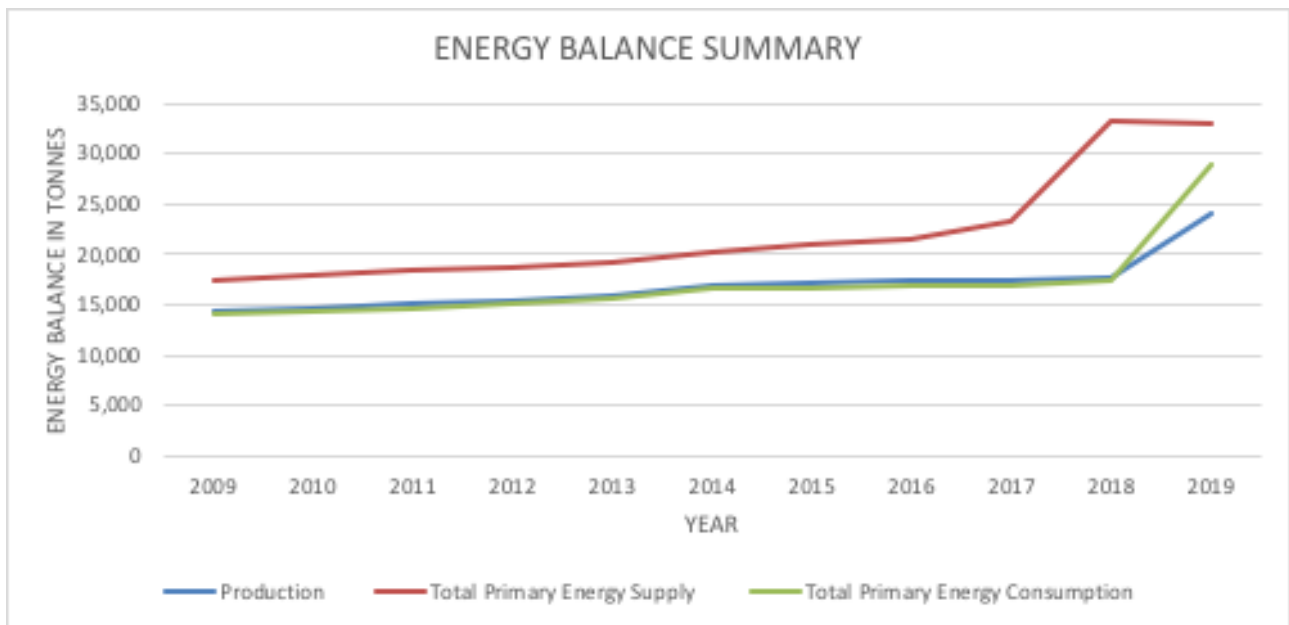
119. The overall energy balance for Kenya shows that total indigenous production, primary energy supply and total final energy consumption have generally been increasing primarily driven by growth in population and expansion of the economy. The total energy production has increased to 17,575 tonnes in 2018 up from 17,306 tonnes in 2017. With regards to total primary energy supply, production increased from 23,277 tonnes in 2017 to 23,361 tonnes in 2018. Lastly, total final energy consumption increased from 16,868 tonnes in 2017 to 17,324 tonnes in 2018. It is important to note that total indigenous production and total final energy consumption have very small differences, an indication that Kenya is primarily producing energy that only meets her needs with very little excess capacity that can be exported to her neighbors. This is very true particularly in electricity where the country imports more than it exports to Uganda in the current energy exchange agreement. Table 9 and Figure 17 below provide a summary of the energy balances for Kenya 2009 to 2019.

Table 18: Summary of Energy Balances for Kenya ('000) Tonnes, 2009-2019

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Production	14,236	14,634	15,017	15,485	15,953	16,920	17,151	17,285	17,306	17,575	24,124
Total Primary Energy Supply	17,357	17,909	18,424	18,640	19,279	20,290	21,029	21,429	23,277	33,220.96	33,089
Total Primary Energy Consumption	13,971	14,293	14,690	15,136	15,659	16,671	16,762	16,972	16,868	17,324	29,022

Source: EPRA 2020

Figure 17: Summary of Energy Balances for Kenya, 2009-2019



Source: EPRA

7

GREENHOUSE GAS EMISSIONS

7.1 Energy Emissions and Climate Change

119. Climate change impacts pose significant hazards for socio-economic development in Kenya, through prolonged droughts, unreliable weather patterns, and the emergence of new pests and diseases.

120. With the expanding economy, energy emissions have been increasing over time, driven by transportation, electricity and heat production, and other fuel combustion. The transport sector, dominated by road transport, is a significant and growing contributor to Kenya's GHG emissions: Kenya's total vehicle fleet (excluding motorcycles) has more than tripled in recent years, leading to severe traffic congestion in major cities. By the end of 2018, the transport sector consumed 75% of the petroleum products, power generation (12%) and industrial and commercial (12%). The shares of energy consumption are positively correlated with the level of emissions.

121. Electricity generation also drives energy emissions. Generation has more than tripled between 2000 to 2018, with hydro and geothermal taking a growing share of the electricity mix. As of December 2018, 28.4% of electricity was generated by hydropower from pumped storage plants, 9.60% by oil, 44.6% by geothermal and 14% by wind and 3.4% by biofuels. In terms of consumption, 54% of electricity is consumed by the industrial sector, 30% by the residential sector and 15% by the commercial sector.

7.2 Grid Emission Factor for Kenya

122. A "Grid Emission Factor" refers to a CO₂ emission factor (tCO₂/MWh) which will be associated with each unit of electricity provided by an electricity system. It is a parameter to determine the baseline emissions for Clean Development Mechanism (CDM) projects in the renewable energy sector (hydro, wind, solar PV, and geothermal power, etc.) and waste heat/gas recovery sector.

123. This ratio is based on total emissions from fossil fuels consumed for electricity generation, in both electricity-only and combined heat and power plants (CHP), divided by the output of electricity generated from all fossil and non-fossil sources. Both main activity producers and auto producers have been included in the calculation.

124. The Net grid emission factor for Kenya in 2019 remains at 0.3322 kgCO₂/kWh). This is an indication that it is one of the cleanest in Africa and the region. This is mainly attributed to the high contribution of renewable energy in the generation mix, which is at 85% of the total energy generated. Some Africa Countries such as South Africa (1.069 kgCO₂/kWh), Egypt (0.50 kgCO₂/kWh), Zimbabwe (0.6 kgCO₂/kWh) have higher grid emission factors than Kenya. India with 1.33 kgCO₂/kWh and China 0.97 kgCO₂/kWh, Estonia 1.90 kgCO₂/kWh have very high emission grid emission factors.

125. However, simulations of the LCPDP indicate emissions will increase again due to the planned opening of the coal-fired power plant in Lamu in 2029 in the Reference scenario, and in 2027 in the Vision scenario. While the Reference Scenario projects limited use of coal for power generation until 2039, the Vision scenario suggests a steep rise in electricity demand after 2030 that will primarily be met through increased coal power generation. Total annual emissions reach 3 MtCO₂e in 2039 in the Reference scenario, and 10.9 MtCO₂e in the Vision scenario. If accumulated over the entire planning horizon, the Reference scenario results in 6.5 MtCO₂e between 2019-2039, while emissions under the Vision scenario rise to 55.8 MtCO₂e in the same period.

Table 18: Carbon Footprint Country specific Green House Gas (GHG) emission factors, 2019

Rank	Country	Factor KgCO ₂ e per kWh
1	Iceland	0
2	Norway	0.011
3	Sweden	0.012
4	Switzerland	0.014
5	France	0.047
6	Brazil	0.0927
7	Austria	0.142
8	Finland	0.143
9	Belgium	0.167
10	Slovakia	0.169
11	Luxemburg	0.201
12	Denmark	0.206
13	Spain	0.228
14	United Kingdom	0.2773
15	Portugal	0.307
16	Latvia	0.313
17	Hungary	0.314
18	Italy	0.327
19	Russian Federation	0.3302
20	Slovenia	0.335
21	Argentina	0.3583
22	Lithuania	0.362
23	Romania	0.401

24	Croatia	0.417
25	United Arab Emirates	0.4333
26	Netherlands	0.457
27	Mexico	0.463
28	Germany	0.469
29	Bulgaria	0.47
30	United States	0.4759
31	Japan	0.4916
32	Republic of Korea	0.517
33	Turkey	0.5434
34	Greece	0.567
35	Czech Republic	0.576
36	China	0.6236
37	Cyprus	0.639
38	Saudi Arabia	0.7176
39	India	0.7429
40	Indonesia	0.7551
41	Malta	0.761
42	Poland	0.846
43	Estonia	0.875
45	South Africa	0.96
46	Ireland	0.3930
47	New Zealand	0.0977
48	Canada	0.8
49	Hong Kong	1.00
50	Kenya	0.3322(2011)

Source: carbon footprint.com

126. Most Green House Gas emissions are attributed to activities in the power sector. Iceland uses renewable energy sources for provision of all the country's power needs. Hydroelectric Power and Geothermal Power dominate the Country's energy mix.

