



**KenGen**  
Energy for the nation.



# ALTERNATIVE BUSINESS & PARTNERSHIP

# 2023



## About KenGen

Kenya Electricity Generating Company PLC (KenGen) stands as the premier electric power generation company in East Africa, with its establishment dating back to 1954 when it was formed under the name Kenya Power Company (KPC). The shareholders initially entrusted the management of KPC to East Africa Power & Lighting Company (EAP&L), which later evolved into Kenya Power and Lighting Company (KPLC) in 1983. From the outset, KenGen's key responsibilities included the development, management, and operation of power plants.

In 1996, the Kenyan Government embarked on energy sector restructuring to optimize resource usage for electricity generation, transmission, and distribution. This effort led to the separation of KPC's management from KPLC, resulting in the birth of KenGen in January 1998.



In 2006, a significant milestone was reached as the Government divested 30% of its stake in KenGen through a successful Initial Public Offer (IPO). Following this, KenGen achieved listing on the Nairobi Securities Exchange (NSE). Aligning with the organization's strategic objectives, shareholders participated in a successful rights issue in 2016. Today, with a commanding market share of about 65% and an impressive installed capacity of 1,904MW, KenGen proudly stands as the predominant energy producer in East Africa.

Beyond the Kenyan borders, KenGen extends its impact across Africa. The company is actively engaged in collaboration with Ethiopia Electric Power (EEP), Tulu Moyo Geothermal Operations (TMGO) in Ethiopia, and the Djibouti Office of Geothermal Energy Development (ODDEG).

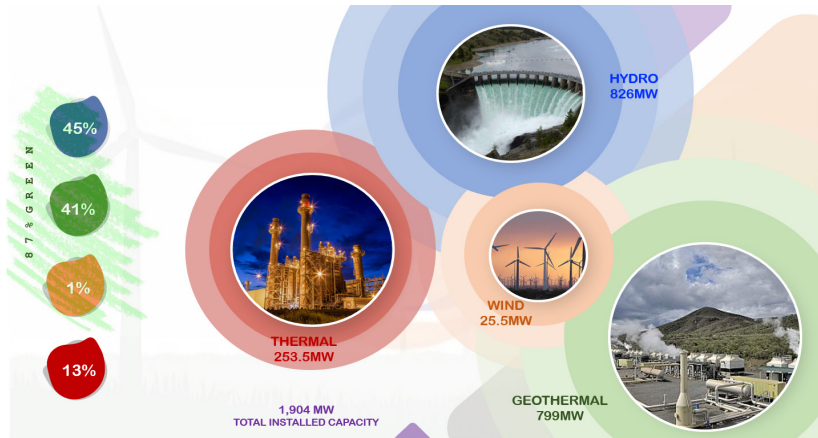
KenGen's core strategy revolves around delivering accessible clean energy while driving value for shareholders through the expansion of energy installed capacity and diversification of revenue streams. The company's dynamic generation capacity is mainly drawn from renewable energy sources namely: Hydro (825.7MW), Geothermal (799MW), Thermal (253.5MW), and Wind (26MW). KenGen's reach spans five official operational regions in Kenya: Geothermal Region, Western Region, Kipevu, Eastern Region, and Central office in Nairobi which covers the head office and Ngong wind farm.

Of all its regions, the Geothermal is the most active located in the Rift Valley and is host to several KenGen geothermal power plants and wellhead units that serve as steadfast baseload energy sources in Kenya. The Western region, which boasts 249.4MW in installed capacity, has four hydro stations and a thermal power plant (Turkwel, Sondu Miriu, Sang'oro, Gogo, and Muhoroni) which contribute significantly to stabilising the grid in western Kenya. Kipevu, housing two thermal plants in Mombasa County, delivers 193.5MW. The Eastern Region features five large power plants along the Tana River: Masinga, Kamburu, Gitaru, Kindaruma, and Kiambere, collectively providing 600.4MW. Also under Eastern Region is the Upper Tana which features Mesco, Wanjii, Sagana, and Tana power plants, boasting an installed capacity of 35.03MW. The Ngong wind plants, situated in the Central Office region, offer 26MW in capacity. Hydro retains its position as KenGen's leading energy source at 45%, with 825.69MW in installed capacity. Geothermal follows closely with 799MW, including 83.6MW harnessed from innovative wellheads technology, constituting 42% of the installed capacity.

Sample generation facilities are shown below.



