

OLKARIA PPP GEOTHERMAL PROJECT

Project Information Memorandum

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1 Introduction

1.1 Introduction

The Kenya Electricity Generating Company PLC ("KenGen") is the leading power generation company in Kenya, producing approximately 75% of the country's electricity consumption using a combination of hydro, geothermal, wind, and thermal power plants. KenGen currently owns and operates five geothermal power stations at Olkaria, namely Olkaria I (45 MW), Olkaria II (105 MW), Olkaria IV (150 MW), Olkaria I unit 4 & 5 (150 MW), Olkaria V(165.4MW) as well as a few modular wellhead generation units, namely the Eburru Wellheads (2.40 MW) and Olkaria Wellheads (81.1 MW).



Figure 1: KenGen Installed Capacity and Generation Output ¹

To achieve its capacity expansion plans, KenGen is working in close collaboration with the National Treasury to develop a 140 MW greenfield geothermal power plant (the "Project") through a Public Private Partnership (PPP). Kenya approved a framework for developing and implementing infrastructure PPPs under the PPP Act of 2013 (the "PPP Act") which led to the promulgation of PPP regulations in 2014.

Legal and environmental/social due diligence demonstrates that there are no significant obstacles to the Project's development and implementation. The Project is expected to be a costeffective and environmentally-sound option for meeting Kenya's base load energy needs utilizing Kenya's substantial endowment of geothermal resources.

The Kenyan National Treasury and KenGen selected K&M Advisors ("K&M") to serve as the Transaction Advisor for the Project and K&M is assisting KenGen with an international competitive tender process to select a private sector partner to implement the Project. As part of this process a Request for Qualifications ("RFQ") will be issued to interested companies and a Request for Proposals ("RFP") will be available to qualifying bidders.

1.2 Transaction Overview

The Project encompasses the development of a geothermal power generation project including

Kenya Electricity Generating Company PLC FY2018 Financial Results Presentation Friday 26th October 2018, Page 12. Full Year Results to 30 June 2018.

all support facilities on a Build, Own, Operate, Transfer (BOOT) basis. KenGen shall be responsible for providing steam under a 25-year steam supply agreement (the "Project Agreement") and the Kenya Power and Lighting Company (KPLC) shall purchase electricity under a long-term agreement from the Project under a 25-year power purchase agreement (the "PPA"). The Project will be developed through a special purpose vehicle incorporated under Kenyan Law (the "SPV"). KenGen shall have the right to make a cash investment in the SPV constituting an ownership participation of 25% in the SPV.

The diagram below presents the institutional arrangements for project implementation, and the text that follows describes the roles and responsibilities of each agency or entity involved.





The Ministry of Energy (MOE) has issued a geothermal resource license to KenGen for the development and utilization of underground resources in the Olkaria geothermal concession area. Furthermore, the MOE will support project decisions through its board representation at KenGen and KPLC.

KenGen as the "Contracting Authority" will be responsible for the operation, maintenance, and management of steam supply to the Project for the full duration of the Project Agreement and PPA. KenGen's responsibility includes the construction and testing of all steam production and reinjection wells. To-date, KenGen has drilled and tested all production wells required for the Project at start-up, as well as [a majority] of reinjection wells. KenGen will also develop all make-up wells required to supply steam to the Project over the contract term. The SPV will finance and construct the Steamfield Above Ground System ("SAGS"), and KenGen will operate and maintain the SAGS under an O&M Agreement with the SPV. Through this arrangement, KenGen will supply

steam at a single Delivery Point, defined at the outlet of the SAGS and inlet to the power plant. KenGen will also manage the procurement of the Project and will assume ownership and operations of the power plant at the end of the PPA term.

Special-Purpose Vehicle (SPV) will finance and construct the power plant, interconnection, and SAGS. The SPV will own and operate the power plant and sell electricity to KPLC under a PPA.

Kenya Power and Lighting Company (KPLC) will purchase electricity from the SPV under a PPA, paying both energy charges for net output and capacity charges for the power plant's contracted capacity.

National Environmental Management Authority (NEMA) will issue an environmental license to the SPV which will allow the SPV to construct and operate the power plant and associated facilities at the Project site. In addition, NEMA will review environmental compliance audits to enforce the Project's compliance with the environmental license.

Energy and Petroleum Regulatory Authority (EPRA) will approve the PPA between the SPV and KPLC. Furthermore, the EPRA will provide a power generation license to the SPV. Lastly, the EPRA will participate in the proposal evaluation team during the PPP procurement process.

The National Treasury will provide a Support Letter to cover certain political risks to be set forth in the Project Agreement.



Figure 3: Risk and Responsibility Flow

2 Country Background

Kenya is widely considered as the leading economy in East Africa and consistently ranks among the most attractive investment destinations in Africa. The country borders Somalia, Ethiopia and Sudan to the north, Uganda to the west, Tanzania to the south and the Indian Ocean to the east. The city of Mombasa is an important regional port and serves most of the Eastern and Central African landlocked countries, including Burundi, Ethiopia, parts of Northern Tanzania, Rwanda, Sudan, and Uganda.