127. South Africa is the largest emitter of GHG gases in Africa due to over reliance on coal for provision of Electric Power.

8

CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

128. Kenya has a stable and expanding energy supply, which is central to its ambition to establish itself as an industrialized middle-income country, as set out in its vision 2030 and the Big Four Agenda development strategy. The nation is fortunate in its energy mix: Hydro, Geothermal, solar and wind energy already play a significant role in power generation particularly in the case of geothermal, solar and wind which have room for expansion. The recent discovery of oil may soon establish Kenya as a crude oil exporter.

129. With power generation recording over 85% from renewable sources, Kenya continues to improve on her carbon footprint with regards to power generation and use. The Energy Act 2019 and Petroleum Act 2019 will further strengthen the country's position in both electricity, renewable energy and petroleum and gas segments.

130. Competition and market share analysis have shown that the country is doing well in widening its energy markets. KenGen remains a dominant player in power generation. This dominance is mainly attributed to the previous power structure that was vertically integrated but with increased unbundling and open access coupled with increased private sector participation, it is unlikely that this will remain the case in the near future.

8.2 Recommendations

131. This Report has provided a snapshot of statistics that will be collected and analyzed as part of the EPRA's Energy Statistic Report, which will be produced and published every year. This is in line with best practice among other regulators such as the Central Bank of Kenya (CBK), the Capital Markets Authority (CMA), and the Communication Authority of Kenya (CAK) among others. From this report, It is recommended that;

- i) EPRA should refine and improve the data collection template for all energy services produced and consumed in the country including related trade statistics.
- ii) EPRA should publish the Energy Statistics report annually to inform the public, consumers and investors on the key energy trends in the country.
- iii) EPRA should enhance partnership and collaboration with other state agencies such as the Kenya National Bureau of Statistics (KNBS), Kenya Pipeline Company (KPC), Kenya Revenue Authority (KRA), Capital Markets Authority (CMA), Kenya Power and the Central Bank of Kenya (CBK) to ensure quality trade and balance of payment statistics. This will help strengthen the macroeconomic stability of the sector.
- iv) Expansion of renewable energy sources (wind, solar and geothermal power generation). This can be achieved by providing incentives such as tax exemption, speedy approval processes to the interested parties and providing a framework for private sector investment.
- v) Further investment in expanding and modernizing the transmission network to reach more parts of the country and minimize losses.
- vi) Adaptation of new technologies and innovations that lead to reduced greenhouse gas emissions.

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ANNEXURES

Annex 1: Structure of the Petroleum Sector's Supply Chain

CRUED IMPORTS



KPC BULK STORAGE DEPOTS



LOCAL DISTRIBUTION



KPRL

PIPELINE TRANSPORT



Bridging



Retail of Regulated Petroleum Products



KOSF Storage



Imports of refined petroleum products



OMC Depots in Mombasa



Annex 2 Requirements for issuance of Petroleum Licenses (Except LPG)

1. Oil Marketing Companies intending to trade in Jet A1 or other aviation petroleum fuels
<ol style="list-style-type: none">1) Proof of General Aviation Insurance for Third Party Insurance liability with a minimum cover of USD 500 million;2) Proof of ownership of into plane refueling dispenser or evidence of lease of the equipment from a licensed supplier of Jet A1 at the airport or airstrip of operation;3) Proof of office space at the airport or airstrip of operation.
2. Import, Export and Wholesale of Fuel Oil-New Application
<ol style="list-style-type: none">a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;b) Legible copies of Identification documents for directors (IDs/passports)c) Certificate of Incorporation/Business registration certificated) Valid tax compliance certificate from Kenya Revenue Authoritye) Single Business Permit for the office premises from the County Governmentf) Work Permits Class "G" for foreign directors as per the CR12g) Proof of application for membership to a National Oil Spill Contingency Group
3. Import, Export and Wholesale of Bitumen-New Application
<ol style="list-style-type: none">a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;b) Legible copies of Identification documents for directors (IDs/passports)c) Certificate of Incorporation/Business registration certificated) Valid tax compliance certificate from Kenya Revenue Authoritye) Single Business Permit for the office premises from the County Governmentf) Work permits Class "G" for foreign directors as per the CR12
4. Bunkering of Petroleum Products (Except LPG)-New Application
<ol style="list-style-type: none">a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;b) Legible copies of Identification documents for directors (IDs/passports)c) Certificate of Incorporation/Business registration certificated) Valid tax compliance certificate from Kenya Revenue Authority Work Permits Class "G" for foreign directors as per the CR12e) Single Business Permit for the office premises from the County Governmentf) Proof of application for membership to a National Oil Spill Contingency Group
5. Export and Wholesale of Petroleum Products (Except LPG)-New Application
<ol style="list-style-type: none">a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;b) Legible copies of Identification documents for directors (IDs/passports)a) Certificate of Incorporation/Business registration certificateb) Valid tax compliance certificate from Kenya Revenue Authoritya) Single Business Permit for the office premises from the County Governmentb) Work permits Class "G" for foreign directors as per the CR12

6. Export and Wholesale of Jet A1 - New Application

- a) CR12 from the Registrar of companies (Not older than one (1) year) for limited companies
- b) Valid Tax Compliance Certificate from Kenya Revenue Authority
- c) Legible Copies of Identification Documents i.e. IDs/Passports for all the Company directors
- d) Single Business Permit to operate business from the respective County Government
- e) Work Permits Class "G" for foreign directors as per CR12
- f) Proof of ownership of into plane refueling dispenser or evidence of long-term lease of the equipment (minimum 5 years) from a licensed supplier of Jet A1 at the airport or airstrip of operation.
- g) Valid license for Import, Export and Wholesale of Petroleum Products (Except LPG) Proof of General
- h) Aviation Insurance for Third Party Insurance liability with a minimum cover of USD 500 million

7. Storage of petroleum products (Except LPG)- New Application

- a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;
- b) Legible copies of Identification documents for directors (IDs/passports)
- c) Certificate of Incorporation/Business registration certificate
- d) Valid tax compliance certificate from Kenya Revenue Authority
- e) Single Business Permit for the office premises from the County Government
- f) Work Permits Class "G" for foreign directors as per the CR12
- g) Environmental Impact Assessment licence from NEMA
- h) Confirmation from KEBS that the facility complies with the Kenya Standard (Inspection Report)
- i) Fire clearance certificate from the respective County Government
- j) Certificate of registration of workplace from DOSHS
- k) Valid certificate of Calibration of the petroleum tanks

8. Transport of petroleum products (Except LPG)- New Application

- a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;
- b) Legible copies of Identification documents for directors (IDs/passports)
- c) Certificate of incorporation/business registration certificate
- d) Work permits Class "G" for foreign directors as per the CR12
- e) Valid tax compliance certificate from KRA;
- f) Single Business Permit for the office premises from the County Government
- g) A valid certificate of calibration for the tanker mounted on each vehicle
- h) Fire certificate for the vehicle from the County Government
- i) A valid Motor Vehicle Inspection Certificate for each prime mover and trailer
- j) Log books for each prime mover and trailer (Attach lease agreement if not in the name of owner/company)
- k) A list of vehicles; prime mover paired to trailer where necessary (In Microsoft Excel)

9. Transport of by rail (Except LPG)- New Application

- a) CR12 from the Registrar of companies (Not older than one (1) year) for limited companies
- b) Certificate of Incorporation / Business Registration Certificate
- c) Valid Tax Compliance Certificate from Kenya Revenue Authority
- d) Legible Copies of Identification Documents i.e. IDs/Passports for all the Company directors
- e) Single Business Permit to operate business from the respective County Government
- f) Work Permits Class "G" for foreign directors as per CR12
- g) Scanned original copy of valid mechanical inspection certificate for each wagon
- h) Scanned original copy of valid certificate of calibration for each Petroleum Wagon
- i) Scanned original copy of fire certificate for each wagon from the County Government
- j) Scanned original copy of proof of ownership of each petroleum wagon or lease agreement with owner of the wagons
- k) List of locomotive drivers and their certifications
- l) Scanned original copy of valid Medical Surveillance certificate for each locomotive driver from DOSHS approved doctors