# KenGen's Generation Portfolio



Turkwel Hydropower Arc Dam



Ngong Wind Farm



Olkaria I AU IV, V & VI



Olkaria II



Olkaria V



Wellhead Unit

## KenGen Green Energy Park

### Background

Aligned with Kenya's Kwanza Bottom-Up Economic Transformation Agenda, the Government of Kenya has initiated a turnaround strategy in the manufacturing sector, focusing on a value chain approach to enhance business competitiveness. The country's manufacturing sector is predominantly agriculture-based, with food processing and beverage manufacturing contributing 40% and 48% of GDP respectively. Embracing the Bottom-Up approach, the Kenyan Government aims for a transformative impact on the manufacturing sector, benefitting both the industry and the nation. In line with this, KenGen envisions establishing the KenGen Green Energy Park at the Olkaria geothermal hub in Naivasha. This will be a premier industrial park offering ample land and cost-effective power and steam sales for industries to thrive.

Leveraging its geothermal resources at Olkaria, KenGen plans to create the Energy Park, utilizing approximately 342 hectares (845 acres) for industrial development. The comprehensive masterplan encompasses industrial and non-industrial functions, including Offices, Data Centres, Research & Development Centres, Hospitality, Visitor Experience Centres, and Administrative and Commercial spaces. The industrial sector focuses on Medium/Heavy Industries, Steam Intensive Industries, and Light Industries, harmonizing with the master plan.

A thorough feasibility study has been conducted, identifying two potential business models for the proposed development. The Master Developer model envisions KenGen as the sole developer of the Energy Park, while the Sub-Developer model anticipates KenGen leasing parcels of land to sub-developers. These sub-developers would then focus on specific components of the Green Energy Park and subsequently sub-lease the serviced Industrial Land. This presents an opportunity for land lease to sub-developers interested in leveraging geothermal steam, brine, raw water, and electricity for their operations within the master-planned parcel.

Kenya Electricity Generating Company PLC invites expressions of interest from both sub-developers and individual manufacturing/processing firms to lease land for operations at the proposed KenGen Green Energy Park in Olkaria, Naivasha.

## **Why KenGen Green Energy Park**

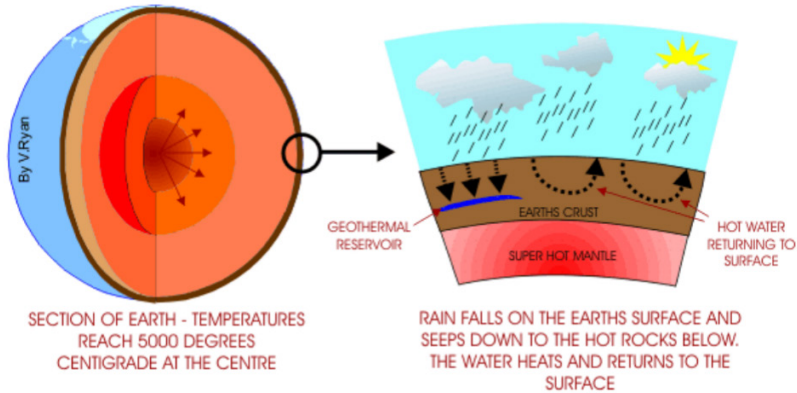
KenGen has finalized plans to establish an Energy Park within its geothermal power generation hub in Olkaria, Naivasha, Kenya. By capitalizing on its geothermal resources at Olkaria, KenGen aims to establish this Energy Park. The development is scheduled in four phases spanning from 2025 to 2045, offering industrial, commercial, and recreational facilities. Quality and reliable utilities will be provided, managed either by the developer or sub-developers.

Situated in Olkaria, Naivasha sub-county, 130 kilometers from Nairobi, the KenGen Green Energy Park will have convenient access via both railway and road connections to major seaports and airports. The park's investment opportunities will include Medium and Heavy Industries (fertilizers, iron and steel, plastics and packaging, fabricated metal products), Steam Intensive Industries (pulp and paper, wood and wood products, textiles and apparel, food and beverages, leather industries), as well as Light Industries (warehousing and logistics, supporting light industries).

## DIRECT GEOTHERMAL USE

### Geothermal Energy Resource

What is Geothermal?



### Geothermal Direct Use Applications

KenGen is actively exploring avenues to optimize geothermal resources, aligning with global geothermal leaders. Leveraging the availability of geothermal brine, the company is advancing direct utilization of geothermal resources.