Table 2.1 below presents a summary of key economic and political indicators for Kenya:

· · ·	
Name	Details
Official Name	Republic of Kenya
Political System	Presidential form of government with a bicameral legislature
Area	580,367 sq. km
Population	51.4 Million ²
GDP (current US\$)	US\$87.9 Billion ³
	Growth Rate: 5.9% (2018), 6.0% (2019 est), 6.1% (2020 est) ⁴
Government Debt	57% of GDP ⁵
Inflation	5.5% (2019 est), 5.4% (2020 est) ⁶
Currency	Kenyan Shillings (KShs). Exchange Rate – 101.99 KSh:1 US\$ ⁷
Credit Rating	B2 Stable (Moody's), B+ Stable (S&P)
Ease of doing business rank	61 out of 190 ⁸
Foreign Direct Investment	US\$1.6 Billion ⁹

2.1 Political System

The Constitution of Kenya was approved by referendum and was enacted on August 27, 2010. The Constitution of Kenya differs significantly from its predecessor, which was enforced at the time of Kenya's independence in 1963. The salient features of the new constitution include¹⁰

- Greater separation of powers between the branches of government.
- Introduction of checks and balances on the powers of the Presidency, including parliamentary oversight of presidential appointments and decisions.
- Constitutional limits on cabinet posts.

⁸ Ease of doing business index. World Bank

² The World Bank. Available at: <u>https://data.worldbank.org/country/kenya</u>

³ Ibid

⁴ The African Development Bank. Kenya Economic Outlook. Available at: <u>https://www.afdb.org/en/countries/east-africa/kenya/kenya-economic-outlook</u>

⁵ Ibid

⁶ Ibid

⁷ Exchange Rate from Xe.com as of September 11, 2019

⁹ World Investment Report 2019. United Nations Conference on Trade and Development (UNCTAD)

¹⁰ United Nations Conference on Trade and Development (UNCTAD). An investment guide to Kenya, Opportunities and Conditions

- Devolution of power to 47 local counties.
- Rules on land acquisition restricting foreigners to 99-year leaseholds.

Based on the Constitution, the Government of Kenya ("GOK") is divided into three distinct branches i) Executive, ii) Legislative, and iii) Judiciary.

The Executive branch consists of the office of the President who is elected through a national popular vote for a maximum of two five-year terms. The Executive branch also includes the office of the Deputy President and the Cabinet. The President of Kenya is the Head-of-State, Commander-in-Chief of the armed forces, and appoints the Cabinet secretaries.

The Legislative branch consists of a National Assembly (lower chamber) and Senate (Upper Chamber). The National Assembly has 350 members out of which 290 are directly elected. The Senate consists of one senator from each of the 47 Kenyan counties, 16 reserved seats for women nominated by the political parties, and four members representing youth and persons with disabilities. In addition, there are 47 county governments and each county government consists of an Assembly and a directly elected Governor. The County Governments oversee many issues at the local level, such as agriculture, health services, culture, transport, trade, planning, environment, and development.

The Judiciary consists of courts and tribunals headed by the Supreme Court, which is presided by a Chief Justice. The justices for the Supreme court are appointed by the President. The Judges and Magistrates for the lower courts are appointed by Judicial Commission. The country's legal framework is similar to that found in western or European countries.

Kenya recently concluded a Presidential election in 2018 that resulted in the reelection of the incumbent President Uhuru Kenyatta.

2.2 Economy

Kenya's healthy economic growth over the last decade has allowed it to establish itself as an economic, financial, and transport hub for East Africa. Kenya's GDP has grown consistently in the last decade with rates around 5% per year resulting in one of the strongest economies in Africa with a GDP of US\$87.9 Billion in 2018.¹¹ This growth trend is expected to continue and grow by 5.9% in 2019 and 6.0% in 2020. The growth in GDP is fueled by the services sector which accounts for 52.5% of the growth followed by the agriculture and manufacturing sectors. Growth in the manufacturing sector has resulted in an increase in Kenyan exports and decreased the Kenyan current account deficit from 6.7% of GDP in 2017 to 5.8% of GDP in 2018.

The World Bank's "Ease of Doing Business – 2019" report ranks Kenya at 61, 19 places up from its ranking the preceding year. The improvement in Kenya's ranking is a result of structural, institutional, and bureaucratic reforms introduced by GOK.

The GOK has embarked on an ambitious "Big 4" agenda as part of its Vision 2030 development program to reduce poverty and enhance quality of life for all Kenyans. The Big 4 agenda is centered on four key components and aims to deliver on these items by 2022¹²:

1. Enhancing Manufacturing: GOK aims to increase manufacturing sector contribution to GDP from 8.5% to 15% and create 1,000,000 new jobs in the process.

¹¹ World Bank. Available at: <u>https://data.worldbank.org/country/kenya</u>

¹² Development Initiatives. Kenya's 2019/20 budget and the big four agenda: a pro poor analysis. July 2019

- 2. Affordable Housing: The second pillar of the Big 4 Agenda is creating affordable housing for the people of Kenya. GOK aims to deliver 500,000 new affordable homes across the country and thereby improving the living conditions for ordinary Kenyans, creating 300,000 new jobs in the construction sector, and increasing the construction section contribution to GDP by 100%.
- 3. Universal Health Coverage: The third component of the Big 4 Agenda aims to provide universal health coverage which guarantees quality and affordable healthcare to all Kenyans.
- 4. Food Security and Nutrition: The final component in the Big 4 Agenda focuses on initiatives that ensures food security and adequate nutrition for the people of Kenya. The government aims to achieve this goal by expanding food production and supply, reducing food prices, and incentivizing farmers and the agricultural community.