10. Retail of petroleum products (Except LPG)- New Application

- a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;
- b) Legible copies of Identification documents for directors (IDs/passports)
- c) Certificate of incorporation/business registration certificate
- d) Work permits Class "G" for foreign directors as per the CR12
- e) Valid tax compliance certificate from KRA;
- f) Single Business Permit for the office premises from the County Government
- g) Proof of ownership of the petrol Service Station (Ownership documents of the petrol service station OR Long term lease (Minimum 5 years)
- h) Environmental Impact Assessment License (EIA) or Environmental Audit acknowledgement letter from NEMA
- i) Certificate of compliance with the Physical Planning Act of 1999
- j) Fire certificate from the Chief Fire Officer Respective County Government;
- k) A valid copy of certificate of registration of work place from DOSHS
- l) A valid copy Fuel dispensing Meter calibration certificate(s) from Weights and Measures Department
- m) A valid certificate of calibration for the Underground Storage tank(s)
- n) A scanned copy of Pressure test Report for the Storage tank(s)(not older than 60 months)

11. Retail of petroleum products (Except LPG)- Renewal Application

- a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;
- b) Legible copies of Identification documents for directors (IDs/passports)
- c) Work permits Class "G" for foreign directors as per the CR12
- d) Valid tax compliance certificate from KRA;
- e) Single Business Permit for the office premises from the County Government
- f) Environmental Impact Assessment licence (EIA) or Environmental Audit acknowledgement letter from NEMA
- g) Fire certificate from the Chief Fire Officer Respective County Government;
- h) A valid copy of certificate of registration of work place from DOSHS
- i) A valid copy Fuel dispensing Meter calibration certificate(s) from Weights and Measures Department
- j) A valid certificate of calibration for the Underground Storage tank(s)
- k) A scanned copy of Pressure Test Report for the Storage tank(s) (not older than 60 months)

12. Import, Export and Wholesale of Petroleum Products (Except LPG)-Renewal Application

- a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;
- b) Legible copies of Identification documents for directors (IDs/passports)
- c) Valid Tax Compliance Certificate from Kenya Revenue Authority
- d) Single Business Permit for the office premises from the County Government
- e) Work Permits Class "G" for foreign directors as per the CR12
- f) Proof of valid membership to a National Oil Spill Contingency Group
- g) Proof of fulfilment of line fill obligations from Kenya Pipeline Company Limited
- h) Clearance letter from Kenya Maritime Authority (KMA) on Compliance with International Oil Pollution Compensation Fund
- i) Proof of online submission of annual purchases and sales data
- j) Proof of operations in Kenya with sales volume of a total 6.6 Million litres of either/or
- k) combination of PMS, AGO or IK within 1 year or ownership of 5 licensed retail outlets that meet the Kenya Standard or Proof of ownership of one (1) licensed petroleum depot.

13. Import, Export and Wholesale of Fuel Oil-Renewal Application

- a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;
- b) Legible copies of Identification documents for directors (IDs/passports)
- c) Valid Tax Compliance Certificate from Kenya Revenue Authority
- d) Single Business Permit for the office premises from the County Government
- e) Legible copies of Identification documents for directors (IDs/passports)
- f) Work permits Class "G" for foreign directors as per the CR12
- g) Proof of membership to a National Oil Spill Contingency Group
- h) Clearance letter from Kenya Maritime Authority (KMA) on Compliance with International Oil Pollution Compensation Fund

14. Import, Export and Wholesale of Bitumen-Renewal Application

- a) CR 12 from Registrar of Companies (not older than 12 months old) for Limited Companies;
- b) Legible copies of Identification documents for directors (IDs/passports)
- c) Work permits Class "G" for foreign directors as per the CR12
- d) Valid Tax Compliance Certificate from Kenya Revenue Authority
- e) Single Business Permit for the office premises from the County Government

15. Bunkering of Petroleum Products (Except LPG)-Renewal Application

- a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;
- b) Legible copies of Identification documents for directors (IDs/passports)
- c) Certificate of Incorporation/Business registration certificate
- d) Valid tax compliance certificate from Kenya Revenue Authority
- e) Work Permits Class "G" for foreign directors as per the CR12
- f) Single Business Permit for the office premises from the County Government
- g) Proof of membership to a National Oil Spill Contingency Group.

16. Export and Wholesale of Petroleum Products (Except LPG)-Renewal Application

- a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;
- b) Legible copies of Identification documents for directors (IDs/passports)
- c) Work permits Class "G" for foreign directors as per the CR12
- d) Valid tax compliance certificate from KRA;
- e) Single Business Permit for the office premises from the County Government

17. Export and Wholesale of Jet A1 – Renewal Application

- a) CR12 from the Registrar of companies (Not older than one (1) year) for limited companies
- b) Valid Tax Compliance Certificate from Kenya Revenue Authority
- c) Legible Copies of Identification Documents i.e. IDs/Passports for all the Company directors
- d) Single Business Permit to operate business from the respective County Government
- e) Work Permits Class "G" for foreign directors as per CR12
- f) Proof of ownership of into plane refueling dispenser or evidence of long-term lease of the equipment (minimum 5 years) from a licensed supplier of Jet A1 at the airport or airstrip of operation.
- g) Valid licence for Import, Export and Wholesale of Petroleum Products (Except LPG)
- h) Proof of General Aviation Insurance for Third Party Insurance liability with a minimum cover of USD 500 million

18. Storage of petroleum products (Except LPG)- Renewal Application

- a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;
- b) Legible copies of Identification documents for directors (IDs/passports)
- c) Valid Tax Compliance Certificate from Kenya Revenue Authority
- d) Single Business Permit for the office premises from the County Government
- e) Work permits Class "G" for foreign directors as per the CR12
- f) Proof of undertaking of annual Environmental Audit acknowledgement letter from NEMA
- g) Fire clearance certificate from the respective County Government
- h) Certificate of registration of workplace from DOSHS
- i) Proof of submission of monthly stocks data
- j) Valid certificate of Calibration of the petroleum

19. Transport of petroleum products (Except LPG)- Renewal Application

- a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;
- b) Legible copies of Identification documents for directors (IDs/passports)
- c) Valid tax compliance certificate from KRA;
- d) Work permits Class "G" for foreign directors as per the CR12
- e) Single Business Permit for the office premises from the County Government
- f) A valid certificate of calibration for the tanker mounted on each vehicle
- g) Fire certificate for the vehicle from the County Government
- h) A valid Motor Vehicle Inspection Certificate for each prime mover and trailer
- i) Log books for each prime mover and trailer (Attach lease agreement if not in the name of owner/company)
- j) A list of vehicles; prime mover paired to trailer where necessary (In Microsoft Excel)

20. Transport of by rail (Except LPG)- Renewal Application

- a) CR12 from the Registrar of companies (Not older than one (1) year) for limited companies
- b) Valid Tax Compliance Certificate from Kenya Revenue Authority
- c) Legible Copies of Identification Documents i.e. IDs/Passports for all the Company directors
- d) Single Business Permit to operate business from the respective County Government
- e) Work Permits Class "G" for foreign directors as per CR12
- f) Scanned original copy of valid mechanical inspection certificate for each wagon
- g) Scanned original copy of valid certificate of calibration for each Petroleum Wagon
- h) Scanned original copy of fire certificate for each wagon from the County Government
- i) Scanned original copy of proof of ownership of each petroleum wagon or lease agreement with owner of the wagons
- j) List of locomotive drivers and their certifications
- k) Scanned original copy of valid Medical Surveillance certificate for each locomotive driver from DOSHS approved doctors