#### *The Olkaria Geothermal Spa*

The Olkaria Geothermal Spa represents the first direct use of Olkaria's geothermal energy. Nestled in Hell's Gate National Park, this spa attracts local and international tourists with its captivating scenery, including towering cliffs, gorges, rock towers, volcanoes, and geothermal steam plumes. The spa's inviting ambiance, sparkling blue waters, and therapeutic benefits make it a sought-after destination for skin treatments, improved circulation, pain relief, and enhanced sleep quality.





*Olkaria Geothermal Spa*

## ***Flower Farming***

KenGen currently supplies steam to Oserian Development Company, a flower-farming enterprise near the Olkaria Geothermal Field. Oserian uses brine to heat fresh water through heat exchangers. The heated water is circulated in greenhouses for temperature regulation and soil fumigation. This approach significantly reduces operating costs and environmental impacts related to conventional pesticides.



*Pipes carrying geothermal brine in Oserian Flower Farm Greenhouse*

## Direct Use Frontier

### *Steam Utilization in KenGen's Energy Park*

With the goal of lowering operational costs and fostering sustainable industrial growth, KenGen has established an Energy Park in its Olkaria geothermal hub. By utilizing Olkaria's geothermal resources, the Energy Park aims to supply steam to steam-intensive industries. The proximity to drilled wells promises substantial operational cost reductions for industries within the park.

### *Mineral Harvesting from Brine*

All KenGen's geothermal plants are single-flash condensing types, yielding brine-containing mineral elements like silica with potential commercial applications. A study is underway to extract silica from brine, which could provide on-site input material for industries in the Energy Park, fostering industrial development.

## POWER GENERATION SERVICES

### Alternative Power Markets

#### Captive Power Market

An increasing number of small and medium-scale industries are expressing interest in generating power for their own consumption. These companies aim to capitalize on decreasing global technology costs, particularly in renewable sources such as solar, biogas/biomass, and wind. These technologies can be harnessed "backyard" style for personal use. This trend is driven by volatile central grid power costs, supply unreliability, and the commitment to reduce greenhouse gas emissions by minimizing reliance on conventional fuel-based thermal sources. KenGen provides technical support and investment options for captive power through various models:

**Labour based contracts:** Clients provide land and material requirements, while KenGen employs its expertise for project implementation. These contracts may also encompass Operation & Maintenance agreements.

**EPC Contracts:** Clients offer land or rooftop space, engaging in Energy Supply Agreements (ESAs) with KenGen to construct the plant and supply energy over an agreed time frame at predetermined rates.

**O&M Contracts:** When clients already possess existing plants, KenGen can enter Operation & Maintenance service contracts for specified periods.

## **Power Supply to KenGen's Energy Park (100% Green Power)**

Direct supply from KenGen's independent grid system ensures that the Energy Park exclusively receives competitively-priced green energy (geothermal). The master plan for KenGen's Energy Park accommodates both industrial and non-industrial activities, including Offices, Data Centres, Research & Development centres, Hospitality, Visitor Experience Centre, and Administrative & Commercial uses.

## **Direct Power Sales to Other Parties**

The Energy Act 2019, under Open Access provisions, presents an opportunity for KenGen to directly sell power to eligible consumers, transmitting the power through existing grid networks upon payment of network charges. KenGen's distributed generation facilities, largely from renewable sources, offer competitive pricing in comparison to other Independent Power Producers (IPPs).

## **Technical Support and Partnerships**

KenGen boasts extensive expertise across the energy value chain, focusing on energy generation, planning, operation, and maintenance, as well as areas like Instrumentation and Calibration.

## **Partnership with County Governments**

KenGen, as a leading energy sector player, collaborates with county governments to offer services such as energy master plan development, energy resource mapping and planning, design and construction of energy infrastructure, energy audits and management, and technical support in accordance with the Energy Act 2019.

## **Instrumentation and Calibration Centre**

KenGen operates a state-of-the-art calibration center catering to KenGen and external customers. Located at Tana Power Station, the center provides expert services including on-site calibration of volumetric flow meters.



**Flow:** On-site Calibration of volumetric flow meters. Applicable to flowmeters used to measure river water, sea water, clean liquids or oils that have less than 3% by volume of particulate content.