2.3 Financial System

Kenya has a relatively well-established financial sector with participation from several local and international players. The Kenyan financial sector is governed by the Central Bank of Kenya and comprises 28 domestic and 14 foreign commercial banks, 1 mortgage finance company, 11 microfinance institutions, and 49 insurance companies. The Banking Sector in Kenya is dominated by seven Tier 1 commercial banks, namely Equity Bank, Kenya Commercial Bank, Barclays Bank of Kenya, Diamond Trust Bank, Cooperative Bank, Central Bank of Africa, and Standard Chartered.¹³ The Nairobi Securities Exchange is the largest securities exchange in East Africa and the fourth largest in the African continent (behind South Africa, Egypt, and Nigeria). There are more than 60 companies listed on the Nairobi Stock Exchange with a market capitalization of approximately US\$21 Billion¹⁴. The Kenyan capital market has grown in recent years and has exhibited strong capital raising capabilities. The Kenyan Bond market is also developing and is dominated by government debt.

2.4 Investment Climate

The GOK has been and continues to be focused on sustaining a stable investment climate for private-sector participation in energy, developing expanded transmission and distribution networks to deliver power to customers, maintaining a creditworthy distribution off-taker, maintaining cost-reflective tariffs, unbundling the integrated and centralized power company, and reducing inefficiency in the power sector to support more affordable end-user tariffs.

KenGen is engaged in the business of generating electricity through the development, management and operation of power generation facilities. KenGen was incorporated in 1954 under the Companies' Act of the laws of Kenya (now repealed) as the Kenya Power Company ("KPC") with 100% GOK ownership. Subsequently, the shareholders of KPC contracted with the East Africa Power & Lighting Company ("EAP&L") to manage KPC. In 1983, EAP&L was changed to Kenya Power & Lighting Company ("KPLC"). In 1996, the GOK initiated major reforms in the energy sector. Generation of electricity was unbundled and the management of KPLC's electric generation assets was separated from its electricity transmission and distribution assets. In 1998, KenGen was formed to own the electric generation assets while KPLC maintained the electricity transmission and distribution functions.

In 2006, the GOK sold 30% of its stake in KenGen and KenGen was listed on the Nairobi Securities

¹³ International Trade Administration. U.S. Department of Commerce, Kenya Country Commercial Guide. Available at: <u>https://www.export.gov/article?id=Kenya-banking-systems</u>

¹⁴ Nairobi Securities Exchange. Market Snapshot, as of September 11, 2019. Available at: <u>https://www.nse.co.ke/market-statistics/market-snapshot.html</u>

Exchange through an initial public offering.

2.4.1 Corporate Taxation in Kenya

Corporate entities are subject to corporate income tax/corporation tax, which is governed by the Income Tax Act, Cap 470 of the Laws of Kenya. This is the tax levied on the income of legal entities. PPPs are incorporated as companies in Kenya and as such:

- PPP's are subject to corporation tax at 30%.
- Losses of PPPs can be carried forward for a maximum of 10 years.
- PPPs can claim an investment deduction of 150% of the asset value of the project due to its location in Naivasha.
- Capital allowances and losses must be used within nine years following the tax year incurred; however, this period can be extended by application.
- The Legal Notice No. 91 provides for exemption of tax on interest on foreign loans acquired for implementation of energy projects. This is an automatic exemption.
- Legal Notice No. 165 provides for a withholding tax exemption on payments for services rendered by non-residents that will be recovered under a Power Purchase Agreement. This is an automatic exemption.
- Bidders should review all relevant Kenyan tax law and regulations including, but not limited to, thin capitalization rules and treatment set forth in Kenya's Income Tax Act.

3 Kenya Power Sector

3.1 Overview

Energy infrastructure is a vital driver of socio-economic development in any country. Kenya has identified the energy sector as an area of growth which is critical for achieving its national development blueprint, "Vision 2030." Vision 2030 calls for the energy sector to provide an affordable, sustainable, and reliable electricity supply to stimulate high and sustained economic growth. This will in turn lead to higher incomes, increased employment, and reduced poverty.

Electricity Sector Overview				
Generation Capacity 2,712 MW Peak Demand1,882 MW Growth 8% p.a. Access Rate 75% Universal Access Target2022				
Source Geothermal Hydro Thermal Wind Others Imports	Capacity (MW) 663 – 24.4% 826 – 30.5% 808 – 29.8% 336 – 12.4% 79 – 2.9%	Generation (GWh) 5,033 – 43.8% 3,741 – 32.5% 1,298 – 11.3% 1,192 – 10.4% 60 – 0.5% 170 – 1.5%		

Kenya also plans to increase electricity access, from 75% in 2019 to 100% by 2022. Kenya has already made substantial progress, almost tripling access to electricity connections from 27% of its population in 2013 to the current rate of 75%. During the same period, the number of new electricity connections per year tripled. Additional generation capacity will be an important part of delivering universal access with high reliability.

The Kenyan government intends to meet future electricity demand while reducing the environmental impact of power generation. This will include reducing the carbon intensity of the sector and increasing the use of renewable energy resources. The National Energy Policy, as articulated in Sessional Paper No.4 of 2004 and operationalized by the Energy Act No. 12 of 2006, encourages the development of renewable energy sources and provides strategies for promoting renewable energy development. The Energy Act 2006 was recently replaced by the "Energy Act 2019", which further promotes the development and use of renewable resources by establishing a Renewable Energy Resource Advisory Committee (RERAC) composed of representatives from the Ministry of Energy and Petroleum, Rural Electrification Agency, Geothermal Development Company Limited, and Kenya Electricity Generating Company Limited, among others. The function of the Committee is to advise the GOK on issues related to the development of renewable sources. Under the new law, the Cabinet Secretary is responsible for the licensing, exploration, production, and royalties associated with geothermal development in Kenya.