Annex 3 Requirements for Issuance of LPG Licenses

1. Import, Export and Wholesale of LPG in Bulk-New Application
<ul style="list-style-type: none">a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;b) Identification documents (IDs or Passports) for all the directors;c) Certificate of incorporation/business registration certificated) Work permits Class "G" for foreign directors as per the CR12e) Valid tax compliance certificate from KRA;f) Single Business Permit to for the premises from the County Government
2. Export and Wholesale of LPG in Bulk-New Application
<ul style="list-style-type: none">a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;b) Identification documents (IDs or Passports) for all the directors;c) Certificate of incorporation/business registration certificated) Work permits Class "G" for foreign directors as per the CR12e) Valid tax compliance certificate from KRA;f) Single Business Permit to for the premises from the County Governmentg) Letter of intent from a licensed LPG Importer
3. Wholesale of LPG in Cylinders-New Application
<ul style="list-style-type: none">a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;b) Identification documents (IDs or Passports) for all the directors;c) Certificate of incorporation/business registration certificated) Work permits Class "G" for foreign directors as per the CR12e) Valid tax compliance certificate from KRA;f) Single Business Permit to for the premises from the County Governmentg) Fire clearance certificate from the respective County Governmenth) Certificate of registration of workplace from DOSHSi) Proof of importation/manufacture of 5,000 cylinders of either 1, 3, 6 or 13kgs (Attach cylinder count report from ERC)/Authority for distributing cylinders from a licensed LPG cylinder brand ownersj) Proof of cylinder brand ownership registration from Kenya Industrial Property Institute (KIPI)/letter of authority from brand ownerk) Weighing scale calibration certificate from Weights and Measures Department
4. Storage & Filling of LPG in Bulk-New
<ul style="list-style-type: none">a) CR 12 from Registrar of Companies (not older than 12 months old) for Limited Companies;b) Certificate of Incorporation/Business registration certificatec) Valid tax compliance certificate from Kenya Revenue Authorityd) Single Business Permit for the premises from the County Governmente) Legible copies of Identification documents for directors (IDs/passports)f) Work permits Class "G" for foreign directors as per the CR12g) Environmental Impact Assessment licence from NEMAh) Fire clearance certificate from the respective County Governmenti) Confirmation from Kenya Bureau of Standards that the facility complies with the Kenya Standard (Inspection Report)j) Certificate of registration of workplace from DOSHSk) Proof of importation/manufacture of 5,000 cylinders of either 1, 3, 6 or 13kgs (Attach cylinder count report from ERC)/Authority for filling of cylinders from licensed LPG cylinder brand ownersl) Proof of cylinder brand ownership registration from Kenya Industrial Property Institute (KIPI)/letter of authority from brand ownerm) Weighing scale calibration certificate from Weights and Measures Departmentn) Valid calibration certificate (s) for the LPG tank (s)o) Valid report (s) on Examination of LPG tank (s) from DOSHS approved Inspector

5. Transport of LPG in bulk- New Application

- a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;
- b) Legible copies of Identification documents for directors (IDs/passports)
- c) Certificate of incorporation/business registration certificate
- d) Work permits Class "G" for foreign directors as per the CR12
- e) Valid tax compliance certificate from KRA;
- f) Single Business Permit for the office premises from the County Government
- g) A valid certificate of calibration for the tanker mounted on each vehicle
- h) Fire certificate for the vehicle from the County Government office by Chief Fire Officer
- i) A valid Motor Vehicle Inspection Certificate for each prime mover and trailer
- j) Log books for each prime mover and trailer (Attach lease agreement if not in the name of owner/company)
- k) Valid report on examination for LPG tank mounted on each vehicle
- l) A list of vehicles; prime mover paired to trailer where necessary (In Microsoft Excel)

6. Retail of LPG in Cylinders – New Application

- a) CR12 from the Registrar of companies (Not older than one (1) year) for limited companies
- b) Certificate of Incorporation / Business Registration Certificate
- c) Valid Tax Compliance Certificate from Kenya Revenue Authority
- d) Legible Copies of Identification Documents i.e. IDs/Passports for all the Company directors
- e) Single Business Permit to operate business from the respective County Government
- f) Work Permits Class "G" for foreign directors as per CR12
- g) Scanned copy of distributorship agreement from LPG Cylinder brand owner or licensed wholesaler
- h) Scanned original copy of a valid weighing scale calibration certificate from Weights and Measures department
- i) Scanned original copy of a valid fire certificate for the premises from the County Government

7. Retail of LPG in Cylinders – Renewal Application

- a) CR12 from the Registrar of companies (Not older than one (1) year) for limited companies
- b) Valid Tax Compliance Certificate from Kenya Revenue Authority
- c) Legible Copies of Identification Documents i.e. IDs/Passports for all the Company directors
- d) Single Business Permit to operate business from the respective County Government
- e) Work Permits Class "G" for foreign directors as per CR12
- f) Scanned copy of distributorship agreement from LPG Cylinder brand owner or licensed wholesaler
- g) Scanned original copy of a valid weighing scale calibration certificate from Weights and Measures department
- h) Scanned original copy of a valid fire certificate for the premises from the County Government

8. Import, Export and Wholesale of LPG in Bulk-Renewal Application

- a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;
- b) Identification documents (IDs or Passports) for all the directors;
- c) Work permits Class "G" for foreign directors as per the CR12
- d) Valid tax compliance certificate from KRA;
- e) Single Business Permit to for the premises from the County Government
- f) Proof of annual data submission

9. Export and Wholesale of LPG in Bulk-Renewal Application

- a) CR 12 from Registrar of Companies (not older than 12 months old) for Limited Companies;
- b) Identification documents (IDs or Passports) for all the directors;
- c) Work permits Class "G" for foreign directors as per the CR12
- d) Valid tax compliance certificate from KRA;
- e) Single Business Permit to for the premises from the County Government

10. Wholesale of LPG in Cylinders-Renewal Application

- a) CR 12 from Registrar of Companies (not older than 12 months) for Limited Companies;
- b) Identification documents (IDs or Passports) for all the directors;
- c) Work permits Class "G" for foreign directors as per the CR12
- d) Valid tax compliance certificate from KRA;
- e) Single Business Permit to for the premises from the County Government
- f) Fire clearance certificate from the respective County Government
- g) Proof of importation/manufacture of 5,000 cylinders of either 1, 3, 6 or 13kgs (Attach cylinder count report from ERC)/Authority for distributing cylinders from a licensed LPG cylinder brand owners.
- h) Proof of cylinder brand ownership registration from Kenya Industrial Property Institute (KIPI)/letter of authority from brand owner
- i) Certificate of registration of workplace from DOSHS
- j) Weighing scale calibration certificate from Weights and Measures Department

11. Storage & Filling of LPG in Bulk-Renewal

- a) CR 12 from Registrar of Companies (not older than 12 months old) for Limited Companies;
- b) Valid Tax Compliance Certificate from Kenya Revenue Authority
- c) Single Business Permit for the premises from the County Government
- d) Legible copies of Identification documents for directors (IDs/passports)
- e) Work permits Class "G" for foreign directors as per the CR12
- f) Proof of undertaking of annual Environmental Audit acknowledgement letter from NEMA
- g) Fire clearance certificate from the respective County Government
- h) Certificate of registration of workplace from DOSHS
- i) A valid certificate of weighing scale calibration from Weights and Measures Department
- j) Valid calibration certificate (s) for the LPG tank (s)
- k) Valid report (s) on Examination of LPG tank (s) from DOSH approved Inspector
- l) Proof of importation/manufacture of 5,000 cylinders of either 1, 3, 6 or 13kgs (Attach cylinder count report from ERC)/Authority for filling of cylinders from licensed LPG cylinder brand owners.