**Torque:** Calibration of Torque Wrenches with range of 4In Lb to 600 Ft Lb



**Temperature:** Sensors, transmitters, indicators, RTDs, thermocouples, recorders, controllers, thermometers, process calibrators, PRTs, thermistors.



**Pressure:** Calibration of Pressure Gauges, calibrators, transducers, transmitters, indicators, switches, valves, controllers, manometers, chart recorders.



**Electronic:** Calibration of Multimeters, Alternating and Direct Current and voltage signal sources(up to 22A, 1000V), clamp meters, data loggers, ohmmeters, decade boxes, RCL(Resistance, Capacitance and Inductance) meters, conductance meters, inductance meters, continuity testers



**Electrical Test and Frequency:** RCD testers, loop testers, earth ground testers, Insulation Resistance meters (“Meggers”), multifunction installation testers, oscilloscopes, frequency meters, frequency counters, timer counters, power quality analyzers.

## **Civil Engineering Materials Testing Laboratory (Olkaria)**

This laboratory ensures material quality for ongoing and future projects. KenGen's involvement in quality control activities and reduced project costs are key goals. The lab provides testing services for soils, gravels, aggregates, concrete, and more, enhancing project efficiency and cost-effectiveness.

## **CONSULTANCY SERVICES**

### *The African Geothermal Giant*



### **Geothermal Drilling**

KenGen's cutting-edge drilling solutions provide access to hidden Earth resources. With a focus on geothermal exploration, from surface exploration to well-siting and design methodologies, KenGen's experienced team offers unmatched drilling expertise.

### **Geoscientific Excellence**

KenGen's geoscientific studies span the globe, from Djibouti's geothermal prospects to mineralogical studies in Rwanda. Expert geoscientists uncover hidden resources, assessing the feasibility of geothermal potential while maintaining environmental responsibility.

## Key Differentiator

KenGen's vertically integrated approach, coupling geoscientific studies with a dedicated drilling section and advanced equipment, streamlines the exploration-to-power generation process, delivering efficient and sustainable energy solutions.

Lead the way with KenGen and embrace Earth's renewable energy potential for a greener, sustainable future.



*Olkaria Discharging Wells*

## Reservoir Engineering

Unveil the hidden potential beneath the Earth's surface with KenGen's Reservoir Engineering expertise. Our groundbreaking offering ensures optimal geothermal energy extraction and reservoir management. Backed by decades of experience and an unwavering commitment to excellence, our skilled reservoir engineers are instrumental in driving successful geothermal projects worldwide.

Our services cover a range of activities, from reservoir assessment and well testing to re-injection scheme design and simulation studies. With our comprehensive approach, we ensure efficient and sustainable energy production.

## Innovative Reservoir Management

Leveraging cutting-edge techniques and simulation models, our reservoir engineers are dedicated to predicting field life and enhancing re-injection effects. Through innovation and continuous improvement, we aim to maximize the potential of your geothermal resources, leading to a brighter, greener future.

## Operations & Maintenance

As geothermal industry leaders, we have redefined power plant management through decades of expertise and innovative practices. Our skilled team of engineers and technicians is at the forefront of advanced technologies, ensuring seamless plant operation, maintenance, and optimization. Our commitment to sustainability is integral to our operations.

With an ISO-certified Environmental Management System, we prioritize eco-friendly practices, minimizing our carbon footprint and positively impacting the communities we serve. At KenGen, responsible geothermal energy harnessing is our mission, leaving a lasting positive impact on our environment and society.





## **Training and Capacity Building**

Our training sessions provide a balanced blend of theoretical knowledge and hands-on practical experience, fostering holistic learning.

Whether you're a local organization aiming to enhance local expertise or an international entity eager to tap into the rich geothermal potential, KenGen's training services cultivate a skilled workforce that drives success.

## **Array of offerings**

Empower your workforce with KenGen's world-class training services, meticulously crafted for both local and international clients. Our deep-rooted commitment to knowledge-sharing and capacity-building ensures that we nurture talent and equip professionals with the skills required to excel in the dynamic geothermal energy sector.

## **Other Supporting Services**

In addition to our core offerings, KenGen extends a range of supporting services, including Geomatics consultancy, Laboratory testing services, and Geophysical surveys.

## **Center of Excellence**

Through KenGen's Center of Excellence, empower your workforce with top-tier training services tailored to both local and international contexts. Our steadfast dedication to knowledge-sharing and capacity-building underscores our commitment to fostering talent and equipping professionals for success in the geothermal energy sector.







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