The Kenya energy sector is primarily regulated by the Energy and Petroleum Regulatory Authority (the "EPRA"), with some oversight and decision-making by Kenya's Ministry of Energy and Petroleum. KenGen and KPLC are the largest owner-operators of electricity infrastructure in Kenya. KenGen develops, owns and operates generation facilities and produces more than 75% of Kenya's power generation. KPLC, on the other hand, is responsible for the distribution and sale at retail of electricity in Kenya to end consumers.

The EPRA was established and receives regulatory authority under several laws, among them the Energy Act, Chapter 314 of the Laws of Kenya which was recently replaced by the 2019 Energy Act. The EPRA and GOK endeavor to modernize and update Kenya's Energy Policy to account for changes and developments that have occurred since the 2004 sessional paper was adopted and acknowledge that renewable energy, including that derived from geothermal resources, has the potential to "enhance energy security" in Kenya if it is effectively harnessed through careful planning and advanced technology. The GOK intends to create an enabling environment for the development, investment and financing of independent power projects in the private sector in Kenya, and, in particular, projects taking advantage of geothermal resources. The other key electric sector laws and regulations are described in Section 3.2.

The "Box" below summarizes the key electric sector institutions relevant for the development of the Project.

- KenGen is a majority government-owned company responsible for generation of electricity supplied to the grid system in Kenya. KenGen's authority to enter into PPP Contracts/ Project Agreements, in this case a Steam Supply Agreement as the principal Project Agreement and perhaps a Land Lease Agreement stems from the PPP Act. The right to develop, operate and maintain, and supply and sell steam from the Olkaria steam fields, which will be further developed for the supply and sale of steam to the Project has been issued by the Ministry of Energy to KenGen via its Concession Agreement with the MEP. Therefore, KenGen, being the licensed steam "owner" has the capacity to supply the steam to the Project.
- **Kenya Power** will be the off-taker of energy generated by the Project. Kenya Power is a limited liability company with the GOK as the main shareholder. The law regulating Kenya Power's contracting capacity is found in the State Corporations Act and the Companies Act.

The EPRA will need to approve the Project PPA to allow KPLC to recover the cost of electricity supply through its retail rates.

• **KETRACO**, the Kenya Electricity Transmission Company Limited operates and manages the national electricity grid. KETRACO is a 100% government-owned and controlled limited liability company, under the regulatory supervision of the EPRA and in accordance with the Kenya National Transmission Grid Code, 2016 ("KNTGC").

3.2 Legal Framework, Procurement Process and Approvals

The following laws and regulations are applicable to the implementation, development and procurement of the Project:

- The 2019 Energy Act and its implementing rules, regulations and policies including:
 - The Energy (Electricity Licensing) Regulations, 2012; and
 - The Feed-in-Tariffs Policy for Wind, Biomass, Small-Hydro, Geothermal, Biogas and Solar Generated Electricity, 2012;
 - The Geothermal Resources Act, Chapter 314, 1982 and its implementing regulations, Geothermal Resources Regulations, 1990.
- The Public-Private Partnership Act, 2013
- The Public Private Partnership Regulations, LN No. 171/2014

- The Constitution of Kenya, 2010
- The Capital Markets Act Cap 485A and the relevant Regulations made thereunder and, in particular, the listed companies disclosure regulations
- The Companies Act, 2015
- State Corporations Act, Cap 446
- The various land laws affecting the Project site including the Land Act No. 6 of 2012, the Land Registration Act No. 3 of 2012 and the Community Land Act No. 27 of 2016
- Environmental Management and Co-ordination Act Cap 387.

Given that the Project will be procured as a public private partnership, the PPP Act and regulations will be particularly relevant for project development, tender, and financing. The sub-sections below provide a brief description of such act and regulations along with other legislation that is relevant for the Project

3.2.1 2019 Energy Act

The 2019 Energy Act replaced the Energy Act No. 12 of 2006 which consolidated the regulation of energy resources within the country and established the Energy Regulatory Commission, the Energy Tribunal, and KETRACO, among other entities. The 2019 Energy Act renamed the Energy Regulatory Commission to the Energy and Petroleum Regulatory Authority ("EPRA") and enacted some major changes to the Kenyan Energy Sector including introduction of net metering, allowing private companies to own and operate distribution networks, and introducing royalties of between 1% to 2.5% for geothermal producers for the first decade, after which they will rise to 5%. The EPRA and the Energy Tribunal are the primary regulatory bodies and operate independently from the GOK. Both institutions coordinate and advise the Ministry of Energy on policy and strategy.

3.2.2 Geothermal Steam Supply

The recently passed Energy Act 2019 declares that all un-extracted geothermal resources in Kenya shall be vested in the Government of Kenya. Geothermal resources are defined as any product derived from and produced within the earth by natural heat; including steam, water, and water vapor and a mixture of any of them that has been heated by natural heat. Section 78 of that Act prohibits any unauthorized exploitation of geothermal resources.

The Ministry of Energy and Petroleum (the "MEP"), together with the Ministry of Mining (the "MoM"), is ultimately responsible for facilitating and overseeing policy implementation in energy, oil, natural gas and mineral projects, including those involving exploitation of geothermal resources.