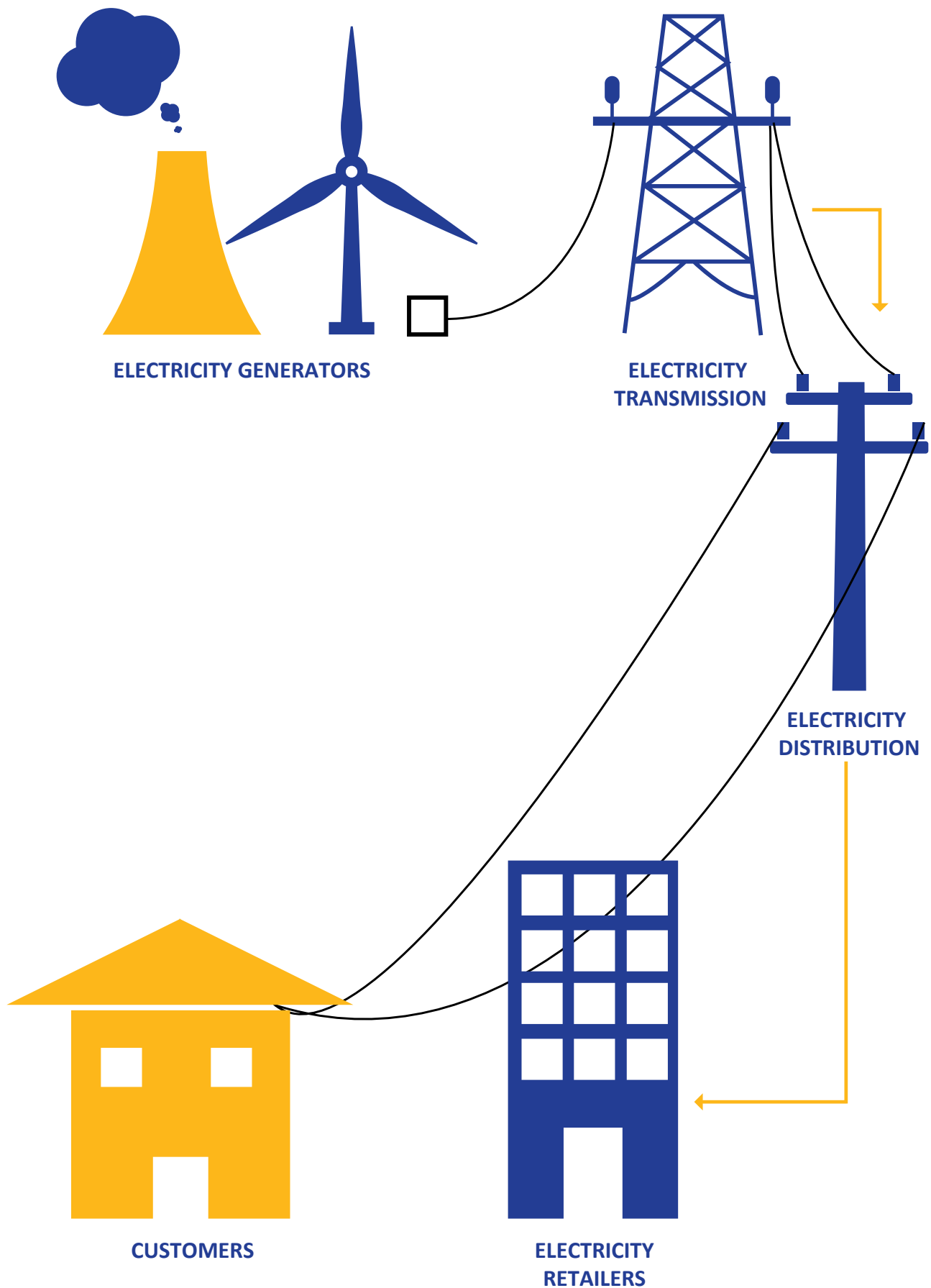
12. Transport of LPG in bulk- Renewal Application

- a) CR 12 from Registrar of Companies (not older than 12 months old) for Limited Companies;
- b) Legible copies of Identification documents for directors (IDs/passports)
- c) Work permits Class "G" for foreign directors as per the CR12
- d) Valid tax compliance certificate from KRA;
- e) Single Business Permit for the office premises from the County Government
- f) A valid certificate of calibration for the tanker mounted on each vehicle
- g) Fire certificate for the vehicle from the County Government office by Chief Fire Officer
- h) A Valid Motor Vehicle Inspection Certificate for each prime mover and trailer
- i) Log books for each prime mover and trailer (Attach lease agreement if not in the name of owner/company)
- j) Valid report on examination for LPG tank mounted on each vehicle
- k) A list of vehicles; prime mover paired to trailer where necessary (In Microsoft Excel)

13. Driver Certification (Petroleum products including LPG)

- a) Scanned original copies of Identification documents (IDs or Passports) for driver.
- b) Valid Certificate of Fitness for Drivers from Designated Health Practitioners (DOSHS approved Doctors)
- c) A valid driving licence for each driver
- d) Certificate of Good Conduct
- e) Passport size photo of the driver

Annex 4: Structure of Kenya's Electricity Supply Chain



Annex 5: Power System Capacity as at December 2019

Company	Installed Capacity	Effective Capacity
1. KenGen		
a) Hydro Power Plants		
Tana	20.0	20.0
Kamburu	94.2	90.0
Gitaru	225.0	216.0
Kindaruma	72.0	70.5
Masinga	40.0	40.0
Kiambere	168.0	164.0
Turkwel	106.0	105.0
Sondu Miriu	60.0	60.0
Sangoro	21.0	20.0
Small Hydros	11.7	11.2
Hydro Total	818	797
b. Thermal Power Plants		
Kipevu I Diesel	73.5	60.0
Kipevu 3 Diesel	120.0	115.0
Muhoroni GT	60.0	56.0
Thermal Total	254	231
c. Geothermal Power Plants		
Olkaria I	45	44
Olkaria II	105	101
Eburru Hill	2.44	2.4
Olkaria Wellhead OW37	5.0	5.0
Olkaria Wellhead OW37 kwg 12	5	5
Olkaria Wellhead OW37 kwg 13	5	5
Olkaria Wellhead OW43	12.8	12.8
Olkaria Wellhead OW905	5	5
Olkaria Wellhead OW914&OW915	37.8	37.8
Olkaria Wellhead OW919	5	5
Olkaria Wellhead OW39	5	5
Olkaria IV	140	140
Olkaria I units 4 and 5	140	140
Olkaria V	165	158
Geothermal Total	678	666

Source: EPRA 2020

d. Wind Power Plants		
Ngong I	11.9	11.9
Ngong II	13.6	13.6
Wind Total	25.5	25.5
KenGen Total	1,775	1,719
1. Government of Kenya (Rural Electrification Programme)		
Off-grid Diesel	28.9	19.5
Off-grid Solar	0.7	0.2
Off-grid Wind	0.6	0.0
Total Off grid	30.2	19.7
2. Independent Power Producers (IPP) - Thermal & Geothermal		
Iberafrica Diesel	52.5	52.5
Tsavo Diesel	74.0	74.0
Biojoule Kenya Limited	2.0	2.0
Mumias- Cogeneration	26.0	21.5
OrPower 4-Geothermal (1st plant)	63.8	63.8
OrPower 4-Geothermal (2nd plant)	39.6	39.6
OrPower 4-Geothermal (3rd plant)	17.6	17.6
OrPower 4-Geothermal (4th plant)	29.0	29.0
Rabai Diesel	90.0	88.6
Thika Diesel	87.0	87.0
Gulf Diesel	80.32	80.32
Triumph Diesel	83.0	83.0
Imenti FiT hydro	0.283	0.283
Gikira FiT hydro	0.514	0.514
Genpro Teremi Falls	5.0	5.0
KTDA Gura	2.0	2.0
KTDA Chania	0.5	0.5
Strathmore Solar	0.25	0.25
Lake Turkana Wind Power	310.0	300.0
Garissa Solar	50.0	50.0
IPP Total	1,013	997
3. Imports		
UETCL	0	0
EEPCO	0	0
TANESCO	0	0