3.2.3 Public Private Partnerships (PPP) Framework

Kenya enacted the PPP Act, followed by the promulgation of PPP regulations in 2014. Section 4 of the PPP Act created a "PPP Committee" which is responsible for the assessment and approval of PPP projects in Kenya. The PPP Committee comprises of senior Principal Secretaries of State, Attorney General, 4 persons nominated by the Cabinet Secretary, and a Director. Section 8 of the PPP Act establishes a PPP Unit which is as a Special Purpose Unit within the National Treasury. The PPP Unit's serves as a Secretariat and a technical arm of the PPP Committee. The PPP Unit assists the PPP Committee in their decision-making process by providing them critical information and resources, including identification of problems, recommendations on different issues, and ensuring that projects meet affordability, value for money, and risk criterion. Pursuant to the act, contracting authorities such as KenGen have established PPP nodes to identify, screen and prioritize projects

based on guidelines issued by the PPP Committee. The PPP Committee and the PPP Unit are responsible for developing skills for reviewing and evaluating project proposals from public entities, and establishing whether the proposed PPA offers "value for money" and whether the risk allocation in the PPA and the other PPP Contracts are efficiently/reasonably allocated between KenGen, as the steam supplier, KPLC, as the power purchaser, and/or the GOK, on the one hand, and the Project Company/IPP, as the power supplier/Project developer and owner, on the other hand.

4 Project Site and Geothermal Field

4.1 Overview

Geothermal energy is the natural internal heat of the earth that is stored within rocks and fluids. Most of the heat is due to the natural decay of radioactive elements. Through various thermal processes, the heat is transferred to the surface of the earth where it can be harnessed for heating and electricity generation. Kenya is well-endowed with a geothermal resource potential of 7,000 to 10,000 MW spread over 14 prospective resources areas in and around the RiftValley.



Figure 4: Geothermal Potential in Kenya

The Olkaria geothermal field is in Naivasha, approximately 120 km northwest of Nairobi. The Project area is in the northeastern sector of the Olkaria geothermal field. The power plant location is next to the existing Olkaria II power station and will interconnect to the grid at the Olkaria I AU switchyard. The site is within an area leased by KenGen from the Kenya Wildlife Service.

Source: Adopted from -Mannvit & Group (2012)

The site is under long-term lease to KenGen, and KenGen already has an ESIA license in this area.

The Project is not expected to have any significant environmental issues and no resettlement activities are anticipated as there are no human settlements in the area.

4.2 Olkaria Geothermal Field

The Olkaria geothermal field is situated just inside the Hell's Gate National Park, on the eastern edge of the Eastern Rift Valley. The Project area is located in the north-eastern and central sector of the Olkaria geothermal field as shown in **Figure 4.3**.

The entire Olkaria volcanic field covers an area of approximately 240 km² and is situated at an elevation ranging between 1,900 and 2,200 masl.

The geological structure of the area has been covered in reports dating back from 1963, however the surface geology comprises ashes, pumice and other pyroclastic deposits from "recent" volcanic eruptions.



Figure 5: Olkaria Project Area

Figure 6: Aerial View of Olkaria PPP Project Location



The Geothermal Resources License issued by the (then) Ministry of Energy to KenGen allows KenGen to:

- Utilize and exploit the geothermal resources in the License area and
- Take, use or apply the geothermal resources to generate power at the Olkaria II power station.

4.3 Topographical & Geotechnical Information

The topography of the Olkaria geothermal field comprises various small hills with several small trees and bushes. Elevations of the steam production facilities range from 2200 masl at Wellpad OW 740 on the east of the geothermal field to 197 masl at reinjection wellpad OW-501.

The routes for additional access roads to the proposed well pads will maximize the use of the existing access roads around the site. The location of the power plant has a gentle east to west slope across the site and is relatively close to the main access road into the Olkaria geothermal field.

The Olkaria area is made up of a high-temperature geothermal system located within the central sector of the Kenya Rift Valley associated with late Quaternary rhyolitic volcanism. The soils around the Project location were found to be comprised of silt and sand (containing traces of gravel and very small fractions of clay).

4.4 Site Access

Road access to Olkaria from Naivasha is via bitumen roads to the Olkaria complex, after which the roads are unsealed gravel roads. The existing road system has been used for heavy and oversized loads during the recent construction phases of the Olkaria IAU and Olkaria IV projects.

4.5 Power Evacuation Arrangements

The Project will connect into the Olkaria District 220 kV transmission infrastructure at the Olkaria I AU substation which is located 3.75km from the Project site. The transmission infrastructure will be designed and constructed by the SPV and transferred to KETRACO after the Project reaches commercial operation.

4.6 Climatological Information

KenGen will provide hourly and daily historical data for rainfall, dry bulb air temperature, humidity and wind. Below is a general overview of climate conditions.

Rainfall

The average annual rainfall is around 750 mm per year, but this can vary from 400 to 1000 mm per year. Rainfall is usually highest during March-April and September-October, with typical rainfall as high as 150 mm per month.

Air Temperature

The long term historical dry bulb temperature range is 5°C to 35°C with an average of 20°C. The long term historical wet bulb temperature range is 5°C to 28°C with an average of 14.8°C. Average relative humidity at midday is typically 57% with a maximum of 75%.

Wind

- The minimum and maximum daily wind speeds recorded for the year are 3.5 m/s and 9.4m/s respectively.
- December to February, the predominant wind direction is North-North-East, consisting mainly of wind speeds between 2 to 5 m/s.
- March to May, wind direction is also predominantly North-North-East.
- June to August, the predominant winds are South-South-East mainly greater than 5m/s.
- September to November, predominant wind direction is South-South-West.

Barometric Pressure

Barometric pressure data show typical values ranging between 799 and 810 mbar. For design purposes, a barometric pressure of 800 mbar (0.8 bar) is selected.