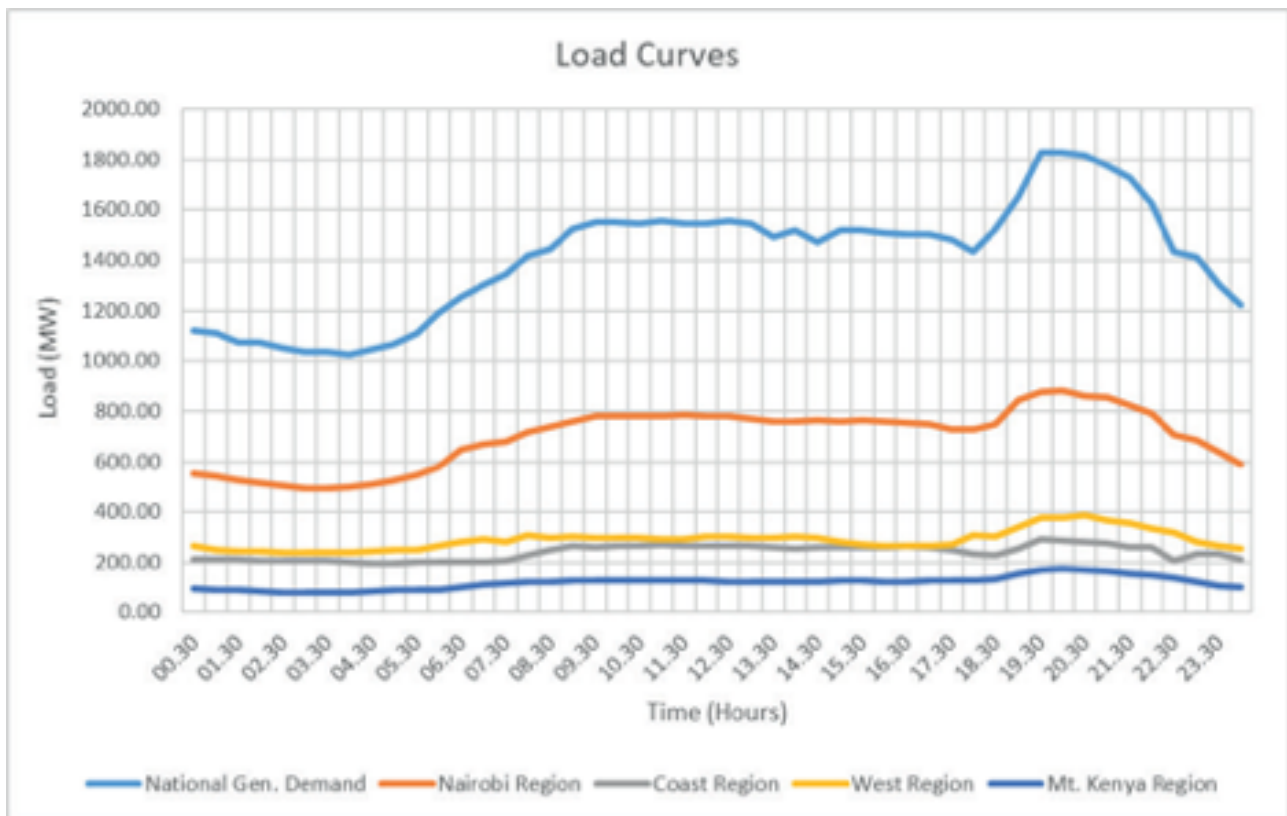
Source: EPRA 2020

Annex 6: Schedule of Electricity Tariffs for 2018/19

Code	Customer Type (Code Name)	Energy Limit kWh/ Month	Charge Method	Unit	Approved Charge Rates
DC-L	Domestic-Lifeline	0-100	Energy	Ksh/kWh	10
DC-O	Domestic- Ordinary	> 100	Energy	Ksh/kWh	15.8
SC	Small Commercial	0- 15,000	Energy	Ksh/kWh	15.6
CI1	Commercial/ Industrial	> 15,000	Energy	Ksh/kWh	12
			Demand	Ksh/KVA	800
CI2	Comm./ Industrial	No. Limit	Energy	Ksh/kWh	10.9
			Demand	Ksh/KVA	520
CI3	Comm./ Industrial	No. Limit	Energy	Ksh/kWh	10.5
			Demand	Ksh/KVA	270
CI4	Comm./ Industrial	No. Limit	Energy	Ksh/kWh	10.3
			Demand	Ksh/KVA	220
CI5	Comm./ Industrial	No Limit	Energy	Ksh/kWh	10.1
			Demand	Ksh/KVA	220
SL	Street Lighting	No Limit	Energy	Ksh/kWh	7.5

Source: EPRA 2020

Annex 7: Load Curves as at 31st December 2019



Source: EPRA 2019

Annex 8: Licensed and approved Power Undertakings

Licensee	Technology	Location of Power Plant(s)	Capacity (MW)	Date Granted	Duration (Years)	Supply To	Remarks	Total (MW)
KenGen[1]	Geothermal	Olkaria I	185	2nd Oct 2008	25	Grid	Modified on 6th Dec 2012	760
KenGen		Olkaria II	105	2nd Oct 2008	25	Grid		
KenGen		Olkaria IV	140	2nd Oct 2008	25	Grid		
KenGen		Mobile wellheads [2]	70	6th Dec 2012	15	Grid		
KenGen		Mobile wellhead [3]	5	6th Dec 2012	15	Grid		
OrPower4[8]		Naivasha	150	24th Nov 2000	25	Grid	Modified on 16th July 2015	
QPEA Menengai [17]		Nakuru	35	4th Dec 2014	25	Grid		
Sosian-Menengai [20]		Nakuru	35	4th Dec 2014	25	Grid		
Orpower 22 [21]		Nakuru	35	16th July 2015	25	Grid		
Total Geothermal				760				
KenGen	Hydro	Masinga	40	2nd Oct 2008	25	Grid		835.99
KenGen		Kamburu	94.2	2nd Oct 2008	25	Grid		
KenGen		Kindaruma	72	2nd Oct 2008	25	Grid		
KenGen		Gitaru	225	2nd Oct 2008	25	Grid		
KenGen		Kiambere	164	2nd Oct 2008	25	Grid		
KenGen		Sagana	1.5	2nd Oct 2008	18	Grid		
KenGen		Ndula	2	2nd Oct 2008	6	Grid		
KenGen		Tana	20	2nd Oct 2008	12	Grid		
KenGen		Wanjii	7.4	2nd Oct 2008	15	Grid		
KenGen		Mesco	0.38	2nd Oct 2008	12	Grid		
KenGen		Turkwel	106	2nd Oct 2008	25	Grid		
KenGen		Gogo	2	2nd Oct 2008	7	Grid		
KenGen		SonduMiri	60	2nd Oct 2008	25	Grid		
KenGen		Sosiani	0.4	2nd Oct 2008	12	Grid		
Kengen		Sangoro	21	26th Jul 2017	25	Grid		
Hydro project services peters Ltd		Meru	0.51	11th Apr 2018	20	Grid		
Tindinyo Falls Resort Limited [19]		River Yala, Nandi County	1.5	4th Dec 2014	25	Grid		
RegenTerem [15]		Mt. Elgon	5.2	27th Feb 2014	20	Grid		
Mt Kenya Power [18]		Meru	0.6	4th Dec 2014	25	Grid		
Kleen Energy [22]		Embu	6	16th July 2015	25	Grid		
Greater Meru Tea Power Co Ltd		Meru County	1.5	30th Mar 2016	25	Grid		
Greater Meru Power Co Ltd		Tharaka-Nithi County	2	30th Mar 2016	25	Grid		
Kirinyaga Power Co Ltd	Kirinyaga County	1.8	30th Mar 2016	25	Grid			
Chania Power Co Ltd	Murang'a County	1	30th Mar 2016	25	Grid			
Total Hydro			835.99					

Licensee	Technology	Location of Power Plant(s)	Capacity (MW)	Date Granted	Duration (Years)	Supply To	Remarks	Total (MW)	
KenGen	Thermal, MSD [4]	Kipevu I	60	27th April 2011	20	Grid		746.8	
KenGen		Kipevu III	120	27th April 2011	20	Grid			
KenGen		Muhoroni	30	29th April 2010	5	Grid	Decommissioned in July 2016		
KenGen		Garissa	3.4	2ndOct 2008	10	Mini Grid	Decommissioned in April 2016		
KenGen		Lamu	2.1	2ndOct 2008	8	Mini Grid	Decommissioned in April 2016		
Tsavo Power[6]		Mombasa	74	21st Mar 2000	23	Grid			
Iberafrica[7]		Nairobi	108.8	20th July 2005	27	Grid			
Rabai Power		Mombasa	90	15th July 2008	15	Grid			
KPRL [12]		Mombasa	8.5	24thFeb 2011	20	Captive			
GulfPower Ltd		Athi River	80	14thSept 2011	20	Grid			
Triumph[13]		Athi River	83	14thSept 2011	20	Grid			
Thika Power		Mang'u Area	87	9th Feb 2012	20	Grid			
Total Thermal		746.8							
KenGen		Gas Turbine	Embakasi	60	27th April 2011	20	Grid	30 MW relocated to Muhoroni. The remaining 30MW at Embakasi is not being dispatched due to expired PPA	90
Kengen	Muhoroni		30	26th July 2017	20	Grid			
Total	90								
KenGen	Wind	Ngong I Phase I	5.1	6thDec 2012	20	Grid		566.5	
Chania Green Generation Ltd		Kajiado	50	11th April 2018	20	Grid			
Lake Turkana[10]		Marsabit	300	16th Dec 2010	20	Grid			
Kinangop[14]		Kinangop	61	9th Feb 2012	20	Grid			
Kipeto Energy Limited		Kajiado	100	16th Sep 2015	20	Grid			
Ol-ndanyat Power Ltd		Kona Baridi, Kajiado County	30	3rd December 2015	25	Grid			
Kengen		Ngong I wind I phase II	6.8	26th July 2017	25	Grid			
Kengen		Ngong II	13.6	26th July 2017	25	Grid			
Total Wind	566.5								
Pwani oil products limited	Biomass	Kilifi	1.5	24th Jan 2018	20	Captive		11.34	
Cummins[16]		Marigat	8.4	29thJan 2014	20	Grid			
DWA ESTATE LIMITED		Makueni	1.44	25th March 2020	20	Grid			
Total Biomass	11.34								
Nzoia Sugar Co. Ltd	Cogeneration	Bungoma	7	11th April 2018	20	Captive		94.7	
Mumias Sugar		Mumias	38	24th Apr 2008	25	Grid			
Butali Sugar Mills Limited		Kakamega County	11	1st Dec 2016	25	Captive			
Chemelil Sugar Co Limited		Kisumu County	3	1st Dec 2016	25	Captive			
SONY Co. Ltd		Migori County	8.7	26th Apr 2017	20	Captive			
Kwale International Sugar Co Ltd		Kwale County	18	25th Feb 2016	20	Grid and Captive			
Pan Paper[9]		Webuye	9	2004	15	Captive			
Total Cogeneration	94.7								

Licensee	Technology	Location of Power Plant(s)	Capacity (MW)	Date Granted	Duration (Years)	Supply To	Remarks	Total (MW)	
Oserian Development Co.ltd	Solar	Nakuru	1	22rd Aug 2018	20	Captive		212.055	
Alten Energy		Uasin Gichu County	40	3rd Mar 2017	25	Grid			
Radiant Energy		Uasin Gichu County	40	3rd Mar 2017	25	Grid			
Eldosol Energy		Uasin Gichu County	40	3rd Mar 2017	25	Grid			
Ofgen Power Ltd		Nairobi & Taita Taveta Counties	0.455	26th Apr 2017	20	Captive			
Strathmore University		Nairobi County	0.6	26th Apr 2017	20	Grid			
							& Cap-tive		
Malindi solar		Kilifi	40	26th July 2017	20	Grid			
KOPERE SOLAR PARK LIMITED		Nandi County	40	30th Jan 2019	20	Grid			
HANNAN ARYA ENERGY (K) LIMITED		Kajiado	10	27th Mar 2029	20	Grid			
Total Solar	212.055								
Homabay Biogas One	Biogas	Homabay	8	11th Apr2018	20	Grid		8	
Bidco[11]	Biothermal	Thika	2.125	18th Aug 2011	20	Grid		2.125	
CemtechLtd	Coal	West Pokot	30	16th July 2015	30	Captive		1095	
Devki Energy Co Ltd		Merrueshi, Kajiado County	15	25th May 2016	20	Captive			
Amu power		Lamu County	1050	3rd Mar 2017	20	Grid			
Total	1095								
Overall Total (MW)	4422.51								

Annex 9: Electric Power Generation, Distribution and Supply Licences

Ref No	Name of Licensee	Technology	Location of Undertaking	Capacity (MW)	Date Granted	Duration (Years)	Supply to	Remarks
GD.01.05	James Finlay	Hydro and Thermal	Kericho	6.7	19th April 05	15	Self and Grid	
GD.02.05	Sotik Tea ¹	Thermal	Arroket Tea Factory	1.5	19th April 05	15	Self	
GD.03.05	Sotik Highlands ²	Thermal	Sotik Highlands Tea Factory	1.06	19th April 05	15	Self	
GD.01.08	Unilever ³	Hydro and Thermal	Kericho	4.66	11th Dec 08	25	Self	Modified 28th Oct 2010
GD.01.10	Imenti ⁴	Hydro	Imenti Tea Factory	0.92	29th April 10	25	Self and Grid	
GD.01.15	Powerhive ⁵	Solar PV	Kisii and Nyamira Counties	3.0	16th Feb 15	25	Public	Transferred to Cloverfield Energy Services Ltd in June 2016
GD.02.15	Talek Power Company Ltd	Solar PV-Diesel Hybrid	Talek, Narok County	0.05	16th Sep 15	25	Public	Mini-grid
GD.03.15	Two Rivers Power Company Ltd	Solar, Diesel & Purchase from KPLC	Nairobi County	2MW Solar, 35MW purchase from KPLC & 10 MW Diesel	16th September 15	25	Self & Public	
GD.03.15	Biojoule Kenya Ltd	Biogas	Naivasha, off Moi South Lake Road, Nakuru County	2.6	3rd December 2015	25	Self and Grid	The energy will be supplied primarily to Gorge Farm and surplus to the grid
GD.01.16	Metumi Power Co Ltd	Hydro	Murang'a County	5.6	30th March 2016	25	Self and Grid	
GD.01.17	Oserian Development Company	Geothermal	Nakuru County	3.7	26th April 2017	20	Captive	Amended on 26th April 2017 to include distribution & supply

¹Sotik Tea means Sotik Tea Company Ltd

²Sotik Highlands means Sotik Highlands Tea Estate Ltd

³Unilever means Unilever Tea Kenya Ltd

⁴Imenti means Imenti Tea Factory Company Ltd.

⁵Powerhive means Power Hive East Africa Ltd

GD.02.17	Nyakwana Power Company Ltd	Hydro	Kisii County	2	28th June 2017	25	Self and Grid	
GD.03.17	Gura Power Company Ltd	Hydro	Nyeri County	5.8	28th June 2017	25	Self and Grid	
GD.01.18	Tatu City Power Co. Ltd	Grid power	Kiambu	135	26th Sep 2018	25	Import of Grid power	

Annex 10: Electric Power Distribution and Supply Permits for KPLC Off-Grid Stations

Ref No	Licensee	Technology	Location of Power Plant(s)	Capacity (kW)	Date Granted	Duration (Years)	Supply To	Remarks
¹ GS.01.09	KPLC ²	³ IDO	Elwak	520	24th Sep 2009	50	Mini grid	
⁴ DS.05.09	KPLC		Garissa		24th Sep 2009	50	Mini grid	Decommissioned in April 2016
GS.02.09	KPLC	IDO	Habas-wein	520	24th Sep 2009	50	Mini grid	
GS.11.09	KPLC	⁵ AGO	Hola	800	24th Sep 2009	50	Mini grid	
DS.06.09	KPLC		Lamu		24th Sep 2009	50	Mini grid	Decommissioned in April 2016
GS.09.09	KPLC	IDO	Lodwar	781	24th Sep 2009	50	Mini grid	
GS.07.09	KPLC	IDO	Mandera	1378	24th Sep 2009	50	Mini grid	
GS.10.09	KPLC	Wind	Marsabit	200	24th Sep 2009	50	Mini grid	
		IDO		120				
		⁶ HFO		1346				
GS.05.09	KPLC	AGO	Merti	128	24th Sep 2009	50	Mini grid	
GS.04.09	KPLC	IDO	Mfangano	1000	24th Sep 2009	50	Mini grid	
GS.08.09	KPLC	IDO	Moyale	1311	24th Sep 2009	50	Mini grid	
GS.03.09	KPLC	IDO	Mpeketoni	600	24th Sep 2009	50	Mini grid	Decommissioned in April 2016
DS.06.09	KPLC	HFO	Wajir	1270	24th Sep 2009	50	Mini grid	
		IDO		160				