5 Project Technical Requirements

5.1 Overview

The Project will consist of a geothermal power generating facility and associated interconnection facilities (together, the "Facility") with a capacity of approximately 140 MW at site reference conditions, to be specified in detail within the RFP. The bidders will select the power generating technology for the Project, subject to requirements to be set forth by KenGen in the RFP which will include:

- A requirement of 100% fluid recovery and reinjection in the Project's functional specifications.
- generators and step-up transformers, auxiliary "balance of plant", together with the relevant control and protection systems comprising the power plant, will be operable in full compliance with the requirements of the Kenya National Transmission Grid Code.
- control of the power plant and SAGS will be through an integrated, distributed control system requiring a uniform single database of information between all components, with appropriate redundancy to ensure high availability, including automatic Plant and SAGS start-up & shutdown. The steam pressure at the turbine will be controlled by three interacting subsystems: (i) vent valves, (ii) turbine inlet valves, and (iii) motorized wellhead trimming valves.
- interconnection via double-circuit 220 kV line to the Olkaria IAU switchyard, which is approximately 3.75 km from the site. From there, the power plant will connect into the Olkaria District 220 kV transmission infrastructure at the Suswa switching station, which is the marshalling point for Olkaria geothermal power stations and is connected with the Nairobi North 220 kV Substation.

5.2 Grid Connection

The power plant will connect into the Olkaria District 220 kV transmission infrastructure at the Olkaria IAU substation which is located 3.75km from the Project site. From the Olkaria I AU substation the power will be transmitted to the Suswa substation (Figure 5.2) 30 km to the south, which is the marshalling point for Olkaria geothermal power stations and is connected with the Nairobi North 220 kV Substation 63 km to the south of Suswa. According to the Kenya Transmission System Single Line Diagram for the year 2018-2019, the interconnections will comprise the following 220 kV double circuit line interconnections:

- Olkaria II-Suswa
 Double circuit constructed of single Canary conductor per phase
- Olkaria IAU-Suswa Double circuit constructed of single Canary conductor perphase
- Olkaria IV-Suswa Double circuit constructed of single Canary conductor perphase
- Suswa-Nairobi Nth Double circuit constructed of single Canary conductor per phase.

Figure 7: Suswa 220 kV Switchyard



The transmission in the district is undergoing considerable development centered on Suswa. The new 400 kV switchyard will interconnect Suswa 220 kV with Nairobi and Mombasa demand at 400 kV, via Isinya 400/220 kV switching station, which is located approximately 100 km to the south of Suswa. Suswa will also provide a 400 kV connection with Loyangalani Substation that forms a grid connection for the 365 MVA Lake Turkana wind farm over 430 km to the north. Each 400 kV circuit is constructed in triplex Canary conductor for each phase.

5.3 Metering

Revenue metering to Kenya Power standard specifications will be installed at the Project to meter power flow out of each generator step up transformer on the 220 kV circuits. The revenue meter will interface with the Project DCS in addition to relaying data to the market operator and system operator.

The SPV shall finance, install, supply and commission the steam metering devices at the steam delivery point. At all times steam pressure at the steam delivery point shall be measured and recorded. Steam dryness and chemical composition including non-condensable gases at the steam delivery point shall be measured bi- monthly, or whenever KenGen connects or disconnects a production well.

5.4 Environmental and Social

The Project will be required to meet all applicable standards and regulations in Kenya including those of Kenya's National Environment Management Authority (NEMA). In addition, the Project will be required to comply with all applicable guidelines of the International Finance Corporation and Equator Principles to safeguard environmental, natural and cultural resources. The awarded bidder will be responsible for obtaining all permits, licenses, and approvals (whether environmental or otherwise) necessary to build, own, operate, and transfer the Facility.

Although the project is not expected to have any significant environmental issues, all impacts must be identified and properly mitigated. Potential impacts include (i) loss of vegetation cover, (ii) impact on fauna and avifauna of Hell's Gate National Park, (iii) dust and exhaust emissions, (iv) hydrogen sulfide emissions, (v) increased stormwater, runoff and soil erosion, (vi) solid waste generation, (vii) noise and vibration, and (viii) land subsidence.

6 Project Description and Structure

6.1 Project Summary

The Project encompasses the development of a geothermal power generation project including all support facilities on a Build, Own, Operate, Transfer (BOOT) basis. The Project will be developed under a PPP arrangement whereby a Special Purpose Vehicle (SPV) will finance, construct, own, and operate the power plant and associated facilities. The SPV will also design, finance and construct the steam field above ground system (SAGS) and the grid interconnection facilities, which will include approximately 3.75 km 220 kV transmission line from the plant site to the Olkaria I AU switchyard. The SAGS will be operated and maintained by KenGen under contract with the SPV, while the SPV shall retain ownership of these facilities. Prior to or commensurate with the Commercial Operations Date ("COD") of the power plant, the SPV shall transfer ownership of the grid interconnection facilities (including the transmission line) to KETRACO.

The SPV shall purchase steam from KenGen under a 25-year steam supply agreement. KPLC will purchase all electricity from the SPV under a 25-year Power Purchase Agreement. The SPV will pay KenGen for steam using a portion of the revenues received under the PPA. The PPA and steam supply agreements will include appropriate back-to-back provisions to ensure that KenGen bears the risk of fuel supply and the SPV bears the responsibility for the efficient operation and maintenance of the power plant. At the end of the PPA term, the SPV will transfer ownership and operations of the SPV's assets to KenGen for a nominal price. KenGen shall have the right to make a cash investment in the SPV constituting an ownership participation of 25% in the SPV.

The desired commercial operation date for the Project is approximately three (3) years from the expected date of financial close for the Project. The Project is not designed to require any direct subsidy from the Government to supplement its revenues.

The power plant will be located adjacent to the existing Olkaria II power plant along its northwestern boundary. KenGen already holds the rights to develop and use this land under an existing long-term lease with the Kenyan Wildlife Service (KWS). The SPV will be granted a long term lease of the Project site.

KenGen shall supply steam to the Project at a single point of delivery at the outlet of the SAGS and inlet to the power plant. The SPV will pay KenGen for steam in accordance with the terms of the steam supply agreement. KenGen will be responsible for delivering all quantities of steam required to operate the power plant up to its full capacity over the entire term of the PPA and steam supply agreement.

Twenty-eight (28) wells have been drilled, tested, and assigned to the Project by KenGen. These wells are capable of supplying adequate steam for 100% of the envisioned capacity of the Project upon commissioning, including a buffer. Information on these wells, including test results, will be made available to bidders in the RFP package. KenGen will drill additional make-up wells as needed in the future to fulfill its supply obligations for the entire term of the steam supply agreement.

6.2 Description of the Project Agreements and Counterparties

The diagram below presents the institutional arrangements for project implementation.

Figure 8: Project Implementation Institutional Arrangements



The Ministry of Energy (MOE) has issued a geothermal resource license to KenGen for the development and utilization of underground resources in the Olkaria geothermal concession area. Furthermore, MOE will support project decisions through its board representation at KenGen and KPLC. Lastly, the MOE will issue approval for the PPP Process under the PPP Act through its representation on the proposal evaluation team and the cabinet approval of the project.

KenGen will be responsible for the operation, maintenance, and management of steam supply to the Project for the full duration of the Project Agreement and PPA. KenGen's responsibility includes the construction and testing of all steam production and reinjection wells. To-date, KenGen has drilled and tested all production wells required for the Project at start-up, as well as [a majority] of reinjection wells. KenGen will also develop all make-up wells required to supply steam to the Project over the contract term. The SPV will finance and construct the Steamfield Above Ground System ("SAGS"), and KenGen will operate and maintain the SAGS under an O&M Agreement with the SPV. Through this arrangement, KenGen will supply steam at a single Delivery Point, defined at the outlet of the SAGS and inlet to the power plant. KenGen will also manage the procurement of the Project and will assume ownership and operations of the power plant at the end of the PPA term.

Special-Purpose Vehicle (SPV) will finance and construct the power plant, interconnection, and SAGS. The SPV will operate the power plant and sell electricity to KPLC under a PPA.

Kenya Power and Lighting Company (KPLC) will purchase electricity from the SPV under a PPA, paying both energy charges for net output and capacity charges for the power plant's contracted capacity.

National Environmental Management Authority (NEMA) will issue an environmental license to the SPV which will allow the SPV to construct and operate the power plant and associated facilities at the Project site. In addition, NEMA will review environmental compliance audits to enforce the Project's compliance with the environmental license.

Energy and Petroleum Regulatory Authority (EPRA) will approve the PPA between the SPV and KPLC. Furthermore, the EPRA will provide a power generation license to the SPV. Lastly, the EPRA will participate in the proposal evaluation team during the PPP procurement process.

The National Treasury will provide a Support Letter to cover certain political risks to be set forth in the Project Agreement.

Figure 9: Risk and Responsibility Flow Ensure SPV access to foreign CONTRACTUAL OBLIGATIONS exchange as needed (currency convertibility) Contract with SPV Refrain from any form of Contract without SPV • expropriation or control of SPV assets (\mathfrak{H}) Approval/permit KenGen Shareholder Support Letter Aareement Steam Supply Agreement Power Purchase Agreement SPV Land Sub-lease Agreement KenGen Kenya Powe Supply steam to power plant (SPV) Produce capacity and energy per PPA commitment Purchase capacity and energy from Facility (SPV) • Operate & maintain SAGS · Design, finance, and construct power plant, SAGS, and arid interconnection Issue dispatch instructions to SPV Operate & maintain wellheads and Coordinate scheduled maintenance access roads in steam field Operate and maintain power plant outages with SPV Identify, fund, drill, and connect make-Purchase steam, water and sublease land from KenGen Operate and maintain interconnection up wells as needed Operate power plant within emissions limits and facilities Supply water to steam field and power environmental, health, and safety laws and regulations in plant (process & potable) Kenva Lease land for power plant, SAGS, & Treat and dispose of wastewater at site in accordance associated facilities from KWS with Kenyan laws & regulations Transfer Facility to KenGen at end of PPA and SSA term Ch. Issue Generation while meeting or exceeding minimum condition and License to SPV function Responsible for community engagement (with KenGen support) lssue Land Lease Environmental SPV Transfer of interconnection 🖄 KETRACØ Aareement facilities to KETRACO Permit nema Note: Lenders Direct Agreement included in RFP; not shown in diagram

The basic Project Agreements to be included in the RFP are listed below:

- Power Purchase Agreement ("PPA") between KPLC, as the power Off-taker and the SPV;
- Project Implementation, operation and maintenance of the SAGS, and steam supply agreement (the "Project Agreement") between the SPV and KenGen for a term of 25 years.
- Land Lease Agreement ("LLA") between KenGen and the SPV; and
- Letter of Support between the GOK and the SPV.