¹GS stands for a Generation, Distribution and Supply licence

²KPLC means the Kenya Power and Lighting Company

³IDO stands for Industrial Diesel oil

⁴DS stands for Distribution and Supply licence

⁵AGO stands for Automotive Gas oil

⁶HFO stands for Heavy Fuel Oil

Annex 11: Electric Power Transmission, Distribution and Supply Licences

Ref Bo	Name of Licensee	Description of the undertaking	Date granted	Duration (years)	Remarks
DS.01.09	KPLC	Distribution in the KPLC Nairobi Region including Nairobi, Kiambu, Limuru, Ruiru, Machakos, Athi River, Kajiado and environs as shown on KPLC drawing Sheet 6 of SK No 10005. Sources of supply comprise generation by MSD at Nairobi South and transmission substations including Juja Road 132/66 kV, Embakasi 220/66 kV, Ruaraka 132/66 kV and Nairobi North 220/66 kV.	24th Sep 2009	50	
DS.02.09	KPLC	Distribution in the KPLC Mt Kenya Region including Nyeri, Thika, Embu, Meru, Murang'a, Maragua, Kirinyaga, Mbeere, Kitui, Mwingi, Tharaka, Isiolo, Laikipia, and environs as shown on KPLC drawing Sheet 6 of SK No 10008. Sources of supply comprise embedded hydro generation at Tana, Wanjii, Sagana, Ndula and Mesco, as well as transmission substations at Kiganjo 132/33 kV, Nanyuki 132/33 kV	24th Sep 2009	50	
DS.03.09	KPLC	Distribution in the KPLC West Region including Nakuru, Kisumu, Eldoret, Kakamega, Baringo, Bomet, Bungoma, Bureti, Busia, Butere, Gucha, Homa Bay, Keiyo, Kericho, Kisii, Kuria, Laikipia, Lugari, Marakwet, Migori, Mt. Elgon, Nandi, Narok, Nyamira, Nyandarua, Nyando, Rachuonyo, Samburu, Siaya, Suba, Trans Mara, Trans Nzoia, Turkana, UasinGishu, Vihiga, West Pokot and environs as shown on KPLC drawing Sheet 6 of SK No 10005. Sources of supply comprise transmission substations at Naivasha 132/33 kV, Lanet 132/33 kV, Lessos 132/33 kV, Eldoret 132/33 kV, Kisumu 132/33 kV, Muhoroni 132/33 kV, Chemosit 132/33 kV, Musaga 132/33 kV, Webuye 132/33 kV as well embedded hydro generation at Gogo and Sosiani.	24th Sep 2009	50	
DS.04.09	KPLC	Distribution in the KPLC Coast Region including Mombasa, Malindi, Kilifi, Kwale, Msambweni, Lamu, Voi, TaitaTaveta, Loitototok, MtitoAndei, LungaLunga, Vanga and environs as shown on KPLC drawing Sheet 7 of SK No 10007. Sources of supply comprise transmission substations at Rabai 132/33 kV, Kipevu 132/33 kV, Bamburi 132/33 kV, Kilifi 132/33 kV, Voi 132/33 kV and MtitoAndei 132/33 kV, as well HSD thermal generation at Lamu and Mpeketoni.	24th Sep 2009	50	
DS.05.09	KPLC	Distribution in Garissa Town and environs as shown KPLC drawing SK No 04800/A. Source of supply is the Garissa HSD and MSD thermal generation operated by the KenGen.	24th Sep 2009	50	
DS.06.09	KPLC	Distribution in Lamu Town and environs as shown on KPLC drawing SK No 10007. Source of supply is the Lamu MSD thermal generation operated by the KenGen.	24th Sep 2009	50	

Annex 12: Kenya's Energy Matrix, 2019

Supply&Consumption in (ktoe)	Coal&Peat ('000 tonnes)	Crude oil('000 tonnes)	Petroleum Products ('000 tonnes)	Gas	Nuclear	Hydro ('000 tonnes)	Geothermal, solar, wind etc ('000 tonnes)	Combustible Renewables and waste (Ktoe)	Electricity (ktoe)	Heat	Total*
Indigenous Production	-	0.00	0.00	-	0.00	3,429.97	4,412.05	16,761.19	-	-	24,603.21
Imports	690.85	0.00	6,448.89	-	0.00	0.00	-	-	11.20	-	7,150.94
Exports	0.00	-	745.37	-	0.00	-	-	-	3.04	-	748.41
International Marine Bunkers**	-	-	0.00	-	0.00	-	-	-	-	-	0.00
International Aviation Bunkers**	-	-	718.40	-	0.00	-	-	-	-	-	718.40
Stock Changes	-	-	0.00	-	0.00	-	-	-	-	-	0.00
Total Primary Energy Supply(TPES)	690.85	0.00	7,912.66	0.00	0.00	3,429.97	4,412.05	16,761.19	14.24	-	33,220.96
Transfers	-	-	-	-	0.00	-	-	-	-	-	-
Statistical differences	-	0.00	0.00	-	0.00	-	-	0.00	-1.40	-	-1.40
	-	-	-	0.00	0.00	-	-	-	-	-	0.00
Electricity Plants	-	-	132.94	0.00	0.00	342.83	440.99	0.00	961.65	-	1,878.41
CHP Plants	-	-	-	-	0.00	-	-	-	-	-	0.00
Heat Plants	-	-	-	-	0.00	-	-	-	-	-	0.00
Heat pumps	-	-	-	-	0.00	-	-	-	-	-	0.00
Gas Works	-	-	-	-	0.00	-	-	-	-	-	0.00
Petroleum Refineries	-	0.00	0.00	-	0.00	-	-	-	-	-	0.00
Coal Transformation	-	-	-	-	0.00	-	-	-	-	-	0.00
Liquefaction Plants	-	-	-	-	0.00	-	-	-	-	-	0.00
Other Transformation	-	-	-	-	0.00	-	-	-5,611.78	-	-	-5,611.78
Own Use	-	0.00	0.00	-	0.00	-	-	-	-21.16	-	-21.16
Distribution Losses	-	-	-	-	0.00	-	-	-	-210.37	-	-210.37
Total Final Consumption(TFC)	690.85	0.00	8,045.60	0.00	0.00	3,772.80	4,853.04	11,149.42	742.97	-	29,254.67
Industry & commercial sector	690.85	0.00	984.69	0.00	0.00	0.00	0.00	0.00	542.08	0.00	2,217.62
Iron and Steel	-	-	-	-	0.00	-	-	-	-	-	0.00
Chemical and Petrochemical	-	-	-	-	0.00	-	-	-	-	-	0.00
Non-Ferrous Metals	-	-	-	-	0.00	-	-	-	-	-	0.00
Non-Metallic Minerals	-	-	-	-	0.00	-	-	-	-	-	0.00
Transport Equipment	-	-	-	-	0.00	-	-	-	-	-	0.00
Machinery	-	-	-	-	0.00	-	-	-	-	-	0.00
Mining and Quarrying	-	-	-	-	0.00	-	-	-	-	-	0.00
Food and Tobacco	-	-	-	-	0.00	-	-	-	-	-	0.00
Paper Pulp and Print	-	-	-	-	0.00	-	-	-	-	-	0.00
Wood and Wood Products	-	-	-	-	0.00	-	-	-	-	-	0.00
Construction	-	-	-	-	0.00	-	-	-	-	-	0.00
Textile and Leather	-	-	-	-	0.00	-	-	-	-	-	0.00
Non-specified (Industry)	-	-	-	-	0.00	-	-	-	-	-	0.00
Transport sector	0.00	0.00	6,871.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,871.28
International Civil Aviation	-	-	-	-	0.00	-	-	-	-	-	0.00
Domestic Air Transport(excl. govt)	-	-	1,040.97	-	0.00	-	-	-	-	-	1,040.97
Road transport & retail pump outlets	-	-	5,803.33	-	0.00	-	-	-	-	-	5,803.33
Rail transport	-	-	19.07	-	0.00	-	-	-	-	-	19.07
Pipeline Transport	-	-	0.00	-	0.00	-	-	-	-	-	0.00
Marine(excl. Naval forces)	-	-	7.91	-	0.00	-	-	-	-	-	7.91
Non-specified (Transport)	-	-	0.00	-	0.00	-	-	-	-	-	0.00
Other sectors	0.00	0.00	189.31	0.00	0.00	0.00	0.00	11,149.42	200.78	0.00	11,539.51
Residential	-	-	0.00	-	0.00	-	-	11,149.42	195.54	-	11,344.96
Government	-	-	28.99	-	0.00	-	-	-	-	-	28.99
Agriculture/ Forestry	-	-	92.56	-	0.00	-	-	-	-	-	92.56
Tourism	-	-	14.73	-	0.00	-	-	-	-	-	14.73
Power generation	-	-	53.03	-	0.00	-	-	-	-	-	53.03
Fishing	-	-	-	-	0.00	-	-	-	-	-	0.00
Non-specified other	-	-	0.00	-	0.00	-	-	-	5.24	-	5.24
Non-Energy Use	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
of which petrochemical feedstocks	-	-	-	-	0.00	-	-	-	-	-	0.00
Non-Energy Use Ind/Transf/Ener	-	-	-	-	0.00	-	-	-	-	-	0.00
Non-Energy Use in Transport	-	-	-	-	0.00	-	-	-	-	-	0.00
Non-Energy Use in Oth. Sect	-	-	-	-	0.00	-	-	-	-	-	0.00

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