6.2.1 PPA

A summary of key terms currently contemplated follows:

- The final tariff structure will be defined in detail in the PPA
- The SPV shall, among other obligations, be responsible for the design, procurement, construction, financing, testing, commissioning, operation and maintenance of the power station and the SAGS.
- The SPV shall be responsible for the procurement of the Project Agreement with KenGen.
- The SPV shall design, procure, construct, finance, test, commission, and transfer to KETRACO the transmission interconnection and connection facilities.
- KPLC will take delivery of net electrical output and pay energy charges for such and make capacity payments for the contracted capacity (adjusted for availability).
- KPLC shall pay for contracted capacity as well as any take-or-pay obligations under the Project Agreement with KenGen in the event KPLC cannot take the available Project capacity or energy.
- Payment to the SPV by KPLC shall be in U.S. Dollars.
- Liquidated damages are payable by KenGen or the SPV in the event of a delay in reaching the contract commercial operation date.

6.2.2 The Project Agreement

The Project Agreement will establish a firm obligation of KenGen to supply steam and maximum hourly rates needed to dispatch the plant when required. Any take-or-pay minimum quantity obligations will be passed through in the PPA with KPLC. A summary of key terms currently contemplated follows:

- KenGen shall drill and develop the steam wells, make-up wells, re-injection wells and piping to the well pad.
- The SPV shall design, finance, supply, construct, and commission the SAGS from the wells to the power station.
- O&M of the SAGS will be performed by KenGen.
- The SPV will agree to take and pay for steam quantities provided at the delivery point for the 25-year Term of the contract.
- At the end of the term, all SPV Project assets will be transferred to KenGen for US\$1.
- KenGen will provide water to the SPV as required.

- KenGen shall undertake to provide an alternative supply of steam in the event of any adverse changes in the well reservoirs which reduces steam supply below the minimum guaranteed rate.
- The price of steam will be fixed and the SPV will have a minimum take-or-pay obligation, to be determined prior to the RFP stage.
- Payment from the SPV to KenGen will be in U.S. Dollars.
- Liquidated damages payable (by KenGen or the SPV) by the party at fault in the event of a delay in reaching the contract commercial operation date.

6.2.3 Government of Kenya Letter of Support

The GOK will provide a letter of support, which is expected to cover certain political risks to the Project.

7 Bidding Framework and Estimated Schedule

7.1 Tender Process Overview

The tender process will include separate phases for Request for Qualifications ("RFQ") and Request for Proposals ("RFP"). The process can be summarized as following:

- Bidders will submit information required to assess their technical and financial capability to design, finance, build, operate and maintain the Power Plant. Bidders will be given approximately 1 month to respond to the RFQ.
- The qualified bidders will be invited to submit a proposal ("Proposal") for the Project in response to the RFP to be issued by KenGen to the qualified bidders.
- The bidders will be given approximately 5 months to submit their bids against the RFP and clarify any issues faced during bid preparation.
- A preferred bidder (based on lowest price Proposal) will be invited to finalize and then execute the Project Agreements

7.1.1 RFP Package

The "RFP package" will contain, inter alia:

- General information related to the Project necessary for the preparation and submission of a bid;
- Specifications of the Project, including the technical and financial conditions that should be met by a bidder;
- Specifications of the level of services, performance indicators and such other requirements as the Involved Power Companies shall consider necessary;
- The criteria and method to be used in evaluating a bid;
- The forms and documents that are required to be filled and submitted by a bidder;
- The value of the bid security required to be submitted by a bidder; and
- The deadline and place for submission of the tender documents by a bidder.
- Draft "Project Agreements" as described in Section 7.2.

7.1.2 Procurement Schedule

The Table below provides the estimated procurement process schedule.

Phase	Item	Responsible Entity(ies)	Timing (By)	Interim Duration
RFQ Stage	Issue RFQ	KenGen	Nov. 5, 2019	-
RFQ Stage	Final bidder clarification questions due	Bidders	RFQ + 30 Days	30 Days
RFQ Stage	Final clarification responses issued	Prequalification Committee	RFQ + 40 Days	10 Days
RFQ Stage	RFQ Submission	Bidders	RFQ + 45 Days	5 Days

RFQ Stage	RFQ Evaluation	Prequalification Committee, Consultant	RFQ + 59 Days	14 Days
RFQ Stage	Approve and Issue Pre-Qualified Bidder Short List	KenGen	RFQ + 73 Days	14 Days
RFP Stage	Issue RFP Document	KenGen	RFQ + 75 Days	2 Days
RFP Stage	Pre-Bid Conference and Site Visit	Project Appraisal Team (PAT), Consultant	RFP + 50 Days	50 Days
RFP Stage	Bidder clarification deadline	Bidders	RFP + 105 Days	55 Days
RFP Stage	Final responses to Bidder clarification questions	Project Appraisal Team (PAT), Consultant	RFP + 121 Days	16 Days
RFP Stage	Bid Submission	Bidders	RFP + 135 Days	14 Days
RFP Stage	Initiate Bid Evaluation	Proposal Evaluation Team (PET)	RFP + 137 Days	2 Days
RFP Stage	Evaluation and Report Complete	Proposal Evaluation Team (PET)	RFP + 212 Days	75 Days
RFP Stage	Final Bidder Ranking Approved (Award)	KenGen, Committee	RFP + 233 Days	21 Days

Appendix A: KENGEN Financial Information

Historical annual reports for KenGen are available online and can be downloaded from the KenGen website <u>https://www.kengen.co.ke/index.php/about-us/financial-performance.html</u>

Appendix B: Kenya Power Financial Information



Contacts

All queries with respect to this PIM and the Project should be sent to the email addresses set out below:

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